PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/504,156

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	190		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	245		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	125		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	34 minus 20 =	* 14	x 30 =	420	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	7 minus 3 =	* 4	x 125 =	500			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1480		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/504,156	07/10/2012	Willem Hendrik Lindhout	05032-00255

CONFIRMATION NO. 6337

PUBLICATION NOTICE

22910
BANNER & WITCOFF, LTD.
28 STATE STREET
SUITE 1800
BOSTON, MA 02109-1701

OC000000057515645

Title: Hybrid Seed Potato Breeding

Publication No.US-2012-0284852-A1
Publication Date:11/08/2012

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Agventure B.V. Ex. 2009
IPR2025-00136
Page 414

PTO/SB/81 (01-09)(P87313US10)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	13/504,156 Conf #6337
Filing Date	July 10, 2012
First Named Inventor	W. LINDHOUT
Title	HYBRID SEED POTATO BREEDING
Art Unit	Not Yet Known
Examiner Name	Not Yet Known
Attorney Docket No.	091876-0014

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

23630

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number	Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number:

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country		Telephone		Email	

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature	H. Lindhout	Date	12/12/12
Name	H. LINDHOUT	Telephone	+31 622 416 771
Title and Company	Agventure BV managing director		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of 1 forms are submitted.

DM_US 39881907-1.091876.0014

PTO/SB/96 (07-09) (P87313US10)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Willem Hendrick LINDHOUT, et al.

Application No./Patent No.: 13/504,156 Filed/Issue Date: July 10, 2012

Titled: HYBRID SEED POTATO BREEDING

Agventure B.V. (Name of Assignee), a Corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [x] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] an assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above by virtue of either:

A. [x] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 028529, Frame 0059, or for which a copy thereof is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
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Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[x] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature — 12/12/12 Date

H. KRUYT — managing director

Printed or Typed Name — Title

DM_US 39881631-1.091876.0014

Electronic Acknowledgement Receipt

EFS ID:	14686086
Application Number:	13504156
International Application Number:	
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	22910
Filer:	Robert H. Underwood/donna davis
Filer Authorized By:	Robert H. Underwood
Attorney Docket Number:	05032-00255
Receipt Date:	14-JAN-2013
Filing Date:	10-JUL-2012
Time Stamp:	09:57:36
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		091876_0014_POA_Statement_Under_373b.pdf	83506 d1f1f61a9f390a3f2104aab623c38274b9c6865d	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73.	2	2

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Information:

Total Files Size (in bytes):	83506

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: January 16, 2013 Signature: _____ (Donna R. Davis)

Docket No.: 091876-0014 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem H. LINDHOUT et al.	Customer Number: 23630
Application No.: 13/504,156	Confirmation No.: 6337
Filed: July 10, 2012	Art Unit: 1638
For: HYBRID SEED POTATO BREEDING	Examiner: Not Yet Assigned

REQUEST FOR CORRECTED FILING RECEIPT

OFFICE OF INITIAL PATENT EXAMINATION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby requests that a *corrected* Filing Receipt be issued in the above-referenced patent application.

Under "Domestic Priority data as claimed by applicant," the priority data should be identified as indicated below. A copy of the Filing Receipt with an Appendix showing the changes noted thereon is attached.

Domestic Priority Data as Claimed by Applicant:

This application is a 371 of PCT/NL2010/050716 10/26/2010
Which claims the benefit of 61/254,980 10/26/2009.

Also attached is a copy of the Application Data Sheet that was filed with the application on April 4, 2012, which includes the claim to the benefit of U.S. 61/254,980, and a copy of the Acknowledgement Receipt of the ADS.

No fee is deemed necessary in connection with the filing of this communication. However, if any fee is required, authorization is hereby given to charge any fees to Deposit Account No. 50-1133.

Please contact the undersigned with any questions or concerns regarding this matter.

Dated: January 16, 2013

Respectfully submitted,
MCDERMOTT WILL & EMERY LLP

By: Robert H. Underwood
Robert H. Underwood
Reg. No. 45,170

McDermott Will & Emery LLP
28 State Street
Boston, MA 02109
Tel: (617) 535-4093
Fax: (617) 535-3800
RHU/drd

DM_US 40652279-1.091876.0014

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY DOCKET NO	TOT CLAIMS	IND CLAIMS
13/504,156	07/10/2012		1545	05032-00255	34	7

CONFIRMATION NO. 6337

22910
BANNER & WITCOFF, LTD.
28 STATE STREET
SUITE 1800
BOSTON, MA 02109-1701

FILING RECEIPT

OC000000055690526

Date Mailed: 08/01/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Willem Hendrik Lindhout, Wageningen, NETHERLANDS;
Teunis Philippus Schotte, Hazerswoude-Dorp, NETHERLANDS;
Richard Gerardus Franciscus Visser, Bennekom, NETHERLANDS;
Herman Johannes van Eck, Wageningen, NETHERLANDS;
Ronaldus Cornelis Bernardus Hutten, Rhenen, NETHERLANDS;

Assignment For Published Patent Application

AGVENTURE B.V., Diepenveen, NL

Power of Attorney: The patent practitioners associated with Customer Number 22910

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/NL10/50716 10/26/2010 SEE THE ATTACHED APPENDIX

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
EUROPEAN PATENT OFFICE (EPO) 09013474.3 10/26/2009

If Required, Foreign Filing License Granted: 07/31/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/504,156**

Projected Publication Date: 11/08/2012

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **

Title

Hybrid Seed Potato Breeding

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier

license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

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APPENDIX TO THE COPY OF THE OFFICIAL FILING RECEIPT

U.S. PATENT APPLICATION SERIAL NO. 13/504,156, Filed July 10, 2012

Domestic Priority Data as Claimed by Applicant:

This application is a 371 of PCT/NL2010/050716 10/26/2010

Which claims the benefit of 61/254,980 10/26/2009.

Electronic Acknowledgement Receipt

COPY

EFS ID:	12633708
Application Number:	13504156
International Application Number:	PCT/NL10/50716
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	22910
Filer:	John P. Iwanicki/Graci Smith
Filer Authorized By:	John P. Iwanicki
Attorney Docket Number:	05032-00255
Receipt Date:	26-APR-2012
Filing Date:	
Time Stamp:	10:46:37
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1480
RAM confirmation Number	12501
Deposit Account	190733
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	Transmittal.pdf	246642 5f3130d7287d16a2207faba6edd0cf2f1ba7893d	no	4
Warnings:					
Information:					
2	Application Data Sheet	ADS.pdf	1421225 fc7675849fdb4e47b2f74b45d9747e5979e90396	no	6
Warnings:					
Information:					
3		PreliminaryAmendment.pdf	85421 992f4039a7d1b0ac7e188288993636881d99bbd19d	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	2
Claims	3	8
Applicant Arguments/Remarks Made in an Amendment	9	9

Warnings:					
Information:					
4	Documents submitted with 371 Applications	ISR.pdf	7577758 d4435865faa54157ab03648e4336103029dad0a7	no	9
Warnings:					
Information:					
5	Documents submitted with 371 Applications	IPRP.pdf	1267181 aaa707ac691f795bec26d04c180012b80064a446	no	10
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	38052 e1762a5867f592ccce3d73cc6087de0866afe0a6	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	10636279

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

COPY

PTO/SB/14 (11-08)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	05032-00255
	Application Number	
Title of Invention	Hybrid Seed Potato Breeding	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Willem	Hendrik	Lindhout	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Wageningen	Country Of Residence i	NL
Citizenship under 37 CFR 1.41(b) i	NL		

Mailing Address of Applicant:

Address 1	Delhorstpad 1A		
Address 2			
City	Wageningen	State/Province	
Postal Code	6703 BE	Country i	NL

Applicant 2

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Teunis	Philippus	Schotte	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Hazerswoude-Dorp	Country Of Residence i	NL
Citizenship under 37 CFR 1.41(b) i	NL		

Mailing Address of Applicant:

Address 1	Westzijdeweg 33A		
Address 2			
City	Hazerswoude-Dorp	State/Province	
Postal Code	2391 JE	Country i	NL

Applicant 3

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard	Gerardus Franciscus	Visser	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Bennekom	Country Of Residence i	NL

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	05032-00255
	Application Number	
Title of Invention	Hybrid Seed Potato Breeding	

Citizenship under 37 CFR 1.41(b)	NL			
Mailing Address of Applicant:				
Address 1	Emmalaan 17			
Address 2				
City	Bennekom	**State/Province**		
Postal Code	6721 ET	**Country**	NL	

Applicant 4

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Herman	Johannes	van Eck	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Wageningen	**Country Of Residence**	NL
Citizenship under 37 CFR 1.41(b)	NL		

Mailing Address of Applicant:

Address 1	Eykmanstraat 9			
Address 2				
City	Wageningen	**State/Province**		
Postal Code	6706 JT	**Country**	NL	

Applicant 5

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ronaldus	Cornelis Bernardus	Hutten	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Rhenen	**Country Of Residence**	NL
Citizenship under 37 CFR 1.41(b)	NL		

Mailing Address of Applicant:

Address 1	De Thijmenstoren 12			
Address 2				
City	Rhenen	**State/Province**		
Postal Code	3912 AT	**Country**	NL	

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	22910

Agventure B.V. Ex. 2009
IPR2025-00136
Page 429

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	05032-00255
	Application Number	
Title of Invention	Hybrid Seed Potato Breeding	

Email Address	jiwanicki@bannerwitcoff.com	Add Email	Remove Email

Application Information:

Title of the Invention	Hybrid Seed Potato Breeding		
Attorney Docket Number	05032-00255	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	11	**Suggested Figure for Publication (if any)**	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	22910		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/NL2010/050716	2010-10-26
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/NL2010/050716	non provisional of	61/254980	2009-10-26

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	05032-00255
	Application Number	
Title of Invention	Hybrid Seed Potato Breeding	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country[i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
09013474.3	EP	2009-10-26	(•) Yes ( ) No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

If the Assignee is an Organization check here. ☒

Organization Name	Agventure B.V.		
Mailing Address Information:			
Address 1	Burg. Arriensweg 32		
Address 2			
City	Diepenveen	**State/Province**	
Country[i]	NL	Postal Code	7431 BM
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button.

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/John P. Iwanicki/			Date (YYYY-MM-DD)	2012-04-26
First Name	John P.	Last Name	Iwanicki	Registration Number	34628

PTO/SB/14 (11-08)
oved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	05032-00255
	Application Number	
Title of Invention	Hybrid Seed Potato Breeding	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Acknowledgement Receipt

EFS ID:	14712349
Application Number:	13504156
International Application Number:	
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	22910
Filer:	Robert H. Underwood/donna davis
Filer Authorized By:	Robert H. Underwood
Attorney Docket Number:	05032-00255
Receipt Date:	16-JAN-2013
Filing Date:	10-JUL-2012
Time Stamp:	12:35:05
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	091876_0014_Req_for_Corrected_FilRec.pdf	395999 ba6b96bfd79bcf279884d381dda27dc8aa1ce9b1	no	14

Warnings:

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing	
Information:	
Total Files Size (in bytes):	395999

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/504,156	07/10/2012	Willem Hendrik Lindhout	05032-00255

CONFIRMATION NO. 6337

POA ACCEPTANCE LETTER

22910
BANNER & WITCOFF, LTD.
28 STATE STREET
SUITE 1800
BOSTON, MA 02109-1701

OC000000058700950

Date Mailed: 01/17/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/10/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/mnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/504,156	07/10/2012	1661	1545	05032-00255	34	7

CONFIRMATION NO. 6337

CORRECTED FILING RECEIPT

22910
BANNER & WITCOFF, LTD.
28 STATE STREET
SUITE 1800
BOSTON, MA 02109-1701



Date Mailed: 01/17/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Willem Hendrik Lindhout, Wageningen, NETHERLANDS;
Teunis Philippus Schotte, Hazerswoude-Dorp, NETHERLANDS;
Richard Gerardus Franciscus Visser, Bennekom, NETHERLANDS;
Herman Johannes van Eck, Wageningen, NETHERLANDS;
Ronaldus Cornelis Bernardus Hutten, Rhenen, NETHERLANDS;

Applicant(s)

Willem Hendrik Lindhout, Wageningen, NETHERLANDS;
Teunis Philippus Schotte, Hazerswoude-Dorp, NETHERLANDS;
Richard Gerardus Franciscus Visser, Bennekom, NETHERLANDS;
Herman Johannes van Eck, Wageningen, NETHERLANDS;
Ronaldus Cornelis Bernardus Hutten, Rhenen, NETHERLANDS;

Assignment For Published Patent Application

AGVENTURE B.V., Diepenveen, NL

Power of Attorney: The patent practitioners associated with Customer Number 22910

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/NL10/50716 10/26/2010
which claims benefit of 61/254,980 10/26/2009

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
EUROPEAN PATENT OFFICE (EPO) 09013474.3 10/26/2009

If Required, Foreign Filing License Granted: 07/31/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/504,156**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

Hybrid Seed Potato Breeding

Preliminary Class

800

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

Agventure B.V. Ex. 2009
IPR2025-00136
Page 437

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/504,156	07/10/2012	Willem Hendrik Lindhout	091876-0014

CONFIRMATION NO. 6337

POA ACCEPTANCE LETTER

23630
McDermott Will & Emery
The McDermott Building
500 North Capitol Street, N.W.
Washington, DC 20001

OC000000058760163

Date Mailed: 01/24/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/14/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/mnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/504,156	07/10/2012	Willem Hendrik Lindhout	05032-00255

CONFIRMATION NO. 6337

POWER OF ATTORNEY NOTICE

22910
BANNER & WITCOFF, LTD.
28 STATE STREET
SUITE 1800
BOSTON, MA 02109-1701

OC000000058760134

Date Mailed: 01/24/2013

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/14/2013.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/mnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/504,156	07/10/2012	Willem Hendrik Lindhout	091876-0014	6337

23630 7590 10/14/2014

McDermott Will & Emery
The McDermott Building
500 North Capitol Street, N.W.
Washington, DC 20001

EXAMINER	
BOGGS, RUSSELL T	

ART UNIT	PAPER NUMBER
1663	

NOTIFICATION DATE	DELIVERY MODE
10/14/2014	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

Office Action Summary	Application No. 13/504,156	Applicant(s) LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1638	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2012*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-34* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-34* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☒ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *26 April 2012* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Agventure B.V. Ex. 2009
IPR2025-00136

DETAILED ACTION

The present application is being examined under the pre-AIA first-to-invent provisions.

Claim Status

1. Claims 1-21 are pending and examined on the merits in the present office action.

Copending Applications

2. Applicants must bring to the attention of the Examiner, or other Office official involved with the examination of a particular application, information within their knowledge as to other copending United States applications, which are "material to patentability" of the application in question. MPEP 2001.06(b). *See* Dayco Products Inc. v. Total Containment Inc., 66 USPQ2d 1801 (Fed. Cir. 2003).

Drawings

3. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the dark boxes in Figures 4 and 5 are not legible. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities.

The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01. See page 9 (two), page 50, page 51 (four) and page 52.

The disclosure is objected to because it refers to "Appendix III" on p. 52, l. 20. No such appendix exists.

Appropriate correction is requested.

Sequence Rules

5. This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821 (a)(l) and (a)(2). However, this application fails to comply with the requirements of 37 CFR 1.821 through 1.825.

Sequence identifiers are missing from pages 54-55.

Full compliance with the sequence rules is required in response to this Office action. Applicant can either give each sequence present within the tables a unique identifier number, or specify them as a range with respect to an already identified sequence. A complete response to this Office action must include both compliance with the sequence rules and a response to the issues set forth herein. Failure to fully comply

with both of these requirements in the time period set forth in this Office action will be held to be non-responsive.

Claim Objections

6. Claims 3, 8-10, 16, 18-19, and 33-34 are objected to because of the following informalities.

Claim 19 is objected to because there is an extraneous hyphen at the end of line 2, i.e., "*Sli*-gene" should read "*Sli* gene."

Claims 3, 10 and 18 are objected to because the limitation "cold sweetening" should be hyphenated. See the last line of each claim.

Claims 8, 16 and 33-34 are objected to because of the recitation of "an offspring generation in the form of" in claim 8(c), l. 2; claim 16(c), l. 3; claim 33(c), l. 3; and claim 34(c), l. 3. Part (c) of the aforementioned claims appears to relate to providing hybrid offspring seed and it is not clear how the above limitation modifies the hybrid offspring seed.

Claim 9 is objected to because of the recitation of "a-e." Reciting "(a)-(e)" would improve the clarity of the claim.

Claim 18 is objected to because of the use "being" in line 2. Examiner suggests replacing "being" with "that is" or returning the Markush group terminology that was present in the claim before amendment: "selected from the group consisting of" and "and."

Appropriate correction is requested.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

> (B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 2-3, 9, 11 and 14-34 are rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the Applicant, regards as the invention.

Claims 11, 19 and 21 and claims dependent thereon are indefinite in their recitation of "NCIMB 41663," "NCIMB 41664," "NCIMB 41665," "NCIMB 41765," “AGVD1," “AGVD2," “AGVD3" and “AGVD15" since the names do not clearly identify the claimed potato varieties and seed. The sole designation of a potato plant in this claim as one of the above-listed terms is arbitrary and creates ambiguity in the claims. Such a plant may be known by other names or abbreviations, or the meaning of the nomenclature could evolve in the art during the lifetime of the patent. If these events, or others, occur, the public's ability to determine the metes and bounds of the claim would be impaired. (See In re Hammack, 427 F .2d 1378, 1382; 166 USPQ 204,208 (CCPA 1970)). Thus the claim does not set forth the metes and bounds of the claimed invention. Overcoming the deposit rejection (*infra*) would overcome this rejection.

Claims 2, 9 and 20 are rejected as indefinite because each recites the limitation “agronomically desirable traits" in the last line. One of skill in the art could think of several "agronomically desirable traits,” but not necessarily all, such traits. One of skill in the art would be uncertain as to the boundary between "desirable" traits and non-“desirable” traits. Reference to the specification on page 8 fails to clarify the scope of the claim limitation. Applicant lists several agronomically desirable traits, but concludes the definition on page 8 by declaring that such traits can include “other agronomically beneficial” traits. Id., Therefore the meaning of the “agronomically desirable traits” is indefinite and thus the metes and bounds of the claim cannot be determined.

Claims 15-16, 29, 32 and 34 are rejected as indefinite because each recites the limitation “determinable" in the following locations: claim 15, l. 3; claim 16(b), l. 3; claim 29, l. 5; claim 32, l. 5; and claim 34(b), l. 4. It is indefinite how to measure a future and theoretical characteristic of the hybrid potato seed and thus the metes and bounds of the claim cannot be determined. Amending this word to “determined” would obviate this rejection.

Claims 14-15 and 33-34 are rejected as indefinite because each recites the limitation “obtainable" – claim 14, line 2; claim 15, line 1; and claims 33-34, line 3 each. It is indefinite how to determine a future and theoretical capability of the method and thus the metes and bounds of the claim cannot be determined. Amending this word to “obtained” would obviate this rejection.

Claim 32 is rejected because it recites the limitation intercrossable in line 1. It is uncertain how to measure a future and theoretical characteristic of the set of at least 2

potato lines. The term is in the preamble, but for the claim the preamble appears to be a required limitation regarding the scope and patentability of the claim. Additionally, since the claim reads on more than 2 potato lines, it is indefinite if all said potato lines must be mutually intercrossable.

Claim 20 recites the limitation "said line" in line 3. This term is indefinite in its antecedent basis because the antecedent basis of this limitation is both the second potato line of claim 20 and the first line of claim 16.

Claim 33 is rejected because it ends with the phrase “as defined in (e)” but “self-compatibility and vigour” are not defined in part (e). Claim 33 is further rejected because it is indefinite whether the phrase “as defined in (e)” applies to both "self-compatibility" and "vigour" or just “vigour.”

Claim 29 recites the limitation "the resultant hybrid potato seed" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 33(e) recites the limitation "the offspring plants" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Dependent claims are included in this rejection because none provide limitations obviating this rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and

use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-10, 12-20, 22-34 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are broadly drawn to a diploid, fertile, self-compatible and essentially homozygous potato line, or a seed thereof, comprising plants that have an average tuber yield of at least 200 g/plant. Independent method claims are drawn to a method to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g., crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland.

Applicant describes a breeding process according to the instant invention starting with AGVD1-3 or AGVD17 on page 37. Applicant describes obtaining the deposited lines, AGBD1 (NCIMB 41663), AGBD2 (NCIMB 41664), AGBD3 (NCIMB 41665) and AGBD17 (NCIMB 41765). Specification, pp. 33-34. Applicant generally describes adding an agronomically desirable trait on page 38. Applicant describes creating the aforementioned lines in Example 1 on pages 44-45. Applicant describes creating an line containing the *Sli* gene with enhanced agricultural quality in Example 2, pp. 46-50.

Applicant describes creating a molecular marker platform, i.e., SNPs, in Example 3, pp. 50-58. In Example 4, Applicant describes the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. Id., pp. 58-62.

Applicant describes the meaning of the claim term "essentially homozygous" on pages 30-31 of the instant specification and suggests that the term reflects a level of homozygosity that is above 25% or 75%. Specification, p. 37.

To claim a genus under the written description requirement, Applicant is required to describe a representative number of species to reflect the variation within the genus or structures sufficient to define the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof.

Here, in the instant application, Applicant describes only four potato lines to use in the claimed methods. Applicant fails to describe working examples of the broad genus of other potato lines falling within the scope of the claims. In contrast to the limited description, Applicant claims a large genus. Applicant fails to describe a representative number of species in comparison to this genus.

Since the specification fails to provide an adequate written description to support the breadth of the claims, Applicant has not demonstrated possession to one of skill in the art of the instant invention as broadly as claimed at the time of filing.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

9. Claims 11, 19 and 21 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The invention appears to employ novel plants. Since the plant is essential to the claimed invention it must be obtainable by a repeatable method set forth in the specification or otherwise be readily available to the public. If the plant is not so obtainable or available, the requirements of 35 USC § 112 may be satisfied by a deposit of the seeds. A deposit of 2500 seeds of each of the claimed embodiments is considered sufficient to ensure public availability.

The specification does not disclose a repeatable process to obtain the plant and thus it is not apparent if the plant is readily available to the public.

(a) If a deposit is made under the terms of the Budapest Treaty, then a statement, affidavit or declaration by Applicant, or a statement by an attorney of record over his or her signature and registration number, or someone empowered to make such a statement, stating that the instant invention will be irrevocably and without restriction released to the public upon the issuance of a patent, would satisfy the deposit

requirement made herein.

(b) If a deposit has not been made under the Budapest Treaty, then in order to certify that the deposit meets the criteria set forth in 37 CFR 1.801-1.809 and MPEP 2402-2411.05, Applicant may provide assurance of compliance by statement, affidavit or declaration, or by someone empowered to make the same, or by a statement by an attorney of record over his or her signature and registration number showing that:

(i) during the pendency of this application, access to the invention will be afforded to the Commissioner upon request;

(ii) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent in accordance with 37 CFR § 1.808(a)(2);

(iii) the deposit will be maintained in a public depository for a period of 30 years or 5 years after the last request or for the effective life of the patent, whichever is longer;

(iv) a test of the viability of the biological material at the time of deposit (see 37 CFR § 1.807); and,

(v) the deposit will be replaced if it should ever become inviable.

In addition, the identifying information set forth in 37 CPR 1.809(d) should be added to the specification, if not already present. See 37 CPR 1.801 - 1.809 [MPEP 2401-2411.05] for additional explanation of these requirements.

Applicant has deposited the seeds (see e.g. pp. 33-34 of the instant specification). Examiner notes that, *inter alia*, a statement, affidavit or declaration by Applicant, or a statement by an attorney of record over his or her signature and registration number, or someone empowered to make such a statement, stating that the instant invention will be irrevocably and without restriction released to the public upon the issuance of a patent is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Section 33(a) of the America Invents Act reads as follows:

> Notwithstanding any other provision of law, no patent may issue on a claim directed to or encompassing a human organism.

10. Claims 1-6 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 1 reads on a wild-type potato line with an average tuber yield of at least 200 g per plant. Claim 3 recites a limitation requiring, e.g., pest resistance. Pest resistance is a well-known property of wild-type potato plants. See, e.g., Watanabe et al. (Breed Sci 46:329-36 (1996)).

Therefore claims 1-6 are directed towards a product of nature.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 5-6, 8, 12, 14 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Maris (Euphytica 46:15-33 (1990)).

Maris discloses breeding potatoes from diploid and tetraploid parents and thus discloses a diploid, fertile, self-compatible and essentially homozygous potato line. Maris, p. 15. Applicant fails to define "essentially homozygous" in a way to distinguish the plants of Maris, and further the Office does not have the facilities and resources to provide the factual evidence needed in order to establish that the product of the prior art does not possess the same, material, structural and functional characteristics of the claimed product. In the absence of evidence to the contrary, the burden is on the Applicant to provide that the claimed product is different from those taught by the prior art and to establish patentable differences (see In re Best, 562F.2d 1252 USPQ 430 (CCPA 1977) and Ex parte Gray, 10 USPQ 2d 1922 (PTO Bd. Pat. App. & Int. 1989)).

Maris discloses plants that have an average tuber yield of at least 200 g/plant. See, e.g., Maris, Table 8, pp. 26-28. Thus Maris anticipates claim 1.

Maris also discloses a plant and a seed of such a potato line (see, e.g., Id., pp. 16-17), and thus anticipates claims 5 and 6.

On pages 16 & 17, Maris also discloses all the steps of the method of claims 8 and 12, and thus anticipates claims 8 and 12. The potato lines of Maris are also

obtainable by the steps of claim 8, and thus claim 14 is anticipated. Parents listed on Table 8, pp. 26-28, have tuber yields of over 200 g per plant and thus claim 17 is anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-3, 5-6, 8-10, 12, 14 and 17 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)).

As noted in the rejection under 35 USC § 102(b), Maris teaches the results of a breeding experiment with potatoes. Maris teaches breeding potatoes from diploid and tetraploid parents and thus teaches a diploid, fertile, self-compatible and essentially homozygous potato line; plants of said lines comprise seeds. Maris, p. 15. Applicant fails to define "essentially homozygous" in a way to distinguish the plants of Maris, and further, as discussed *supra*, the Office does not have the facilities and resources to provide the factual evidence to determine if the plants of Maris are or are not essentially homozygous. Maris also teaches plants that have an average tuber yield of at least 200 g/plant. See, e.g., Maris, Table 8, pp. 26-28. Thus claims 1, 5 and 6 are obvious.

On pages 16 & 17, Maris also teaches all the steps of the method of claims 8 and 12. Additionally, all parents listed on Table 8, pp. 26-28 have a tuber yield of over 200 g per plant. Thus claims 8 and 12 are obvious. Further, the potato lines of Maris are also obtainable by the steps of claim 8 and thus claim 14 is obvious.

Parents listed on Maris's Table 8, pp. 26-28, have tuber yields of over 200 g per plant and thus claim 17 is obvious.

Maris does not teach potato plants having an average fresh weight of at least 500 grams as recited in claim 4. Maris, however, does teach potato plants having a dry matter yield in a range of approximately 111 g per plant to 158 g per plant. Id., Table 8, p. 28. Thus, for example, a plant with an average fresh weight which only displays a 316% increase with respect to its dry weight is obvious in view of the plants of Table 8 of Maris, and thus claim 4 is obvious.

Maris arguably does not teach adding an agronomical desirable trait *per se* to the potato lines taught, although "an agronomically desirable trait" encompasses virtually any improved trait, although claim 2 excludes tuber yield. Watanabe et al., however, teaches the value of introgressing an agronomically desirable trait, such as nematode resistance, into a diploid breeding stock. See, e.g., Watanabe et al., p. 329. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the teachings of Maris and use the lines of Maris according to the teachings of Watanabe et al. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of

success. Thus claims 2 and 3 are obvious, and the methods to produce such plants, i.e., claims 9 and 10, are also obvious.

13. Claims 1-3, 5-6, 8-10, 12-14 and 17 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)) in further view of Hermundstad & Peloquin (Potato Res 29:289-97 (1986)).

Claims 1-3, 5-6, 8-10, 12, 14 and 17 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris in view of Watanabe et al. as set forth *supra* in the rejection under 35 USC § 103(a).

Neither Maris or Watanabe et al. teach that their plants are self-incompatible. However, in view of the teachings of Hermundstad & Peloquin that most wild species of potatoes are self-incompatible, and the use of wild potato species by Watanabe et al. (Watanabe, p. 329), the use of the second potato plant of claim 13, and thus claim 13 itself, is obvious.

14. Claim 1, 5-6, 8, 12, 14, 16-17, 22-26 and 29-34 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Phumichai et al. (Genome 48:977-84 (2005).

Claims 1, 5-6, 8, 12, 14 and 17 are obvious in view of the teachings of Maris as set forth *supra* in the rejection under 35 USC § 103(a).

Maris does not teach the degree of contrasting homozygous loci as determinable by molecular marker analysis as required by claims 16 (25%), 29, 32 and 34 (20%). In view of the teachings of Phumichai et al. regarding the heterozygosity of two lines (see, e.g., page 978), two breeding lines that comprise at least 20% contrasting homozygous loci are obvious in view of the lines of Maris, and thus claims 16, 29, 32, and 34 are obvious.

Maris also discloses a plant and a seed of such as ones produced by the method of claim 16 (see, e.g., pp. 16-17), such plants have pollen or ovule and tubers, and thus claims 15, 22-26 are obvious. Maris also discloses subsequent generations which produce at least 200 g of tubers per plant, and thus claims 30-31 and 33 are obvious.

15. Claims 1, 5-6, 8, 12, 14, 16-18, 20, 22-26 and 29-34 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Phumichai et al. (Genome 48:977-84 (2005) in further view of Watanabe et al. (Breed Sci 46:329-36 (1996)).

Claims 1-3, 5-6, 8-10, 12, 14 and 17 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)) as set forth *supra* in the rejection under 35 USC § 103(a). Claims 1, 5-6, 8, 12, 14, 16-17, 22-26, 29 and 30-34 are rejected under pre-AIA 35

U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Phumichai et al. (Genome 48:977-84 (2005) as set forth *supra* in the rejection under 35 USC § 103(a).

Therefore it is obvious to add the teachings of Watanabe et al. for adding nematode resistance, as discussed *supra*, to a method such as claim 16, and thereby obtain plants. Thus claims 18 and 20 are obvious.

13. Claims 1, 5-6, 8, 12, 14, 17 and 27-28 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Wang & Ran (NZ J Crop Hort Sci 28:1-8 (2000)).

Claims 1-3, 5-6, 8-10, 12, 14 and 17 are obvious in view of the teachings of Maris as set forth *supra* in the rejection under 35 USC § 103(a).

Maris does not teach the use of tissue culture. Want & Ran teach the value of using tissue culture to improve agronomically desirable traits of potatoes.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the teachings of Maris and use the lines of Maris according to the teachings of Wang & Ran to create tissue cultures from the potatoes of Maris and regenerate plants therefrom. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Therefore claims 27 and 28 are obvious.

Conclusion

16. No claim is allowed.

17. The prior art made of record and not relied upon is considered pertinent to Applicant's patent application.

(1) EP 0913081 A1, Hosaka et al., published 5 June 1999, teaching a breeding method for potatoes;

(2) Juan Pablo Raimondi et al., Euphytica 132(3):287-95 (2003) teaching crossability relationships between wild diploid potato species;

(3) Dinu et al., Int'l J Plant Breed Res 110(3):403-15 (2003) teaching novel inter-series hybrids in potatoes;

(4) Bani-Aameur et al., Euphytica 68(3):169-79 (1993); enhancing potatoes using clones; and

(5) Visker et al., Euphytica 137(3):311-23 (2004).

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUSSELL BOGGS whose telephone number is (571)272-2805. The examiner can normally be reached on Monday through Friday from 8:30 AM to 5:00 PM (Eastern Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shubo (Joe) Zhou, can be reached at (571)-272-0724. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RUSSELL BOGGS/
Examiner, Art Unit 1663

/MEDINA A IBRAHIM/
Primary Examiner, Art Unit 1662

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1638	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
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	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
*	N	EP 0913081 A1	06-1999	EP	Hosaka et al.	
	O					
	P					
	Q					
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	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Maris, Euphytica 46:15-33 (1990)
*	V	Watanable et al., Breed Sci 46:329-36 (1996)
*	W	Hermundstad & Peloquin, Potato Res 29:289-97 (1986)
*	X	Phumichai et al., Genome 48:977-84 (2005)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Wang & Ran, NZ J Crop Hort Sci 28:1-8 (2000)
*	V	Juan Pablo Raimondi et al., Euphytica 132(3):287-95 (2003)
*	W	Dinu et al., Int'l J Plant Breed Res 110(3):403-15 (2003)
*	X	Visker et al., Euphytica 137(3):311-23 (2004)

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FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Bani-Aameur et al., Euphytica 68(3):169-79 (1993)
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	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13504156	LINDHOUT ET AL.
	Examiner	Art Unit
	RUSSELL BOGGS	1638

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
STIC search of STN	8/12/14	/RTB/
STN, EAST and Google search as per attached	9/28/14	/RTB/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/RUSSELL BOGGS/ Examiner.Art Unit 1638	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13504156
Filing Date	2012-04-26
First Named Inventor	Willem Hendrick Lindhout
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	05032-00255

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/R.T.B./	1	0913081	EP	A1	1999-05-06	President of Kobe University		☐

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Receipt date: 05/22/2012	Application Number	13504156
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2012-04-26
(Not for submission under 37 CFR 1.99)	First Named Inventor	Willem Hendrick Lindhout
	Art Unit	TBA
	Examiner Name	TBA
	Attorney Docket Number	05032-00255

/R.T.B./	1	International Search Report relating to corresponding PCT/NL2010/050716, issued June 8, 2011.	☐
/R.T.B./	2	International Preliminary Report on Patentability relating to corresponding PCT/NL2010/050716, issued April 26, 2012.	☐
/R.T.B./	3	BANI-AAMEUR, et al., "Enhancement of Diploid Solanum Chacoense Bitt. Using Adapted Clones of Solanum Phureja Juz. & Buk.," Euphytica, 68: 169-179, 1993.	☐
/R.T.B./	4	BUSO, et al., "Tuber Yield and Quality of 4x-2x (FDR) Potato Progenies Derived from the Wild Diploid Species Solanum Berthaultii and Solanum Tarijense," Plant Breeding, 122, 229-232 (2003).	☐
/R.T.B./	5	DeMAINE, M. J., "The Effects of Inbreeding on the Parental Values of Potato Dihaploids," Ann. Appl. Biol. (1995) 127: 151-156.	☐
/R.T.B./	6	DINU, et al., "Novel Inter-Series Hybrids in Solanum, Section Petota," Theor Appl Genet (2005) 110: 403-415.	☐
/R.T.B./	7	EIJLANDER, et al., "Selection of Vigorous and Fertile S-homo- and Heterozygous Tester Clones From Self-Incompatible Diploid Potato, Solanum Tuberosum L.," Euphytica, 97: 97-111, 1997.	☐
/R.T.B./	8	HERMSEN, et al., "Inheritance of Genetic Markers From Two Potato Dihaploids and Their Respective Parent Cultivars," Euphytica, 27 (1978) 681-688.	☐
/R.T.B./	9	HERMUNDSTAD, et al., "Tuber Yield and Tuber Traits of Haploid-Wild Species F1 Hybrids," Potato Research 29 (1986) 289-297.	☐
/R.T.B./	10	HOSAKA, et al., "Genetics of Self-Compatibility Wild Diploid Potato Species Solanum Chacoense. 1. Detection of an S Locus Inhibitor (Sli) Gene," Euphytica, 99: 191-197, 1998.	☐
/R.T.B./	11	JANSKY, S., "Overcoming Hybridization Barriers in Potato," Plant Breeding, 125, 1-12 (2006).	☐

Receipt date: 05/22/2012	Application Number	13504156
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2012-04-26
(Not for submission under 37 CFR 1.99)	First Named Inventor	Willem Hendrick Lindhout
	Art Unit	TBA
	Examiner Name	TBA
	Attorney Docket Number	05032-00255

/R.T.B./	12	MARIS, B., "Comparison of Diploid and Tetraploid Potato Families Derived from Solanum Phureja x Dihaploid S. Tuberosum Hybrids and Their Vegetatively Doubled Counterparts," Euphytica, 46: 15-33, 1990.	☐
/R.T.B./	13	PABLO, et al., "Crossability Relationships Among the Wild Diploid Potato Species Solanum Kurtzianum, S. Chacoense and S. Ruiz-Lealii from Argentina," Euphytica, 132: 2987-295, 2003.	☐
/R.T.B./	14	PHUMICHAI, et al., "Toward the Development of Highly Homozygous Diploid Potato Lines Using the Self-Compatability Controlling Sli Gene," Genome, 48: 977-984 (2005).	☐
/R.T.B./	15	SIMMONDS, N. W., "A Review of Potato Propagation by Means of Seed, as Distinct from Clonal Propagation by Tubers," Potato Research, 40 (1997) 191-214.	☐
/R.T.B./	16	VISKER, et al., "Correlation Between Late Blight Resistance and Foliage Maturity Type in Potato," Euphytica, 137: 311-323, 2004.	☐
/R.T.B./	17	WANG, et al., "Improving Main Agronomic Characters of Dihaploids with 2n Gametes by Means of Sexual Hybridisation and Another Culture of Potato (Solanum Tuberosum)," New Zealand Journal of Crop and Horticultural Science, 2000, Vol. 28: 1-8.	☐
/R.T.B./	18	WATANABE, et al., "Generation of Pest Resistant. Diploid Potato Germplasm with Short-Day Adaptation from Diverse Genetic Stocks," Breeding Science, 46: 329-336 (1996).	☐

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EXAMINER SIGNATURE

Examiner Signature	/Russell Boggs/	Date Considered	09/09/2014

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Receipt date: 05/22/2012		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Application Number	13504156
	Filing Date	2012-04-26
	First Named Inventor	Willem Hendrick Lindhout
	Art Unit	TBA
	Examiner Name	TBA
	Attorney Docket Number	05032-00255

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John P. Iwanicki/	Date (YYYY-MM-DD)	2012-05-22
Name/Print	John P. Iwanicki	Registration Number	34628

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	12	agvd	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 21:56
L2	2	ivp07	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:03
L3	189275	potato	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:04
L4	49491	potato.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:04
L5	16962	inbred near line	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:05
L6	16102	L5 and hybrid	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:05
L7	4716	breed.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:05
L8	683	800/317.2.icls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:07
L9	119	L8 and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:08
L10	101	L8 and L5	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:08
L11	1	L10 and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2014/09/28 22:08

EAST Search History (Interference)

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9/28/2014 10:09:05 PM

STN Search 09272014

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     (FILE 'HOME' ENTERED AT 21:47:18 ON 28 SEP 2014)

     FILE 'MEDLINE, CROPU, AGRICOLA, CABA, CAPLUS, BIOSIS' ENTERED AT 21:48:20
     ON 28 SEP 2014
L1            69 S AGVD?
L2          8925 S L1 AND VIRUS OR VIROID
L3            46 S L1 AND (VIRUS OR VIROID)
L4             0 S L3 NOT L1
L5            23 S L1 NOT L3
L6            34 DUPLICATE REMOVE L1 (35 DUPLICATES REMOVED)
L7            15 S L6 NOT (VIRUS OR VIROID)
L8            19 S L6 NOT L7
L9             0 S IVP07
L10            2 S POTATO AND ((INBRED (S) LINE) AND HYBRID) AND BREED/AB
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CONFIRMATION NO. 6337

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/504,156	07/10/2012 **RULE**	800	1638	091876-0014

APPLICANTS

INVENTORS

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Teunis Philippus Schotte, Hazerswoude-Dorp, NETHERLANDS;
Richard Gerardus Franciscus Visser, Bennekom, NETHERLANDS;
Herman Johannes van Eck, Wageningen, NETHERLANDS;
Ronaldus Cornelis Bernardus Hutten, Rhenen, NETHERLANDS;

** **CONTINUING DATA** *************************

This application is a 371 of PCT/NL10/50716 10/26/2010
which claims benefit of 61/254,980 10/26/2009 /RTB/

** **FOREIGN APPLICATIONS** *************************

EUROPEAN PATENT OFFICE (EPO) 09013474.3 10/26/2009

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Foreign Priority claimed / 35 USC 119(a-d) conditions met / Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged /RUSSELL T BOGGS/ Examiner's Signature	☐ Met after Allowance Initials	NETHERLANDS	11	34	7

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UNITED STATES

TITLE

Hybrid Seed Potato Breeding

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In re Patent Application of: Willem Hendrik LINDHOUT et al.	:	Customer Number: 23630
Application No.: 13/504,156	:	Confirmation No.: 6337
Filed: July 10, 2012	:	Art Unit: 1663
For: Hybrid Seed Potato Breeding	:	Examiner: BOGGS, Russell T

RESPONSE TO NON-FINAL OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed October 14, 2014, please amend the above-identified U.S. patent application as directed herein.

Amendments to the Specification begin on Page 2.

Amendments to the Drawings begin on Page 5.

Amendments to the Claims begin on Page 6.

Remarks/Arguments begin on Page 13.

Agventure B.V. Ex. 2009
IPR2025-00136
Page 476

AMENDMENTS TO THE SPECIFICATION

In the following amendment to the specification, [[deletions are double bracketed]] or ~~shown with strike through~~, and additions are underlined.

Please replace the paragraph at page 9, lines 3-9 as follows:

> Proper (commercial) sources of tetraploid cultivars are provided through the European Cultivated Potato Database (ECPD) at http://www.europotato.org/menu.php and/or the Potato Pedigree Database of the expertise group Plant Breeding (a cooperation between the Laboratory of Plant breeding of Wageningen UR, the Netherlands) and the business unit Biodiversity and breeding of Plant Research International (PRI), Wageningen, the Netherlands at http://www.plantbreeding.wur.nl/potatopedigree/.

Please replace the paragraph bridging pages 50-51, as follows:

> In order to analyse SNPs in potato, the Illumina standard GoldenGate protocol (Shen et al. 2005. Mutation Research 573:70-82) has been used previously (Anithakumari et al. 2010. Mol. Breeding, 26:65-75). This platform comprises 384 SNPs and was later expanded with another 768 SNPs. These 384 and 768 SNPs have been developed using EST sequences, which represent the mRNA without intron sequences. Since the present inventors have access to the first draft sequence of the potato genome (www.potatogenome.net) it was possible to compare the mRNA with the genomic DNA sequence including the intervening sequences. This comparison with the potato genome sequence was performed with the Basic Local Alignment Search Tool (BLAST; Altschul et al. 1990. J. Mol. Biol. 215: 403-410). This resulted in 538 and 1681 hits, respectively. The occurrence of multiple BLAST hits was considered to reflect paralogs or intron spanning sequences. These were removed from the initial collection of SNPs that were first developed for GoldenGate analysis (Anithakumari et al. 2010). This resulted in 279 and 453 unique BLAST hits representing the occurrence of only one

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copy in the potato genome sequence of *Solanum tuberosum* Group Phureja DMl-3 516R44 (CIP801092) as known hitherto (Potato Genome Sequencing Consortium, www.potatogenome.net).

Please replace the paragraph at page 51, lines 11-17, line 15 as follows:

For the present SNP design the minimal sequence length was set at 101 bp. Therefore 81 sequences were removed as they were shorter. The resulting 553 sequences have a length of at least 101 bp. A total of 100 sequences were then removed for having incomplete matches of only 35 up to 94 nucleotides within a scaffold of a doubled monoploid (DM-3 516R44; www.potatogenome.net). Also removed were sequences with introduced alignment gaps and sequences having other potential mismatch problems.

Please replace the paragraph at page 51, lines 18-23, line 23 as follows:

Though twenty-five sequences did not meet the criteria described above, they were kept as these were were known to be highly informative in the GoldenGate SNP assays. These SNPs even allowed to discriminate between the five genotype classes that occur in tetraploids (Voorrips et al, EAPR-EUCARPIA congress "Potato Breeding after completion of the DNA Sequence of the Potato Genome", 27-30 June 2010, Wageningen, the Netherlands, e-publication at http://edepot.wur.nl/143559, pg 42).

Please replace the paragraph at page 52, lines 3-4 follows:

The 100 SNP sequences selected as described above were used in a KASPar SNP genotyping system (KBioscience Ltd. Hoddesdon, UK; http://www.kbioscience.co.ukllab%20services/SNP%20Genotyping/genotyping_chemistry.html). The markers were tested on a set of 20 diploid potato genotypes (see Figure 4) including the three diploid parents used in the present study and further on the donor of the *Sli* gene, clone 07-1004-1 (see also Example 2 herein above).

Please amend the paragraph at page 52, lines 19-23, line 20 as follows:

All markers showed a high frequency of occurrence in the diploid potato germplasm used in this experiment ~~(Appendix III)~~ (Figure 9). The heterozygote frequency in the germplasm by suing these 100 markers ranged from 26% to 77%, while the *Sli* gene donor was 100% homozygous as is in accordance with expectations (Phumichai et al. 2005 Genome 48: 977-984).

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AMENDMENTS TO THE DRAWINGS

Please replace the originally filed drawing sheets with the replacement sheets submitted herewith.

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Page 480

AMENDMENTS TO THE CLAIMS

The below claim listing will replace all prior versions of the claims.

1. (Currently Amended) A diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of the loci in said plants are homozygous.

2. (Canceled).

3. (Currently Amended) The potato line of claim [[2]]1, wherein said at least one agronomically desirable trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

4. (Previously Presented) The potato line of claim 1, wherein plants of said line when mature attain an average fresh weight of the foliage and shoots of at least 500 grams per plant.

5. (Previously Presented) A plant of a line according to claim 1.

6. (Previously Presented) A seed of a plant according to claim 5.

7. (Previously Presented) Seed according to claim 6, wherein said seed is a uniform hybrid potato seed.

8. (Currently Amended) A method for producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a first diploid, self-compatible, fertile and essentially homozygous potato line of the species *Solanum tuberosum*;

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid or tetraploid potato line of the species *Solanum tuberosum* which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first and second potato plant to provide seeds and collecting said seeds to thereby provide ~~an offspring generation in the form of~~ a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plant and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plant or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, to thereby provide a diploid, self-compatible and essentially homozygous potato breeding line of the species *Solanum tuberosum* comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

and wherein at least 50% of the loci in said plants are homozygous.

9. (Currently Amended) The method of claim 8, wherein said steps (a)-(e) are repeated and wherein step (b) comprises the provision of a second potato plant, wherein said second potato plant is a donor for an additional agronomically desirable trait, wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

10. (Canceled).

11. (Previously Presented) The method of claim 8, wherein said first potato plant is a plant of potato line NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively.

12. (Previously Presented) The method of claim 8, wherein said second potato plant is a plant of a second diploid, fertile, self-compatible and essentially homozygous potato line.

13. (Previously Presented) The method of claim 8, wherein said second potato plant is a plant of a second diploid, fertile, self-incompatible potato line.

14. (Currently Amended) A diploid potato breeding line, more preferably an elite line, ~~obtainable~~ obtained by the method of claim 8.

15. (Currently Amended) A hybrid potato seed ~~obtainable~~ obtained by crossing plants of a first and second diploid potato breeding line according to claim 14, wherein said plants of said first and second diploid potato breeding line contain at least 20 % contrasting homozygous loci as ~~determinable~~ determined by molecular marker analysis.

16. (Currently Amended) A method for producing a uniform hybrid potato seed, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a first diploid, fertile, self-compatible and essentially homozygous potato line according to claim 1,

(b) providing a second potato plant, wherein said second potato plant is a plant of a second diploid, fertile, self-compatible and essentially homozygous potato line according to claim 1, wherein said first and second plant contain at least 20 % contrasting homozygous loci as ~~determinable~~ determined by molecular marker analysis, and

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(c) cross pollinating said first and second potato plant and allowing one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide ~~an offspring generation in the form of~~ a hybrid offspring seed.

17. (Canceled).

18. (Currently Amended) Method according to claim 16, wherein at least one of said first and second potato plants comprises at least one agronomically desirable trait ~~being~~ selected from the group consisting of insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color [[or]] and cold-sweetening resistance.

19. (Currently Amended) The method of claim 16, wherein said first potato line is a diploid, self-compatible and essentially homozygous offspring potato plant comprising the *Sli[[-]]* gene, preferably wherein said first potato plant is a plant of potato lines NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland, or a diploid, self-compatible and essentially homozygous offspring potato plant thereof.

20. (Currently Amended) The method of claim 16, wherein said second potato plant is a plant of a second diploid, self-compatible and essentially homozygous potato line, said second potato line comprising an additional agronomically desirable trait; and wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

21. (Original) A seed of potato lines NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland.

22. (Previously Presented) A seed produced by the method of claim 16.

23. (Previously Presented) A hybrid potato plant, or part thereof, produced by growing the seed of claim 16.

24. (Previously Presented) Pollen or an ovule of the plant of claim 23.

25. (Previously Presented) A tuber from the plant of claim 23.

26. (Previously Presented) A potato plant having all of the physiological and morphological characteristics of the plant of claim 23.

27. (Previously Presented) A tissue culture of the plant of claim 23.

28. (Previously Presented) A potato plant regenerated from the tissue culture of claim 27.

29. (Currently Amended) A method for producing a hybrid potato seed wherein the method comprises crossing a first potato plant with a second potato plant and harvesting ~~the resultant~~ a hybrid potato seed resulting from said crossing, wherein said first or second parent potato plant is the potato plant of claim 5, wherein said first and second parent potato have at least 20 % contrasting homozygous loci as ~~determinable~~ determined by molecular genetic marker analysis.

30. (Previously Presented) A method of producing a hybrid potato plant, said method comprising producing a seed according to a method of claim 16 and growing said seed into a potato plant.

31. (Previously Presented) A potato plant produced by the method of claim 30, or a tuber thereof.

32. (Currently Amended) A set of ~~at least~~ 2 ~~intercrossable~~ homozygous diploid, fertile, self-compatible and essentially homozygous potato lines of the species *Solanum tuberosum* for

intercrossing, comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein each of said lines differ from another line in said set by having at least 20 % contrasting homozygous loci as ~~determinable~~ determined by molecular genetic marker analysis; and wherein at least 50% of the loci in said plants are homozygous.

33. (Currently Amended) A diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant ~~obtainable~~ obtained by:

(a) providing a first potato plant, which first potato plant is a plant of a first diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum*,

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid potato line of the species *Solanum tuberosum* having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant,

(c) cross pollinating said first and second potato plant and allowing one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide ~~an offspring generation in the form of~~ a hybrid offspring seed,

(d) growing said hybrid offspring seed into a hybrid offspring potato plant,

(e) backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, and selecting from [[the]] offspring plants thus generated a plant that is diploid, self-compatible and vigorous in that it produces tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(f) selfing said diploid, self-compatible and vigorous plant for between 1 to 8 generations while selecting for self-compatibility and vigour ~~as defined in (e);~~

wherein at least 50% of the loci in said plants are homozygous.

34. (Currently Amended) A hybrid potato seed which seed, when sown produces a diploid, fertile, self-compatible and essentially heterozygous potato plant of the species *Solanum tuberosum* having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, said plant being ~~obtainable~~ obtained by:

(a) providing a first diploid, fertile, self-compatible and essentially homozygous potato line comprising plants of the species *Solanum tuberosum* having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant,

(b) providing a second diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein said first and second plant contain at least 20 % contrasting homozygous loci as ~~determinable~~ determined by molecular marker analysis, and

(c) cross pollinating said first and second potato plant and allowing at least one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide ~~an offspring generation in the form of~~ a hybrid offspring seed;

and wherein at least 50% of the loci in said plant are homozygous.

REMARKS/ARGUMENTS

Status of Claims

Claims 1-34 were pending in this application. Claims 2, 10 and 17 are canceled without prejudice. Claims 1, 3, 8, 9, 14-16, 18-20, 29 and 32-34 have been amended.

Support for these amendments can be found throughout the application. For example, support for the amendment to claims 1, 8, 32-34 is found at page 37, lines 20-23, 30-33 and at page 39, lines 25-29. Support for the amendment to claims 9 and 20 is found at page 35 lines 26-33 and at page 36, line 1. Support for the amendment to claims 3, 9, 18 and 20 is found at page 33, lines 11-20.

Claims 14-16, 18-19 and 29 have been amended to correct informalities. No new matter is believed to be added herein.

Drawings

The drawings were objected to as Figures 4 and 5 were not legible. Replacement sheets of drawings are submitted herewith. Figures 4 and 5 have been amended in compliance with 37 CFR 1.121 (d). Amendments to the drawings are supported, for example, by original Figures 4 and 5 of the application as filed. No new matter has been added.

Specification

The specification has been amended to delete the embedded hyperlink and/or other form of browser-executable code. The specification has been amended to correct informalities. The amendments do not add new matter.

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Sequence Rules

Applicant wish to bring to Examiner's attention that Table 5A was amended to include SEQ ID NOs for all of Table 5A with our earlier amendment, filed on July 10, 2012.

Claim Objections

Claims 3, 8-10, 16, 18-19, and 33-34 are objected to because of informalities.

Examiner's objection is now believed to be moot in view of the amendment to claims 3, 8-10, 16, 18-19, and 33-34.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 2-3, 9, 11 and 14-34 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite, for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

A. According to the Examiner, claims 11, 19 and 21 and claims dependent thereon are indefinite in their recitation of "NCIMB 41663," "NCIMB 41664," "NCIMB 41665," "NCIMB 41765," "AGVD1," "AGVD2," "AGVD3" and "AGVD15", since the names do not clearly identify the claimed potato varieties and seed.

Applicant wish to bring to Examiner's attention that a "statement relating to the deposited biological material" is submitted concurrently herewith, thereby rendering this rejection moot.

B. According to the Examiner, claims 2, 9 and 20 are indefinite in the recitation of "agronomically desirable traits".

Claim 2 is deleted. This rejection is believed to be moot in view of the amendment to claims 9 and 20. Support for the basis of amendment to claims 9 and 20 can be found in the instant specification at the paragraph bridging pages 35-36.

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C. According to the Examiner, claims 15-16, 29, 32 and 34 are indefinite in the recitation of "determinable".

For clarity purposes, the word "determinable" is amended to "determined" in claims 15-16, 29, 32 and 34, thereby rendering the rejection moot.

D. According to the Examiner, claims 14-15 and 33-34 is indefinite in the recitation of "obtainable.

For clarity purposes, the word "obtainable" is amended to "obtained" in claims 14-15 and 33-34, thereby rendering the rejection moot.

E. According to the Examiner, claim 32 is indefinite in the recitation of "intercrossable" and is indefinite if all said potato lines must be mutually intercrossable.

The term "intercrossable" is deleted from claim 32. Claim 32 is amended to recite the potato lines that are mutually intercrossable. This rejection is believed to be moot in view of the amendment to claim 32.

F. According to the Examiner, claim 20 is indefinite in the recitation of "said line".

The term "said line" in claim 20 is amended to "said potato line". This rejection is believed to be moot in view of the amendment to claim 20.

G. According to the Examiner, claim 33 is rejected because it ends with the phrase "as defined in (e)" but "self-compatibility and vigour" are not defined in part (e). Claim 33 is indefinite whether the phrase "as defined in (e)" applies to both "self- compatibility" and "vigour" or just "vigour".

The phrase "as defined in (e)" is deleted from claim 33. This rejection is believed to be moot in view of the amendment to claim 33.

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H. According to the Examiner, claim 29 is indefinite in the recitation of "the resultant hybrid potato seed".

This rejection is believed to be moot in view of the amendment to claim 29.

I. According to the Examiner, claim 33(e) is indefinite in the recitation of "the offspring plants".

This rejection is believed to be moot in view of the amendment to claim 33(e).

Rejections under 35 U.S.C. § 112, first paragraph

A. Claims 1-10, 12-20 and 22-34 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

According to the Examiner, the claims are broadly drawn to a diploid, fertile, self-compatible and essentially homozygous potato line, or a seed thereof, comprising plants that have an average tuber yield of at least 200 g/plant. Independent method claims are drawn to a method to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g., crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland. According to the Examiner, the Applicant claims a large genus, whereas the instant application describes only four potato lines to use in the claimed methods.

Claims 1-10, 12-20 and 22-34 have been amended and limited to the species *S. tuberosum*. *S. tuberosum* lines AGVD1, AGVD2, AGVD3 and AGVD17 represent four examples of *S. tuberosum* having various levels of homozygosity. It is clear that additional *S. tuberosum lines* can be produced by the methods as claimed.

B. Claims 11, 19 and 21 are rejected under 35 U.S.C. § 112, second paragraph, as failing to comply with the enablement requirement.

According to the Examiner, the specification does not disclose a repeatable process to obtain the plant and thus it is not apparent if the plant is readily available to the public.

Applicant wish to bring to Examiner's attention that a "statement relating to the deposited biological material" is submitted concurrently herewith, thereby rendering this rejection moot.

Reconsideration and further examination are respectfully requested.

Rejections under 35 U.S.C. § 101

According to the Examiner, claims 1-6 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter and therefore claims 1-6 would be directed to products-of-nature.

Applicant wish to bring to Examiner's attention that, without *the hand of man* the plants as presently claimed would not have been produced. The diploid *S. tuberosum* plants as present in nature are self-incompatible, and are not essentially homozygous as presently claimed. Hence, they do therefore not comply with the required features of claim 1. The reason is that the *Sli*-gene, responsible for the self-compatibility, is derived from *Solanum chacoense*, and is not present in *Solanum tuberosum*. And even if one would assume that a natural *S. tuberosum* plant could derive the *Sli*-gene from *Solanum chacoense*, such a plant would not be essentially homozygous as presently claimed, because repeated steps of (controlled) selfing are needed to produce such plants. Repeated selfing in *S. tuberosum* would moreover not have led to plants having a tuber yield in excess of 200 grams per plant, because prior to the present invention such repeated selfings produced poorly growing plants only, due to the phenomenon of *inbreeding depression*.

Reconsideration and further examination are respectfully requested.

Rejections under 35 U.S.C. § 102

According to the Examiner, claims 1, 5-6, 8, 12, 14 and 17 are rejected under 35 U.S.C. § 102(b) as being anticipated by Maris (Euphytica 46:15-33 (1990)).

Applicant respectfully disagrees. Claims 1, 5-6, 8, 12, 14 and 17 are novel in view of Maris (Euphytica 46:15-33 (1990)). Table 8 of Maris does not disclose data on self-compatible, essentially homozygous *S. tuberosum* plants. Table 8 of Maris discloses data on four *phureja* x dihaploid *tuberosum* hybrids (indicated as parents) and clones of the F1 hybrid families used in crosses, which eventually yielded Sib1, Sib2, F1 x Sib1' BC1 and Sib1 x Sib1 seeds at the two levels of ploidy. The paper discloses results obtained from the second clonal generation of these combinations and their parents, as indicated on page 16, right hand column, second paragraph of Maris et al.

In essence, the plants of Maris are not *Solanum tuberosum* plants, but interspecific hybrids containing a mixture of the genomes of both *Solanum phureja* and *Solanum tuberosum* (*vide* Maris p. 31, left hand column, lines and Maris, p. 32, line 7 left column: "*S. phureja forms 50% of the above 2x parents*"). The term dihaploid, as used in Maris, combines in one word the number of genome copies (diploid) and their origin (haploid). Hence, the term "*phureja x dihaploid tuberosum hybrid*" refers to a diploid produced by crossing a diploid *phureja* with a dihaploid *tuberosum* to obtain a diploid hybrid. This is clearly indicated in Maris p. 31, left column, lines 16-18: "*Though the 2x parents used in the present study were not dihaploids but phureja x dihaploid tuberosum hybrids,* [...]". Such hybrids are not essentially homozygous. Only doubled monoploids or doubled haploids are homozygous.

The plants of Maris are therefore not essentially homozygous *Solanum tuberosum* plants, but interspecific hybrids containing a mixture of the genomes of both *Solanum phureja* and *Solanum tuberosum* that are essentially heterozygous.

Reconsideration and further examination are respectfully requested.

Rejections under 35 U.S.C. § 103

A. Claims 1-3, 5-6, 8-10, 12, 14 and 17 rejected under 35 U.S.C. § 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)).

B. Claims 1-3, 5-6, 8-10, 12-14 and 17 rejected under 35 U.S.C. § 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)) in further view of Hermundstad & Peloquin (Potato Res 29:289-97 (1986)).

C. Claim 1, 5-6, 8, 12, 14, 16-17, 22-26 and 29-34 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Phumichai et al. (Genome 48:977-84 (2005).

D. Claims 1, 5-6, 8, 12, 14, 16-18, 20, 22-26 and 29-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Phumichai et al. (Genome 48:977-84 (2005) in further view of Watanabe et al. (Breed Sci 46:329-36 (1996)).

E. Claims 1, 5-6, 8, 12, 14, 17 and 27-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Wang & Ran (NZ J Crop Hart Sci 28:1-8 (2000)).

Applicant respectfully disagrees. The obviousness rejection is based on the assumption that Maris discloses diploid, fertile, self-compatible and essentially homozygous potato plants having a tuber yield of at least 200 grams fresh weight per plant. As indicated above, none of these features other than the fact that they are diploid is disclosed in Maris.

Maris clearly indicates that potato breeding, i.e. the art and science of changing the traits of potato plants in order to produce desired characteristics, cannot progress through the use of *S. tuberosum dihaploids*. The aim of Maris was to attempt and increase yield through increasing heterozygosity as clearly indicated on page 32, lines 2-6, where Maris et al indicate:

"[…] *by the use of the primitive cultivated diploid S. phureja in the above experiments probably new alleles were introduced, which increased heterozygosity resulting in higher tuber yields.*" [mark-up added]

The present inventors have broken the dogma that essentially homozygous *S. tuberosum* plants would be unattainable, and progressed through decreasing heterozygosity. Maris expressly states, *inter alia*, that:

"*Based on results mentioned in the literature and on the present results, a continued use of S. tuberosum dihaploids in potato breeding needs to be dissuaded.*" (Maris, p. 15) [mark-up added]

"*Based on theoretical considerations that heterozygosity (heterosis!) is decisive for high tuber yields, from their results they concluded that intermating dihaploids per se does not increase heterozygosity and, more important, that without the introduction of new germplasm dihaploidization followed by repolyploidization can only be expected to result in tetraploids with heterozygosity (tuber yield!) equal to or below that of their parents. These conclusions are quite correct. Dihaploidization by itself does not introduce new features, neither new genes nor new alleles. The production of tuberosum dihaploids, followed by breeding within them and finally by asexual or sexual retetraploidization, therefore, is nothing but a waste of time.*" (Maris, p.31) [mark-up added]

"*The above results indicate that in potato breeding the use of only dihaploids of S. tuberosum serves no purpose, but in combination with diploid species it might be profitable.*" (Maris, p.32) [mark-up added]

"*Dihaploids are hard to use. A high percentage of dihaploids does not flower; those that do flower are mostly male sterile, and in the case of male fertility self- and cross- incompatibility may interfere. Most significant, however, is that the use of dihaploids in potato breeding in the last thirty years has not yielded a single superior cultivar in which only dihaploids are involved, and no other diploid species. To avoid loss of more time and money, therefore, it*

seems advisable to abandon continued use of dihaploids in potato breeding." (Maris, p.32) [mark-up added].

Based solely on recitations from the Maris reference, the skilled person is dissuaded to try and attempt to produce the *Solanum tuberosum* plants of the present invention. It is therefore all the more inventive that the present inventors have pursued a route of diploid breeding in potato using *Solanum tuberosum*.

Reconsideration and further examination are respectfully requested.

CONCLUSION

Should the Examiner be of the view that an interview would expedite consideration of the application, request is made that the Examiner telephone the Applicants' attorney at (617) 535 4453 in order that any outstanding issues be resolved.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1133, under Order No. 091876-0014 from which the undersigned is authorized to draw.

Respectfully submitted,

MCDERMOTT WILL & EMERY LLP



Kristin A. Connarn
Registration No. 57,025

Please recognize our Customer No. 23630 as our correspondence address.

28 State Street
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Phone: (617)-535-4453
Facsimile: (617) 535-3800
Date: January 14, 2015

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 1/14/15 Signature: (Sarah Hupprich)

Docket No.: 091876-0014
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem Hendrik LINDHOUT et al.	:	Customer Number: 23630
Application No.: 13/504,156	:	Confirmation No.: 6337
Filed: July 10, 2012	:	Art Unit: 1663
For: Hybrid Seed Potato Breeding	:	Examiner: BOGGS, Russell T

STATEMENT RELATING TO DEPOSITED BIOLOGICAL MATERIAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant has deposited the seeds referred to in the instant specification at pages 33-34 with the NCIMB, Aberdeen, Scotland under accession numbers NCIMB 41663, NCIMB 41664 and NCIMB 41665 on October 23, 2009 and NCIMB 41765 on October 5, 2010 respectively.

In connection with the response to the non-final Office Action submitted concurrently herewith, the undersigned hereby states that:

Applicants hereby states that the instant invention will be irrevocably and without restriction released to the public upon the issuance of a patent.

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Respectfully submitted,

MCDERMOTT WILL & EMERY LLP

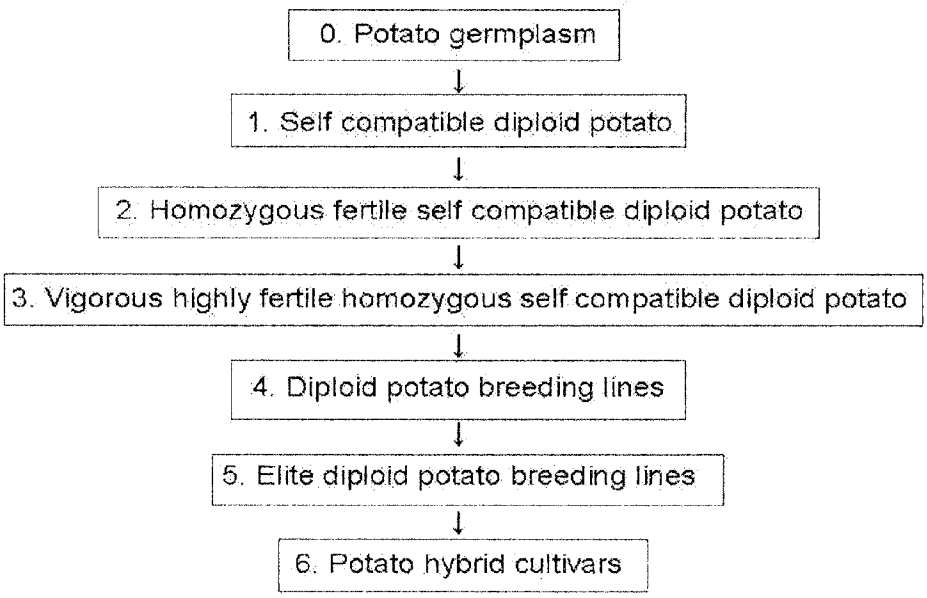
Kristin A. Connarn
Registration No. 57,025

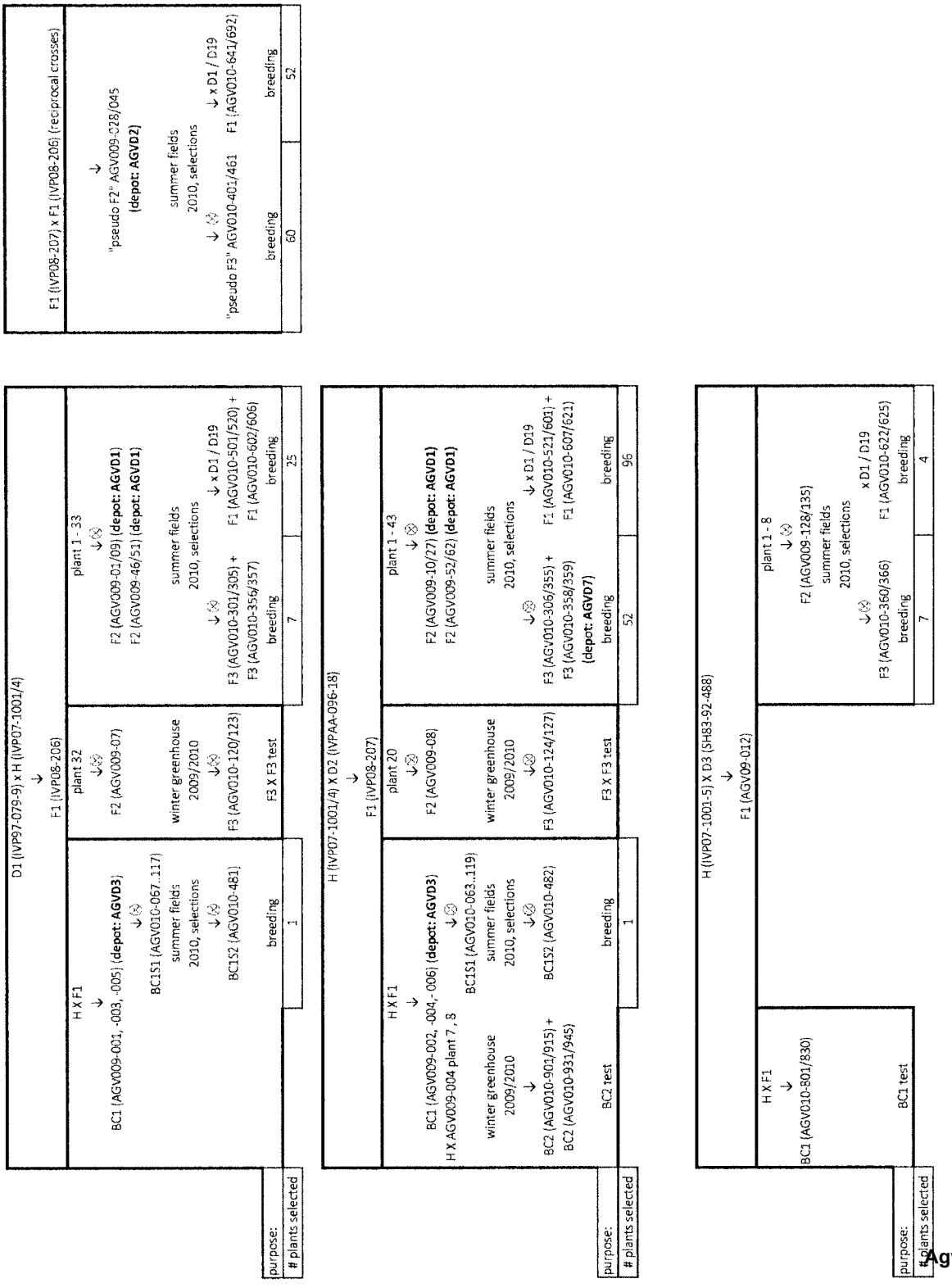
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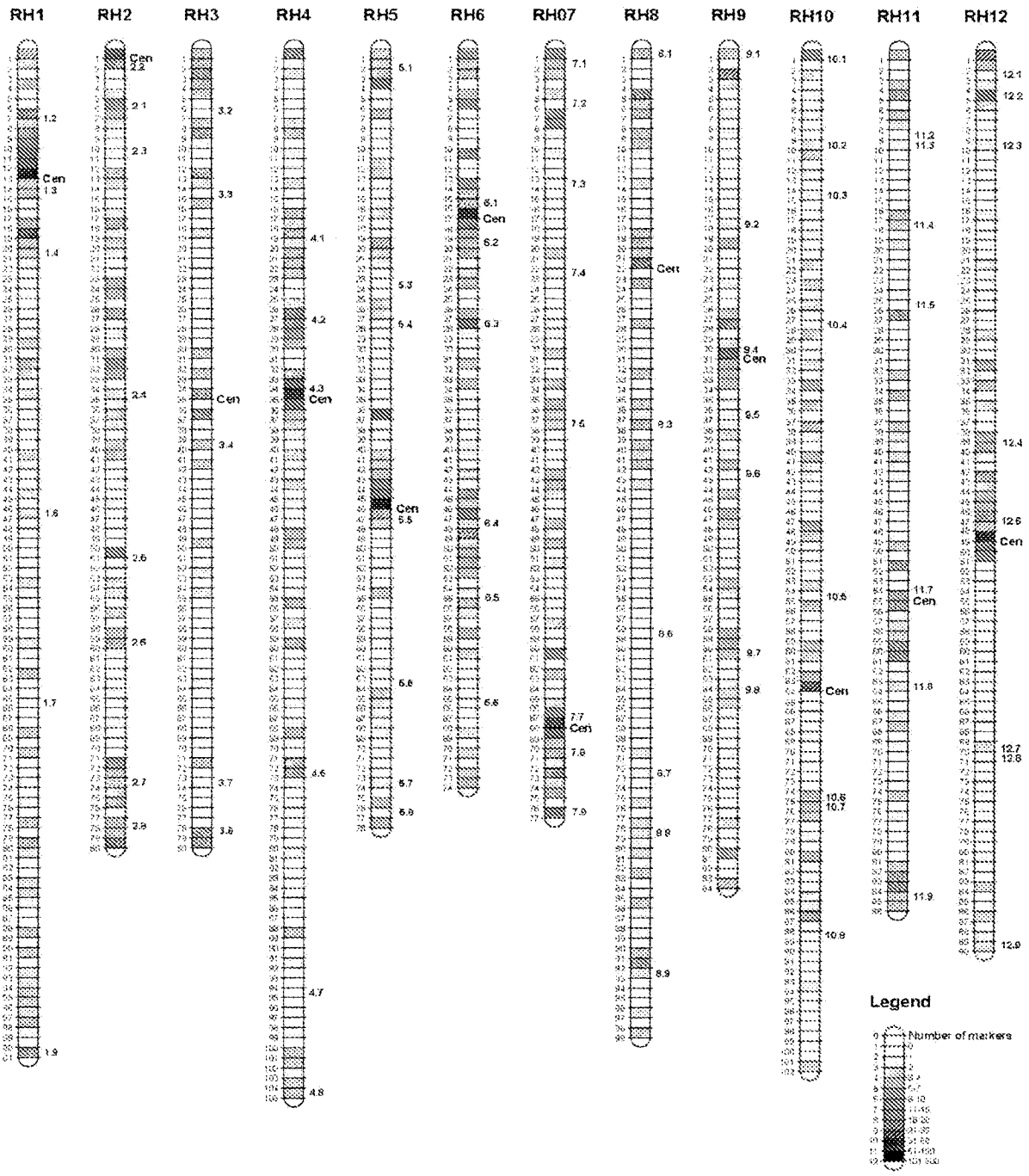
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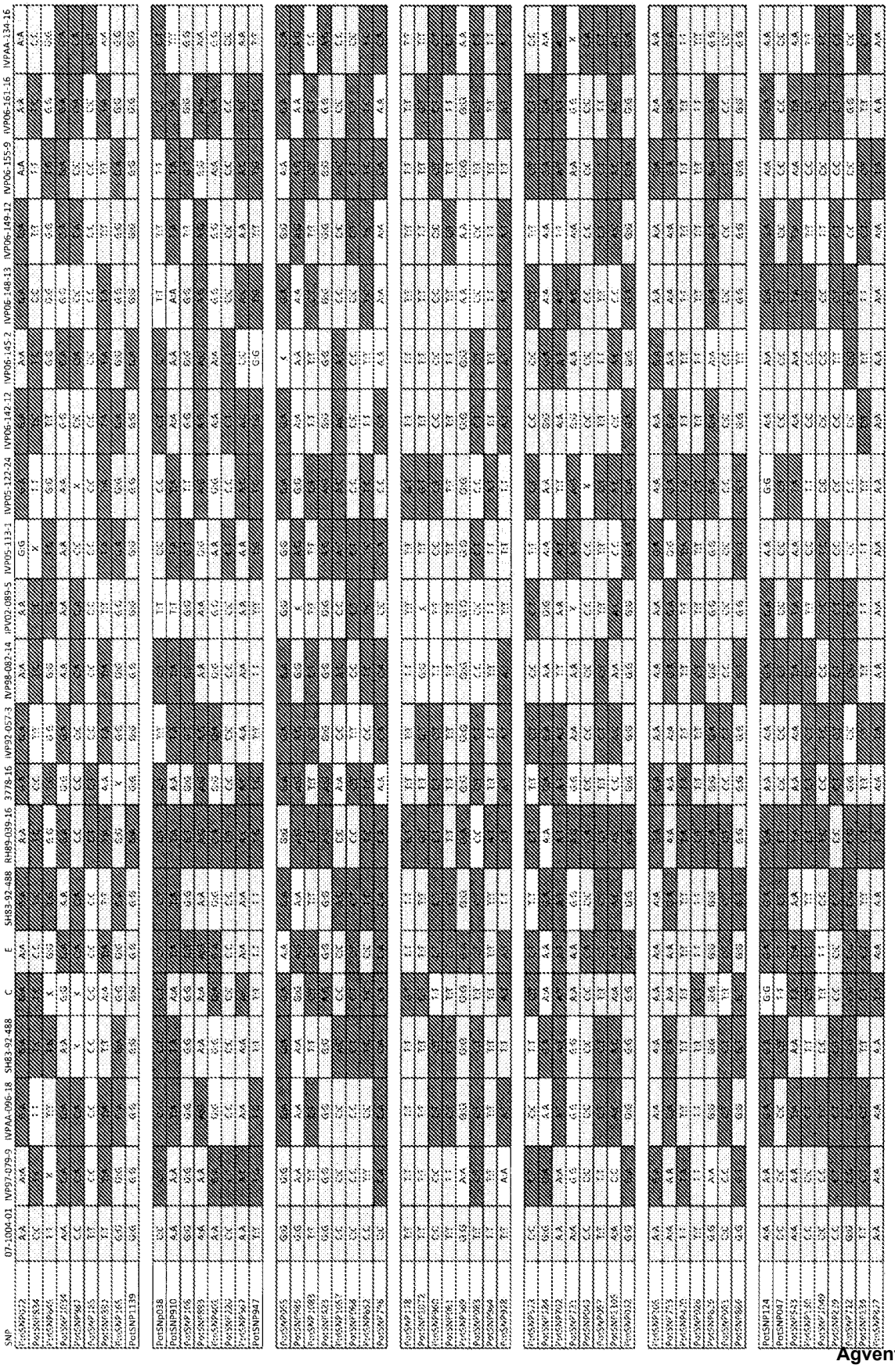
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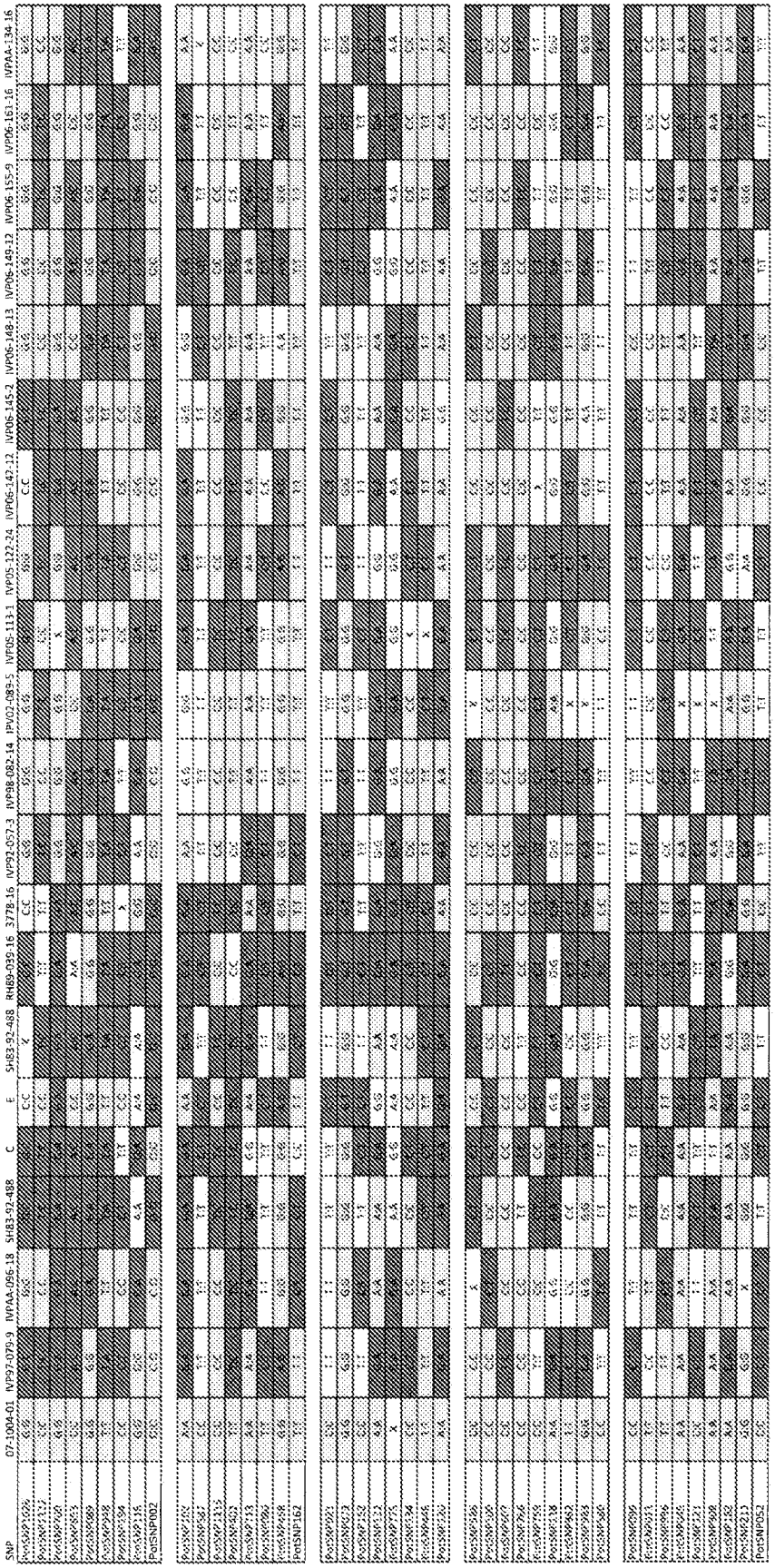
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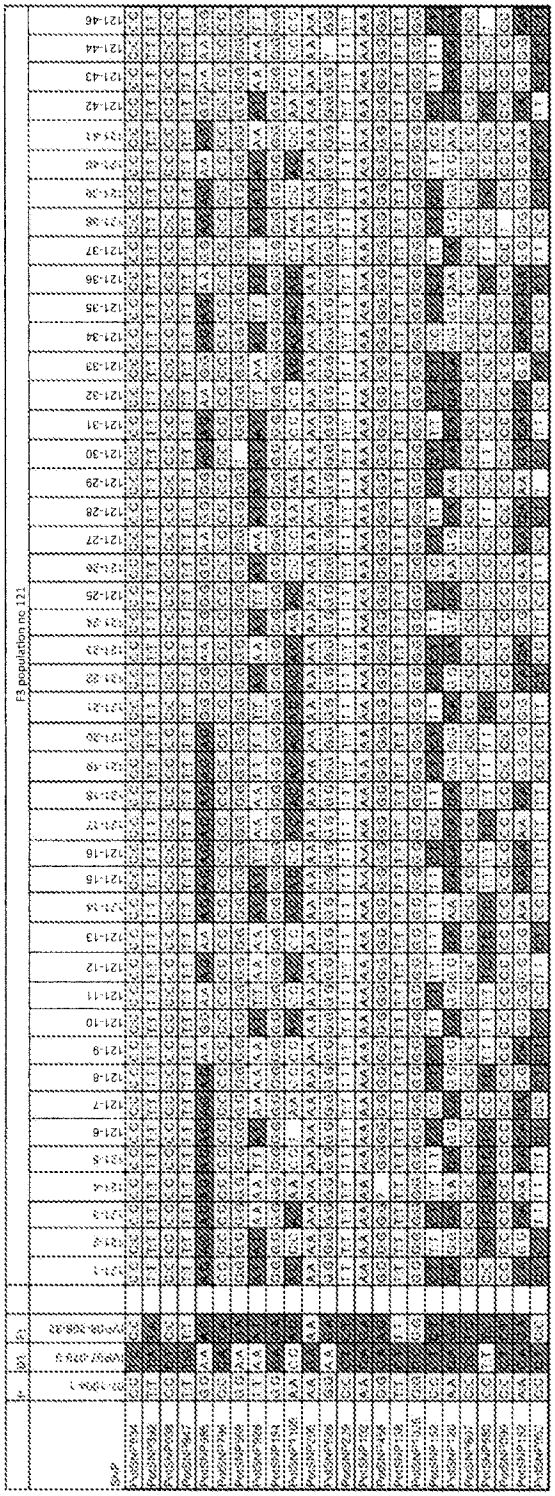

0. Potato germplasm
1. Self compatible diploid potato
2. Homozygous fertile self compatible diploid potato
3. Vigorous highly fertile homozygous self compatible diploid potato
4. Diploid potato breeding lines
5. Elite diploid potato breeding lines
6. Potato hybrid cultivars

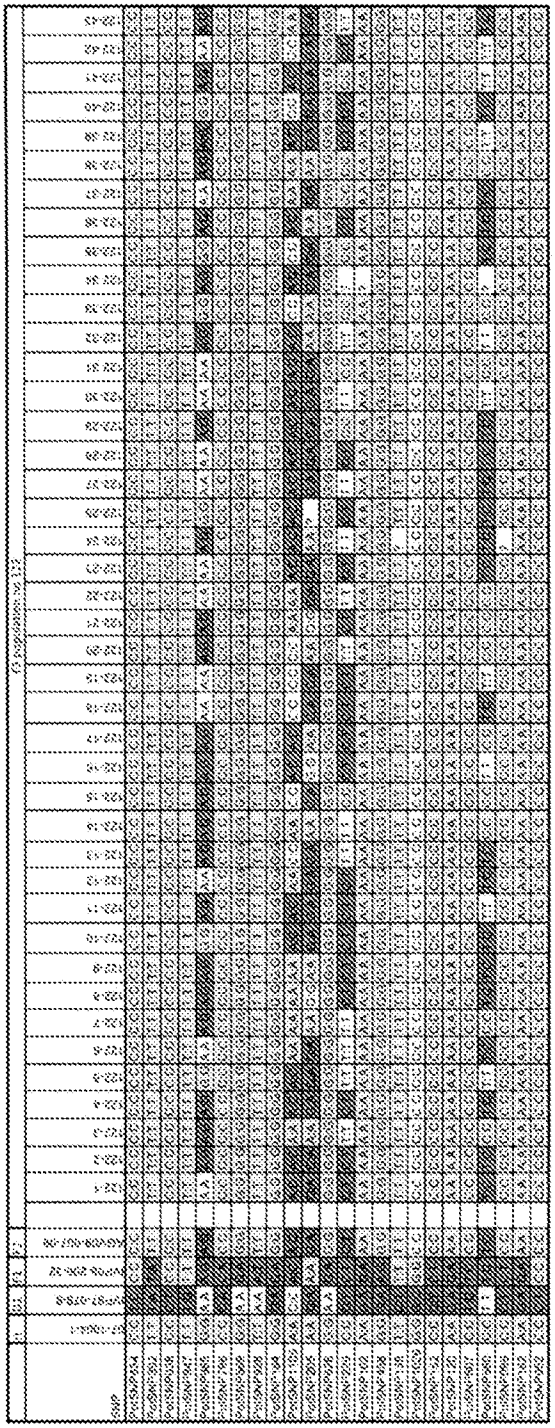

F1 (IVP08-207) x F1 (IVP08-206) (reciprocal crosses)
"pseudo F2" AGV009-028/045
(depot: AGVD2)
summer fields
2010, selections
↓ x D1 / D19
"pseudo F3" AGV010-401/461
F1 (AGV010-641/692)
breeding
breeding
60
52
D1 (IVP97-079-9) x H (IVP07-1001/4)
F1 (IVP08-206)
H X F1
plant 32
plant 1 - 33
BC1 (AGV009-001, -003, -005) (depot: AGVD3)
BC1S1 (AGV010-067..117)
BC1S2 (AGV010-481)
F2 (AGV009-07)
winter greenhouse
2009/2010
F3 (AGV010-120/123)
F2 (AGV009-01/09) (depot: AGVD1)
F2 (AGV009-46/51) (depot: AGVD1)
summer fields
2010, selections
F3 (AGV010-301/305) +
F3 (AGV010-356/357)
↓ x D1 / D19
F1 (AGV010-501/520) +
F1 (AGV010-602/606)
F3 X F3 test
breeding
breeding
purpose:
plants selected
1
7
25
H (IVP07-1001/4) X D2 (IVPAA-096-18)
F1 (IVP08-207)
H X F1
plant 20
plant 1 - 43
BC1 (AGV009-002, -004, -006) (depot: AGVD3)
H X AGV009-004 plant 7, 8
BC1S1 (AGV010-063..119)
BC2 (AGV010-901/915) +
BC2 (AGV010-931/945)
BC1S2 (AGV010-482)
winter greenhouse
2009/2010
summer fields
2010, selections
F2 (AGV009-08)
F3 (AGV010-124/127)
F2 (AGV009-10/27) (depot: AGVD1)
F2 (AGV009-52/62) (depot: AGVD1)
F3 (AGV010-306/355) +
F3 (AGV010-358/359)
(depot: AGVD7)
↓ x D1 / D19
F1 (AGV010-521/601) +
F1 (AGV010-607/621)
F3 X F3 test
BC2 test
breeding
breeding
purpose:
plants selected
1
52
96
H (IVP07-1001-5) X D3 (SH83-92-488)
F1 (AGV09-012)
H X F1
plant 1 - 8
BC1 (AGV010-801/830)
F2 (AGV009-128/135)
summer fields
2010, selections
F3 (AGV010-360/366)
x D1 / D19
F1 (AGV010-622/625)
BC1 test
breeding
breeding
purpose:
plants selected
7
4

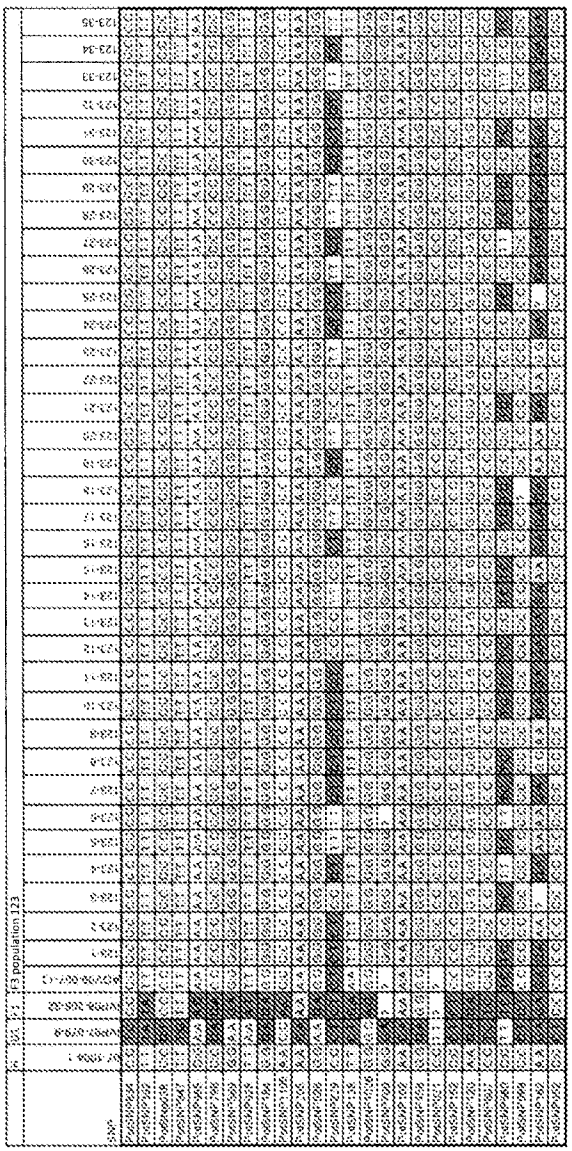

RH1
RH2
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RH4
RH5
RH6
RH07
RH8
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RH12
Cen
Legend
Number of markers

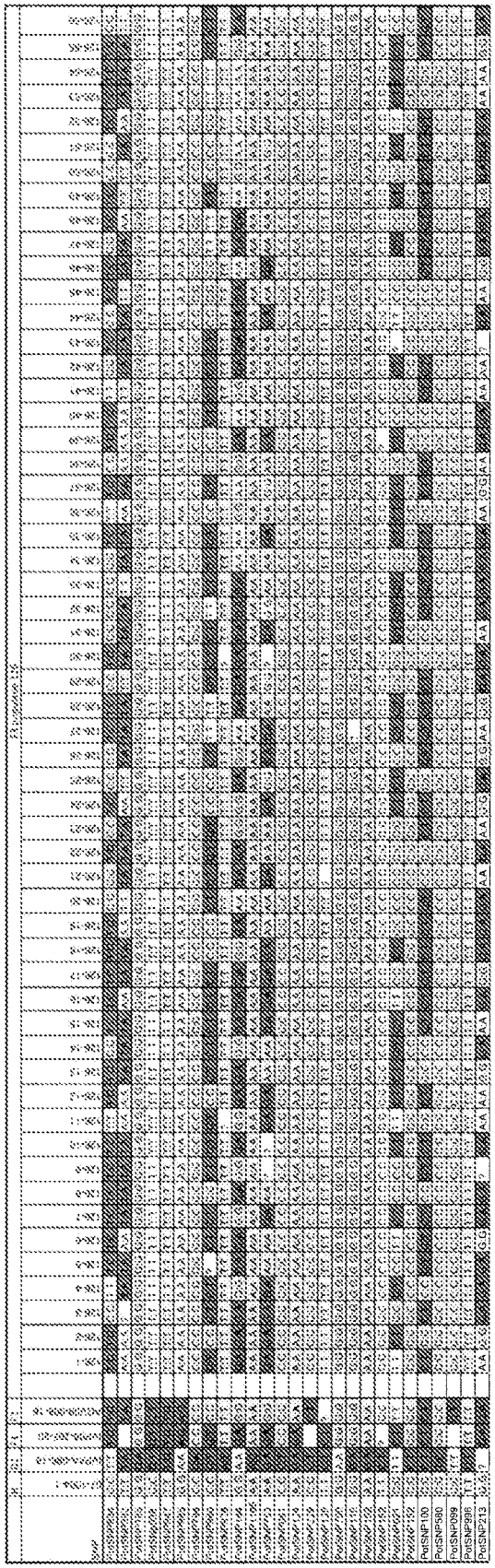


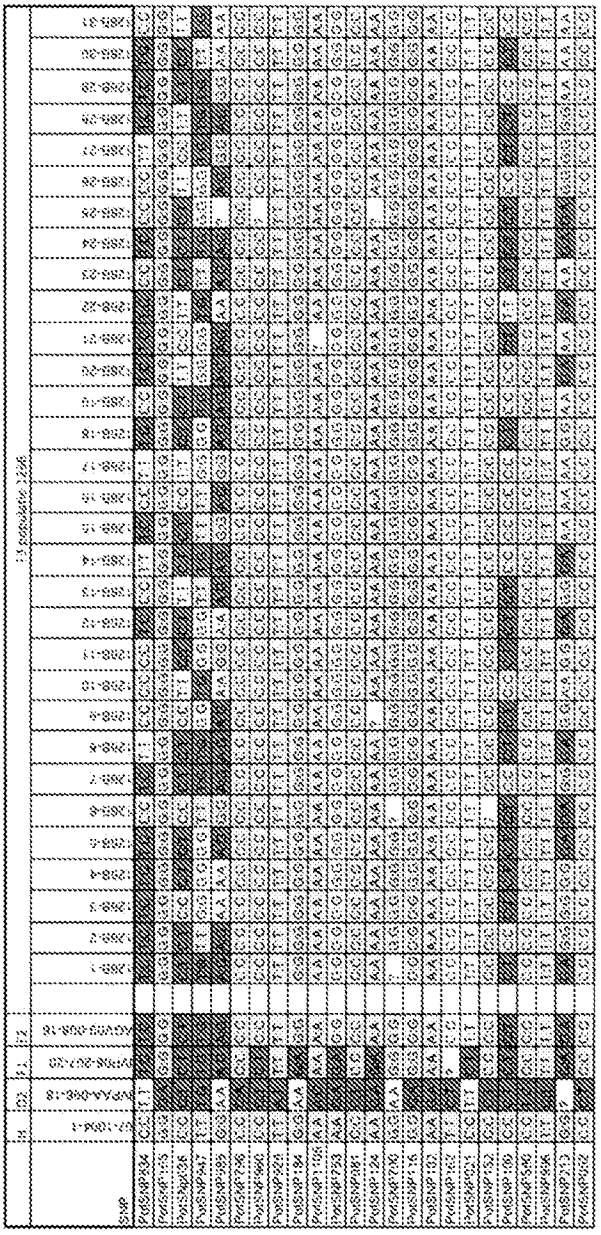


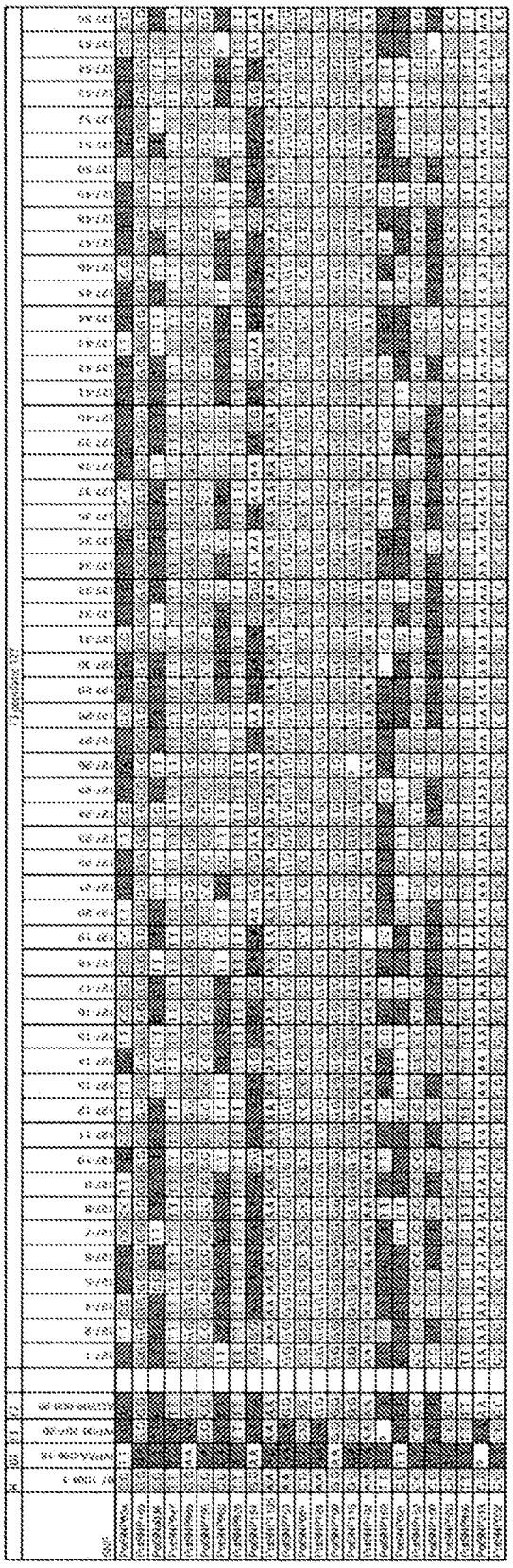












Electronic Acknowledgement Receipt

EFS ID:	21207707
Application Number:	13504156
International Application Number:	
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	23630
Filer:	Kristin Anne Connarn/Sarah Hupprich
Filer Authorized By:	Kristin Anne Connarn
Attorney Docket Number:	091876-0014
Receipt Date:	14-JAN-2015
Filing Date:	10-JUL-2012
Time Stamp:	15:00:41
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		0014_Response.pdf	1025481 2369e78045f6e6eb7bfe8325ffe5530d13dd8c0c	yes	21

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Specification	2	4
	Drawings-only black and white line drawings	5	5
	Claims	6	12
	Applicant Arguments/Remarks Made in an Amendment	13	21

Warnings:

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing

Information:

2	Miscellaneous Incoming Letter	0014_Statement.pdf	55484 4cf03176b1303a260333b17f61cdbb16e18bae9f	no	2

Warnings:

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing

Information:

3	Drawings-only black and white line drawings	0014_Drawings.pdf	5158749 6ed293c9381d7b2466ac5b7f90f05bf84678c5f9	no	11

Warnings:

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing

Information:

Total Files Size (in bytes):	6239714

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

SCORE Placeholder Sheet for IFW Content

Application Number: 13504156 Document Date: 01/14/2015

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

- Drawings – Other than Black and White Line Drawings

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

To access the documents in the SCORE database, refer to instructions below.

At the time of document entry (noted above):

- Examiners may access SCORE content via the eDAN interface.
- Other USPTO employees can bookmark the current SCORE URL (http://Score.uspto.gov/ScoreAccessWeb/).
- External customers may access SCORE content via the Public and Private PAIR interfaces.

Form Revision Date: September 30, 2013

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/504,156	Filing Date 07/10/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **01/14/2015**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 31	Minus	** 34	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 6	Minus	***7	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/PARTHENIA D. MERRILL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/504,156	07/10/2012	Willem Hendrik Lindhout	091876-0014	6337

23630 7590 05/18/2015

McDermott Will & Emery
The McDermott Building
500 North Capitol Street, N.W.
Washington, DC 20001

EXAMINER
BOGGS, RUSSELL T

ART UNIT	PAPER NUMBER
1663	

NOTIFICATION DATE	DELIVERY MODE
05/18/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

Office Action Summary	Application No. 13/504,156	Applicant(s) LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1,3-9,11-16 and 18-34* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☒ Claim(s) *21* is/are allowed.

7)☒ Claim(s) *1,3-9,12-16,18-20 and 22-34* is/are rejected.

8)☒ Claim(s) *11* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *14 January 2015* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Agventure B.V. Ex. 2009
IPR2025-00136

DETAILED ACTION

The present application is being examined under the pre-AIA first-to-invent provisions.

Claim Status

1. Claims 1-34 were examined on the merits in the Office action mailed 14 October 2014 and rejected.

Applicant responded on 14 January 2015 amending several claims and cancelling claims 2, 10 and 17.

Claims 1, 3-9, 11-16 and 18-34 are examined herein.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Withdrawal of Objections and Rejections

2. The objection under the sequence rules is withdrawn in view of Applicant's amendment to the specification on 10 July 2012; the Examiner thanks Applicant for bringing this to the Examiner's attention.

3. The objection to claims 3, 8, 9, 16, 18 (two), 19, and 33-34 is withdrawn in view of Applicant's amendments to the claims.

4. The rejection of claims 11, 19 and 21 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of their recitation of "NCIMB 41663," "NCIMB 41664," "NCIMB 41665," "NCIMB 41765," "AGVD1," "AGVD2," "AGVD3" and "AGVD15" is withdrawn in view of Applicant's overcoming the deposit rejection.

5. The rejection of claims 9 and 20 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of their recitation of the limitation "agronomically desirable traits" is withdrawn in view of Applicant's amendments to the claims.

6. The rejection of claims 15-16, 29, 32 and 34 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of their recitation of the limitation "determinable" is withdrawn in view of Applicant's amendments to the claims.

7. The rejection of claims 14-15 and 33-34 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of their recitation of the limitation "obtainable " is withdrawn in view of Applicant's amendments to the claims.

8. The rejection of claim 32 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of its recitation of the limitation "intercrossable" is withdrawn in view of Applicant's amendments to the claim.

9. The rejection of claim 20 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of its recitation of the limitation “said line" is withdrawn in view of Applicant’s amendments to the claim.

10. The rejection of claim 29 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite because of its recitation of the limitation “the resultant hybrid potato seed" is withdrawn in view of Applicant’s amendments to the claim.

11. The rejection of claim 33 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite regarding the limitation “as defined in (e)" is withdrawn in view of Applicant’s amendments to the claim.

12. The rejection of claim 33 under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite regarding the limitation “the offspring plants" is withdrawn in view of Applicant’s amendments to the claim.

13. The rejection of claims 1, 3-9, 12-13, 16, 18, and 21-34 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement is withdrawn in view of Applicant’s amendments to the claims and arguments.

14. The rejection of claims 11, 19 and 21 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement regarding the seed deposit is withdrawn in view of Applicant’s statement regarding the deposit.

15. The rejection of claims 1, 3-9, 12-16, 18-20 and 22-34 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement is withdrawn in view of Applicant's amendments to the claims.

16. The rejection of claims 1 and 3-6 under 35 U.S.C. 101 is withdrawn in view of Applicant's amendments to the claims and arguments.

17. The rejection of claims 1, 5-6, 8, 12 and 14 under 35 U.S.C. 102(b) as being anticipated by Maris (Euphytica 46:15-33 (1990)) is withdrawn in view of Applicant's amendments to the claims.

18. The rejection of claims 1, 3, 5-6, 8-9, 12, and 14 pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)) is withdrawn in view of Applicant's amendments to the claims.

19. The rejection of claims 1, 3, 5-6, 8-9, and 12-14 pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Watanabe et al. (Breed Sci 46:329-36 (1996)) in further view of Hermundstad & Peloquin (Potato Res 29:289-97 (1986)) is withdrawn in view of Applicant's amendments to the claims.

20. The rejection of claims 1, 5-6, 8, 12, 14, 16, 22-26 and 29-34 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Phumichai et al. (Genome 48:977-84 (2005) is withdrawn in view of Applicant's amendments to the claims.

21. The rejection of claims 1, 5-6, 8, 12, 14, 16, 18, 20, 22-26 and 29-34 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in

view of Phumichai et al. (Genome 48:977-84 (2005) in further view of Watanabe et al. (Breed Sci 46:329-36 (1996)) is withdrawn in view of Applicant's amendments to the claims.

22. The rejection of claims 1, 5-6, 8, 12, 14, and 27-28 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Maris (Euphytica 46:15-33 (1990)) in view of Wang & Ran (NZ J Crop Hort Sci 28:1-8 (2000)) is withdrawn in view of Applicant's amendments to the claims.

23. All objections and rejections of cancelled claims are rendered moot.

Drawings

24. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the dark boxes in Figures 4 and 5 are not legible. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Applicant submitted new drawings; however, in particular, the letters in the dark crosshatch in Figures 4 and 5 remain illegible. Additionally, Figure 3 is only marginally legible.

Specification

25. The disclosure remains objected to because of the following informalities.

The disclosure remains objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01. See page 9 (two), page 50, page 51 (four) and page 52.

No changes were marked in the paragraphs filed on 14 January 2015.

The disclosure is objected to because it refers to “Figure 9” in the replacement paragraph filed on 14 January 2015 for p. 52, ll. 19-23. No such figure exists.

Although Applicant’s amendment corrected the objection of record, the amendment appears to introduce new matter into the disclosure.

Appropriate correction is requested.

Claim Objections

26. Claim 16 is objected to because it depends on claim 1 twice – see line 4 and lines 6-7.

This is a new objection necessitated by Applicant's amendments to the claim.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

> (B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

27. Claims 8-15, 33 and 34 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

This is a new rejection necessitated by Applicant's amendments to the claims.

Claim 8 and both claims 33 and 34 recite two parental plants and an offspring plant at the minimum. In the last line of each claim, the limitation “said plants” is recited. It is indefinite as to whether this reads on all plants of the claim, including the offspring plants, and thus the metes and bounds of the claims cannot be determined.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

The following is a quotation of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

28. Claims 14-15 and 19-20 remain rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Due to Applicant's amendments to the claims, the rejection is modified from the rejection set forth in the Office action mailed 14 October 2014 as applied to the above-referenced claims. Applicant traverses the rejection in the paper filed 14 January 2015. Applicant's arguments have been fully considered but are not persuasive.

The claims are broadly drawn to a diploid, fertile, self-compatible and essentially homozygous potato line, or a seed thereof, comprising plants that have an average tuber yield of at least 200 g/plant. Independent method claims are drawn to a method to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g., crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland.

Applicant describes a breeding process according to the instant invention starting with AGVD1-3 or AGVD17 on page 37. Applicant describes obtaining the deposited lines, AGBD1 (NCIMB 41663), AGBD2 (NCIMB 41664), AGBD3 (NCIMB 41665) and AGBD17 (NCIMB 41765). Specification ("Spec."), pp. 33-34. Applicant generally describes adding an agronomically desirable trait on page 38. Applicant describes

creating the aforementioned lines in Example 1 on pages 44-45. Applicant describes creating a line containing the *Sli* gene with enhanced agricultural quality in Example 2, pp. 46-50. Applicant describes creating a molecular marker platform, i.e., SNPs, in Example 3, pp. 50-58. In Example 4, Applicant describes the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. Id., pp. 58-62.

Applicant describes the meaning of the claim term "essentially homozygous" on pages 30-31 of the instant specification and suggests that the term reflects a level of homozygosity that is above 25% or 75%. Spec., p. 37.

To claim a genus under the written description requirement, Applicant is required to describe a representative number of species to reflect the variation within the genus or structures sufficient to define the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof.

Here, in the instant application, Applicant describes only four potato lines to use in the claimed methods. Applicant fails to describe working examples of the broad genus of other potato lines falling within the scope of the claims. In contrast to the limited description, Applicant claims several large genera. Applicant fails to describe a representative number of species in comparison to these genera. These genera in particular include those set forth in claims 14 (any "diploid potato breeding line"), 15 (all "hybrid potato seed"), and 19 (all offspring).

Since the specification fails to provide an adequate written description to support the breadth of the claims, Applicant has not demonstrated possession to one of skill in the art of the instant invention as broadly as claimed at the time of filing.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Applicant addressed the rejection under 35 USC 112(a) written description but focused on other aspects, now withdrawn, of the rejection.

29. Claim 1, 3-9, 12-16, 18-20 and 22-34 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

This is a new rejection necessitated by Applicant's amendments to the claims.

Claim 1 reads on a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* comprising plants having an average tuber yield expressed in grams of flesh weight of at least 200 grams per plant wherein at least 50% of the loci in said plants are homozygous.

Independent method claims are drawn to a method to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g.,

crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland.

Applicant teaches a breeding process according to the instant invention starting with AGVD1-3 or AGVD17 on page 37. Applicant teaches obtaining the deposited lines, AGBD1 (NCIMB 41663), AGBD2 (NCIMB 41664), AGBD3 (NCIMB 41665) and AGBD17 (NCIMB 41765). Spec., pp. 33-34. Applicant generally teaches adding an agronomically desirable trait on page 38. Applicant teaches creating the aforementioned lines in Example 1 on pages 44-45. Applicant teaches creating a line containing the *Sli* gene with enhanced agricultural quality in Example 2, pp. 46-50. Applicant teaches creating a molecular marker platform, i.e., SNPs, in Example 3, pp. 50-58. In Example 4, Applicant teaches the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. Id., pp. 58-62.

Applicant teaches, in page 17 of the response filed on 14 January 2015 ("Response"), that the *Solanum tuberosum* line of the invention comprises the Sli gene from *Solanum chacoense*. and is thus distinguishable from diploid *S. tuberosum* plants as present in nature. In the specification, Applicant teaches that "[o]nly by repeated selfing of a self-compatible plant comprising the *Sli* gene derived from *S. chacoense* and the use of [it] did the inventors arrive at the product of the present invention." Spec., p. 6, ll. 5-7.

Applicant thus teaches that the invention as claimed in claim 1 is not enabled. Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

30. Claims 1, 3-6, 8-9, 12-16, 18, 20, 22-26 and 29-34 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Simmonds, Potato Res 40:191-214 (1997) in view of Lippman & Zamir, Trends Genet 23(2):61-66 (2006) in further view of Phumichai et al., Genome 48:977-84 (2005) in further view of Maris (Euphytica 46:15-33 (1990)), and in further view of Watanabe et al. (Breed Sci 46:329-36 (1996)).

This is a new rejection necessitated by Applicant's amendments to the claims.

Simmonds teaches that the production of potatoes by seed is a valuable technique because such potatoes are disease-free, and thus provides motivation (p. 194, p. 202); production of potatoes from seed is routinely used in the Third World. Simmonds, pp. 202-03. Simmonds also teaches that diploid potatoes were underutilized at the time of Simmonds' review and thus provides motivation to develop diploid potatoes. Id., e.g., p. 192, p. 209. Simmonds teaches that heterosis produces a "spectacular" increase in yield. p. 192. The benefits of using heterosis from the cross of two inbred homozygous lines is well known in the art. See, e.g., Lippman & Zamir, Trends Genet 23(2):61-66 (2006), p. 62 (Box 2). Therefore it would be obvious to one

of skill in the art at the time of Applicant's invention to develop a diploid, fertile, and essentially homozygous potato line.

Developing the line from the species *Solanum tuberosum* would be obvious in view of, e.g., the importance of this species in world agriculture. See, e.g., Spec., p. 1, ll. 13-15.

Introducing, e.g., the *Sli* gene as taught by Phumichai et al. into an self-incompatible cultivated diploid potato line would have been obvious one of skill in the art at the time of Applicant's invention. See, e.g., Phumichai et al., title, p. 977, and p. 978.

Maris teaches 2x plants that have an average tuber yield of at least 200 g/plant. See, e.g., Maris, Table 8, pp. 26-28. In any case, breeding a potato line for a high yield of tubers per plant is an obvious step.

In KSR, the Supreme Court held that:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

KSR Int'l Co. v. Teleflex Inc., 550 US 398, 417, 82 USPQ2d 1385, 1396 (2007). Given the record, creation of a *Solanum tuberosum* line as broadly as claimed in claim 1 is obvious in view of the above references. Claim 5, drawn to a plant, and claims 6 and 7, drawn to a seed thereof, are also obvious.

Simmonds teaches breeding resistance into potato lines (Simmonds, p. 192) and Watanabe et al. teaches breeding pest resistance into potato lines. Watanabe et al.,

title. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to add, e.g., nematode resistance to a potato line. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Thus claim 3 is obvious, and a method to produce such plants, i.e., claim 9, is also obvious.

On pages 16 & 17, Maris, for example, also teaches all the steps of the method of claims 8 and 12. Additionally, several plants listed on Maris Table 8, pp. 26-28 have a tuber yield of over 200 g per plant. As noted above, obtained a homozygous line is obvious in view of the art. Thus claims 8 and 12 are obvious. Further, the potato lines of Maris are also obtainable by the steps of claim 8 and thus claim 14 is obvious; a seed of such a plant is also obvious and thus claim 15 is obvious.

Maris does not teach potato plants having an average fresh weight of at least 500 grams as recited in claim 4. Maris, however, does teach potato plants having a dry matter yield in a range of approximately 111 g per plant to 158 g per plant. Id., Table 8, p. 28. Thus, for example, a plant with an average fresh weight which only displays a 316% increase with respect to its dry weight is obvious in view of the plants of Table 8 of Maris, and furthermore, obtaining a larger plant is obviously a beneficial phenotype, and thus claim 4 is obvious.

Applicant teaches that wild species of potatoes are self-incompatible (spec., p. 4), and the use of wild potato species is taught by Watanabe et al. to generate pest-resistant potatoes (Watanabe, p. 329), and thus the use of the second potato plant as recited in claim 13, and thus claim 13 is obvious.

In view of the teachings of Phumichai et al. regarding the heterozygosity of two lines (see, e.g., page 978), two breeding lines that comprise at least 20% contrasting homozygous loci are obvious in view of the lines of, e.g., Maris, and thus claims 16 and 29 are obvious. A seed of a plant produced by the method of claim 16, and growing a plant from the seed, pollen or an ovule from the plant, and a tuber from the plant are also obvious and thus claims 22-26 are obvious.

Simmonds teaches breeding resistance into potato lines (Simmonds, p. 192) and Watanabe et al. teaches breeding pest resistance into potato lines. Watanabe et al., title. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to add, e.g., nematode resistance to a potato line. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Thus a method to produce such plants, i.e., claim 18 and 20 are obvious.

Creating a plant line that is, e.g., 50% homozygous, is routine the agricultural art (see, e.g., Lippman & Zamir, entire article), and thus claims 32 and 34 are obvious. All the steps of the method of claim 30 are taught by the above references and thus claim 30 is obvious, as well as a plant produced by the method of claim 30, and so claims 30 and 31 are obvious.

In view of the above, claim 33 recites backcrossing steps routine in the art and thus claim 33 is obvious.

~~31.~~ Claims 27 and 28 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Simmonds, Potato Res 40:191-214 (1997) in view of Lippman & Zamir, Trends Genet 23(2):61-66 (2006) in further view of Phumichai et al., Genome 48:977-84 (2005) in further view of Maris (Euphytica 46:15-33 (1990)), and in further view of Wang & Ran (NZ J Crop Hort Sci 28:1-8 (2000)).

This is a new rejection necessitated by Applicant's amendments to the claims.

Claims 1, 16 and 23 are obvious in view of the teachings of Simmonds, Lippman & Zamir, Phumichai and Maris as set forth *supra*. The above references do not teach the use of tissue culture. Wang & Ran teach the value of using tissue culture to improve agronomically desirable traits of potatoes.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the teachings of Maris and use the lines of Maris according to the teachings of Wang & Ran to create tissue cultures from the potatoes of Maris and regenerate plants therefrom. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Therefore claims 27 and 28 are obvious.

Allowable Subject Matter

32. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

33. Claim 21 is allowed.

34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUSSELL BOGGS whose telephone number is (571)272-2805. The examiner can normally be reached on Monday through Friday from 8:30 AM to 5:00 PM (Eastern Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shubo (Joe) Zhou, can be reached at (571)-272-0724. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RUSSELL BOGGS/
Examiner, Art Unit 1663

/MEDINA A IBRAHIM/
Primary Examiner, Art Unit 1662

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Simmonds, Potato Res 40:191-214 (1997)
	V	Lippman & Zamir, Trends Genet 23(2):61-66 (2006)
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	54436	potato.ab. or tuberosum.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2015/05/11 16:03
L2	99	L1 and inbred	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2015/05/11 16:03
L3	17	L2 and (diploid or 2n)	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2015/05/11 16:03

EAST Search History (Interference)

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13504156	LINDHOUT ET AL.
	Examiner	Art Unit
	RUSSELL BOGGS	1638

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
STIC search of STN	8/12/14	/RTB/
STN, EAST and Google search as per attached	9/28/14	/RTB/
STIC search	9/23/14	/RTB/
EAST search as per attached	5/11/15	/RTB/
discuss claims and rejections with A.M. Grunberg	5/8/15	/RTB/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/RUSSELL BOGGS/ Examiner.Art Unit 1638	

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	13/504,156	Filing Date	2012-07-10	Docket Number (if applicable)	091876-0014	Art Unit	6337
First Named Inventor	Willem Hendrik LINDHOUT			Examiner Name	BOGGS, Russell T		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 50-1133

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature		Date (YYYY-MM-DD)	2015-11-18
Name	Kristin A. Connarn	Registration Number	57025

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 11/18/15 Signature: (Sarah Hupprich)

Docket No.: 091876-0014
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem Hendrik LINDHOUT et al.	:	Customer Number: 23630
Application No.: 13/504,156	:	Confirmation No.: 6337
Filed: July 10, 2012	:	Art Unit: 1663
For: Hybrid Seed Potato Breeding	:	Examiner: BOGGS, Russell T

RESPONSE TO FINAL OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed May 18, 2015, please amend the above-identified U.S. patent application as directed herein. A Petition for Extension of Time (3 months), Request for Continued Examination (RCE) and the applicable fees are being filed concurrently herewith. Reconsideration and further examination of the present application in light of the following:

Amendments to the Specification begin on Page 2.

Amendments to the Drawings begin on Page 4.

Amendments to the Claims begin on Page 5.

Remarks/Arguments begin on Page 14.

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IPR2025-00136
Page 541

AMENDMENTS TO THE SPECIFICATION

In the following amendment to the specification, [[deletions are double bracketed]] or ~~shown with strike through~~, and additions are underlined.

Please amend the paragraph at page 9, lines 3-9 as follows:

> Proper (commercial) sources of tetraploid cultivars are provided through the European Cultivated Potato Database (ECPD) at ~~http://~~www.europotato.org/menu.php and/or the Potato Pedigree Database of the expertise group Plant Breeding (a cooperation between the Laboratory of Plant breeding of Wageningen UR, the Netherlands) and the business unit Biodiversity and breeding of Plant Research International (PRI), Wageningen, the Netherlands at ~~http://~~www.plantbreeding.wur.nl/potatopedigree/.

Please amend the paragraph at page 50, lines 19-21 as follows:

> Since the present inventors have access to the first draft sequence of the potato genome (~~www.potatogenome.net~~ www.potatogenome.net) it was possible to compare the mRNA with the genomic DNA sequence including the intervening sequences.

Please amend the paragraph at page 51, lines 2-5 as follows:

> This resulted in 279 and 453 unique BLAST hits representing the occurrence of only one copy in the potato genome sequence of *Solanum tuberosum* Group Phureja DMl-3 516R44 (CIP801092) as known hitherto (Potato Genome Sequencing Consortium, ~~www.potatogenome.net~~ www.potatogenome.net).

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Please amend the paragraph at page 51, lines 13-15 as follows:

A total of 100 sequences were then removed for having incomplete matches of only 35 up to 94 nucleotides within a scaffold of a doubled monoploid (DM-3 516R44; ~~www.potatogenome.net~~ www.potatogenome.net).

Please amend the paragraph at page 51, lines 20-23 as follows:

These SNPs even allowed to discriminate between the five genotype classes that occur in tetraploids (Voorrips et al, EAPR-EUCARPIA congress "Potato Breeding after completion of the DNA Sequence of the Potato Genome", 27-30 June 2010, Wageningen, the Netherlands, e-publication at ~~http://~~edepot.wur.nl/143559, pg 42).

Please amend the paragraph at page 52, lines 2-5 follows:

The 100 SNP sequences selected as described above were used in a KASPar SNP genotyping system (KBioscience Ltd. Hoddesdon, UK; ~~http://~~www.kbioscience.co.ukllab%20services/SNP%20Genotyping/genotyping_chemistry.html).

Please amend the paragraph at page 52, lines 19-20 as follows:

All markers showed a high frequency of occurrence in the diploid potato germplasm used in this experiment ~~(Appendix III)~~ (Table 6).

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Page 543

AMENDMENTS TO THE DRAWINGS

Please replace the originally filed drawing sheets with the replacement sheets submitted herewith.

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Page 544

AMENDMENTS TO THE CLAIMS

The below claim listing will replace all prior versions of the claims.

1. (Currently Amended) A diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing Solanum species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of the loci in said plants are homozygous, wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatible Solanum species crossable to S. tuberosum, and wherein at least 25% of the plants of said line produce seed-carrying berries.

2. (Canceled).

3. (Previously Presented) The potato line of claim 1, wherein said at least one agronomically desirable trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

4. (Previously Presented) The potato line of claim 1, wherein plants of said line when mature attain an average fresh weight of the foliage and shoots of at least 500 grams per plant.

5. (Previously Presented) A plant of a line according to claim 1.

6. (Currently Amended) ~~A seed~~ Seeds or tubers of a plant according to claim 5.

7. (Currently Amended) Seeds according to claim 6, wherein said seeds are ~~is~~ a uniform hybrid potato seeds.

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8. (Currently Amended) A method for producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, comprising:

(a) providing a ~~first~~ potato plant, which ~~first~~ potato plant is a plant of a ~~first~~ diploid, self-compatible~~, fertile and essentially homozygous~~ potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, wherein self-compatibility in said *Solanum tuberosum* potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*, selfing said plant of said diploid, self compatible potato line for at least 3 times while selecting for plants that produce fertile offspring to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line;

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid or tetraploid potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first and second potato plant to provide seeds and collecting said seeds to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plant and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plant or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, to thereby provide a diploid, fertile, self-compatible and essentially homozygous

potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

and wherein at least 50% of the loci in ~~said~~ the plants provided in step (e) are homozygous.

9. (Previously Presented) The method of claim 8, wherein said steps (a)-(e) are repeated and wherein step (b) comprises the provision of a second potato plant, wherein said second potato plant is a donor for an additional agronomically desirable trait, wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

10. (Canceled).

11. (Previously Presented) The method of claim 8, wherein said first potato plant is a plant of potato line NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively.

12. (Previously Presented) The method of claim 8, wherein said second potato plant is a plant of a second diploid, fertile, self-compatible and essentially homozygous potato line.

13. (Previously Presented) The method of claim 8, wherein said second potato plant is a plant of a second diploid, fertile, self-incompatible potato line.

14. (Currently Amended) [[A]] An essentially homozygous diploid potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of

other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, more preferably an elite line, obtained by the method of claim 8.

15. (Currently Amended) A hybrid potato seed of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* obtained by crossing plants of a first and second diploid potato breeding line according to claim 14, wherein said plants of said first and second diploid potato breeding line contain at least 20 % contrasting homozygous loci as determined by molecular marker analysis.

16. (Currently Amended) A method for producing a uniform hybrid potato seed, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a first diploid, fertile, self-compatible and essentially homozygous potato line ~~according to claim 1,~~ of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of the loci in said first potato plant are homozygous; and wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum,*

(b) providing a second potato plant, wherein said second potato plant is a plant of a second diploid, fertile, self-compatible and essentially homozygous potato line ~~according to claim 1,~~ of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said second potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of the loci in said second potato plant are homozygous; and wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*, and wherein said first and second plant

contain at least 20 % contrasting homozygous loci as determined by molecular marker analysis, and

(c) cross pollinating said first and second potato plant and allowing one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide a hybrid offspring seed.

17. (Canceled).

18. (Previously Presented) Method according to claim 16, wherein at least one of said first and second potato plants comprises at least one agronomically desirable trait selected from the group consisting of insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color and cold-sweetening resistance.

19. (Currently Amended) The method of claim 16, wherein said first potato ~~line is a diploid, self-compatible and essentially homozygous offspring potato plant comprising the *Sli[[-]]* gene, preferably wherein said first potato~~ plant is a plant of potato lines NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland, or a diploid, self-compatible and essentially homozygous offspring potato plant thereof, wherein said diploid, self-compatible and essentially homozygous offspring plant is of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*.

20. (Currently Amended) The method of claim 16, wherein said second potato plant is a plant of a second diploid, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said second potato line comprising an additional agronomically desirable trait; and wherein said trait is insect tolerance, nematode

resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

21. (Original) A seed of potato lines NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland.

22. (Previously Presented) A seed produced by the method of claim 16.

23. (Previously Presented) A hybrid potato plant, or part thereof, produced by growing the seed of claim 16.

24. (Previously Presented) Pollen or an ovule of the plant of claim 23.

25. (Previously Presented) A tuber from the plant of claim 23.

26. (Previously Presented) A potato plant having all of the physiological and morphological characteristics of the plant of claim 23.

27. (Previously Presented) A tissue culture of the plant of claim 23.

28. (Previously Presented) A potato plant regenerated from the tissue culture of claim 27.

29. (Previously Presented) A method for producing a hybrid potato seed wherein the method comprises crossing a first potato plant with a second potato plant and harvesting a hybrid potato seed resulting from said crossing, wherein said first or second parent potato plant is the potato plant of claim 5, wherein said first and second parent potato have at least 20 % contrasting homozygous loci as determined by molecular genetic marker analysis.

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30. (Previously Presented) A method of producing a hybrid potato plant, said method comprising producing a seed according to a method of claim 16 and growing said seed into a potato plant.

31. (Previously Presented) A potato plant produced by the method of claim 30, or a tuber thereof.

32. (Currently Amended) A set of 2 homozygous diploid, fertile, self-compatible and essentially homozygous potato lines of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* according to claim 1 for intercrossing, ~~comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant,~~ wherein each of said lines differ from another line in said set by having at least 20 % contrasting homozygous loci as determined by molecular genetic marker analysis; and wherein at least 50% of the loci in said plants are homozygous.

33. (Canceled).

34. (Currently Amended) A hybrid potato seed which seed, when sown produces a diploid, fertile, self-compatible and essentially heterozygous potato plant of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, said plant being obtained by:

(a) providing a first diploid, fertile, self-compatible and essentially homozygous potato line comprising plants of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein at least 50% of the loci in a plant of said first

potato line are homozygous; and wherein self-compatibility in said first potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum;*

(b) providing a second diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein said first and second plant contain at least 20 % contrasting homozygous loci as determined by molecular marker analysis, and wherein at least 50% of the loci in a plant of said second potato line are homozygous; and wherein self-compatibility in said second potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum* and

(c) cross pollinating said first and second potato plant and allowing at least one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide a hybrid offspring seed;

~~and wherein at least 50% of the loci in said plant are homozygous~~.

35. (New) A method for producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, comprising:

(a) providing a first potato plant, which first potato plant is a plant of potato line NCIMB 41663, NCIMB 41664, NCIMB 41665, or NCIMB 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively;

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid or tetraploid potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to

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Solanum tuberosum, said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first and second potato plant to provide seeds and collecting said seeds to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plant and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plant or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, to thereby provide a diploid, fertile, self-compatible and essentially homozygous potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

and wherein at least 50% of the loci in a plant provided in step (e) are homozygous.

36. (New) Starch, potato chips, or French fries produced from the tuber of any of claims 5, 25 or 31.

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REMARKS/ARGUMENTS

Status of Claims

Claims 1, 3-9, 11-16 and 18-34 were pending in this application. Claims 1, 6-8, 14-16, 19, 20, 32 and 34 have been amended. Claim 33 is canceled without prejudice. New claims 35 and 36 are added.

Support for these amendments can be found throughout the application. For example, support for the amendment to claims 1, 8, 14-16, 19, 20, 32 and 34 is found at page 17, lines 14-17.

Support for the amendment to claim 1 is found at page 15, lines 29-31 and at page 28, lines 7-8 and at page 28, lines 13-14.

Support for new claim 35 can be found in the specification at page 7, lines 8-28; page 9, lines 10-13; page 17, lines 14-17 and page 21, lines 1-5.

Support for new claim 36 can be found in the specification at page 64, lines 20-21.

Claims 6 and 7 have been amended to correct informalities. No new matter is believed to be added herein.

Drawings

The drawings were objected to as Figure 3 was marginally legible and Figures 4-5 were not legible. Replacement sheets of drawings are submitted herewith. The dark boxes in Figures 4 and 5 have been deleted. Figures 3-5 have been amended in compliance with 37 CFR 1.121 (d). Amendments to the drawings are supported, for example, by original Figures 3, 4 and 5 of the application as filed. No new matter has been added.

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Specification

The specification has been amended to delete the embedded hyperlink and/or other form of browser-executable code. The specification has been amended to correct informalities. The amendments do not add new matter.

Claim Objections

Claim 16 is objected to because it depends on claim 1 twice. Claim 16 has been amended to delete reference to claim 1 in both instances.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 8-15, 33 and 34 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite, for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. According to the Examiner, claims 8, 33 and 34 are indefinite in the recitation of the term 'said plants'.

Claim 33 was canceled. For clarity purposes, the term 'said plants' in claim 8 was replaced by the term 'the plants provided in step (e)'. The phrase 'and wherein at least 50% of the loci in said plant are homozygous' was deleted in claim 34.

Rejections under 35 U.S.C. § 112, first paragraph

A. Claims 14-15 and 19-20 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

According to the Examiner, the claims are broadly drawn to a diploid, fertile, self-compatible and essentially homozygous potato line, or a seed thereof, comprising plants that have an average tuber yield of at least 200 g/plant. Independent method claims are drawn to a method

to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g., crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland. According to the Examiner, The applicant claims a large genus, whereas the instant application describes only four potato lines to use in the claimed methods.

Applicant respectfully disagrees. To advance prosecution, claims 14-15 and 19-20 have been amended.

Amended claim 14 is drawn to an essentially homozygous diploid potato breeding line of the species *Solanum tuberosu*m or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*.

Amended claim 15 is drawn to a hybrid potato seed of the species *Solanum tuberosu*m or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*.

Claims 19 and 20 have been amended to further define the plant species as the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*.

Applicant describes the invention for the species *Solanum tuberosum* and *Solanum tuberosum* comprising introgressions from other tuber-bearing *Solanum* species. The applicant has shown that the methods as proposed are effective in generating a representative number of new plants that are essentially homozygous and have a high tuber yield for this potato species.

The Applicant has demonstrated that the methods can be used to produce a "diploid potato breeding line" of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgressions from other tuber-bearing *Solanum* species.

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The Applicant has demonstrated that the methods can be used to produce a "hybrid potato seed" of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgressions from other tuber-bearing *Solanum* species.

Further, the Applicant has demonstrated that the methods can be used to produce offspring of a diploid potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgressions from other tuber-bearing *Solanum* species.

Example 4 discloses the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations (*see* specification at page 58-62).

Reconsideration and further examination are respectfully requested.

B. Claims 1, 3-9, 12-16, 18-20 and 22-34 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Applicant respectfully disagrees. To advance prosecution, claims 1, 6-8, 14-16, 19, 20, 32 and 34 have been amended.

The present invention discloses a provision of *S. tuberosum* plants that are homozygous and have a high tuber-yield. This combination has never been obtained. Therefore, there exists no hybrid breeding program for potato, such as present in, for instance, tomato.

In order to obtain homozygous *S. tuberosum* plants, several routes can in principle be followed. One such route is doubling haploids. However, this route has proven unsuccessful (*see* specification at paragraph bridging pages 36 and 37 and Example 1 at page 44, lines 5-14).

The essential problem that the invention solves is not the provision of self-compatibility in *S. tuberosum*. Self-compatibility is a trait that is known to be present in diploid *S. tuberosum* (*see* specification at page 15, lines 29-31). Cultivated potato (*Solanum tuberosum*) is usually self-incompatible, but self-compatibility can be introduced from related species (*see* specification at page 15, lines 29-31). The applicant has demonstrated that self-compatibility in

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the potato lines obtained is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*.

In practice, the applicant has thus used the prior art teaching of introducing self-compatibility from related species. This is now indicated in claim 1, and the other rejected claims. It is therefore submitted that the rejection is overcome by amendment.

Reconsideration and further examination are respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 1, 3-6, 8-9, 12-16, 18, 20, 22-26 and 29-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Simmonds (*Potato Res* 40:191-214 ,1997) in view of Lippman & Zamir (*Trends Genet* 23(2):61-66 ,2006) in further view of Phumichai et al. (*Genome* 48:977-84 ,2005) in further view of Maris (*Euphytica* 46:15-33,1990), and in further view of Watanabe et al. (*Breed Sci* 46:329-36,1996).

According to the Examiner, based on the teachings of Simmonds and Lippman, it would be obvious to develop a diploid, fertile, and essentially homozygous potato line and furthermore it would be obvious to do this in a line from the species *Solanum tuberosum.* In the Examiner's opinion, introducing, e.g., the *Sli* gene as taught by Phumichai et al. into a self-incompatible cultivated diploid potato line would be obvious for one of ordinary skill in the art. According to the Examiner, breeding a potato line for a high yield of tubers per plant is an obvious step in view of Maris.

Applicant respectfully disagrees. Without acquiescing to the merits of the rejection and solely to expedite prosecution, claims 1, 6, 8, 14-16, 19, 20, 32 and 34 have been amended.

There is a general prejudice that production of homozygous true breeding lines of potato would not be possible (*see* specification at page 5, lines 1-28). The instant invention has overcome the prejudice that homozygous potato could not be developed due to inbreeding

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depression (*see* specification at page 37, lines 21-32). Applicants have used a strategy of selfing and "selecting for plants that produce fertile offspring" (*see* for e.g., claim 8). This step of selecting for plants that produce fertile offspring has never been employed in potato breeding. This is because potato breeders select for vigour and high tuber yield.

Surprisingly, such successive rounds of selfing while selecting for plants that produce fertile offspring eventually resulted in plants with progressively improved fertility and vigour. Without wishing to be bound by theory, the applicant believes that this manner of selection indeed allowed the removal of a sufficient amount of deleterious genes from the *Solanum tuberosum* germplasm.

The results were unexpected, since selection for fertile plants has usually been associated with selecting for heterozygosity, not homozygosity as taught by Phumichai et al.

> "*The slower than expected decline in heterozygosity has been reported by Brouwerand Osborn (1997) with inbreeding diploid alfalfa and by Scotti et al. (2000) with inbreeding tetraploid alfalfa. Consequential selection for vigor and fertility during selfing has been suggested as the cause (Brouwer and Osborn 1997). We previously suggested that reproductive traits, such as flowering versus nonflowering and the degree of pollen production, were strongly correlated with heterozygosity, and selection for fertility favored the more heterozygous plants (Phumichai et al. 2004)*".
>
> (*see* Phumichai et al. (*Genome* 48:977-84, 2005 at page 982, paragraph bridging the left and right columns).

The applicants were the first to follow the strategy that during the inbreeding process, the selection process of suitable offspring plants having an increased level of homozygosity should not be based on selecting vigorous plants having high tuber yields, but on selecting self-compatible plants having the highest level of fertility.

For any potato breeder, this is a fully counterintuitive process. Potato breeders attempt to maximize the vigor of the plant and in particular the tuber yield while minimizing the amount of flowers and berries produced. After all, and in contrast to for instance tomato, the berries have no agronomic value, and cultivation of flowering and berries-producing potato plants may

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result in segregated seeds being shed that may grow into undesirable plants in commercial production fields. Hence, flowers, berries and viable seeds are not considered valuable and are selected against, while strong plants with high tuber yields are selected for further rounds of breeding.

The applicants demonstrated that an increase in vigor is possible when a sufficient level of fertility is attained, and that any premature selection for vigor, results in ushering or selection for deleterious genes. Based on this finding, the applicants made the first cross between a diploid self-compatible potato line (indicated as the self-incompatibility donor) and a diploid vigorous line of *S. tuberosum*, optionally backcrossed against the self-incompatibility donor, and continued the selfing process to increase the homozygosity, while again selecting for fertility. This resulted surprisingly in a method for producing essentially homozygous inbred and diploid *S. tuberosum* plants that were fertile and vigorous.

There are several breeding methods that could be followed, when developing a hybrid true potato seed. When attempting to provide improved potato breeding methods via homozygous diploids, the skilled person may, again, choose from a vast number of strategies other than repeated selfing or inbreeding, including doubling haploids, and ovule or anther culture. Also, a person of ordinary skill could chose to provide an improved "cultivated diploid potato" germplasm based on mixed *S. stenotomum* / *S. phureja* material as taught by Phumichai et al. However, the prior art does not teach or suggest that such a method would succeed based on *S. tuberosum* due to inbreeding depression. There is no reasonable expectation of success for inbreeding of *S. tuberosum* diploid material.

In view of the foregoing, the claims are not obvious. Reconsideration and further examination are respectfully requested.

CONCLUSION

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Should the Examiner be of the view that an interview would expedite consideration of the application, request is made that the Examiner telephone the applicants' attorney at (617) 535 4453 in order that any outstanding issues be resolved.

Applicants have included the fee for a three-month extension of time fee and RCE. The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1133, under Order No. 091876-0014 from which the undersigned is authorized to draw.

Respectfully submitted,

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Date: November 18, 2015

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Electronic Patent Application Fee Transmittal

Application Number:	13504156
Filing Date:	10-Jul-2012
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Filer:	Kristin Anne Connarn
Attorney Docket Number:	091876-0014

Filed as Small Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	2253	1	700	700
Miscellaneous:				
Request for Continued Examination	2801	1	600	600
		Total in USD ($)		**1300**

Electronic Acknowledgement Receipt

EFS ID:	24115478
Application Number:	13504156
International Application Number:	
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Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	23630
Filer:	Kristin Anne Connarn/Sarah Walsh
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Drawings-only black and white line drawings	0014_Drawings.pdf	1098938 0fc98270d4525ee7e200f5414595f18473230971	no	11
Warnings:					
Information:					
2	Extension of Time	0014_Ext.pdf	49530 e60111e505ec0b44cf0496a10632aac5f8efe643	no	1
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	0014_RCE.pdf	118390 fa6051fbfceb02e4f240ca190f4e9e2257b28823	no	3
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
4		0014_Response.pdf	978269 8cd4cbf25f4a8582ba7ffa8a32326a4098f643d8	yes	21

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Specification	2	3
Drawings-only black and white line drawings	4	4
Claims	5	13
Applicant Arguments/Remarks Made in an Amendment	14	21

Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	32248 f73dcb1d1779dc8447e5ecff2eab54329879e188	no	2

Agventure B.V. Ex. 2009
IPR2025-00136
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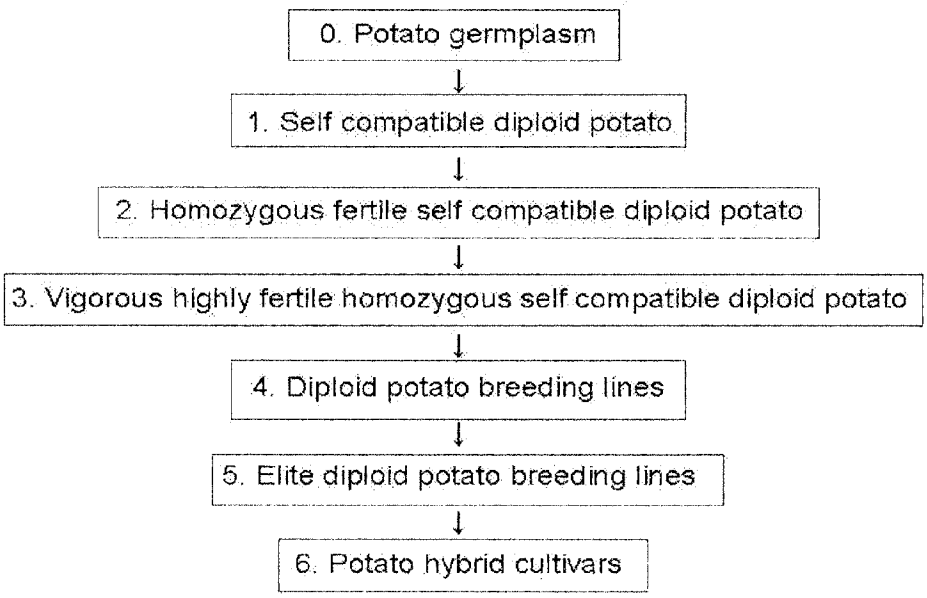
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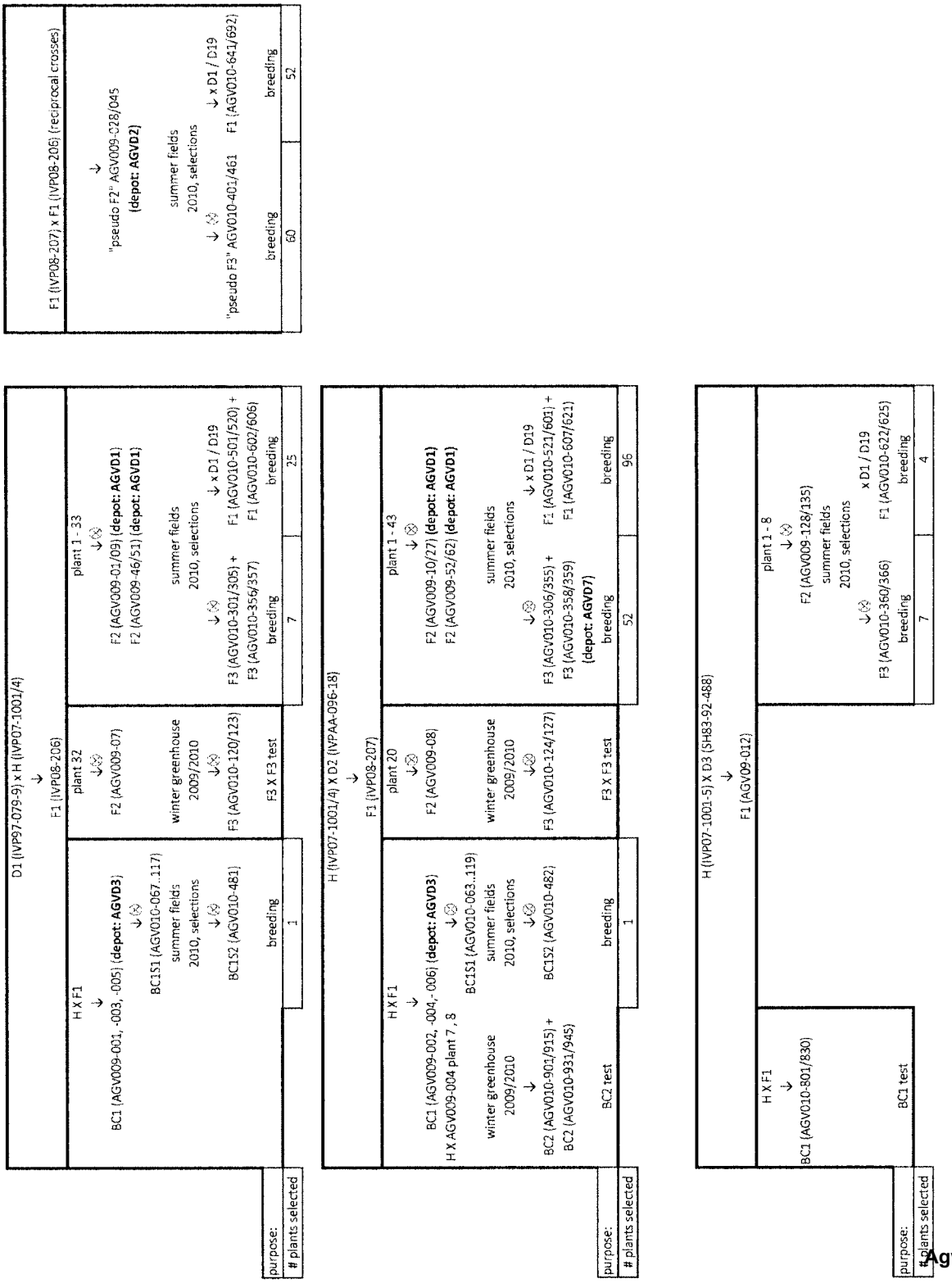
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

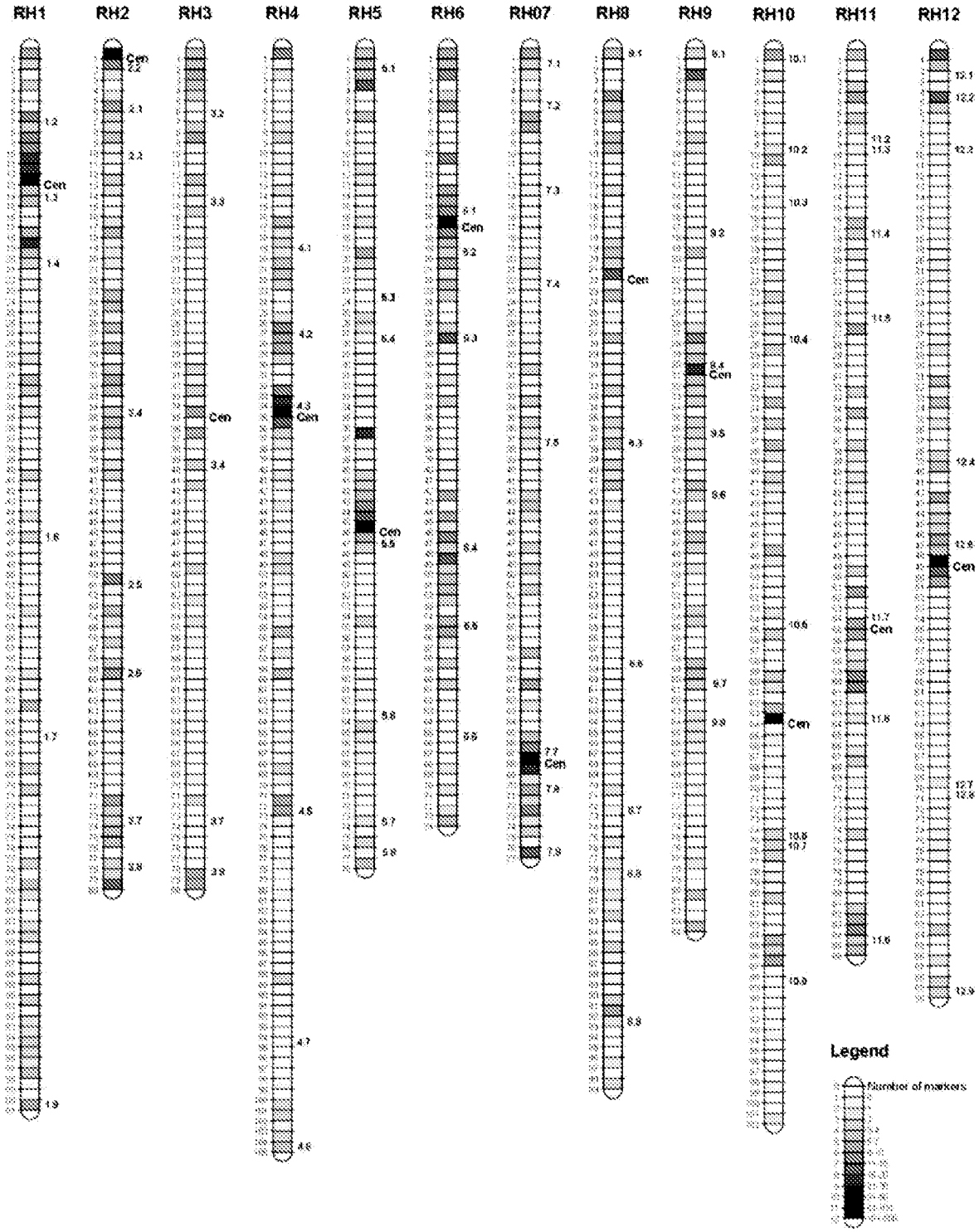
New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.


0. Potato germplasm
1. Self compatible diploid potato
2. Homozygous fertile self compatible diploid potato
3. Vigorous highly fertile homozygous self compatible diploid potato
4. Diploid potato breeding lines
5. Elite diploid potato breeding lines
6. Potato hybrid cultivars


F1 (IVP08-207) x F1 (IVP08-206) (reciprocal crosses)
"pseudo F2" AGV009-028/045
(depot: AGVD2)
summer fields
2010, selections
↓ x D1 / D19
"pseudo F3" AGV010-401/461
F1 (AGV010-641/692)
breeding
breeding
60
52
D1 (IVP97-079-9) x H (IVP07-1001/4)
F1 (IVP08-206)
H X F1
plant 32
plant 1 - 33
BC1 (AGV009-001, -003, -005) (depot: AGVD3)
BC1S1 (AGV010-067..117)
summer fields
2010, selections
BC1S2 (AGV010-481)
F2 (AGV009-07)
winter greenhouse
2009/2010
F3 (AGV010-120/123)
F2 (AGV009-01/09) (depot: AGVD1)
F2 (AGV009-46/51) (depot: AGVD1)
summer fields
2010, selections
↓ x D1 / D19
F3 (AGV010-301/305) +
F3 (AGV010-356/357)
F1 (AGV010-501/520) +
F1 (AGV010-602/606)
F3 X F3 test
breeding
breeding
purpose:
plants selected
1
7
25
H (IVP07-1001/4) X D2 (IVPAA-096-18)
F1 (IVP08-207)
H X F1
plant 20
plant 1 - 43
BC1 (AGV009-002, -004, -006) (depot: AGVD3)
H X AGV009-004 plant 7, 8
BC1S1 (AGV010-063..119)
summer fields
2010, selections
BC2 (AGV010-901/915) +
BC2 (AGV010-931/945)
BC1S2 (AGV010-482)
F2 (AGV009-08)
F2 (AGV009-10/27) (depot: AGVD1)
F2 (AGV009-52/62) (depot: AGVD1)
summer fields
2010, selections
↓ x D1 / D19
F3 (AGV010-124/127)
F3 (AGV010-306/355) +
F3 (AGV010-358/359)
(depot: AGVD7)
F1 (AGV010-521/601) +
F1 (AGV010-607/621)
F3 X F3 test
breeding
breeding
purpose:
plants selected
BC2 test
1
52
96
H (IVP07-1001-5) X D3 (SH83-92-488)
F1 (AGV09-012)
H X F1
plant 1 - 8
BC1 (AGV010-801/830)
F2 (AGV009-128/135)
summer fields
2010, selections
x D1 / D19
F3 (AGV010-360/366)
F1 (AGV010-622/625)
breeding
breeding
purpose:
plants selected
BC1 test
7
4


RH1
RH2
RH3
RH4
RH5
RH6
RH07
RH8
RH9
RH10
RH11
RH12
Cen
Legend
Number of markers

SNP	07-1004-01	IVP97-079-9	IVPAA-096-18	SH83-92-488	C	E	SH83-92-488	RH89-039-16	3728-16	IVP92-057-3	IVP98-082-14	IPV02-089-5	IVP05-113-1	IVP05-122-24	IVB06-142-12	IVB06-145-2	IVB06-148-13	IVP06-149-12	IVP06-155-9	IVP06-161-16	IVPAA-134-16
PotSNP072	A:A	A:A	G:A	G:A	G:A	A:A	G:A	A:A	G:A	G:A	A:A	A:A	G:G	G:A	G:A	A:A	G:A	G:A	A:A	A:A	A:A
PotSNP834	C:C	T:C	T:T	T:C	T:C	C:C	T:C	T:C	C:C	T:T	T:C	T:C	X	T:C	T:C	T:C	C:C	T:T	T:T	T:C	C:C
PotSNP645	T:T	X	T:T	T:G	X	G:G	T:G	G:G	G:G	G:G	G:G	T:G	T:G	G:G	T:T	G:G	G:G	G:G	T:G	G:G	G:G
PotSNP1034	A:A	G:A	G:A	A:A	G:G	G:A	A:A	G:G	G:A	G:A	A:A	A:A	A:A	A:A	G:G	G:A	G:G	G:A	G:A	G:A	G:A
PotSNP987	C:C	C:A	C:A	X	X	C:A	C:A	C:C	C:C	C:C	C:A	C:A	C:C	X	C:C	C:A	C:C	C:A	C:C	C:A	C:A
PotSNP185	T:T	C:C	C:C	C:C	C:C	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP252	T:T	T:T	G:A	G:A	G:A	G:A	G:A	A:A	T:T	G:A	G:A	G:G	G:A	G:A	G:A	G:A	G:A	G:G	T:T	G:A	G:A
PotSNP1139	G:G	G:G	G:A	G:G	G:G	G:A	G:G	G:G	X	G:G	G:G	G:G	G:A	G:G	G:G	G:A	G:G	G:G	G:A	G:G	G:G
PotSNP038	C:C	C:T	C:T	C:T	C:T	C:T	C:T	C:T	C:T	T:T	C:C	T:T	C:C	C:C	C:T	C:T	T:T	T:T	T:T	C:T	C:T
PotSNP910	A:A	A:A	T:A	A:A	T:A	T:A	T:A	A:A	T:A	T:T	T:A	T:A	T:A	T:A	A:A	A:A	A:A	T:A	T:A	T:A	T:T
PotSNP106	G:G	G:G	G:G	G:G	G:T	G:G	G:T	G:G	G:T	G:G	G:T	G:T	G:T	T:T	G:G	G:G	G:G	T:T	G:T	G:G	G:G
PotSNP2883	A:A	A:A	A:A	A:A	A:G	A:G	A:G	A:G	A:G	A:A	G:G	A:A	A:G	A:G	A:G	A:G	A:G	A:G	G:G	A:G	A:A
PotSNP1401	A:A	G:A	G:G	G:G	G:A	G:A	G:A	G:G	G:A	G:G	G:G	G:G	A:A	G:G	A:A	A:A	G:G	G:G	A:A	G:A	G:G
PotSNP1249	C:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C
PotSNP1257	A:A	A:C	A:A	A:C	A:C	A:A	A:C	A:C	A:C	A:A	A:A	A:A	A:C	A:C	A:C	A:C	A:C	A:A	A:C	A:C	A:A
PotSNP947	T:T	T:G	T:G	T:T	T:T	T:T	T:G	T:G	T:T	T:T	T:T	T:T	T:G	T:G	T:G	G:G	A:A	T:T	T:G	T:G	T:T
PotSNP055	G:G	G:G	G:A	G:A	G:A	A:A	G:G	G:A	G:A	G:A	G:A	G:G	G:G	G:A	G:A	X	G:A	G:G	A:A	G:A	G:A
PotSNP985	G:G	A:A	A:A	G:G	A:G	A:G	A:G	A:G	A:G	G:G	G:G	X	A:G	G:G	A:A	A:A	A:G	A:G	A:G	A:A	A:G
PotSNP1083	T:T	T:T	C:T	C:T	C:T	C:T	C:T	C:T	T:T	C:T	T:T	T:T	C:T	T:T	T:T	T:T	C:T	T:T	C:T	C:T	C:C
PotSNP423	G:G	G:G	G:G	A:G	G:G	A:G	G:G	G:G	A:G	G:G	G:G	G:G	A:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	A:G
PotSNP1057	C:C	C:C	C:C	A:C	C:C	C:C	A:A	C:C	A:C	C:C	A:C	A:C	A:C	C:C	A:C	A:C	C:C	C:C	A:C	C:C	C:C
PotSNP1068	C:C	T:C	C:C	C:T	C:T	C:C	C:T	C:C	C:T	C:T	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:T	C:T	C:T	C:C
PotSNP952	T:T	T:T	T:T	C:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C
PotSNP796	C:C	C:A	C:A	C:A	C:A	C:A	C:A	C:A	A:A	C:A	C:A	C:C	C:A	C:C	C:A	A:A	A:A	A:A	C:A	A:A	C:A
PotSNP178	T:T	T:T	T:T	T:T	G:T	T:T	G:T	T:T	T:T	T:T	T:T	T:T	T:T	G:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP1072	T:T	T:T	T:T	T:T	G:T	T:T	G:T	T:T	G:T	T:T	G:G	X	T:T	G:T	T:T	T:T	T:T	T:T	T:T	G:T	T:T
PotSNP960	C:C	C:C	C:T	C:T	T:T	C:T	C:T	C:T	C:T	T:T	T:T	T:T	C:C	C:T	C:C	C:C	C:C	C:C	C:T	C:T	C:T
PotSNP061	T:T	T:T	C:T	C:T	T:T	C:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	C:T	T:T	T:T	C:T
PotSNP569	G:G	A:A	G:G	G:G	G:G	G:A	G:G	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	A:A	A:A	A:A	G:G	G:G	A:A
PotSNP083	T:T	C:T	C:T	T:T	G:T	C:T	C:T	C:C	C:T	T:T	T:T	C:C	C:T	C:T	C:T	C:C	C:C	C:C	T:T	C:T	C:T
PotSNP964	T:T	T:T	T:T	T:T	T:T	T:T	T:T	A:T	T:T	T:T	T:T	T:T	A:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP928	T:T	A:A	A:T	A:T	A:T	T:T	A:T	A:T	A:T	A:T	A:T	T:T	T:T	A:T	A:T	A:T	A:T	A:T	T:T	A:T	A:T
PotSNP573	C:C	C:T	C:C	T:T	C:T	C:T	T:T	C:T	C:T	C:C	C:T	C:T	C:T	C:C	C:C	C:T	T:T	T:T	C:T	C:T	C:C
PotSNP184	G:G	G:A	A:A	G:A	A:A	A:A	G:A	A:A	G:A	T:T	A:A	G:G	A:A	T:T	G:G	G:A	A:A	A:A	G:A	G:A	A:A
PotSNP702	A:A	A:A	A:T	A:T	A:T	A:T	A:T	A:T	A:T	T:T	A:A	A:A	A:T	T:T	A:A	A:T	A:T	A:T	A:T	A:T	A:T
PotSNP731	A:A	G:G	G:G	G:G	A:A	A:A	G:G	A:G	G:G	A:A	A:A	X	A:G	A:G	G:G	A:A	A:G	A:A	A:A	G:G	X
PotSNP043	C:C	C:C	C:C	C:C	C:C	C:A	C:C	C:A	C:C	C:C	C:C	C:C	C:C	X	C:C	C:C	C:C	C:C	C:C	C:C	C:A
PotSNP057	T:T	T:T	C:T	C:T	T:T	C:T	C:T	C:T	T:T	C:T	C:T	T:T	T:T	C:T	T:T	T:T	C:T	C:T	C:T	T:T	C:T
PotSNP1035	C:A	A:C	A:C	C:A	A:A	A:C	A:C	A:C	C:C	A:C	A:A	A:C	C:C	A:C	C:C	A:C	A:C	A:C	A:C	A:C	A:C
PotSNP092	G:G	G:A	G:G	G:G	G:A	G:A	G:A	G:A	G:G	G:G	G:G	G:G	G:A	G:A	G:A	G:G	G:A	G:A	G:A	G:G	G:A
PotSNP205	A:A	G:A	A:A	A:A	A:A	A:A	G:A	G:A	A:A	A:A	A:A	A:A	G:A	A:A	A:A	G:A	A:A	A:A	G:A	A:A	A:A
PotSNP753	A:A	A:A	G:A	G:A	A:A	A:A	G:A	A:A	A:A	A:A	G:A	G:A	G:G	G:A	G:A	A:A	A:A	A:A	G:A	G:A	G:A
PotSNP470	T:T	T:A	T:T	T:T	T:T	T:T	T:T	T:A	T:A	T:T	T:T	T:T	T:A	T:A	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP026	T:T	T:T	T:T	T:T	C:T	T:T	C:T	T:T	T:T	C:T	T:T	T:T	C:T	C:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP626	G:G	A:A	G:G	G:G	G:G	G:G	G:A	G:G	G:A	G:G	G:G	G:G	G:G	G:A	G:A	A:A	G:A	G:A	G:A	G:A	G:G
PotSNP081	C:C	C:C	C:T	C:T	T:T	C:T	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:T	C:C	C:C
PotSNP866	G:G	G:T	G:G	G:T	G:T	G:G	G:T	G:G	G:G	G:T	G:T	G:G	G:T	G:T	G:G	T:T	G:G	G:G	G:G	G:G	G:G
PotSNP124	A:A	A:A	G:A	G:A	G:G	G:A	G:A	G:A	A:A	G:A	G:A	A:A	G:G	G:A	A:A	A:A	G:A	G:A	A:A	G:A	A:A
PotSNP047	C:C	C:C	C:C	C:T	T:T	C:T	C:T	C:C	C:C	C:T	C:C	C:C	C:T	C:T	C:C	C:C	C:T	C:C	C:C	C:C	C:C
PotSNP543	A:A	A:A	T:A	A:A	T:A	T:A	A:A	T:A	A:A	C:T	T:A	T:A	A:A	T:A	A:A	A:A	C:T	T:A	A:A	T:A	A:A
PotSNP130	C:C	C:C	C:T	C:T	T:T	C:T	C:C	T:C	C:C	C:T	C:C	T:C	T:C	C:C	C:C	C:C	C:C	T:T	C:C	T:C	T:C
PotSNP1049	C:C	C:T	C:C	C:T	C:T	T:T	C:C	C:C	C:T	C:T	C:T	C:T	C:C	C:C	C:C	T:T	C:T	T:T	C:C	C:T	C:T
PotSNP229	C:C	C:T	C:C	C:T	C:C	C:C	C:T	C:C	C:T	C:T	C:T	C:T	C:C	C:C	C:C	T:T	C:T	C:T	C:C	C:T	C:T
PotSNP712	G:G	C:G	C:G	C:G	C:G	C:G	C:G	C:G	G:G	C:G	C:G	C:G	C:C	C:C	C:C	C:G	C:G	C:C	C:C	G:G	C:C
PotSNP1238	T:T	A:T	A:T	T:T	C:T	C:T	C:T	C:T	T:T	C:T	C:T	T:T	T:T	T:T	C:T	C:T	T:T	C:T	C:T	C:T	C:T
PotSNP1827	A:A	A:A	A:A	A:A	T:A	A:A	A:A	T:A	A:A	T:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	T:A	A:A	A:A

SNP	07-1004-01	IVP57429-9	IVPAA-896-18	SHK1-92-588	C	P	SHK1-92-588	RH89-039-16	3778-16	IVP92-057-3	IVP08-087-14	IPV02-069-5	IVP06-115-1	IVP06-122-23	IVP06-142-12	IVP06-145-2	IVP06-148-13	IVP06-148-12	IVP06-155-9	IVP06-161-16	IVPAA-134-16
PetSNP1026	G/G	G/C	G/G	G/C	C/C	C/C	X	G/C	C/C	G/G	G/G	G/C	G/C	G/C	C/C	G/C	G/G	G/G	G/G	G/G	G/A
PetSNP172	C/C	T/C	C/C	T/C	C/C	C/C	T/C	T/C	T/T	C/C	C/C	T/C	C/C	T/C	C/C	T/C	C/C	C/C	T/C	T/C	C/C
PetSNP730	G/G	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/G	G/G	G/G	X	G/A	G/A	G/A	G/G	G/G	G/G	G/G	G/G
PetSNP8633	C/C	A/C	A/C	A/C	C/C	A/C	A/C	A/A	A/C	A/C	A/C	C/C	A/C	A/C	A/C	A/C	C/C	A/C	A/C	C/C	A/C
PetSNP1088	G/G	G/A	G/A	G/A	G/G	G/A	G/A	G/A	G/G	G/A	G/A	G/A	G/G	G/A	G/A	G/A	G/A	G/A	G/A	G/G	G/A
PetSNP4048	T/T	T/A	T/A	T/A	T/T	T/A	T/A	T/A	T/T	T/A	T/A	T/A	T/T	T/A	T/A	T/A	T/A	T/A	T/A	T/T	T/A
PetSNP154	C/C	C/T	C/C	C/T	C/C	C/T	C/T	C/T	X	C/T	T/T	C/T	C/C	C/T	C/C	C/T	C/T	C/T	C/T	C/T	T/T
PetSNP115	G/G	G/G	G/A	A/A	G/A	A/A	A/A	G/A	G/G	A/A	G/A	G/A	G/A	G/G	G/G	G/G	G/A	G/A	G/G	G/A	G/A
PetSNP502	C/C	C/C	G/C	G/C	C/C	G/C	G/C	G/C	C/C	C/C	C/C	G/C	G/C	C/C	C/C	G/C	G/C	C/C	C/C	C/C	G/C
PetSNP102	A/A	G/A	G/A	G/A	A/A	G/A	G/A	G/A	A/A	G/G	G/G	G/A	G/A	G/A	G/A	G/G	G/G	G/A	G/A	G/A	A/A
PetSNP587	C/C	T/T	T/T	C/T	C/T	C/T	C/T	C/T	T/T	C/C	T/T	T/T	T/T	T/T	T/T	T/T	A/A	G/A	T/T	T/T	X
PetSNP115	T/T	C/C	T/C	T/C	T/C	T/C	T/C	T/C	C/C	T/T	C/C	T/C	C/C	T/C	C/C	T/C	T/T	C/C	C/C	T/T	C/C
PetSNP402	T/T	T/C	T/C	T/C	T/C	T/C	T/C	C/C	T/C	T/T	T/T	T/C	T/C	T/C	T/C	T/C	T/T	T/C	C/C	T/T	C/C
PetSNP713	A/A	A/A	G/A	G/G	A/A	G/A	A/A	G/A	A/A	A/A	A/A	G/A	A/A	A/A	A/A	A/A	A/A	A/A	G/A	A/A	A/A
PetSNP1480	C/T	A/T	T/T	T/T	C/T	A/T	C/T	C/T	C/T	C/T	T/T	A/T	C/T	A/T	C/T	C/T	A/T	C/T	C/T	T/T	C/C
PetSNP1483	G/G	A/G	G/G	G/G	A/G	G/G	A/G	G/G	G/G	G/G	G/G	A/G	A/G	A/G	A/G	G/G	A/A	A/G	G/G	A/G	G/G
PetSNP152	T/T	C/T	C/T	C/C	C/T	T/T	C/T	C/T	T/T	C/T	T/T	G/T	T/T	C/T	T/T	C/T	C/T	T/T	C/T	C/T	T/T
PetSNP721	C/C	T/T	T/T	T/T	C/T	T/T	C/T	C/T	T/T	C/T	T/T	T/T	C/T	C/T	C/T	C/T	T/T	C/T	C/T	C/T	T/T
PetSNP1022	G/G	G/G	G/G	G/G	G/T	G/T	G/T	G/T	G/T	G/T	G/T	G/G	G/T	G/T	G/G	G/G	G/T	G/T	G/T	G/T	G/G
PetSNP152	C/C	T/T	C/T	C/T	C/T	C/T	C/T	C/T	T/T	T/T	T/T	T/T	C/T	T/T	T/T	T/T	T/T	C/T	C/T	T/T	C/T
PetSNP122	A/A	G/A	A/A	A/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	A/A	A/A	G/A	G/A	G/A	G/A	G/A
PetSNP1275	X	G/A	G/A	A/A	G/G	A/A	A/A	G/A	G/A	G/A	G/G	G/A	G/G	G/A	G/A	G/A	G/A	A/A	G/A	A/A	A/A
PetSNP124	C/C	C/T	C/A	C/A	C/C	C/A	C/A	C/A	C/A	C/A	C/C	C/A	C/C	C/T	C/T	C/A	C/A	C/C	C/A	C/C	C/A
PetSNP446	T/T	T/T	T/T	C/T	C/T	T/T	C/T	C/T	C/T	T/T	T/T	A/T	C/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PetSNP120	A/A	G/A	A/A	G/A	G/A	G/A	G/A	G/A	A/A	G/A	A/A	G/A	G/A	A/A	A/A	G/G	A/A	G/A	A/A	A/A	A/A
PetSNP586	C/C	C/C	X	C/T	C/T	C/C	C/T	C/C	C/C	C/C	X	C/T	C/T	C/C	C/C	C/T	C/T	C/C	C/C	C/C	C/T
PetSNP100	C/C	C/C	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/T	C/C	C/C	C/C
PetSNP867	C/C	T/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PetSNP760	C/C	T/T	C/T	T/T	C/C	C/T	C/T	C/C	C/T	C/T	C/T	C/T	C/C	C/T	C/T	C/C	C/T	C/T	C/C	T/T	C/T
PetSNP759	T/T	C/C	T/T	C/T	C/C	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	X	C/T	C/T	C/T	C/C	T/T	T/T
PetSNP118	A/A	G/A	G/G	G/A	G/A	G/G	G/A	G/G	G/A	G/G	G/A	A/A	G/G	G/A	G/G	G/A	G/A	G/A	G/G	G/G	G/G
PetSNP1492	T/T	G/T	C/C	G/C	G/A	C/C	G/A	C/C	G/A	C/T	G/A	X	C/T	G/A	G/A	T/T	T/T	G/T	T/T	C/T	C/T
PetSNP582	G/G	G/A	G/G	G/G	G/G	G/G	G/A	G/G	G/A	G/A	G/A	X	G/G	G/A	G/G	A/A	G/G	G/A	G/G	G/A	G/G
PetSNP580	C/C	T/T	T/C	T/T	T/C	T/C	C/C	T/T	T/T	T/T	T/T	X	C/C	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/C
PetSNP699	C/C	C/T	T/T	T/T	C/T	T/T	C/T	T/T	T/T	T/T	T/T	C/T	C/T	C/T	C/C	T/T	C/C	T/T	T/T	C/T	C/T
PetSNP011	T/T	C/C	T/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/C	C/C	T/T	C/C	T/T	C/C	C/C	C/C
PetSNP896	T/T	T/T	C/T	C/T	T/T	C/C	C/T	C/T	T/T	C/C	C/T	C/T	C/T	C/C	T/T	C/T	T/T	C/T	C/T	C/C	T/T
PetSNP945	A/A	A/A	A/A	A/A	G/A	A/A	G/A	G/A	A/A	G/A	G/A	X	G/A	G/A	A/A	A/A	A/A	G/A	A/A	G/A	A/A
PetSNP1923	C/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	X	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C
PetSNP928	A/C	A/A	A/A	T/A	A/A	T/A	A/A	T/A	T/A	A/A	T/A	X	T/I	T/A	A/A	T/A	A/A	T/A	A/A	A/A	A/A
PetSNP182	A/A	G/A	A/A	A/A	G/A	A/A	G/A	G/G	G/A	G/G	G/A	A/A	G/G	G/A	G/A	G/A	G/A	G/A	G/A	G/A	A/A
PetSNP423	G/G	G/G	X	G/G	G/G	G/G	G/G	G/A	G/G	G/A	G/A	G/G	G/A	A/A	G/G	G/A	G/A	G/G	G/A	G/A	G/A
PetSNP924	C/C	C/T	C/T	T/T	C/T	C/T	C/C	C/T	C/C	T/T	C/T	T/T	T/T	C/T	C/C	C/C	T/T	C/T	C/T	T/T	T/T

	H	D1	F1		F3 population no 121																					
SNP	07-1004-1	IVP97-079-9	IVP08-206-32		121-1	121-2	121-3	121-4	121-5	121-6	121-7	121-8	121-9	121-10	121-11	121-12	121-13	121-14	121-15	121-16	121-17	121-18	121-19	121-20	121-21
PotSNP834	C:C	T:C	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP392	T:T	T:A	T:A		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP038	C:C	C:T	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP947	T:T	T:G	T:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP985	G:G	A:A	A:G		A:G	A:G	A:G	A:G	A:G	A:G	A:G	A:G	A:A	G:G	A:A	A:G	A:A	A:G	A:G	A:G	A:G	A:G	A:G	A:G	G:G
PotSNP796	C:C	C:A	C:A		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP569	G:G	A:A	G:A		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP928	T:T	A:A	A:T		A:T	A:T	A:A	A:A	T:T	A:T	A:A	A:A	A:A	A:T	T:T	A:A	A:A	A:T	A:T	T:T	A:A	A:A	T:T	T:T	T:T
PotSNP184	G:G	G:A	G:A		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1105	A:A	C:C	A:C		A:C	C:C	A:C	A:A	C:C	?	A:A	C:C	C:C	A:C	C:C	A:C	C:C	A:C	A:C	C:C	A:C	A:C	A:C	A:C	A:C
PotSNP205	A:A	G:A	A:A		A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP626	G:G	A:A	G:A		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP229	C:C	C:T	C:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP102	A:A	G:A	G:A		A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP458	G:G	A:G	A:G		G:G	G:G	G:G	?	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP138	T:T	C:T	T:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP1026	G:G	G:C	G:G		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP152	C:C	C:T	C:T		C:T	T:T	C:T	T:T	T:T	C:T	C:C	C:T	C:T	T:T	C:T	T:T	T:T	T:T	T:T	C:T	C:C	T:T	C:T	C:T	T:T
PotSNP120	A:A	G:A	G:A		G:A	G:G	G:A	A:A	G:A	G:G	G:A	G:G	G:A	G:G	G:G	G:G	G:A	A:A	G:A	G:A	G:A	G:A	G:G	G:G	G:A
PotSNP607	C:C	T:C	T:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP580	C:C	T:T	T:C		C:C	T:C	T:C	T:C	T:C	T:C	C:C	T:C	T:T	T:T	T:T	T:C	T:C	T:C	T:T	T:T	T:T	T:T	T:T	T:T	T:C
PotSNP099	C:C	C:T	C:T		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP182	A:A	G:A	G:A		G:A	G:G	G:A	A:A	G:A	G:A	G:A	G:G	G:A	G:G	G:G	G:G	G:G	A:A	G:A	G:A	A:A	G:A	G:G	G:G	G:G
PotSNP052	C:C	C:T	C:C		C:T	C:T	T:T	T:T	T:T	C:T	C:C	C:T	C:T	C:T	C:C	T:T	C:T	C:C	T:T	T:T	T:T	T:T	T:T	C:C	T:T

F3 population no 121

SNP	121-22	121-23	121-24	121-25	121-26	121-27	121-28	121-29	121-30	121-31	121-32	121-33	121-34	121-35	121-36	121-37	121-38	121-39	121-40	121-41	121-42	121-43	121-44	121-46
PotSNP834	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP392	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP038	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP947	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP985	G:G	A:A	G:G	G:G	G:G	G:G	A:A	G:G	A:G	A:G	A:A	G:G	A:G	A:G	A:T	G:G	A:G	A:G	A:G	A:G	G:G	A:A	A:A	G:G
PotSNP796	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP569	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	?	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	C:C
PotSNP928	A:T	A:T	A:T	T:T	A:T	A:T	A:T	A:T	A:T	A:T	T:T	A:A	A:T	T:T	A:T	T:T	G:G	A:T	A:T	A:A	A:T	A:A	A:A	?
PotSNP184	A:C	A:C	A:A	A:C	C:C	C:C	C:C	A:A	C:C	C:C	C:C	A:C	A:C	A:C	A:C	C:C	A:A	C:C	A:C	A:A	A:A	C:C	C:C	C:C
PotSNP1105	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP205	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	?	G:G
PotSNP626	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP229	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP102	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP458	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1105	A:C	A:C	A:A	A:C	A:A	A:A	A:A	A:A	C:C	A:C	C:C	A:C	A:C	A:C	A:C	C:C	A:A	C:C	A:C	C:C	A:A	C:C	A:A	C:C
PotSNP205	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP626	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	?	G:G
PotSNP229	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP102	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP458	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1138	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP1026	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP152	C:T	C:T	T:T	C:T	C:T	C:T	T:T	C:C	C:T	C:T	C:T	C:T	C:C	C:C	C:C	C:T	C:C	C:T	C:T	C:T	T:T	C:T	T:T	C:T
PotSNP120	G:A	G:A	G:A	G:A	G:A	G:A	G:A	G:A	G:A	G:G	G:A	G:G	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP607	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP580	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:C	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:C	T:C	T:C	T:C	T:C	T:C	T:C	?
PotSNP099	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	?	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP182	G:G	G:G	G:G	G:G	G:A	G:A	G:G	G:A	G:A	G:A	G:A	G:G	G:A	G:A	G:A	G:G	G:G	G:G	G:G	A:A	G:A	G:G	G:G	G:A
PotSNP052	T:T	T:T	T:T	C:C	T:T	C:C	C:T	?	C:T	T:T	C:C	C:T	C:C	C:C	C:T	T:T	C:C	C:T	C:T	C:T	T:T	C:T	C:T	C:T

					F3 population no 122																				
	H	D1	F1	F2																					
SNP	07-1004-1	IVP97-079-9	IVP08-206-32	AGV09-007-09		122-1	122-2	122-3	122-4	122-5	122-6	122-7	122-8	122-9	122-10	122-11	122-12	122-13	122-14	122-15	122-16	122-17	122-18	122-19	122-20
PotSNP834	C:C	T:C	C:C	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP392	T:T	T:A	T:A	T:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP038	C:C	C:T	C:C	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP947	T:T	T:G	T:T	T:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP985	G:G	A:A	A:G	A:G		A:A	A:G	A:G	A:G	G:G	A:A	A:G	A:G	A:G	G:G	A:G	A:A	A:G	A:G	A:G	A:G	A:G	A:A	A:A	A:G
PotSNP796	C:C	C:A	C:A	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP569	G:G	A:A	G:A	G:G		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP928	T:T	A:A	A:T	T:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP184	G:G	G:A	G:A	G:G		G:G	G:G	G:G	G:G	A:C	A:A	A:A	A:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1105	A:A	C:C	A:C	A:C		A:C	A:C	A:A	A:C	A:C	A:A	A:A	A:A	A:A	A:C	A:C	A:A	A:C	A:C	C:C	A:C	C:C	C:C	C:C	C:C
PotSNP205	A:A	G:A	A:A	G:A		G:A	G:A	A:A	G:A	G:A	G:A	A:A	G:A	A:A	G:A	G:A	G:A	G:A	A:A	G:A	G:A	A:A	G:A	G:A	A:A
PotSNP626	G:G	A:A	G:A	G:G		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP229	C:C	C:T	C:T	C:T		C:T	C:T	T:T	T:T	T:T	T:T	T:T	C:T	C:T	C:T	C:T	T:T	T:T	T:T	C:C	C:T	C:T	C:T	C:T	T:T
PotSNP102	A:A	G:A	G:A	A:A		A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP458	G:G	G:A	A:G	G:G		G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP138	T:T	C:T	T:T	T:T		T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP1026	G:G	G:C	G:G	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP152	C:C	C:T	C:T	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP120	A:A	G:A	G:A	A:A		A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP607	C:C	T:C	T:C	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP580	C:C	T:T	T:C	T:C		T:C	T:C	C:C	T:C	T:T	T:C	C:C	T:C	T:C	T:C	T:C	T:C	T:C	C:C	C:C	T:C	C:C	T:C	T:C	C:C
PotSNP099	C:C	C:T	C:T	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP182	A:A	G:A	G:A	A:A		A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP052	C:C	C:T	C:C	C:C		C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C

F3 population no 122																									
SNP	122-21	122-22	122-23	122-24	122-25	122-27	122-28	122-29	122-30	122-31	122-32	122-33	122-34	122-35	122-36	122-37	122-38	122-39	122-40	122-41	122-42	122-43			
PotSNP834	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			
PotSNP392	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T			
PotSNP038	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			
PotSNP947	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T			
PotSNP985	A:G	A:A	A:A	A:G	G:G	A:C	A:C	G:G	A:G	A:C	A:C	G:G	G:G	G:G	A:C	A:A	A:A	A:C	A:C	A:C	C:C	A:A			
PotSNP796	G:G	G:G	G:G	G:G	G:G	G:A	G:A	G:A	G:A	G:A	A:A	A:A	A:A	G:A	A:A	G:A	A:A	G:G	G:A	G:A	G:A	G:A			
PotSNP569	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T			
PotSNP928	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G			
PotSNP184	T:T	A:A	A:A	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	A:C	C:C	A:C	A:C	A:C	A:C	C:C	A:C	C:C	A:A			
PotSNP1105	A:A	A:A	A:A	A:C	?	G:A	G:A	G:A	G:A	A:C	A:A	A:A	G:A	G:A	A:C	A:A	A:A	G:A	G:A	G:A	G:A	G:A			
PotSNP205	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G			
PotSNP626	C:T	T:T	C:T	T:T	C:T	T:T	C:T	C:C	T:T	C:C	T:T	C:C	?	C:C	C:T	C:C	C:C	C:T	C:T	C:C	C:T	T:T			
PotSNP102	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	?	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A			
PotSNP458	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G			
PotSNP138	T:T	T:T	T:T	?	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T			
PotSNP1026	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			
PotSNP152	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			
PotSNP120	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A			
PotSNP607	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			
PotSNP580	C:C	C:C	T:C	T:C	T:C	T:C	T:C	C:C	T:T	C:C	T:T	C:C	?	T:C	T:C	T:C	C:C	T:T	T:C	T:T	T:T	T:C			
PotSNP099	C:C	C:C	C:C	?	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			
PotSNP182	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A			
PotSNP052	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C			

	H	D1	F1	F3 population 123																			
SNP	07-1004-1	IVP97-079-9	IVP08-206-32	AGV09-007-13	123-1	123-2	123-3	123-4	123-5	123-6	123-7	123-8	123-9	123-10	123-11	123-12	123-13	123-14	123-15	123-16	123-17	123-18	123-19	123-20
PotSNP834	C:C	T:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP392	T:T	T:A	T:A	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP038	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP947	T:T	T:G	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP985	G:G	A:A	A:G	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP796	C:C	C:A	C:A	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP569	G:G	A:A	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP928	T:T	A:A	A:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP184	G:G	G:A	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1105	A:A	A:C	A:C	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP205	A:A	C:C	G:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP626	G:G	A:A	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP229	C:C	C:T	C:T	C:T	C:T	C:T	C:C	C:T	T:T	T:T	C:T	C:T	C:T	C:T	C:T	C:C	T:T	T:T	C:C	C:T	T:T	C:C	C:T	T:T
PotSNP138	T:T	C:T	G:A	A:A	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP1026	G:G	G:C	A:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP700	G:G	G:A	?	?	G:G	G:G	G:G	G:G	G:G	?	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP102	A:A	G:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP458	G:G	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP021	C:C	T:T	?	?	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP152	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP120	A:A	G:A	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP607	C:C	T:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP580	C:C	T:T	T:C	T:C	C:C	C:C	T:C	T:T	T:T	T:T	T:C	T:C	C:C	T:C	T:C	T:C	C:C	T:C	T:C	C:C	T:C	T:C	C:C	C:C
PotSNP099	C:C	C:T	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	?	C:C	C:C
PotSNP182	A:A	G:A	G:A	G:A	G:A	A:A	?	G:A	A:A	A:A	G:A	G:G	A:A	G:A	G:A	G:A	G:A	G:A	A:A	G:A	G:A	G:A	A:A	A:A
PotSNP052	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C

F3 population 123																								
SNP	123-21	123-22	123-23	123-24	123-25	123-26	123-27	123-28	123-29	123-30	123-31	123-32	123-33	123-34	123-35									
PotSNP834	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP392	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T									
PotSNP038	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP947	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T									
PotSNP985	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A									
PotSNP796	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP569	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP928	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T									
PotSNP184	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP1105	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP205	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A									
PotSNP626	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP229	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP138	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T									
PotSNP1026	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP700	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP102	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A									
PotSNP458	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP021	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP152	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP120	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G									
PotSNP607	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP580	C:C	C:C	C:C	C:C	C:C	C:C	T:C	T:C	C:C	C:C	T:C	C:C	T:C	C:C	T:C									
PotSNP099	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									
PotSNP182	A:A	G:A	G:A	G:A	?	G:A	G:A	G:A	G:A	A:A	G:A	G:G	G:A	G:A	G:A									
PotSNP052	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C									

SNP	H	D2	F1	F2	F3 population 126																																			
	07-1004-1	IVP44-096-18	IVM08-207-20	ACGV09-008-15	125-1	125-2	125-8	125-4	125-5	125-6	125-7	125-8	125-9	125-10	125-11	125-12	125-13	125-14	125-15	125-17	125-18	125-19	125-20	125-21	125-22	125-23	125-24	125-25	125-26	125-27	125-28	125-29	125-30	125-31	125-32	125-33	125-34	125-35	125-36
PotSNP834	C/C	T/T	T/C	T/C	T/C	T/C	C/C	T/T	T/C	T/C	T/C	T/C	T/C	T/C	T/T	T/C	T/C	C/C	T/C	T/C	T/C	T/C	C/C	C/C	T/C	C/C	T/C	C/C	T/C	T/C	C/C	C/C	C/C	C/C	C/C	T/T	T/T	T/T	C/C
PotSNP392	T/T	T/A		T/A	A/A	A/A	?	T/A	T/A	A/A	T/A	T/A	T/A	T/A	A/A	T/A	T/A	T/A	A/A	T/A	G/A	G/A	T/A	T/A	T/A	T/A	A/A	T/A	T/A	T/A	T/A	T/A	T/A	T/A	T/A	T/T	T/T	T/T	T/A
PotSNP155	G/G	G/A	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/A	G/G	G/G	G/G	G/A	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	T/A	A/A	T/A	T/A	T/A	T/A	G/G	G/G	G/G	G/G
PotSNP947	T/T	T/G	T/G	T/G	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP985	G/G	A/A	A/G	A/G	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP795	C/C	C/A	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP950	C/C	C/A	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP928	T/T	A/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	?	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP194	G/G	A/A	G/A	G/G	G/A	G/A	G/A	G/G	G/A	G/A	G/G	G/G	G/G	G/A	G/G	G/A	G/A	G/G	G/A	G/A	G/G	G/A	A/A	G/A	G/A	G/G	G/A	G/A	G/A	G/G	G/A	G/A	G/A	G/A	G/A	G/G	G/G	G/G	G/G
PotSNP1105	A/A	A/C	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP753	A/A	G/A	G/A	G/G	G/A	G/A	A/A	G/A	A/A	A/A	G/A	A/A	?	?	G/A	G/A	A/A	A/A	G/A	G/A	G/A	A/A	A/A	G/A	A/A	A/A	G/A	G/A	A/A	G/G	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A
PotSNP1061	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP124	A/A	G/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP1038	A/C	C/T	C/T	C/C	T/C	T/C	C/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	C/C	T/C	T/C	T/C	T/C	C/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C	T/C
PotSNP700	G/G	G/A	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP115	G/G	G/A	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP102	A/A	G/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP152	T/T	C/T	?	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP021	C/C	T/T	T/T	C/T	T/T	C/T	C/C	C/T	C/C	T/T	C/T	C/C	C/C	C/T	T/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/C	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/C
PotSNP152	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP1080	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP090	C/C	T/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP069	C/C	T/T		C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP996	T/T	C/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP213	G/G	?	G/A	G/A	G/A	G/G	A/A	G/A	G/A	G/A	G/A	G/A	?	G/A	A/A	A/A	G/G	G/A	G/A	G/G	G/A	G/A	A/A	A/A	G/A	A/A	G/G	G/A	A/A	G/A	G/A	G/A	G/A	G/A	G/A	G/G	G/G	G/G	G/G

F3 population 126 SNP	125-26	125-27	125-28	125-29	125-30	125-31	125-32	125-33	125-34	125-35	125-36	125-37	125-38	125-39	125-40	125-41	125-42	125-43	125-44	125-45	125-47	125-48	125-49	125-50	125-51	125-52	125-53	125-54	125-55	125-56
PotSNP834	C/C	T/C	T/C	C/C	T/C	C/C	C/C	T/C	C/C	T/C	T/C	T/C	T/C	T/C	T/C	T/T	C/C	T/C	C/C	T/C	C/C	T/C	T/C	C/C	C/C	T/C	T/C	T/C	T/T	C/C
PotSNP392	T/T	T/A	T/A	T/T	T/A	A/A	T/A	T/A	A/A	T/A	T/A	T/A	A/A	T/A	A/A	T/T	T/T	T/T	T/T	T/A	T/T	A/A	T/T	T/T	T/A	A/A	T/A	T/A	T/A	T/T
PotSNP155	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP947	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP985	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP795	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP950	T/T	T/T	T/T	C/T	T/T	C/T	C/C	C/T	C/C	C/T	C/T	C/T	T/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/T	C/T	C/T	C/T
PotSNP928	T/T	T/T	T/T	?	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP194	A/A	G/A	G/A	G/A	A/A	G/A	A/A	A/A	A/A	G/A	A/A	G/G	A/A	A/A	G/G	A/A	A/A	A/A	G/A	G/A	A/A	G/A	A/A	A/A	G/A	A/A	A/A	A/A	A/A	A/A
PotSNP753	G/A	A/A	A/A	?	G/A	A/A	G/G	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP1061	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP124	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP1038	T/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP700	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP115	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP102	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP152	T/T	T/T	T/T	C/T	T/T	C/T	C/C	C/T	C/C	C/T	C/T	C/T	T/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/T	C/T	C/T	C/T
PotSNP021	C/C	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP152	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP100	C/T	C/T	C/T	C/C	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/T	C/C	C/C	C/C	C/T	C/C	C/C	C/C	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/C	C/C	C/T	C/T
PotSNP980	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP699	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP995	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP213	A/A	G/G	G/A	G/A	G/A	A/A	G/A	G/A	G/A	A/A	G/G	G/A	A/A	G/A	G/A	A/A	A/A	?	G/A	A/A	G/G	G/A	G/G	G/A	G/A	A/A	A/A	A/A	G/G	G/A

	H	D2	F1	F2	F3 populatie 126B												
SNP	07-1004-1	IVPAA-096-18	IVP08-207-20	AGV09-008-16	1268-1	1268-2	1268-3	1268-4	1268-5	1268-6	1268-7	1268-8	1268-9	1268-10	1268-11	1268-12	1268-13
PotSNP834	C:C	T:T	T:C	T:C	T:C	T:C	T:C	T:C	T:C	C:C	T:C	T:T	C:C	C:C	C:C	T:C	C:C
PotSNP165	G:G	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP038	C:C	C:T	C:T	C:T	C:T	C:T	C:C	C:T	C:T	C:C	C:T	C:T	C:C	T:T	C:T	C:T	T:T
PotSNP947	T:T	T:G	T:G	T:G	T:G	T:T	G:G	G:G	G:G	T:T	T:G	T:G	G:G	T:G	G:G	G:G	T:T
PotSNP985	G:G	A:A	A:G	A:G	A:G	A:G	A:A	A:A	A:G	G:G	A:G	A:G	A:G	A:A	G:G	A:A	A:G
PotSNP796	C:C	C:A	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP960	C:C	C:T	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP928	T:T	A:T	T:T	T:C	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP184	G:G	A:A	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1105	A:A	A:C	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP753	A:A	G:A	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP081	C:C	C:T	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP124	A:A	G:A	G:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	?	A:A	A:A	A:A	A:A
PotSNP700	G:G	A:A	G:G	G:G	?	G:G	G:G	G:G	G:G	?	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP116	G:G	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP102	A:A	G:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP162	T:T	C:T	?	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP021	C:C	T:T	C:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP152	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	?	C:C	C:C	?	C:C	C:C	C:C	C:C
PotSNP100	C:C	C:T	C:T	C:C	C:T	C:C	C:T	C:T	C:T	C:T	C:C	C:T	C:T	C:C	C:T	C:T	C:T
PotSNP580	C:C	T:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP996	T:T	C:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP213	G:G	?	G:A	G:A	G:A	G:G	G:G	G:G	G:A	G:A	G:G	G:A	G:G	A:A	G:G	G:A	G:G
PotSNP052	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C

F3 populatie 126B																	
SNP	1268-14	1268-15	1268-16	1268-17	1268-18	1268-19	1268-20	1268-21	1268-22	1268-23	1268-24	1268-25	1268-26	1268-27	1268-28	1268-29	1268-30	1268-31
PotSNP834	T:T	T:C	C:C	T:T	T:C	C:C	T:C	T:C	T:C	C:C	T:C	C:C	C:C	T:T	T:C	T:C	T:C	C:C
PotSNP165	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP038	C:T	C:T	C:C	T:T	C:T	C:T	T:T	C:C	T:T	C:T	C:T	T:T	C:C	T:T	C:T	C:T	C:T	T:T
PotSNP947	T:T	T:T	T:T	G:G	G:G	T:G	G:G	G:G	T:T	T:G	G:G	G:G	T:G	T:G	T:G	T:G	T:T	T:G
PotSNP985	A:G	G:G	A:G	G:G	A:G	A:G	A:G	A:G	A:G	A:G	?	A:G	G:G	A:G	G:G	G:G	A:A	A:A
PotSNP796	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP960	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	?	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP928	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP184	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP1105	A:A	A:A	A:A	A:A	A:A	A:A	A:A	?	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP753	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP081	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP124	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	?	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP700	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP116	G:G	G:A	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G	G:G
PotSNP102	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A	A:A
PotSNP162	T:T	T:T	?	G:G	A:G	T:G	G:G	G:G	T:G	A:G	G:G	G:G	T:G	T:G	T:G	T:T	T:T	T:G
PotSNP021	C:C	T:T	C:T	T:T	T:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	T:T	T:T	T:T	T:T	T:T
PotSNP152	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	?	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP100	C:C	C:T	C:T	C:C	C:C	C:T	C:C	C:T	C:T	C:T	C:C	C:T	C:C	C:C	C:T	C:T	C:C	C:T
PotSNP580	C:C	T:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C
PotSNP996	T:T	C:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T	T:T
PotSNP213	G:G	?	G:A	G:A	G:G	G:G	G:G	G:G	G:A	G:A	G:G	G:A	G:G	G:G	A:A	G:G	G:A	G:G
PotSNP052	C:C	C:T	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	C:C	A:A	C:C

	H	D1	F1	F2	F3 populatie 127																									
SNP	07-1004-1	IVPAA-095-18	IVP08-207-20	ACV09-008-23		127-1	127-2	127-4	127-5	127-8	127-7	127-9	127-10	127-11	127-12	127-13	127-14	127-15	127-16	127-17	127-18	127-19	127-20	127-21	127-22	127-23	127-24	127-25	127-26
PotSNP834	C/C	T/T	T/C	T/C		T/C	T/T	C/C	T/C	C/C	T/T	T/C	T/C	C/C	T/T	T/T	T/T	T/T	C/C	C/C	T/T	C/C	C/C	T/T	T/C	T/C	T/T	C/C	T/C	T/C
PotSNP185	G/A	G/G	G/G	G/G		G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP038	C/C	C/T	C/T	C/T		C/T	C/T	C/T	C/C	C/T	C/T	C/T	C/T	C/T	C/T	T/T	C/T	T/T	C/T	C/T	C/T	C/T	C/T	C/T	T/T	T/T	T/T	C/C	C/T	T/T
PotSNP947	T/T	T/G	T/T	T/T		T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP985	G/G	A/A	A/G	G/G		G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP786	C/C	C/A	C/C	C/C		C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP960	C/C	C/T	C/T	T/T		T/T	C/T	C/T	C/T	C/T	C/T	C/T	T/T	T/T	C/T	T/T	C/T	T/T	C/T	T/T	T/T	C/T	C/T	T/T	C/T	T/T	T/T	C/C	T/T	C/C
PotSNP928	A/C	A/C	A/A	A/A		A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP184	G/A	A/A	G/A	G/A		G/G	G/G	G/A	G/A	G/A	G/A	G/A	G/G	G/A	G/A	G/A	G/G	G/A	G/A	G/A	G/A	G/A	A/A	G/G	A/A	G/G	G/G	G/G	G/G	G/G
PotSNP1305	A/A	A/C	A/A	A/A		?	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP753	A/A	G/A	G/A	G/G		G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP081	C/C	C/T	C/C	C/C		C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP124	A/A	G/A	G/A	G/G		G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP700	G/G	A/A	G/G	G/G		G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP715	G/G	G/A	A/G	A/G		A/G	A/G	A/G	G/G	A/G	A/G	A/G	A/G	A/A	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	A/G	?
PotSNP1020	A/A	G/A	A/A	A/A		A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP152	C/T	?	C/T	C/T		C/T	T/T	C/C	C/T	C/T	C/T	C/T	T/T	C/T	C/C	C/T	C/T	T/T	C/C	C/T	T/T	C/C	C/T	C/T	C/T	C/T	C/T	C/C	C/T	C/T
PotSNP021	C/C	T/T	C/T	C/T		C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/C	C/T	C/C	C/T	C/C	T/T	C/C	C/T	T/T	C/C	C/T	C/T	C/C	C/C	C/C	C/C	C/T	C/C
PotSNP100	C/C	C/T	C/T	C/T		C/C	C/C	C/C	C/C	C/C	C/T	C/C	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/T	C/C
PotSNP980	C/C	?/C	C/C	C/C		C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP996	T/T	C/T	T/T	T/T		T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP213	G/G	T/T	G/A	A/A		A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP052	C/C	C/T	C/C	C/C		C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C

F3 populatie 127																														
SNP	127-27	127-28	127-29	127-30	127-31	127-32	127-33	127-34	127-35	127-36	127-37	127-38	127-39	127-40	127-41	127-42	127-43	127-44	127-45	127-46	127-47	127-48	127-49	127-50	127-51	127-52	127-53	127-54	127-55	127-56
PotSNP834	T/C	C/C	T/C	T/C	C/C	T/C	T/C	T/C	C/C	C/C	C/C	T/C	T/C	T/C	T/C	T/C	T/T	T/C	C/C	C/C	T/C	T/C	T/C	C/C	T/C	T/C	T/C	T/C	C/C	C/C
PotSNP185	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/A	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP038	C/T	C/T	C/T	C/T	T/T	C/T	C/T	C/T	C/T	T/T	C/T	C/T	C/T	C/T	C/T	C/T	T/T	T/T	C/T	C/T	C/T	C/C	T/T	C/C	C/T	T/T	C/C	T/T	C/C	C/T
PotSNP947	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP985	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP786	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP960	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T
PotSNP928	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP184	G/A	A/A	G/A	G/A	A/A	G/A	A/A	A/A	G/A	A/A	A/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	G/A	A/A	A/A
PotSNP1305	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP753	A/A	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP081	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP124	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP700	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP715	G/G	G/G	G/G	G/G	G/G	G/G	A/G	A/G	G/G	A/G	A/G	A/G	A/G	A/A	A/G	A/G	A/G	A/G	G/G	G/G	A/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G	G/G
PotSNP1020	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP152	C/T	C/T	?/T	C/T	C/C	C/T	C/C	C/T	C/C	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/T	C/T	C/C	C/C	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T	C/T
PotSNP021	C/C	C/C	C/T	C/T	C/T	C/T	C/C	C/T	C/C	C/C	C/T	C/C	C/C	C/C	C/C	C/C	C/T	C/C	C/C	C/C	C/T	C/T	C/T	C/T	C/T	T/T	C/T	T/T	C/T	C/C
PotSNP100	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
PotSNP980	?/C	T/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	?/C	C/C
PotSNP996	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T	T/T
PotSNP213	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A	A/A
PotSNP052	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C

PTO/AIA/22 (03-13)
Approved for use through 7/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 091876-0014
Application Number 13/504,156 Conf # 6337	Filed July 10, 2012
For HYBRID SEED POTATO BRREDING	
Art Unit 1663	Examiner BOGGS, Russell T

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$200	$100	$50	$
☐ Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☒ Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$ 700
☐ Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐ Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-1133 .

☒ Payment made via EFS-Web.

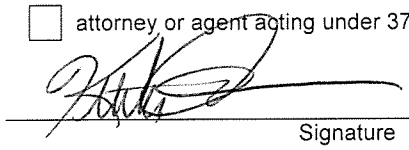
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☒ attorney or agent of record. Registration number 57,025 .

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____ .



Signature

November 18, 2015
Date

Kristin A. Connarn
Typed or printed name

(617) 535-4453
Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of 1 forms are submitted.

DM_US 67690156-1.091876.0014

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 11/18/15

Electronic Signature for Sarah Hupprich: /Sarah Hupprich/

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/504,156	Filing Date 07/10/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **11/18/2015**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 32	Minus	** 34	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 7	Minus	***7	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/ROZENIA HARMON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/504,156	07/10/2012	Willem Hendrik Lindhout	091876-0014	6337

23630 7590 03/08/2016

McDermott Will & Emery
The McDermott Building
500 North Capitol Street, N.W.
Washington, DC 20001

EXAMINER
BOGGS, RUSSELL T

ART UNIT	PAPER NUMBER
1663	

NOTIFICATION DATE	DELIVERY MODE
03/08/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

Office Action Summary	Application No. 13/504,156	Applicant(s) LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1,3-9,11-16,18-32 and 34-36* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1,3-9,11-16,18-32 and 34-36* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☒ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *18 November 2015* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Agventure B.V. Ex. 2009
IPR2025-00136

DETAILED ACTION

The present application is being examined under the pre-AIA first-to-invent provisions.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 18 November 2015 has been entered.

Claim Status

2. Claims 1-34 were examined on the merits in the Office action mailed 14 October 2014 and rejected. Applicant responded on 14 January 2015 amending several claims and cancelling claims 2, 10 and 17. Claims 1, 3-9, 11-16 and 18-34 were examined and rejected in the final rejection mailed 18 May 2015.

Applicant filed an RCE on 18 November 2015. Claims 1, 3-9, 11-16, 18-32 and 34-36 are examined herein.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Withdrawal of Objections and Rejections

3. The objection to the specification regarding the embedded hyperlinks is withdrawn in view of Applicant's amendments to the specification.

4. The objection to the specification because it referred to "Figure 9" in the replacement paragraph filed on 14 January 2015 is withdrawn in view of Applicant's amendments.

5. The objection to the drawings is withdrawn in view of Applicant's submission of new drawings.

6. The objection to claim 16 is withdrawn in view of Applicant's amendments.

7. The rejection of claims 1, 3-9, 12-16, 18-20 and 22-34 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement is withdrawn in view of Applicant's amendments to the claims.

8. Any objections to and rejections of cancelled claims are rendered moot.

Specification

9. The disclosure is objected to because of the following informalities.

The abstract of the disclosure is objected to because the last word is "see" instead of "seed." Correction is required. See MPEP § 608.01(b).

The specification is objected to because it uses the word “suing” instead of “using” in the paragraph on page 52, line 21.

The specification is objected to because the preposition “to” in line 14, page 37 appears to be a typographical error because the limitation "instead to tetraploid plants" does not make sense in context.

The specification is objected to because it lacks the address of NCIMB on pages 33-34 where the specification provides information regarding the deposits.

Appropriate correction is requested.

Claim Objections

10. Claims 1, 4-9, 11-13, 19, 21 and 35 are objected to because of the following informalities.

Claim 1 is objected to for several reasons. (1) It refers to plural “plants” in line 4 and line 5 rather than reading on a single plant. (2) "S. tuberosum" in the second to last line is not italicized which is inconsistent with the rest of the claims. (3) "Solanum" in the third line and seventh line are not italicized in contrast to, e.g., claim 16. (4) Lines 2-3 recite "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing Solanum [sic] species crossable to *Solanum tuberosum*." The word “species” is either redundant or, in the alternate, seems to apply via the conjunctive "or" to the "*Solanum tuberosum* comprising introgression segments of other tuber-bearing Solanum [sic] species crossable to *Solanum tuberosum* " which is, of course, not a species.

Claim 4 is objected to because it refers to the plural “plants” in line 1 and thus the scope of the claim is difficult to determine: does it read on a single plant or, if it reads on multiple plants, how does one select which plants to measure?

Claim 5 is objected to because it recites "a line according to claim 1" rather than "the line according to claim 1."

Claim 6 is objected to because it refers to the plural “seeds and tubers” in line 1 and thus the scope of the claim is difficult to determine: does it read on a single seed or tuber, or if it reads on multiple seeds or tubers, how does one select which seeds or tubers to measure?

Claim 7 is objected to because it refers to the plural “seeds” in line 1 (twice) and thus the scope of the claim is difficult to determine: does it read on a single seed, or if it reads on multiple seeds, how does one select which seeds to measure?

Claim 8 is objected to for several reasons. (1) It recites a plural subject in several places, for example, “seeds” in line 20 and 21. The claim should be re-phrased to refer to a singular composition and furthermore, the aforementioned use of “seeds” is inconsistent with “a hybrid offspring seed" recited in line 21. (2) This singular hybrid offspring seed is then transformed into “a population of hybrid offspring potato plant”

[sic] in lines 23-24 but the word “plant” is grammatically inconsistent with the preceding word “population.” Furthermore, since the claim recites " a population of hybrid offspring potato plant” [sic], “said hybrid offspring potato plant” is rejected under 35 USC 112(b) *infra* for lacking an antecedent basis. (3) the recitation of "the plants" in line 30 should be amended to recite "each of the plants . . ." if the claim is not amended to be directed at the embodiment of a single plant, or “the plant” if the claim is amended to be directed at the embodiment of a single plant. (4) Line 10 lacks an article, e.g., “a tuber-bearing . . .” (5) The "a first potato plant" recited in line 12 is actually the second potato plant referenced in the claim, and hence the "second potato plant" in line 14 is actually the third potato of the claim. See also claim 11 which previously referred to the now-unnumbered potato plant but which now refers to the plant resulting from part (a).

Claim 9 is objected to because it repeats steps (a)-(e) of claim 8, but part (e) of claim 8 is also a repeating step. Thus, "wherein said steps (a)-(e) are repeated" appears to be redundant.

Claim 11 is objected to because the words “accession number” are missing between “NCIMB” and each of “41663,” “41664,” “41665,” and “41765” in line 2.

Claims 12 and 13 are objected to because each recites "a second diploid, fertile, . . . potato line." The use of the word "second" without the definite article "the" suggests

the claim is not referencing the second potato line of claim 8 and is actually referencing a third line relative to claim 8.

Claim 19 is objected to because the words "accession number" are missing between "NCIMB" and each of "41663," "41664," "41665," and "41765" in lines 3-4.

Claim 21 is objected to because the words "accession number" are missing between "NCIMB" and each of "41663," "41664," "41665," and "41765" in lines 1-2.

Claim 35 is objected to because the words "accession number" are missing between "NCIMB" and each of "41663," "41664," "41665," and "41765" in line 7.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

> (B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1, 2-9, 11-16, 18-20, 22-32 and 34-36 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claims 1 (lines 2-3); 8 (lines 2-3, 8-9, 15-16, 24-25); 14 (lines 2-3); 15 (lines 2-3); 16(a) (lines 3-4); 16(b) (lines 3-4); 19 (lines 7-9); 20 (lines 3-4); 32 (lines 2-4); 34 (lines 3-4, 8-10, 15-16) and 35 (lines 2-3, part (b) lines 2-4, part (e), lines 4-6) recite the limitation "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" recited in lines 2-3, as well as in other places within the claim. The limitation is indefinite because it appears to require that the plant have some relationship to *Solanum tuberosum* but the extent of that relationship is indefinite. Since there is no lower limit to the amount of *Solanum tuberosum* DNA that is present, the claim encompasses a tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with a potentially trivial amount of *Solanum tuberosum* DNA present in the genome. See, for example, Veilleux, which states that "*Solanum phureja* is a diploid (2n=2x=24), primitive cultivated species that has little genetic distinction from and is completely cross compatible with *S. tuberosum*." Veilleux, Sol CAP News 3(2):4-4 (2011), p. 4. Thus the limitation appears to read on *S. phureja* in spite of the phrasing of the limitation.

Furthermore, a recent review by Spooner et al. teaches that "[h]undreds of successful interspecific hybrids have been reported in the literature" and that "the biological concept of a species is difficult to apply to potatoes." Spooner et al., Bot Rev 80:283-383 (2014), p. 303 & see also pp. 303-18. Thus, herein, the limitation "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" is indefinite. It is interpreted herein to read on any other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*.

Claims 1 (line 5); 8 (second-to-last line); 16 (lines 8 & 16); 32 (second-to-last line); 34 (lines 11 & 19-20); and 35 (last line) recite the limitation “the loci.” There is insufficient antecedent basis for this limitation in the claims because there is no prior reference to a set of loci. The use of the definite article suggests that the limitation is referring to a specific set of loci. Deletion of the word “the” would obviate this particular rejection.

Claim 3 recites the limitation "said at least one agronomically desirable trait" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim because there is no reference to any “agronomically desirable trait” in claim 1.

Claim 7 is rejected because it recites the limitation "uniform hybrid potato seed" but the specification fails to define the term and the term lacks a meaning in the art.

Claim 8 is rejected under 35 USC 112(b) *infra* for lacking an antecedent basis in its recitation of “said hybrid offspring potato plant” in line 25. The apparent antecedent basis of “said hybrid offspring potato plant” is “a population of hybrid offspring potato plant” [sic] in lines 23-24, but which particular plant is being referenced is indefinite.

Claim 8 is also rejected under 35 USC 112(b) *infra* for lacking an antecedent basis in its recitation of “said potato line” in line 28, “said [*S.*] *tuberosum* potato line” in

lines 9-10, and "said potato line" in line 17. Several potato lines are referenced in the claim, and thus the particular potato line being referenced is indefinite.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 14 recites the broad recitation an “essentially homozygous diploid potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*” in lines 1-3, and the claim also recites “more preferably an elite line” in lines 3-4 which is the narrower statement of the range/limitation.

Claim 36 recites the limitation "the tuber of any of claims 5 . . ." in line 1. There is insufficient antecedent basis for this limitation in the claim because there is no reference to a tuber in claim 5. Amending claim 36 to depend from claim 6 instead of claim 5 would obviate this rejection.

Therefore the metes and bounds of the above claims cannot be determined.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

The following is a quotation of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claims 1, 3-9, 11-16, 18-20, 22-32 and 34-36 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in

the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant traverses the rejection in the paper filed 18 November 2015. Applicant's arguments have been fully considered but are not persuasive.

Claim 1 is drawn to a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of the loci in said plants are homozygous, wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*, and wherein at least 25% of the plants of said line produce seed-carrying berries. Claims depending from claim 1 recite properties of the potato line of claim 1 (claims 3-4), a plant or plant part of the line of claim 1 (claims 5-7); a method using the plant of claim 5 to produce a hybrid potato seed (claim 29); and a set of two lines thereof (claim 32).

Claim 8 is a method claim drawn to producing a diploid, fertile, self-compatible and essentially homozygous potato line starting with an uncharacterized potato plant and selfing it three times to produce a "first" potato plant, then crossing it with an uncharacterized "second" potato plant to produce a hybrid potato plant with specified characteristics. Dependent claims are drawn to properties of the potato line (claims 9 and 12-13); where the method yields as a first potato plant one of four deposited lines

(claim 11); a line produced by the method (claim 14); and a potato seed from the line of claim 14 (claim 15).

Claim 16 is a method claim drawn to producing a uniform hybrid potato seed starting with a first plant from a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant and wherein at least 50% of the loci are homozygous; and crossing the first plant with second plant with the same recited limitations.

Dependent claims are drawn to properties of the potato line (claims 18 and 20); where the method yields as a first potato plant one of four deposited lines (claim 19); a seed produced by the claimed method (claim 22); and a plant or part thereof from the seed of claim 22 (claims 23-26); a tissue culture and a plant produced from this tissue culture (claims 27-28); and a method using the seed to produce a plant (claim 30) as well as a plant thus produced or a part thereof (claim 31).

Claims 34 and 35 are independent claims: claim 34 reads on hybrid potato seed produced by a plant where the plant is obtained by a method similar to, e.g., claim 16; and claim 36 reads on a method for producing a diploid, fertile, self-compatible and essentially homozygous potato line using the deposited lines.

Claim 36 depends from claims 5, 25 or 31 and reads on, e.g., a food product.

In the specification, Applicant describes obtaining the IVP07-1001/4 line from publically available germplasm and plants that contain the *Sli* gene and using these plants to breed AGVD1, AGVD2, and AGVD3. Specification ("Spec."), pp. 44-45.

Applicant describes the deposited lines by breeders reference: AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765). *Id.*, pp. 33-34. Applicant describes a breeding process according to the instant invention starting with AGVD1-3 or AGVD17 on page 37.

Applicant generally describes adding an agronomically desirable trait to a potato genotype on page 38. Applicant describes crossing the *Sli* gene donor with various potato clones designated: IVP97-079-9, IVPAA-096-l8 and SH83-92-488 to generate clones D1, D2 and D3. *Id.*, p. 47. Applicant describes creating a line containing the *Sli* gene with enhanced agricultural quality in Example 2, pp. 46-50. Applicant describes creating a molecular marker platform, i.e., SNPs, in Example 3, pp. 50-58. In Example 4, Applicant describes the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. *Id.*, pp. 58-62.

Applicant describes the meaning of the claim term "essentially homozygous" on pages 30-31 of the instant specification and suggests that the term reflects a level of homozygosity that is above 25% or 75%. *Id.*, p. 37.

To claim a genus under the written description requirement, Applicant is required to describe a representative number of species to reflect the variation within the genus or structures sufficient to define the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties,

functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof.

The claimed genera, in particular, include those set forth in the following exemplary claims:

claim 1 – any "diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with certain recited characteristics;

claim 8 / 14 – (a) any diploid, fertile, self-compatible and essentially homozygous potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with certain recited characteristics; and

(b) any self-compatibility gene from a tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*;

claim 14 – any essentially homozygous diploid potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*; and

claim 15 – any hybrid potato seed of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with at least 20 % contrasting homozygous loci as determined by molecular marker analysis.

Jansky indirectly describes the breadth of the of the claimed genus by "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" as extremely large. Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009), pp. 27-29. Spooner et al. confirms the breadth of the claimed genus. Spooner et al., Bot Rev 80:283-383 (2014), Table 1, pp. 286-94.

Does Applicant describe a representative number of species in comparison to the size of the genus claimed? In the instant application, Applicant describes only four potato lines to use in the claimed methods and wall were created from the same line, the IVP07-1001/4 line. Applicant fails to describe working examples of the broad genus of other potato lines falling within the scope of the claims. Applicant only describes one parental line and fails to describe examples of claimed potato lines descending from different parents. However, in contrast to the limited description, as noted above, Applicant claims several large genera.

Applicant fails to describe a representative number of species in comparison to the size of the genus claimed. Applicant also fails to describe any structure / function relationship necessary and/or sufficient for a potato line to be included in the claimed genus. Applicant only provides written description under 35 USC 112(a) for the deposited lines and the *Sli* gene. Four potato lines are not a representative number of species in comparison to the size of the genus claimed, and thus Applicant fails to describe a representative number of species in comparison to these genera.

Furthermore, claim 1, e.g., recites the limitation "self-compatibility in said potato line is introduced" while the only working example provided by Applicant is using the *Sli* gene. A single gene is not a representative number of species in comparison to the genus claimed.

The specification therefore fails to provide an adequate written description to support the breadth of the claims. Applicant has not demonstrated possession to one of skill in the art of the instant invention as broadly as claimed at the time of filing, and one of skill in the art would not believe Applicant to be in possession of the genus as broadly as claimed.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Applicant's Arguments

In the arguments filed against the rejection under 35 USC 112(a) written description, first summarizes the rejection of record as of 18 May 2015. Remarks/Arguments ("Remarks"), pp. 15-17. Applicant argues that "applicant has shown that the methods as proposed are effective in generating a representative number of new plants that are essentially homozygous and have a high tuber yield for this potato species." *Id.*, p. 16. Applicant argues that the methods can be used to produce both a diploid potato breeding line and a hybrid potato seed. *Id.*, pp. 16-17.

Response to Applicant's Arguments

The invention appears to involve novel plants. The instant composition claims and method claims encompass a vast genus of plants. The claims read on using any

plant of "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgressions from other tuber-bearing *Solanum* species." As noted above in the rejection under 35 USC 112(b), this constitutes a broad genus of plants. Applicant has described by deposit only four lines. Applicant argues that these lines were obtained by breeding an unnamed parental line for fertility, but Applicant appears to suggest that the deposited lines were surprising. Remarks, p. 19. Applicant fails to provide any working examples starting from a different parental line yet the claimed genus encompasses as a starting material any potato plant that can be crossed with *S. tuberosum*. One of ordinary skill in the art would not believe Applicant to be in possession of the genus as broadly as claimed.

13. Claims 1-32 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The invention appears to employ novel plants. Since the plant is essential to the claimed invention it must be obtainable by a repeatable method set forth in the specification or otherwise be readily available to the public. If the plant is not so obtainable or available, the requirements of 35 USC § 112 may be satisfied by a deposit

of the seeds. A deposit of 2500 seeds of each of the claimed embodiments is considered sufficient to ensure public availability.

The specification does not disclose a repeatable process to obtain the plant and thus it is not apparent if the plant is readily available to the public.

(a) If a deposit is made under the terms of the Budapest Treaty, then a statement, affidavit or declaration by Applicant, or a statement by an attorney of record over his or her signature and registration number, or someone empowered to make such a statement, stating that the instant invention will be irrevocably and without restriction released to the public upon the issuance of a patent, would satisfy the deposit requirement made herein.

(b) If a deposit has not been made under the Budapest Treaty, then in order to certify that the deposit meets the criteria set forth in 37 CFR 1.801-1.809 and MPEP 2402-2411.05, Applicant may provide assurance of compliance by statement, affidavit or declaration, or by someone empowered to make the same, or by a statement by an attorney of record over his or her signature and registration number showing that:

(i) during the pendency of this application, access to the invention will be afforded to the Commissioner upon request;

(ii) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent in accordance with 37 CFR § 1.808(a)(2);

(iii) the deposit will be maintained in a public depository for a period of 30 years or 5 years after the last request or for the effective life of the patent, whichever is longer;

(iv) a test of the viability of the biological material at the time of deposit (see 37 CFR § 1.807); and,

(v) the deposit will be replaced if it should ever become inviable.

In addition, the identifying information set forth in 37 CPR 1.809(d) should be added to the specification, if not already present. See 37 CPR 1.801 - 1.809 (MPEP 2401-2411.05) for additional explanation of these requirements.

Applicant has submitted a statement satisfying (b)(ii) above on 14 January 2015, but Applicant must affirm that the deposit was made under the terms of the Budapest Treaty, or affirm (b)(i), (b)(iii), (b)(iv) and (b)(v).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 1, 3-9, 12-16, 18, 20, 22-26 and 29-34 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009) in view of Phumichai et al., Genome 48:977-84 (2005), in further

view of Maris (Euphytica 46:15-33 (1990), Simmonds, Potato Res 40:191-214 (1997), and in further view of Watanabe et al. (Breed Sci 46:329-36 (1996).

Applicant traverses the rejection in the paper filed 18 November 2015. Applicant's arguments have been fully considered but are not persuasive.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

a. Determining the scope and contents of the prior art.

b. Ascertaining the differences between the prior art and the claims at issue.

c. Resolving the level of ordinary skill in the pertinent art.

d. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Jansky teaches the breeding strategy of first obtaining homozygous diploids using a self-incompatibility inhibitor. Jansky, p. 46. Applicant has obtained homozygous diploids using the *Sli* gene self-incompatibility inhibitor. Spec., p. 44. Jansky teaches that "[h]ighly homozygous inbreds could be also be used for heterosis breeding. Jansky, p. 46. Jansky teaches that such an approach might be difficult, but does not teach that it would be impossible. *Id.*

Additionally, Simmonds teaches that the production of potatoes by seed is a valuable technique because such potatoes are disease-free, and thus provides motivation (p. 194, p. 202); production of potatoes from seed is routinely used in the Third World. Simmonds, pp. 202-03. Simmonds also teaches that diploid potatoes

were underutilized at the time of Simmonds' review and thus further provides motivation to develop diploid potatoes. *Id.*, e.g., p. 192, p. 209. Simmonds teaches that heterosis produces a "spectacular" increase in yield. p. 192.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to follow the teachings of Jansky and Simmonds to develop a diploid, fertile, and essentially homozygous potato line. Developing the line from, e.g. the species *Solanum tuberosum* or limitation "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum,*" would be obvious in view of, e.g., the importance of this species in world agriculture. See, e.g., Spec., p. 1, ll. 13-15. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Applicant's specification fails to teach any step that distinguishes Applicant's approach from that of Jansky or Simmonds. It would have been *prima facie* obvious to select for increased fertility if one of ordinary skill in the art sought to develop a breeding line for the purposes of obtaining heterosis in potatoes.

Additionally, Phumichai et al. confirms the approach of Jansky, and documents the use of the *Sli* gene in the approach. Phumichai et al., abstract.

> Potato (*Solanum tuberosum*) is an auto- [sic] or segmental allo-tetraploid showing tetrasomic inheritance, which results in complicated genetic segregation. Since potatoes are propagated vegetatively, highly heterotic genotypes can be maintained, which facilitates the use of heterosis, an essential factor in potato breeding, particularly for tuber yield. Alternatively, open-pollinated true potato seed (TPS) can be used as a low-cost planting material for potato production.

> Highly homozygous inbreds, once amply produced, would be highly useful for the development of TPS varieties with genetic uniformity, as well as for the investigation of heterosis."
>
> "A scheme for hybrid breeding using homozygous diploids and subsequent somatic hybridization has been proposed, for which the availability of highly homozygous diploid (or pure) lines is a key for success. In considering the use of pure lines for the development of genetically uniform [true potato seed] varieties, self-fertile, seed-propagated lines are highly desirable, and simple techniques to develop such lines are necessary." .

Id., pp. 977-78 (citations omitted). Therefore, introducing, e.g., the *Sli* gene as taught by Phumichai et al. into an self-incompatible cultivated diploid potato line would have been obvious one of skill in the art at the time of Applicant's invention. See, e.g., *Id.* Phumichai et al. teaches using lines with a 50% homozygosity (see, e.g., page 979), which would be further consistent with an inbred line.

Maris teaches 2x plants that have an average tuber yield of at least 200 g/plant. See, e.g., Maris, Table 8, pp. 26-28. Under the broad but reasonable interpretation of the claim limitation "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" set forth above, the plants of Maris fall within the scope of this limitation. Claim 1 recites further limitations directed at properties of the claimed plants such as tuber yield. Achieving a certain degree of homozygosity, e.g. 50%, in a plant line is implicit in inbreeding. As pointed out in Applicant's Remarks filed on 18 November 2015, selecting for high tuber yield is obvious. Remarks, p. 19. Furthermore, Jansky teaches that properties of potato plants are environmentally variable for traits including yield and tuber size. Jansky, p. 45.

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). The burden of proof is then on the applicant to demonstrate that the product does not necessarily possess the properties of the claimed invention. *Id.*, pp. 195 USPQ 433-34. See, also, MPEP section § 2112 (v). Further, in 2009, the Federal Circuit returned to this question – does a previously undiscovered property of a composition that was otherwise obvious provide a patentable distinction? The Federal Circuit held that it did not, stating that "[e]ven if no prior art of record explicitly discusses the [limitation], the . . . application itself instructs that [the limitation] is not an additional requirement imposed by the claims on the [claimed invention], but rather a property necessarily present in the [claimed invention]." *In re Kubin*, 561 F.3d 1351, 1357-58, 90 USPQ2d 1417, 1422 (Fed. Cir. 2009) (as quoted in *Par Pharm., Inc. v Twi Pharm., Inc.*, 773 F.3d 1186, 112 USPQ2d 1945, 1952 (Fed. Cir. 2014).

In *KSR*, the Supreme Court held that:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

KSR Int'l Co. v. Teleflex Inc., 550 US 398, 417, 82 USPQ2d 1385, 1396 (2007). Given the teachings above, creation of a *Solanum tuberosum* line as broadly as claimed in

claim 1 is obvious in view of the above references. Claim 5, drawn to a plant, and claims 6 and 7, drawn to a seed thereof, are also obvious. Claim 4 merely recites characteristics of a plant that was obvious to make, and therefore claim 4 is also obvious.

Maris, on pages 16 & 17, for example, teaches all the steps of the method of claims 8 and 12, which are routine breeding steps for creating an inbred, except the use of the *Sli* gene; Phumichai et al., however, teaches the use of the *Sli* gene. Phumichai et al., e.g., title. Additionally, several plants listed on Maris Table 8, pp. 26-28 have a tuber yield of over 200 g per plant. As noted above, obtaining a homozygous line is obvious in view of the art. Thus claims 8 and 12 are obvious. Further, the potato lines of Maris are also obtainable by the steps of claim 8 and thus claim 14 is obvious; a seed of such a plant is also obvious and thus claim 15 is obvious.

Maris does not teach potato plants having an average fresh weight of at least 500 grams as recited in claim 4. Maris, however, does teach potato plants having a dry matter yield in a range of approximately 111 g per plant to 158 g per plant. *Id.*, Table 8, p. 28. Thus, for example, a plant with an average fresh weight which only displays a 316% increase with respect to its dry weight is obvious in view of the plants of Table 8 of Maris, and furthermore, obtaining a larger plant is obviously a beneficial phenotype, and thus claim 4 is obvious.

Applicant teaches that wild species of potatoes are self-incompatible (spec., p. 4), and the use of wild potato species is taught by Watanabe et al. to generate pest-

resistant potatoes (Watanabe, p. 329), and thus the use of the second potato plant as recited in claim 13, and thus claim 13 is obvious.

Phumichai et al. teaches using lines with a 50% homozygosity (see, e.g., page 979), which would be further consistent with an inbred line, and with the teachings of Phumichai et al. regarding the heterozygosity of two lines (see, e.g., page 978), two breeding lines that comprise at least 20% contrasting homozygous loci are obvious in view of the lines of, e.g., Maris, and thus claims 16 and 29 are obvious.

A seed of a plant produced by the method of claim 16, and growing a plant from the seed, pollen or an ovule from the plant, and a tuber from the plant are also obvious and thus claims 22-26 are obvious.

Simmonds teaches breeding resistance into potato lines (Simmonds, p. 192) and Watanabe et al. teaches breeding pest resistance into potato lines. Watanabe et al., title. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicants' invention to add, e.g., nematode resistance to a potato line. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Thus claim 3 is obvious, and a method to produce such plants, i.e., claims 9, 18 and 20, is also obvious.

Creating a plant line that is, e.g., 50% homozygous, is routine the agricultural art (see, e.g., Phumichai, entire article), and thus claims 32 and 34 are obvious.

All the steps of the method of claim 30 are taught by the above references and thus claim 30 is obvious, as well as a plant produced by the method of claim 30, and so claim 31 is obvious.

Jansky teaches that chips are economically valuable (p. 43), and thus claim 36 is obvious.

Applicant's Arguments

In the arguments filed against the rejection under 35 USC 103, Applicant first summarizes the rejection of record as of 18 May 2015. Remarks, p. 18. Applicant argues for a "general prejudice that production of homozygous true breeding lines of potato would not be possible," citing to the specification. *Id.* Applicant argues that the inventive step, as it were, was to select for fertile plants, and alleges that this never has been employed in potato breeding. *Id.*, pp. 18-19. Applicant points to a passage of Phumichai et al. teaching that selecting for homozygosity would necessarily be selecting for heterozygosity. Applicant argues that this is a counterintuitive process as potato breeders are attempting to maximize potato yield. *Id.*, p. 19.

Response to Applicant's Arguments

The recent review of Jansky as cited above argues against Applicant's asserted general prejudice. Applicant cites to no particular reference suggesting that adapting the inbred / cross / heterosis to potatoes is doomed to failure.

Furthermore, if one of skill in the art was seeking to develop a heterosis system by developing inbred lines which could be crossed, the artisan would necessarily select for fertile plants without which any inbreeding experiment would come to an end. The Examiner agrees that the long-term goal of potato breeders is to maximize yield, but that doesn't necessarily prevent a short-term goal on decreasing yield in inbred lines to

achieve heterosis. See, e.g., Lippman & Zamir, Trends Genet 23(2):61-66 (2006), entire article.

15. Claims 27 and 28 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009) in view of Phumichai et al., Genome 48:977-84 (2005), in further view of Maris (Euphytica 46:15-33 (1990), and in further view of Wang & Ran (NZ J Crop Hort Sci 28:1-8 (2000)).

Claims 1, 16 and 23 are obvious in view of the teachings set forth *supra*. The above references do not teach the use of tissue culture. Wang & Ran teach the value of using tissue culture to improve agronomically desirable traits of potatoes.

It would have been prima facie obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the teachings of Maris and use the lines of Maris according to the teachings of Wang & Ran to create tissue cultures from the potatoes of Maris and regenerate plants therefrom. Given the level of skill in the art at the time of Applicants' invention, one of ordinary skill in the art would have had a reasonable expectation of success. Therefore claims 27 and 28 are obvious.

Applicant's Arguments

Applicant did not separately address the aspect of the 103 rejection concerning tissue culture.

Conclusion

16. No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUSSELL BOGGS whose telephone number is (571)272-2805. The examiner can normally be reached on Monday through Friday between 8:00 AM to 6:30 PM (Mountain Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amjad Abraham, can be reached at 571-270-7058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RUSSELL BOGGS/

Examiner, Art Unit 1663

/MEDINA A IBRAHIM/
Primary Examiner, Art Unit 1662

Request for Information under 37 CFR § 1.105

Applicant and the assignee of this application are required under 37 CFR § 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

This request is being made for the following reasons:

Applicant is claiming a seed of plant variety 'AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765)', but the instant specification is silent about what starting materials and methods were used to produce plant variety 'AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765).' The requested information is required to make a meaningful and complete search of the prior art.

In response to this requirement, if known, please provide answers to each of the following interrogatories eliciting factual information:

(i) Please supply the breeding methodology and history regarding the development of the instant variety.

a) Such information should include the all the designations / denominations used for the original parental lines.

b) Information should also include information pertaining to the public availability of the original parental lines.

c) The breeding method used should be set forth such as whether single seed descent, bulk method, backcross method, or some other method was used.

d) The filial generation in which the instant plant was chosen should be set forth.

e) Information pertaining to the homozygosity or heterozygosity of the parents as well as the instant plant should be set forth.

f) Are there any patent applications or patents in which sibs of the instant plant are claimed? If so, please set forth serial numbers and names of the sibs.

If Applicant views any or all of the above requested information as a Trade Secret, then Applicant should follow the guidance of MPEP § 724.02 when submitting the requested information.

In responding to those requirements that require copies of documents, where the document is a bound text or a single article over 50 pages, the requirement may be met by providing copies of those pages that provide the particular subject matter indicated in the requirement, or where such subject matter is not indicated, the subject matter found in applicant's disclosure. Please indicate where the relevant information can be found.

The fee and certification requirements of 37 CFR § 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR § 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR § 1.105 are subject to the fee and certification requirements of 37 CFR § 1.97.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR § 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
	A	US-				
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
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	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Jansky, Adv Potato Chem & Tech, ed. J. Singh & L. Kaur, pp. 27-62 (2009)
	V	Spooner et al., Bot Rev 80:283-383 (2014)
	W	Veilleux, Sol CAP News 3(2):4 (2011)
*	X	Phumichai et al., Genome 48:977-84 (2005)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	Page 2 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
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	M	US-				

FOREIGN PATENT DOCUMENTS

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	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Maris (Euphytica 46:15-33 (1990)
*	V	Simmonds, Potato Res 40:191-214 (1997)
*	W	Watanabe et al. (Breed Sci 46:329-36 (1996)
*	X	Lippman & Zamir, Trends Genet 23(2):61-66 (2006)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	Page 3 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Bairu et al., Plant Growth Regul 63:147-73 (2011)
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	59820	potato.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 18:55
L2	1121	800/317.2.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 18:56
L3	60121	potato.ab. or tuberosum.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 18:56
L4	296	a01h5/04.cpc.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 18:58
L5	159	a01h5/06.cpc.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 18:59
L6	61015	L2 or L3 or L4	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:07
L7	223	L6 and (inbred near line)	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:07
L8	22	L7 and heterosis	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:08
L9	0	L6 and jansky sh.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:10
L10	4	L6 and lindhout.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:10
L11	111	L6 and (janksy or chung or kittipadukal).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:11
L12	42	L11 and potato.ti.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2016/01/31 19:12

EAST Search History (Interference)

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13504156	LINDHOUT ET AL.
	Examiner	Art Unit
	RUSSELL BOGGS	1638

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
STIC search of STN	8/12/14	/RTB/
STN, EAST and Google search as per attached	9/28/14	/RTB/
STIC search	9/23/14	/RTB/
EAST search as per attached	5/11/15	/RTB/
discuss claims and rejections with A.M. Grunberg	5/8/15	/RTB/
EAST search as per attached	1/31/16	/RTB/
extensive literature search by cross-referencing, Google Scholar & PubMed	1/19 to 2/2/16	/RTB/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/RUSSELL BOGGS/ Examiner.Art Unit 1638	

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 9/8/16 Signature: SWalsh
(Sarah Walsh)

Docket No.: 091876-0014 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem Hendrik Lindhout, et al.	:	Customer Number: 23630
Application No.: 13/504,156	:	Confirmation No.: 6337
Filed: July 10, 2012	:	Art Unit: 1663
For: Hybrid Seed Potato Breeding	:	Examiner: Russell T. Boggs

Mail Stop – Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT IN RESPONSE TO NON-FINAL OFFICE ACTION UNDER 37 C.F.R. 1.111

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

In response to the Office Action dated March 8, 2016, please amend the above-identified U.S. as directed herein. A Petition for Extension of Time (3 months), a Statement relating to deposited biological material, a Declaration under 37 CFR 1.132, a response to information requested under 37 CFR 1.105 and an Information Disclosure Statement are concurrently filed herewith. Reconsideration and further examination of the present application is requested in light of the following:

Amendments to the Abstract begin on Page 2.

Amendments to the Specification begin on Page 3.

Amendments to the Claims begin on Page 6.

Remarks/Arguments begin on Page 16.

AMENDMENTS TO THE ABSTRACT

In the following amendment to the abstract, ~~deletions are shown with strike through~~, and additions are underlined.

Please amend the abstract as follows:

The present invention relates to diploid, fertile, self-compatible and essentially homozygous potato lines, wherein said lines comprise an agronomically desirable trait such as vigour. The invention further relates to methods for producing such plants and to hybrid seeds obtained by crossing such homozygous potato lines and to potato plants grown from said ~~see~~ seed.

Agventure B.V. Ex. 2009
IPR2025-00136
Page 620

AMENDMENTS TO THE SPECIFICATION

In the following amendment to the specification, ~~deletions are shown with strike through~~, and additions are underlined.

Please amend the paragraph at page 52, lines 19-23 as follows:

All markers showed a high frequency of occurrence in the diploid potato germplasm used in this experiment (Figure 9). The heterozygote frequency in the germplasm by ~~suing~~ using these 100 markers ranged from 26% to 77%, while the *Sli* gene donor was 100% homozygous as is in accordance with expectations (Phumichai et al. 2005 Genome 48: 977-984).

Please amend the paragraph at page 37, lines 5-19 as follows:

The present inventors used the strategy of repeated selfing, backcrossing and crossing of potato germ plasm of a single self-compatible potato line and one or more self-incompatible potato lines harbouring agronomic traits. The homozygous plants of the present invention were obtained by continuous selfing of diploid potato plants and selection for fertile offspring (besides the inherent selection for self-compatibility). This is an entirely new approach, as in the prior art methods, plants are obtained by selection for agronomical traits, such as tuber formation or general growth characteristics of the offspring plants, not by selection for fertile offspring from selfings. Moreover, and unlike the prior art methods the procedures are performed using diploid plant lines, instead ~~to~~ of tetraploid plants. Unexpectedly, this radically new approach proved successful for obtaining increasingly homozygous, diploid offspring plants, that were ~~self-compatibel~~ self-compatible and fertile. In addition, when (out)crossed with plants of diploid lines harbouring beneficial traits, such as resistance or white tuber color, these traits could be introduced into the essentially homozygous germ plasm without loss of self-compatibility and fertility.

Please amend the paragraph at page 33, lines 11-22 as follows:

Plants according to the present invention include the line with breeders reference AGVD1, representative seeds of said line having been deposited on 23 October 2009 with the NCIMB, Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB219YA, Scotland under accession

number NCIMB 41663 and breeders reference AGVD1, which plant represents an F2 obtained by crossing a plant of parent IVP07-1001/4 (see Example 1), which is an essentially homozygous, diploid, fertile and self-compatible but non-vigorous potato line with a plant of parent D1, which is an elite diploid breeding clone that is essentially non-homozygous, and is not self-compatible, but which has the desirable agronomic trait of yellow flesh color and exhibits good cooking quality in that the flesh is not greying after cooking, and selfing the resulting F1 offspring plants. It is estimated that AGVD1 is about 50% homozygous, meaning that about 50% of the loci for which the parents differ are homozygous.

Please amend the paragraph at page 33, lines 23-31 as follows:

Plants according to the present invention also include the line with breeders reference AGVD2, representative seeds of said line having been deposited on 23 October 2009 with the NCIMB, Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB219YA, Scotland under accession number NCIMB 41664 and under breeders reference AGVD2, which line represents an (F1 x F1) line (or pseudo F2) obtained by crossing a plant of parent IVP07-1001/4 as indicated above with a plant of parent D1 as indicated above, and mutually crossing individual F1 offspring plants, that share the IVP07-1001/4 parent but have different individuals of the D1parent. It is estimated that AGVD2 is about 25% homozygous for the loci for which the parents differ.

Please amend the paragraph bridging pages 33 and 34 as follows:

Plants according to the present invention also include the line with breeders reference AGVD3, representative seeds of said line having been deposited on 23 October 2009 with the NCIMB, Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB219YA, Scotland under accession number NCIMB 41665 and under breeders reference AGVD3, which line represents a BC1 population obtained by crossing a plant of parent IVP07-1001/4 as indicated above with a plant of parent D 1 as indicated above, and backcrossing the resulting F1 offspring plants with the IVP07-1001/4 parent. It is estimated that AGVD3 is about 75% homozygous for the loci for which the parents differ.

Please amend the paragraph at page 34, lines 7-14 as follows:

Plants according to the present invention also include the line with breeders reference AGVD17, representative seeds of said line having been deposited on 5 October 2010 with the NCIMB, Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB219YA, Scotland under accession number NCIMB 41765 and under breeders reference AGVD17, which line represents an F3 population obtained by crossing a plant of parent IVP07-1001/4 as indicated above with a plant of parent D2 as indicated above, and backcrossing the resulting F1 offspring plants with the IVP07-1001/4 parent, followed by two steps of selfing. It is estimated that AGVD17 is > 80% homozygous for the loci for which the parents differ.

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Page 623

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber bearing ~~Solanum~~ *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising a plant[[s]] having ~~an average~~ a tuber yield expressed in grams of fresh weight of at least 200 grams ~~per plant~~; wherein at least 50% of [[the]] loci in said plant[[s]] are homozygous, wherein said self-compatibility originating from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, ~~wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatibile Solanum species crossable to S. tuberosum,~~ and wherein at least 25% of the plants of said line produce seed-carrying berries.

2. (Cancelled)

3. (Currently Amended) The potato line of claim 1, wherein said plant of said line, in addition to said tuber yield, comprises at least one agronomically desirable trait [[is]] selected from the group consisting of insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color [[or]] and cold-sweetening resistance.

4. (Currently Amended) The potato line of claim 1, wherein said plant[[s]] of said line, when mature, attains ~~an average~~ a fresh weight of the foliage and shoots of at least 500 grams ~~per plant~~.

5. (Currently Amended) A plant of [[a]] the line according to claim 1.

6. (Currently Amended) ~~Seeds~~ A seed or tuber[[s]] of a plant according to claim 5.

7. (Cancelled)

8. (Currently Amended) A method for producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising a plant[[s]] having ~~an average~~ a tuber yield expressed in grams of fresh weight of at least 200 grams ~~per plant~~, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a diploid, fertile, self-compatible and essentially homozygous potato line ~~of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*, wherein self-compatibility in said *Solanum tuberosum* potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*,~~ obtained by selfing ~~said~~ a plant of diploid, self-compatible ~~plant of said diploid, self-compatible~~ potato line for at least 3 times while selecting for plants that produce fertile offspring, wherein said self-compatibility originates from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line,

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid ~~or tetraploid~~ potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first and second potato plant to provide a seed[[s]] and collecting said seed[[s]] to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plants and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plants or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, and selecting for plants that produce fertile offspring, to thereby provide a diploid, fertile, self-compatible and essentially homozygous potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising a plant[[s]] having ~~an average~~ a tuber yield expressed in grams of fresh weight of at least 200 grams ~~per plant~~;

and wherein at least 50% of [[the]] loci in the plant[[s]] provided in step (e) are homozygous.

9. (Currently Amended) The method of claim 8, ~~wherein said steps (a)-(e) are repeated and~~ wherein step (b) comprises the provision of a second potato plant, wherein said second potato plant is a donor for an additional agronomically desirable trait, wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

10. (Cancelled)

11. (Currently Amended) The method of claim 8, wherein said first potato plant is a plant of potato line NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively.

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12. (Currently Amended) The method of claim 8, wherein said second potato plant is [[a]] the plant of a second diploid, fertile, self-compatible and essentially homozygous potato line.

13. (Currently Amended) The method of claim 8, wherein said second potato plant is [[a]] the plant of a second diploid, fertile, self-incompatible potato line.

14-15. (Cancelled)

16. (Currently Amended) A method for producing a uniform hybrid potato seed, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a first diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of [[the]] loci in said first potato plant are homozygous; and wherein said self-compatibility originates from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, ~~and wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum,*~~

(b) providing a second potato plant, wherein said second potato plant is a plant of a second diploid or tetraploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said second potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of [[the]] loci in said second potato plant are homozygous; and wherein said self-compatibility originates from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or

NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, ~~and wherein self-compatibility in said potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum,*~~ and wherein said first and second plant contain at least 20 % contrasting homozygous loci as determined by molecular marker analysis, and

(c) cross pollinating said first and second potato plant and allowing one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide a hybrid offspring seed.

17. (Cancelled)

18. (Previously Presented) Method according to claim 16, wherein at least one of said first and second potato plants comprises at least one agronomically desirable trait selected from the group consisting of insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color and cold-sweetening resistance.

19. (Currently Amended) The method of claim 16, wherein said first potato plant is a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland.~~, or a diploid, self-compatible and essentially homozygous offspring potato plant thereof, wherein said diploid, self-compatible and essentially homozygous offspring plant is of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum.*~~

20. (Currently Amended) The method of claim 16, wherein said second potato plant is a plant of a second diploid or tetraploid, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said second potato line comprising

an additional agronomically desirable trait; and wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

21. (Currently Amended) A seed of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland.

22. (Previously Presented) A seed produced by the method of claim 16.

23. (Currently Amended) A hybrid potato plant, or part thereof, produced by growing the seed of claim [[16]] 22.

24. (Previously Presented) Pollen or an ovule of the plant of claim 23.

25. (Previously Presented) A tuber from the plant of claim 23.

26. (Previously Presented) A potato plant having all of the physiological and morphological characteristics of the plant of claim 23.

27. (Previously Presented) A tissue culture of the plant of claim 23.

28. (Previously Presented) A potato plant regenerated from the tissue culture of claim 27.

29. (Currently Amended) A method for producing a hybrid potato seed wherein the method comprises crossing a first potato plant with a second potato plant and harvesting a hybrid potato seed resulting from said crossing, wherein said first or second parent potato plant is the potato plant of claim 5 or claim 38, wherein said first and second parent potato have at least 20 % contrasting homozygous loci as determined by molecular genetic marker analysis.

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30. (Previously Presented) A method of producing a hybrid potato plant, said method comprising producing a seed according to a method of claim 16 and growing said seed into a potato plant.

31. (Previously Presented) A potato plant produced by the method of claim 30, or a tuber thereof.

32. (Currently Amended) A set of 2 homozygous diploid, fertile, self-compatible and essentially homozygous potato lines of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* according to claim 1 for intercrossing, wherein each of said lines differ from another line in said set by having at least 20 % contrasting homozygous loci as determined by molecular genetic marker analysis; and wherein at least 50% of [[the]] loci in said plants are homozygous.

33. (Cancelled)

34. (Currently Amended) A hybrid potato seed which seed, when sown produces a diploid, fertile, self-compatible and essentially heterozygous potato plant of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, said plant being obtained by:

(a) providing a first diploid, fertile, self-compatible and essentially homozygous potato line comprising plants of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein at least 50% of [[the]] loci in a plant of said first potato line are homozygous; wherein said self-compatibility originates from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB

accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively ~~and wherein self-compatibility in said first potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*~~;

(b) providing a second diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein said first and second plant contain at least 20 % contrasting homozygous loci as determined by molecular marker analysis, and wherein at least 50% of [[the]] loci in a plant of said second potato line are homozygous; wherein said self-compatibility originates from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds,of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, and ~~wherein self-compatibility in said second potato line is introduced from tuber-bearing self-compatible *Solanum* species crossable to *S. tuberosum*~~ and

(c) cross pollinating said first and second potato plant and allowing at least one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide a hybrid offspring seed.

35. (Currently Amended) A method for producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, comprising:

(a) providing a first potato plant, which first potato plant is a plant of potato line NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said line having been deposited with the

NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively;

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid or tetraploid potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first and second potato plant to provide seeds and collecting said seeds to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plant and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plant or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, to thereby provide a diploid, fertile, self-compatible and essentially homozygous potato breeding line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

and wherein at least 50% of [[the]] loci in a plant provided in step (e) are homozygous.

36. (Currently Amended) Starch, potato chips, or French fries produced from the tuber of any of claims [[5]] 6, 25 or 31.

37. (New) A tetraploid potato line produced by doubling the genome of a plant of claim 5.

38. (New) A plant of a tetraploid potato line according to claim 37.

39. (New) The potato line according to claim 1, wherein at least 75% of loci in said plant of said line are homozygous.

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REMARKS/ARGUMENTS

Status of Claims

Claims 1, 3-9, 11-16, 18-32 and 34-36 were pending in this application. Claims 1, 3-6, 8, 9, 11-13, 16, 19-21, 23, 29, 32 and 34-36 have been amended. Claims 7, 14 and 15 are canceled without prejudice. Claims 37-39 are newly added.

Basis for this amendment is present throughout the application as filed. For example, support for the amendment to claims 1, 8, 16, and 34 is found at page 6, lines 5-7, at page 10, lines 26-32, at page 32, lines 24-28, at page 37, lines 21-24, at page 46, lines 32 to page 47, line 2 and at Table 6).

Claims 1, 3-6, 8, 9, 11-13, 16, 19-21, 23, 29, 32 and 34-36 have been amended to correct informalities. No new matter is believed to be added herein.

Support for new claim 37 can be found *inter alia* at page 31, lines 6-15 and at page 40, lines 31 to page 41, line 3.

Abstract

The abstract has been amended to correct a spelling error. The amendments do not add new matter.

Specification

The specification has been amended to correct informalities. Spelling and typographical errors have been corrected and address of NCIMB regarding the deposits is included. The amendments do not add new matter.

Claim Objections

Claims 1, 4-9, 11-13, 19, 21 and 35 are objected to because of informalities.

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A. Claim 1 is objected to for the following reasons: (1) "plants" referred in plural rather than reading on a single plant, (2) S. tuberosum is not italicized, (3) Solanum is not italicized and (4) the recitation of the word "species"

Claim 1 is amended to correct the informalities.

B. Claim 4 is objected to because it refers to the "plants" in plural.

Claim 4 is amended to recite the word "plant" in singular.

C. Claim 5 is objected to because of recitation of the phrase "a line according to claim 1".

Claim 5 is amended to recite the phrase "the line…" instead of "a line….".

D. Claim 7 is objected to because it refers to the "seeds" in plural.

Claim 7 is cancelled.

E. Claim 8 is objected to for the following reasons: (1) recites in plural "seeds" rather than a singular composition, (2) the phrase "said hybrid offspring potato plant" lacks antecedent basis, (3) the recitation of the phrase "the plants", (4) the recitation of the phrase "tuber-bearing" and (5) the recitation of the phrase "a first potato plant".

Claim 8 is amended to correct the informalities.

F. Claim 9 is objected to because of recitation of the phrase "wherein said steps (a)-(e) are repeated".

Claim 9 is amended to delete the phrase "wherein said steps (a)-(e) are repeated".

G. Claim 11 is objected to because the word "accession number" is missing.

Claim 11 is amended to include the word "accession number" between "NCIMB" and each of "41663", "41664", "41665" and "41765".

H. Claims 12 and 13 are objected to because of the recitation of the phrase "a second diploid".

Claims 12 and 13 are amended to replace the phrase "a second diploid" with the phrase "the second diploid".

I. Claim 19 is objected to because the word "accession number" is missing.

Claim 19 is amended to include the word "accession number" between "NCIMB" and each of "41663", "41664", "41665" and "41765".

J. Claim 21 is objected to because the word "accession number" is missing.

Claim 21 is amended to include the word "accession number" between "NCIMB" and each of "41663", "41664", "41665" and "41765".

K. Claim 35 is objected to because the word "accession number" is missing.

Claim 35 is amended to include the word "accession number" between "NCIMB" and each of "41663", "41664", "41665" and "41765".

Reconsideration and withdrawal of objection are respectfully requested.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 1, 3-9, 11-16, 18-20, 22-32 and 34-36 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite, for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

A. According to the Examiner, claims 1, 8, 14, 15, 16, 19, 20, 32, 34 and 35 are indefinite in their recitation of "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*", since it appears to require that the plant have some relationship to *Solanum tuberosum* but the extent of that relationship is indefinite.

Claims 14 and 15 have been cancelled. Claims 1, 8, 16, 19, 20, 32, 34 and 35 are amended for clarity purposes.

B. According to the Examiner, claims 1, 8, 16, 32, 34 and 35 are indefinite in the recitation of "the loci", as there is insufficient antecedent basis.

For clarity purposes, the phrase "the loci" is amended to "loci" in claims 1, 8, 16, 32, 34 and 35.

C. According to the Examiner, claim 3 is indefinite in the recitation of "said at least one agronomically desirable trait", as there is insufficient antecedent basis.

For clarity purposes, the phrase "said at least one agronomically desirable trait" in claim 3 is replaced with "said plant of said line, in addition to said tuber yield, comprises at least one agronomically desirable trait". Support for the basis of amendment to claim 3 can be found *inter alia* in the originally filed PCT claim 2.

D. According to the Examiner, claim 7 is indefinite in the recitation of "uniform hybrid potato seed", as the specification fails to define the term and the term lacks a meaning in the art.

Claim 7 is cancelled.

E. According to the Examiner, claim 8 is indefinite in the recitation of "said hybrid offspring potato plant" and "said potato line", as it lacks antecedent basis.

For clarity purposes, claim 8 is amended. Support for the basis of amendment to claim 8 can be found in the specification at page 37, lines 11-14 and 30-32.

F. According to the Examiner, claim 36 is indefinite in the recitation of "the tuber of any of claims 5, 25 or 31", as there is no reference to a tuber in claim 5.

The phrase "the tuber of any of claims 5, 25 or 31" in claim 36 is amended to "the tuber of any of claims 6, 25 or 31".

Reconsideration and withdrawal of rejection are respectfully requested.

Rejections under 35 U.S.C. § 112, first paragraph

A. Claims 1, 3-9, 11-16, 18-20, 22-32 and 34-36 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

According to the Examiner, the claims are broadly drawn to a diploid, fertile, self-compatible and essentially homozygous potato line, or a seed thereof, comprising plants that have an average tuber yield of at least 200 g/plant. Independent method claims 8, 16, 34 and 35 are drawn to a method to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g., crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland. According to the Examiner, the Applicant claims a large genus, whereas the instant application describes only four potato lines to use in the claimed methods that were created from the same line, the IVP07-1001/4 line.

Claims 7, 14 and 15 are cancelled. Claims 1, 3-6, 8, 9, 11, 16, 19, 20, 23, 29, 32 and 34-36 have been amended and limited to the species *S. tuberosum*.

The claimed self-compatible *S.tuberosum* lines originates from *Solanum chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds,of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively.

AGVD1, AGVD2, AGVD3 and AGVD17 represent four examples of *S. tuberosum* having various levels of homozygosity. It is clear from the application as filed that the Applicant has demonstrated the methods that can be used to produce (1) a diploid potato breeding line, (2) hybrid potato seed and (3) an offspring of a diploid potato breeding line of the species of *Solanum tuberosum*.

Reconsideration and withdrawal of rejection are respectfully requested.

B. Claims 1-32 are rejected under 35 U.S. C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement.

According to the Examiner, the specification does not disclose a repeatable process to obtain the plant and thus it is not apparent if the plant is readily available to the public.

Applicant asserts that the deposit of seeds was made under the Budapest Treaty. A Statement is submitted concurrently herewith by the Attorney of record stating that the instant invention will be readily available to the public upon the issuance of a patent.

Reconsideration and withdrawal of rejection are respectfully requested.

Rejections under 35 U.S.C. § 103

A. Claims 1, 3-9, 12-16, 18, 20, 22-26 and 29-34 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Jansky ("Breeding, Genetics, and Cultivar Development", *Advances in Potato Chemistry and Technology*, ed. J. Singh & L. Kaur, pp. 27-62, June, 2009) in view of Phumichai et al. (*Genome* 48:977-84, 2005), in further view of Maris (*Euphytica* 46:15-33, 1990), Simmonds, (*Potato Res* 40:191-214, 1997), and in further view of Watanabe et al. (*Breed Sci* 46:329-36, 1996).

B. Claims 27 and 28 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Jansky, ("Breeding, Genetics, and Cultivar Development", *Advances in Potato Chemistry and Technology*, ed. J. Singh & L. Kaur, pp. 27-62 , June, 2009) in view of Phumichai et al. (*Genome* 48:977-84, 2005), in further view of Maris (*Euphytica* 46:15-33, 1990), and in further view of Wang & Ran (*NZ J Crop Hart Sci* 28:1-8 , 2000).

The Examiner has concluded that it would have been obvious to a person of ordinary skill in the art to modify the teachings of the said prior art references to arrive at the claimed invention.

The rejection is principally based on the prior art disclosure (Jansky and Phumichai) that *Sli gene* originating from *Solanum chacoense* can be used to attain high levels of homozygosity in potato plants and the inbred plants can be used in heterosis breeding and to produce true potato seed and from Simmonds disclosure that diploid potato plants were at that time underutilized, therefore providing motivation to cultivate them and that heterosis produces a "spectacular" increase in yield. The Examiner has cited Maris and Watanabe as allegedly disclosing the claimed agronomically desirable traits.

Applicant respectfully disagrees. Without acquiescing to the merits of the rejection and solely to expedite prosecution, claims 1, 3-6, 8, 9, 12, 13, 16, 20, 23, 29, 32 and 34 have been amended and claims 7, 14 and 15 have been cancelled.

The Scope And Content Of The Prior Art

Prior art potato breeding methods:

The applicant herewith provides an overview of the prior art of potato breeding up to the priority date of the present application. In this, it will be emphasized that the skilled person would not arrive at the claimed subject-matter and that the steps of obtaining such a plant are not common in the breeding of cultivated or commercial potatoes of the species *Solanum tuberosum*.

Plant breeding can be divided into the "classical" methods of slowly enriching plant populations with beneficial characteristics and "hybrid" breeding, wherein homozygous parental inbred lines are developed and crossed to produce a commercial (F1) hybrid variety. In order to improve the F1 hybrid, the essentially homozygous parental lines may be improved by deliberate interbreeding (crossing) of closely or distantly related individuals to produce new germplasm whereby traits or genes from a donor line are introduced into the genetic background of a favored line with high agronomical or horticultural value.

Although hybrid breeding procedures are suitable and presently used for many crop species, for *Solanum tuberosum*, the current breeding process is not a hybrid breeding process, but a process of crossing highly heterozygous tetraploid parental lines and selecting from tens or hundreds of thousands of offspring plants the new and improved germplasm. This process is excessively labor intensive and time consuming as explained in the introductory part of the description of the application as filed. Still, potato breeding on a commercial level occurs in this way, primarily because hybrid breeding methods have proven unsuccessful (see below). Although a large number of new varieties have been developed, today's potato industry is still dominated by two potato varieties that were developed a century ago: Bintje (1904) in (parts of) Europe and Russet Burbank (1876) in North America. Methods of potato breeding have not changed much in the 20th century.

Hybrid breeding in *Solanum tuberosum* has not been possible up to the present invention. While at the tetraploid level the provision of homozygous inbred lines is prevented due to inbreeding depression (*see* introduction of Uijtewaal, Euphytica, 36: 745-753, 1987, IDS filed concurrently), homozygous inbred lines have not been obtained at the diploid level due to both inbreeding depression and self-incompatibility (*see* Watanabe at introduction). However such essentially homozygous lines are pivotal in allowing the introduction of new traits into *S. tuberosum* germplasm. There are presently a large number of traits available for potato breeding, for instance for resistance to phytophtera, but such traits cannot be included in the present commercial germplasms.

Hence, there is a long felt need for improved methods of breeding *S. tuberosum*. One of the preferred, but unavailable, methods is that of hybrid breeding using essentially homozygous parental lines of *S. tuberosum*, also evidenced by the wish expressed in Jansky's publication, which was quickly downplayed as commercially unfeasible due to "dramatic reductions in fertility and vigor", while referring to Phumichai, both publications currently being used by the Examiner in the obviousness rejection. Jansky refers to sibling mating as an attractive alternative to hybrid breeding, thereby suggesting – and further establishing the prejudice argued herein below – to stay clear of hybrid breeding in *S. tuberosum*.

Inbreeding:

Apart from exhibiting the complex tetrasomic inheritance, *S. tuberosum* breeding also suffers from the inbreeding depression. One of the earliest publications on potato breeding is by Krantz (*see* Krantz, Technical Bulletin 25, Dec 1924, IDS filed concurrently). This reference advocates the use of self-fertilization or inbreeding that is successfully used in other crops. Krantz summarizes as follows:

> "*Inbreeding studies on maize by East (5) and Shull (41, 42, 43, 44) suggested to these investigators the value of selection in self-fertilized lines of normally cross-pollinated crop as a means for their improvement. [...]. In a vegetatively propagated crop such as the potato, in which the resultant heterozygous F1 individuals can be propagated indefinitely, the method would appear to be particularly appropriate. Furthermore, the almost total absence of desirable parents among our present potato varieties which produce viable pollen, makes it imperative to utilize some method to secure the parents necessary for a basis for potato breeding work.*"
> [*emphasis added, see* Krantz at pages 23-24 under the section titled "Selection in self-fertilized lines].

It is thus clear that in 1924, some 90 years ago, inbreeding in *S. tuberosum* was advocated as a valuable and necessary course, but that there were problems with producing fertile offspring. This is just one indication of the presence of a long felt need. In consecutive sections of his book chapter, Krantz describes the effect of the inbreeding strategy on heterozygosity, vigor and fertility, and discloses the following:

> *"Improved varieties that are dependable as pollen parents are a necessary requisite to any great improvement in the potato varieties of this country. Selection in self-fertilized lines is the best method of obtaining such varieties."* [*emphasis added, see* Krantz at page 29 under the section titled "Conclusions"].

Thus, in 1924 there was already a strong scientific motivation to use inbreeding in potato breeding methods. However, 60 years onward, Jackson et al. in 1984 were not able to report more than that "inbreeding in potatoes presents a considerable challenge, but one for which the potential rewards are great." (*see* Jackson, 1984, Report of the XXVIII Planning Conference, IDS filed concurrently). Hence, despite the rewards and the suggestion of inbreeding strategies 60 years earlier, there were no such breeding results to report in 1984 due, at large, to inbreeding depression.

Tetraploid *S. tuberosum* is a natural reservoir for deleterious and lethal alleles. Although tolerated in tetraploids via dominance and epistatic interactions, this genetic burden causes inbreeding depression when homozygosity is increased (*see* Birhman, Genome, 43, 495-502, 2000, IDS filed concurrently). The exact mechanism of this phenomenon is not known, but it is considered that homozygous expression of deleterious genes upon inbreeding is the cause of the very weak and infertile plants of which the seedlings are addressed as "... having small, gnarly, absolutely worthless tubers" (*see* Krantz at page 24 under the section titled "Effect of inbreeding on heterzygosity").

Diploids:

Following the first description of genetically less complex diploid wild *Solanum* species (*S. chacoense, S, phureja, S. stenotomum*, etc.) and even diploid *S. tuberosum* clones in the late fifties (*see* Hougas, Am. Potato Journal, 35: 701-707, 1958, IDS filed concurrently) the use of cultivated

diploid Solanum species was implemented in potato breeding (*see* Haynes, Symposium, 1972, IDS filed concurrently).

Initially, potato dihaploids (2n = 2x = 24= diploid *S. tuberosum*) were envisioned as a tool to simplify the breeding of *S. tuberosum* cultivar production by reducing tetraploid germplasm to a diploid breeding level. Hougas already indicated in 1958 that such diploids are of interest to plant breeders primarily because they would present a rapid method for obtaining a high degree of homozygosity, and that the use of chromosome doubling in monoploids (haploids derived from diploid species) would result in completely homozygous individuals.

One should bear in mind, however, that, although not as a result from self-fertilization, these diploid *S. tuberosum* clones also suffer from inbreeding depression, due to the reduction of the tetraploid genome to the diploid level via haploidization (*see* Uijtewaal at pages 745-746 under the section titled "Introduction" and at pages 750-752, under the section titled "Discussion"). Such diploid *S. tuberosum* clones are weak and feeble plants, produce hardly any tubers (*see* Uijtewaal at page 750, Fig. 1) and cannot be selfed (*see* Uijtewaal at page 752, fourth paragraph), i.e., such dihaploids are self-incompatible. This self-incompatibility means that selfed plants do not form berries upon self-fertilization, or that berries do not contain viable seeds after selfing. Despite the fact that these diploid *S. tuberosum* breeding programs were proposed some 55 years ago by Hougas, they have never resulted in vigorous fertile homozygous diploid *S. tuberosum* lines before the present invention due to self-incompatibility and inbreeding depression.

A second motive for the production of diploids was to acquire a 'genetic bridge' between the genomes of the various *Solanaceae* species. By this technique, ploidy barriers between cultivated *S. tuberosum* and wild *Solanum* species could be circumvented by reducing tetraploid *S. tuberosum* to the diploid level and crossing the resultant dihaploids to the wild diploid *Solanum* spp. In the background of this wild diploid *Solanum* spp material, the *S. tuberosum* genes can be recombined to a beneficial constitution. Novel germplasm is then incorporated back into tetraploid *S. tuberosum* breeding programs via sexual crosses between tetraploid *S. tuberosum* and colchicine-doubled *S. tuberosum* diploids, or through 4x-2x crosses utilizing unreduced gamete formation. This breeding strategy is indicated as "germplasm enhancement", which is basically a diploid breeding scheme

using wild *Solanum* relatives to prepare a desired combination of genes, and then to elevate this back to the tetraploid level of cultivated *S. tuberosum*. This breeding strategy is also described by Maris, Hermundstad and Watanabe.

Watanabe is an example of such a potato breeding scheme through germplasm enhancement. The aim of the scientific research described in Watanabe is to use potato diploids as a genetic bridge to transfer resistance genes to tetraploid *S. tuberosum*. This is a two-step process whereby in the first step resistance genes are transferred from the wild donor species into diploid *S. tuberosum* by crossing and selections of the resistant diploid *S. tuberosum* in the progenies of such crosses. In the second step the resistance is transferred from resistant diploid *S. tuberosum* genotypes into tetraploid *S. tuberosum* by crossings via the production of unreduced gametes (2n) in the diploids. The resulting tetraploid plants can be further crossed with commercial tetraploid breeding germplasm to combine favourable agricultural traits from the tetraploids with the resistance gene originating from the wild *Solanum* species. Watanabe is not the first publication wherein germplasm enhancement is described. Hougas already expressed this idea in 1958 and combining useful genes for classic potato breeding through germplasm enhancement is a major line of research ever since, as indicated by Maris and Hermundstad. However, these *S. tuberosum* diploids are not essentially homozygous.

Homozygous diploids:

As indicated above under the section titled 'Diploids', one of the foreseen advantages of diploids (or dihaploids as they are also called for *S. tuberosum*) was that they could rapidly provide for a high degree of homozygosity.

Homozygous diploids of potato can in principle be obtained by one of two ways:

1. Doubling haploids (*see* Uijtewaal), wherein the haploids are for instance obtained by ovule culture or anther culture (*see* Jacobsen, Theor. Appl. Genet, 52: 119-123, 1978, IDS filed concurrently), or

2. Repeated selfings using the *S. chacoense Sli* gene (*see* Phumichai).

Of the 2 methods above, only doubling of haploids (1) has successfully resulted in the production of homozygous diploids of *S. tuberosum*. As noted earlier, although some improvement in tuber yield could be obtained in the case of using doubled haploids (*see* Uijtewaal at page 750, Fig. 1 and page 746, Table 1), this is not nearly the 200 g/plant as present in a plant obtained by the method of claim 8, and, furthermore, these plants were essentially infertile (*see* Uijtewaal at page 752, third paragraph).

In contrast, the inbreeding technique reported by Phumichai for obtaining homozygous potatoes is NOT performed with *S. tuberosum*. The plants of Phumichai are not *S. tuberosum* plants but a mixture of the genomes of three wild relatives *S. chacoense, S, phureja, and S. stenotomum*. The *Sli* gene donor, clone F1-1, is also not an *S. tuberosum* plant but an interspecific hybrid between a highly inbred clone (S7) of *S. chacoense* and a cultivated diploid *S. phureja* clone (*see* Birhman). The F1 (S0) clone 94H87 is a cross between the *Sli* gene donor clone F1-1, and "cultivated diploid" 93H100 (*see* Phumichai at page 979, Fig. 1). Birhman discloses the following:

> "The family 93H100 consisted of plants raised from a mixture of seeds obtained by bulk-pollen pollinations among the cultivated diploid potatoes (the S. *stenotomum* – *S. phureja* mixed population)." [emphasis added, *see* Birhman at page 426, column 2].

Hence, clone 93H100 is *S. stenotomum/S. phureja*, while clone F1-1 is *S. chacoense/S. phureja*.

The schematic figure herein below summarizes the *Sli* gene ancestry, and position of the 93H100 family described by Phumichai.

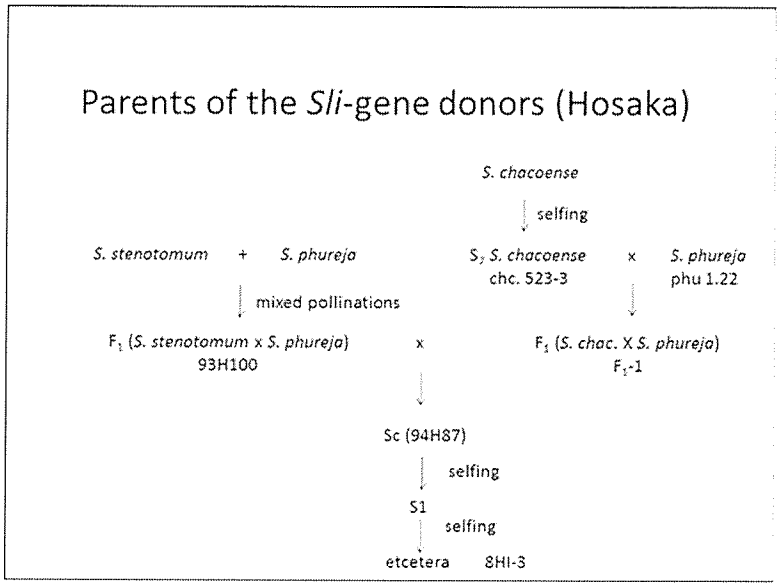


Fig. 1: Indication of the ancestry of the clones 93H100 (left), 94H87 (center) and F1-1 (right) (based on Birhman).

It should be noted that the term "Cultivated diploid potatoes" in Phumichai refers to *S. stenotomum/S. phureja* germplasm, and not to *S. tuberosum*. The term "cultivated diploid potatoes" must be understood in the light of Haynes, as follows:

> *"To date, consideration of breeding at the diploid level has always involved the derived diploids from Group Tuberosum. Other diploids have entered the picture primarily as sources of disease and insect resistance to be transferred largely through back cross programs. No systematic effort has been made to improve the diploid cultivars themselves through breeding."* [*see* Haynes at page 102, second paragraph].

The authors of Phumichai progress on that route, in an attempt to improve the germplasm of the diploid cultivated potatoes *S. stenotomum, S. chacoense* and *S. phureja*. Essentially, therefore, Phumichai is directed to enhancement of wild potato germplasm.

Differences Between the Prior Art and the Claimed Invention

The problem that the present inventors aimed to solve was to produce an essentially homozygous diploid potato plant (in the present case of the species *S. tuberosum*) that could be used as a true breeding parent for producing uniform hybrid potato seed. For that, the plant must show to be fertile, self-compatible and vigorous in that it produces more than 200 gram tubers.

Phumichai is directed to the same problem of attempting to produce highly homozygous diploid potato plants for producing TPS. This reference also uses the same method, namely inbreeding while overcoming the self-incompatibility problem using the *Sli gene*. The same problem is mentioned in Jansky (*see* Jansky at page 46, third paragraph), which for that matter explicitly refers back to Phumichai.

The difference between the present invention and Phumichai, or Jansky for that matter, is that the potato plant is a *Solanum tuberosum* plant, that is also vigorous in that it has a high (>200 gr/plant) tuber yield.

The present inventors arrived at such a plant by a method as presently claimed, in the first culturing steps encountering frail and weak plants with very few flowers and very few berries after self-pollination, and many berries without seed.

This phenomenon was already observed by Phumichai for the wild diploid cultivars when crossing a self-compatible potato plant having the *Sli gene* with cultivated plants raised from a mixture of seeds obtained by bulk-pollen pollinations among the cultivated diploid potatoes *S. stenotomum* and *S. phureja*.

Phumichai discloses that only 1 of 7 cross combinations reached S5 generation indicating serious loss of fertility and inbreeding depression reduced pollen viability and tuber yield (*see* Phumichai at page 982, second and third paragraphs).

Thus a skilled person would not be inclined to perform such a crossing with diploid plants of *Solanum tuberosum* since these tetraploid-derived diploids suffer from even more inbreeding depression.

Surprisingly, the inventors found that, successive rounds of selfing while selecting for plants that produce fertile offspring eventually resulted in plants with progressively improved fertility and vigour. Without wishing to be bound by theory, the inventors believe that this manner of selection indeed allowed the removal of a sufficient amount of deleterious genes from the *Solanum tuberosum* germplasm.

This result was fully unexpected, since selection for fertile plants has usually been associated with selecting for heterozygosity, not homozygosity.

> *"The slower than expected decline in heterozygosity has been reported by Brouwer and Osborn (1997) with inbreeding diploid alfalfa and by Scotti et al. (2000) with inbreeding tetraploid alfalfa. Consequential selection for vigor and fertility during selfing has been suggested as the cause (Brouwer and Osborn 1997). We previously suggested that reproductive traits, such as flowering versus nonflowering and the degree of pollen production, were strongly correlated with heterozygosity, and selection for fertility favored the more heterozygous plants."* [*see* Phumichai at page 982).

The present inventors were the first to follow the strategy that during the inbreeding process, the selection process of suitable offspring plants having an increased level of homozygosity should not be based on selecting vigorous plants having high tuber yields, but on selecting self-compatible plants having the highest level of fertility. For any potato breeder, this is a fully counterintuitive process. After all, potato breeders attempt to maximize the vigor of the plant and in particular the tuber yield while minimizing the amount of flowers and berries produced. After all, and in contrast to for instance tomato, the berries have no agronomic value, and cultivation of flowering and berries-producing potato plants may result in segregated seeds being shed that may grow into undesirable plants in commercial production fields. Hence, flowers, berries and viable seeds are not considered valuable and are selected against, while strong plants with high tuber yields are selected for further rounds of breeding.

The present inventors showed for the first time that an increase in vigor is possible when a sufficient level of fertility is attained, and that any premature selection for vigor results in ushering or selection for deleterious genes. Hence the inventors made a first cross between a diploid self-compatible potato line having the *Sli gene* and a diploid vigorous line of *S. tuberosum*, optionally backcrossed against the *Sli* donor, and continued the selfing process to increase the homozygosity while again selecting for fertility. In this manner, the inventors were surprisingly able to produce essentially homozygous inbred and diploid *S. tuberosum* plants that were fertile and vigorous.

Applicant wishes to provide further citations regarding no expectation of success, contrary to the Examiner's assertion.

Bachem (Unravelling the Potato Genome, 2008, IDS filed concurrently) reported in 2008 on the perspectives of unraveling the potato genome on the FAO website dedicated to the International year of the Potato comments the following.

> *"Cultivated potato is what we call a highly heterozygous, self-incompatible outbreeder - in practice that makes it impossible to produce true breeding lines and so genetic improvement is a complex and lengthy process."* [emphasis added, *see* first paragraph of http://www.fao.org/potato-2008/en/perspectives/bachem.html]

Simko (Genetics, 173: 2237-2245, 2006, IDS filed concurrently) recites Simmonds and classify potato as an outcrosser because it suffers from severe inbreeding depression that prevents development of homozygous lines. (*see* Simko at page 2237, right column).

Veilleux (Solcapnews 3(2): 4-5, 2011) discloses the following:

> *"[...], the plant breeding community was captivated by the new opportunities to derive haploid and doubled haploid lines of commercial crops. Our intentions for applying the technique to the Haynes adapted phureja population of potato were motivated by the possibility of deriving homozygous lines as building blocks for hybrid true potato seed. My dissertation research at the University of Minnesota under the direction of Florian Lauer involved selecting 2n pollen producing clones from the adapted phureja population, crossing them to potato cultivars and evaluating the resulting tetraploid 4x-2x hybrids in the field. The high yield and cultivar like appearance of these 4x-2x hybrids was remarkable, despite the lack of selection on the phureja population for any traits except 2n pollen. Their heterogeneity could be attributed to genetic segregation expected to occur both during the formation of megasporocytes in the tetraploid cultivars as well as the formation of 2n pollen in the diploid phureja selections. We knew from the work of Wenzel in Germany and Uijtewaal in Holland that inbreeding depression in potato cultivars or (di)haploid breeding lines was severe, so that even if plants could be obtained, they were too weak to be of much use. However they had established a protocol for anther culture of potato. We hoped that the adapted phureja population would have greater tolerance to inbreeding".* [emphasis added; *see* Veilleux at page 4, first paragraph]

The above mentioned additional references also suggest that there was no expectation of success for inbreeding of *S. tuberosum* diploid material.

The general prejudice that production of homozygous true breeding lines of potato would not be possible is also indicated and supported with references on page 5, lines 1-28 of the application as filed.

Level Of Ordinary Skill In The Art

The person of ordinary skill in the art would have a background in potato breeding and crossing. The person of ordinary skill would be aware of the disclosures of the prior art documents discussed in this Amendment.

Objective Evidence Of Non-Obviousness

A Declaration by Willem Hendrik Lindhout under 37 CFR 1.132 on the newly developed diploid potato inbreds providing additional information regarding the claimed invention that is probative of non-obviousness is submitted herewith. Testimonies from the following experts in the field of potato breeding are provided herewith.

1. Ir. Jan van Loon, a Dutch Potato Breeder since 1973, subsequently at Cebeco, Hettema and HZPC.

2. Prof. Dr. Ir. Evert Jacobsen, Professor of Plant Breeding, Wageningen University, Netherlands since 1988; Max-Planck and successor to Hermsen in Wageningen.

3. Prof. Dr. Jonathan D. G. Jones, Laboratory Head, The Sainsbury Laboratory, John Innes Centre, and Professor at East Anglia University, UK.

4. Prof. Dr. Ir. Maarten Koornneef, Director at the Max Planck Institute for Plant Breeding Research and Part-time professor of Plant Genetics at Wageningen University, The Netherlands.

5. Prof. Dr. Sanwen Huang, PhD, Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing, China.

The above experts testify that:

(a) it was impossible to produce commercial potato varieties [*S. tuberosum*] from seed and that it would be very difficult, if not impossible to produce homozygous inbred lines as parents for a variety from true potato seeds (*see* testimony from van Loon),

(b) inbreeding depression and self-incompatibility at the diploid level justified the traditional way of breeding and that the approach by the inventors was considered unrealistic and unfeasible for the development of commercial cultivars (*see* testimony from Jacobsen),

(c) attempts to produce hybrid potato at the diploid level using the *S. chacoense Sli gene* in *Solanum phureja* and selfing the lines that carry the *Sli gene*, were never successful in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing (*see* testimony from Jones),

(d) development of diploid, homozygous inbreds in potato was a daring undertaking with very little chance of success and that the success in challenging this dogma is a positive surprise (*see* testimony from Koornneef), and

(e) the progress made by the inventors on developing self-compatible homozygous diploid potato with good agronomic performance was surprising that, this result was the breakthrough that the experts have been waiting for since nearly a century and is crucial for the potato breeding worldwide and especially for the food security in, for instance, China (*see* testimony from Huang).

Commercial Importance of the invention

Applicant also wishes to bring the commercial and societal impact of the present invention, in establishing the background for non-obviousness. The Dutch company Solynta, which exploits the subject-matter of the present US patent application, had the honor to receive from the Dutch government the title of "National Icon 2014", for its groundbreaking technology in the field of potato breeding.

> *"For crops, the potato is fourth in terms of revenue in the world. Yet innovation in this crop has been silent for about 60 years. The variety 'bintje' is still the biggest variety in Europe. Solynta comes with a new breeding technique with potato seed instead of potatoes. The genetic material of the potato can be enhanced and so varied."* [emphasis added, *see* http://www.rvo.nl/nationaal-icoon-2014-hybride-aardappels].
>
> *"This groundbreaking technology makes it possible to increase the nutritional value of potatoes and to grow different types of potatoes". This means more efficient storage and transport and less disease. "Solynta underlines with this project the major Dutch contribution to the global world food supply."* [*see* http://www.rvo.nl/nationaal-icoon-2014-hybride-aardappels].

The Claimed Invention is Non-Obvious

The present invention solves the problem of producing diploid, homozygous inbred potato plants that are self-compatible, fertile and vigorous. The question to be answered is whether a skilled person would arrive at the claimed solution because of prior art teachings.

Applicant respectfully submits that this is not the case. If one would endeavor on a quest to find a vigorous homozygous Solanum tuberosum, this is not an endeavor one would engage on with any expectation of success.

If one of skill would choose to select the *Sli gene* donor F1-1 as taught by Phumichai and cross it with a cultivated diploid variety such as *S. phureja* or *S. stenotomum*, as described in Phumichai or Birhman, one would recognize that although some level of vigor may be obtained, it would not result in a fertile homozygote due to inbreeding depression, as clearly stated in Phumichai as follows:

> "*However, the fact that only 1 of 7 cross combinations reached S5 generation indicates that serious loss of fertility is typical in most families. Thus, inbreeding depression, typically expressed as reduced pollen viability and tuber yield ([...]), will certainly limit continued selfing of the present diploid inbreds*." [emphasis added; *see* Phumichai at page 982, left column, second paragraph].

Moreover, this line of development would result in a homozygous wild potato cultivar, not an *S. tuberosum* cultivar. The skilled person is also aware of the results of doubled haploid *S. tuberosum* experiments, and is aware that such breeding routes result in plants "too weak to be of much use" as stated herein above. Hence, the only experiment that resulted in essentially homozygous inbred potatoes with some tuber yield (not reported as being commercially relevant as the >200 gr/plant as presently claimed) were not obtained with dihaploids obtained from tetraploid *S. tuberosum*, but with naturally occurring diploid potato lines of the species *S. phureja* and *S. stenotomum*. Hence, if one would cross the *Sli* gene donor F1-1 from Phumichai or Birhman with a plant of a diploid *S. tuberosum* line, all one would expect is that this would not work.

Hence, performing a cross between a plant derived from *Sli* gene donor F1-1 from Phumichai or Birhman with a plant of a diploid *S. tuberosum* line with intent to produce a fertile and vigorous homozygous *S. tuberosum plant* will not lead to successful results and therefore not obvious to try, as results in that direction predicted failure.

Further, the Applicant notes that the combination of teachings of Phumichai and/or Jansky with Maris clearly reflects the hindsight that taints the present obviousness rejection. As argued hereinbefore, the main problem that underlies the invention is that it was hitherto impossible to produce essentially homozygous *Solanum tuberosum* plants that are vigorous in the sense as presently claimed. The features of tuber yield and the level of homozygosity are therefore the essential elements that together define the invention.

In the context of obviousness, one cannot simply mosaic features together, especially not if a disclosure that is used to mosaic the invention expressly states its unsuitability for the purpose of the invention and the problem it solves.

In that context, Applicant refers to their arguments and citations from Maris that were filed in response to the non-final Office Action dated October 14, 2014, wherein *inter alia* passages from Maris such as "continued use of *S. tuberosum* dihaploids in potato breeding needs to be dissuaded" were cited.

In this context, one cannot counter-argue that "Maris is only relied upon for its disclosure of the claimed tuber yield", as, if that rationale is followed, no single invention would be patentable anymore because every claimed feature has already been described in isolation somewhere in the art.

In view of the foregoing, the claims are non-obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

CONCLUSION

Should the Examiner be of the view that an interview would expedite consideration of the application, request is made that the Examiner telephone the applicant's attorney at (617) 535 4453 in order that any outstanding issues be resolved.

Applicant has included the fee for three-month extension of time fee. The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit

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IPR2025-00136
Page 653

Account No. 50-1133, under Order No. 091876-0014 from which the undersigned is authorized to draw.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP

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Date: September 8, 2016

DM_US 73533232-1.091876.0014

PTO/AIA/22 (03-13)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 091876-0014
Application Number 13/504,156 Conf # 6337	Filed July 10, 2012
For HYBRID SEED POTATO BREEDING	
Art Unit 1663	Examiner BOGGS, Russell T

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$200	$100	$50	$
☐ Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☒ Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$ 700
☐ Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐ Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-1133 .

☒ Payment made via EFS-Web.

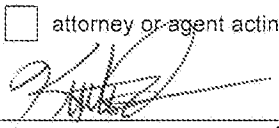
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I am the

☐ applicant.

☒ attorney or agent of record. Registration number 57,025 .

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____ .



Signature

September 8, 2016
Date

Kristin A. Connarn
Typed or printed name

(617) 535-4453
Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of 1 forms are submitted.

DM_US 75981159-1.091876.0014

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 9/8/16 Electronic Signature for Sarah Hupprich: /Sarah Hupprich/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13504156
Filing Date	2012-07-10
First Named Inventor	Willem Hendrik LINDHOUT
Art Unit	1663
Examiner Name	Russell T BOGGS
Attorney Docket Number	091876-0014

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140115736		2014-04-24	Lindhout et al.	

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FOREIGN PATENT DOCUMENTS

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13504156
	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

	1	UIJTEWAAL, et al., "Morphology and Vigour of Monohaploid Potato Clones, Their Corresponding Homozygous Diploids and Tetraploids and Their Heterozygous Diploid Parent", Euphytica, 10 April 1987, pp. 745-753, v. 36.	☐
	2	KRANTZ, "Potato Breeding Methods", Technical Bulletin 25, December 1924, pp.1-32, The University of Minnesota Department of Agriculture, University Farm, St. Paul.	☐
	3	JACKSON, et al., "Inbreeding and True Potato Seed Production", Innovative Methods for Propagating Potatoes, Report of the XXVIII Planning Conference, December 10-14, 1984, pp. 169-179, International Potato Center (CIP), Lima, Peru.	☐
	4	BIRHMAN, et al., "Production of Inbred Progenies of Diploid Potatoes Using an S-locus Inhibitor (Sli) Gene, and Their Characterization", Genome, (2000) pp. 495-502, v. 43.	☐
	5	HOUGAS, et al., "The Potential of Potato Haplois in Breeding and Genetic Research", Am. Potato Journal, 1958, v. 35, pp. 701-707.	☐
	6	HAYNES, "The Use of Cultivated Diploid Solanum Species in Potato Breeding", Prospects for the Potato in the Developing World, Symposium held at Lima, Peru, July 17-19, 1972, pp. 101-110.	☐
	7	JACOBSEN, et al., "The Influence and Possible Recombination of Genotypes on the Production of Microspore Embryoids in Anther Cultures of Solanum Tuberosum and Dihaploid Hybrids", Theor. Appl. Genet., 1978, pp. 119-123, v. 52.	☐
	8	BACHEM, "Unravelling the Potato Genome", Retrieved from the Internet: http://www.fao.org/potato-2008/en/perspectives/bachem.html, International year of the potato (2008).	☐
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	10	BRADSHAW, "New and Modern Methods of Potato Breeding", Chapter 8, pp. 157-77 (2007).	☐
	11	PHUMICHAI et al., "Cryptic Improvement for Fertility by Continuous Selfing of Diploid Potatoes using Sli Gene," Euphytica, 149: pp. 251-258 (2006).	☐

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	Application Number	13504156
	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

	12	PHUMICHAI et al., "Expression of S-locus Inhibitor Gene (Sli) in Various Diploid Potatoes," Euphytica, 148: pp. 227-234 (2006).	☐
	13	The International Search Report from corresponding PCT/NL2012/050269, dated September 19, 2012.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13504156
	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2016-09-08
Name/Print	Kristin A. Connarn	Registration Number	57,025

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 9/8/16 Signature: Sarah Walsh (Sarah Walsh)

Docket No.: 091876-0014 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem Hendrik LINDHOUT, et al.	:	Customer Number: 23630
Application No.: 13/504,156	:	Confirmation No.: 6337
Filed: July 10, 2012	:	Art Unit: 1663
For: Hybrid Seed Potato Breeding	:	Examiner: Russell T. BOGGS

STATEMENT RELATING TO DEPOSITED BIOLOGICAL MATERIAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant has deposited the seeds referred to in the instant specification at pages 33-34 with the NCIMB, Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA, Scotland under accession numbers NCIMB 41663, NCIMB 41664 and NCIMB 41665 on October 23, 2009 and NCIMB 41765 on October 5, 2010 respectively. This deposit was made under the terms of the Budapest Treaty.

NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines were deposited with the NCIMB under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively.

Applicant herewith submits a copy of the "Notification of acceptance of a deposit for the purposes of patent procedure" dated November 4, 2009, received from the National Collection of Industrial Food and Marine Bacteria (NCIMB) towards the deposit of seeds under breeders reference AGVD1, AGVD2 and AGVD3 and copies of all receipts and viability statements of all four deposits disclosed in the application.

In connection with the response to the non-final Office Action submitted concurrently herewith, the undersigned hereby states that:

Applicant hereby states that the instant invention will be irrevocably and without restriction released to the public upon the issuance of a patent.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Kristin A. Connarn
Registration No. 57,025

Please recognize our Customer No. 23630 as our correspondence address

28 State Street
Boston, MA 02109-1775
Phone: 617-535-4453
Facsimile: 617-535-3800
Date: September 8, 2014

DM_US 75961923-1.091876.0014

T. Ph. Schotte
Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepenveen
The Netherlands

NCIMB

Our ref: PAT 182/NCPAT 26147

Your ref:

Date: 4 November 2009.

Dear Dr Schotte,

NOTIFICATION OF ACCEPTANCE OF A DEPOSIT FOR THE PURPOSES OF PATENT PROCEDURE

Parent Plant	Cultivar Designation	NCIMB Number
Solanum tuberosum	AGVD 1	NCIMB 41663
Solanum tuberosum	AGVD 2	NCIMB 41664
Solanum tuberosum	AGVD 3	NCIMB 41665

I have to inform you that the above designated seeds, received on 23 October 2009 were accepted for deposit for patent purposes on 2 November 2009. You are reminded that you are bound by the terms and conditions of this acceptance set out in the Application Form signed by Hein Kruyt. on 2 November 2009 a copy of which should have been retained by you.

Yours faithfully,

Terence Dando

Terence Dando, B.Sc., M.Phil

professional microbiology

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepveen
The Netherlands

NAME AND ADDRESS OF DEPOSITOR

INTERNATIONAL FORM

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT
issued pursuant to Rule 7.1 by the INTERNATIONAL DEPOSITARY AUTHORITY identified at the bottom of this page

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the DEPOSITOR:	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY:
Solanum tuberosum AGVD 1	NCIMB 41663

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I above was accompanied by:

[ ] a scientific description

[X] a proposed taxonomic designation

(Mark with a cross where applicable)

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I above, which was received by it on 23 October 2009 (date of the original deposit)[1]

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism identified under I above was received by this International Depositary Authority on (date of the original deposit) and a request to convert the original deposit to a deposit under the Budapest Treaty was received by it on

(date of receipt of request for conversion)

V. INTERNATIONAL DEPOSITARY AUTHORITY

Name: NCIMB Ltd

Address: Ferguson Building
Craibstone Estate
Bucksburn
Aberdeen AB21 9YA Scotland

Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Terence Dowds

Date: 4 November 2009

[1] Where Rule 6/4(d) applies, such date is the date on which the status of International Depositary Authority was acquired.

Form BP/4 (sole page)

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepenveen
The Netherlands

NAME AND ADDRESS OF THE PARTY TO WHOM THE VIABILITY STATEMENT IS ISSUED

INTERNATIONAL FORM

VIABILITY STATEMENT
issued pursuant to Rule 10.2 by the INTERNATIONAL DEPOSITARY AUTHORITY identified on the following page

I. DEPOSITOR	II. IDENTIFICATION OF THE MICROORGANISM
Name: AS ABOVE	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY: NCIMB 41665
Address:	Date of the deposit or of the transfer[1]: 23 October 2009

III. VIABILITY STATEMENT

The viability of the microorganism identified under II above was tested on 23 October 2009 [2]. On that date, the said microorganism was:

[3] [X] viable

[3] [ ] no longer viable

1 Indicate the date of the original deposit or, where a new deposit or a transfer has been made, the most recent relevant date (date of the new deposit or date of the transfer).

2 In the cases referred to in Rule 10.2(a)(ii) and (iii), refer to the most recent viability test.

3 Mark with a cross the applicable box.

Form BP/9 (first page)

IV. CONDITIONS UNDER WHICH THE VIABILITY TEST HAS BEEN PERFORMED[4]
V. INTERNATIONAL DEPOSITARY AUTHORITY
Name: NCIMB Ltd., Address: Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA, Scotland. Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Date: 4 November 2009

[4] Fill in if the information has been requested and if the results of the test were negative.

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BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arrienweg 32
7431 Diepenveen
The Netherlands

NAME AND ADDRESS OF THE PARTY TO WHOM THE VIABILITY STATEMENT IS ISSUED

INTERNATIONAL FORM

VIABILITY STATEMENT
issued pursuant to Rule 10.2 by the INTERNATIONAL DEPOSITARY AUTHORITY identified on the following page

I. DEPOSITOR	II. IDENTIFICATION OF THE MICROORGANISM
Name: AS ABOVE Address:	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY: NCIMB 41663 Date of the deposit or of the transfer[1]: 23 October 2009

III. VIABILITY STATEMENT

The viability of the microorganism identified under II above was tested on 23 October 2009 [2]. On that date, the said microorganism was:

[3] [X] viable

[3] [ ] no longer viable

1 Indicate the date of the original deposit or, where a new deposit or a transfer has been made, the most recent relevant date (date of the new deposit or date of the transfer).

2 In the cases referred to in Rule 10.2(a)(ii) and (iii), refer to the most recent viability test.

3 Mark with a cross the applicable box.

Form BP/9 (first page)

IV. CONDITIONS UNDER WHICH THE VIABILITY TEST HAS BEEN PERFORMED[4]
V. INTERNATIONAL DEPOSITARY AUTHORITY
Name: NCIMB Ltd., Address: Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA, Scotland. Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Terence Dondrup Date: 4 November 2009

[4] Fill in if the information has been requested and if the results of the test were negative.

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Page 668

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepenveen
The Netherlands

INTERNATIONAL FORM

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT
issued pursuant to Rule 7.1 by the
INTERNATIONAL DEPOSITARY AUTHORITY
identified at the bottom of this page

NAME AND ADDRESS OF DEPOSITOR

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the DEPOSITOR:

Solanum tuberosum AGVD 2

Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY:

NCIMB 41664

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I above was accompanied by:

[ ] a scientific description

[X] a proposed taxonomic designation

(Mark with a cross where applicable)

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I above, which was received by it on 23 October 2009 (date of the original deposit)[1]

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism identified under I above was received by this International Depositary Authority on (date of the original deposit) and a request to convert the original deposit to a deposit under the Budapest Treaty was received by it on

(date of receipt of request for conversion)

V. INTERNATIONAL DEPOSITARY AUTHORITY

Name: NCIMB Ltd

Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Terence Dando

Address: Ferguson Building
Craibstone Estate
Bucksburn
Aberdeen AB21 9YA Scotland

Date: 4 November 2009

[1] Where Rule 6/4(d) applies, such date is the date on which the status of International Depositary Authority was acquired

Form BP/4 (sole page)

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepenveen
The Netherlands

NAME AND ADDRESS OF THE PARTY TO WHOM THE VIABILITY STATEMENT IS ISSUED

INTERNATIONAL FORM

VIABILITY STATEMENT
issued pursuant to Rule 10.2 by the INTERNATIONAL DEPOSITARY AUTHORITY identified on the following page

I. DEPOSITOR	II. IDENTIFICATION OF THE MICROORGANISM
Name: AS ABOVE Address:	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY: NCIMB 41664 Date of the deposit or of the transfer[1]: 23 October 2009

III. VIABILITY STATEMENT

The viability of the microorganism identified under II above was tested on 23 October 2009 [2]. On that date, the said microorganism was:

[3] [X] viable

[3] [ ] no longer viable

1 Indicate the date of the original deposit or, where a new deposit or a transfer has been made, the most recent relevant date (date of the new deposit or date of the transfer).

2 In the cases referred to in Rule 10.2(a)(ii) and (iii), refer to the most recent viability test.

3 Mark with a cross the applicable box.

Form BP/9 (first page)

IV. CONDITIONS UNDER WHICH THE VIABILITY TEST HAS BEEN PERFORMED[4]
V. INTERNATIONAL DEPOSITARY AUTHORITY
Name: NCIMB Ltd., Address: Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA, Scotland. Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Terence Dandoy Date: 4 November 2009

[4] Fill in if the information has been requested and if the results of the test were negative.

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepenveen
The Netherlands

NAME AND ADDRESS OF DEPOSITOR

INTERNATIONAL FORM

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT
issued pursuant to Rule 7.1 by the INTERNATIONAL DEPOSITARY AUTHORITY identified at the bottom of this page

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the DEPOSITOR:	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY:
Solanum tuberosum AGVD 3	NCIMB 41665

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I above was accompanied by:

[ ] a scientific description

[X] a proposed taxonomic designation

(Mark with a cross where applicable)

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I above, which was received by it on 23 October 2009 (date of the original deposit)[1]

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism identified under I above was received by this International Depositary Authority on (date of the original deposit) and a request to convert the original deposit to a deposit under the Budapest Treaty was received by it on (date of receipt of request for conversion)

V. INTERNATIONAL DEPOSITARY AUTHORITY

Name: NCIMB Ltd

Address: Ferguson Building
Craibstone Estate
Bucksburn
Aberdeen AB21 9YA Scotland

Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Terence Dando

Date: 4 November 2009

[1] Where Rule 6/4(d) applies, such date is the date on which the status of International Depositary Authority was acquired.

Form BP/4 (sole page)

NCIMB

DEPOSIT FOR THE PURPOSES OF PATENT PROCEDURE

APPLICATION FORM

I/We request NCIMB Ltd to accept for deposit for the purposes of patent procedure the following organism(s):

(Name of organism(s) and depositor's strain or cultivar designation, if any).

Solanum Tuberosum AGUD 1
" " AGUD 2
" " AGUD 3

I/We understand that if after examination of the organism(s) and/or the information contained in the Accession Form(s) enclosed herewith, NCIMB Ltd shall find the organism(s) not to be of a kind which it accepts for deposit for the purposes of patent procedure, NCIMB Ltd shall refuse to accept the organism(s) and shall notify me/us forthwith of such refusal. In such cases, unless I/we request the return of the organism(s) within 28 days of such notification, NCIMB Ltd shall be entitled to destroy it.

If NCIMB Ltd agrees to accept the organism(s), I/we agree to be bound by the following terms and conditions:

1. I/We have provided all the information and indications requested by NCIMB Ltd on the Accession Form(s) established by NCIMB Ltd for that purpose and enclosed herewith.

2. I/We may replace at my/our expense, according to the relevant patent regulations, the deposited organism(s), if it (they) should deteriorate or cease to exist, so that NCIMB Ltd is no longer able to furnish samples, following receipt from NCIMB Ltd of notification of such inability to furnish samples.

3. I/We will pay to NCIMB Ltd all fees charged for the storage of the organism(s) and the supply to me/us of samples thereof.

NCIMB Limited
Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA, Scotland UK
Tel: +44 (0)1224 711100 Fax: +44 (0)1224 711299 Email:enquiries@ncimb.com
Website: www.ncimb.com

NCIMB

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4. I/We will indemnify NCIMB Ltd against all claims that may be brought against NCIMB Ltd as a result of the release of samples of the organism(s), unless such claims arise of account of the negligence of NCIMB Ltd, its servants or agents.

5. I/We will not require the return of the organism(s), to me/us, for a period of 30 years after the date the organism(s) is (are) accepted for the purpose of patent procedures, or 5 years after the date of the last request for a sample thereof, whichever is the latter, during which period NCIMB Ltd shall have the right to retain the organism(s).

6. I/We will authorise NCIMB Ltd to release samples of the organism(s) only in accordance with the provisions of Rule 11 of the Budapest Treaty in any case where the deposit is intended to serve for the purposes of patent procedure for any state which has ratified the Treaty, or organisation which has made the declarations referred to in Article 9 of the Treaty. In any other case, I/we will authorise NCIMB Ltd to release such samples only:

   (i) on my/our written authorisation

   or

   (ii) on the written authorisation of the following industrial property office(s) (specify industrial property offices):

7. I/We will abide by the above terms and conditions, which may be varied from time to time for the purpose of compliance with any Treaty or Convention to which the United Kingdom is a party.

Signature of Depositor .....

Name ..... Agventure BV ..... Date 2/11/09

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BUDAPEST TREATY ON THE INTERNATIONAL
RECOGNITION OF THE DEPOSIT OF MICROORGANISMS
FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arriensweg 32
7431 BN Diepenveen
The Netherlands

INTERNATIONAL FORM

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT
issued pursuant to Rule 7.1 by the
INTERNATIONAL DEPOSITARY AUTHORITY
identified at the bottom of this page

NAME AND ADDRESS
OF DEPOSITOR

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the DEPOSITOR:	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY:
Solanum tuberosum AGVD 17	NCIMB 41765

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I above was accompanied by:

[ ] a scientific description

[X] a proposed taxonomic designation

(Mark with a cross where applicable)

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I above, which was received by it on 05 October 2010 (date of the original deposit)[1]

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism identified under I above was received by this International Depositary Authority on (date of the original deposit) and a request to convert the original deposit to a deposit under the Budapest Treaty was received by it on

(date of receipt of request for conversion)

V. INTERNATIONAL DEPOSITARY AUTHORITY

Name: NCIMB Ltd

Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Teresa Davidson

Address: Ferguson Building
Craibstone Estate
Bucksburn
Aberdeen AB21 9YA Scotland

Date: 19 October 2010

[1] Where Rule 6/4(d) applies, such date is the date on which the status of International Depositary Authority was acquired.

Form BP/4 (sole page)

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

Agventure B. V.
Burgemeester Arrienweg 32
7431 Diepenveen
The Netherlands

NAME AND ADDRESS OF THE PARTY TO WHOM THE VIABILITY STATEMENT IS ISSUED

INTERNATIONAL FORM

VIABILITY STATEMENT
issued pursuant to Rule 10.2 by the INTERNATIONAL DEPOSITARY AUTHORITY identified on the following page

I. DEPOSITOR	II. IDENTIFICATION OF THE MICROORGANISM
Name: AS ABOVE Address:	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY: NCIMB 41765 Date of the deposit or of the transfer[1]: 05 October 2010

III. VIABILITY STATEMENT

The viability of the microorganism identified under II above was tested on 05 October 2010 [2]. On that date, the said microorganism was:

[3] [X] viable

[3] [ ] no longer viable

1 Indicate the date of the original deposit or, where a new deposit or a transfer has been made, the most recent relevant date (date of the new deposit or date of the transfer).

2 In the cases referred to in Rule 10.2(a)(ii) and (iii), refer to the most recent viability test.

3 Mark with a cross the applicable box.

Form BP/9 (first page)

IV. CONDITIONS UNDER WHICH THE VIABILITY TEST HAS BEEN PERFORMED[4]
V. INTERNATIONAL DEPOSITARY AUTHORITY
Name: NCIMB Ltd., Address: Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA, Scotland. Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorised official(s): Date: 19 October 2010

[4] Fill in if the information has been requested and if the results of the test were negative.

P87313US10

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Willem Hendrik Lindhout *et al.*,
Serial No.: 13/504,156
Filing or 371 (c) date: 07-10-2012

Group Art Unit: 1663
Examiner: Boggs, Russell T
Atty. Dkt. No.: 091876-0014

For: HYBRID SEED POTATO BREEDING

Confirmation no.: 6337

DECLARATION OF WILLEM HENDRIK LINDHOUT UNDER 37 C.F.R. § 1.132.

I, Willem Hendrik Lindhout, hereby declare as follows:

1. I am a citizen of the Netherlands, residing in Wageningen, the Netherlands.

2. I am a named inventor of U.S. patent application No.:13/504,156 to Lindhout *et al.*, assigned to Agventure B.V.

3. I am Founder and Director R&D of Florere B.V., operating under the tradename of Solynta, a privately held limited liability Company dedicated to F1 hybrid Potato Breeding and holding company of Agventure B.V.

4. I hold an MSc degree in Biology, an MSc degree in Chemistry, and a PhD in Molecular Biology from the University of Leiden, The Netherlands.

5. Until 2006, I was Associate Professor of Plant Breeding at Wageningen University, The Netherlands. During this period, I published more than 100 scientific publications related to plant breeding, served as the Coordinator of Bachelors and Masters Studies in Plant Sciences, Wageningen University and served as the National Coordinator of Tomato Genomics Research as part of the Centre for Biosystems Genomics (CBSG), a national network of biology sciences aiming at a better understanding of the biochemical, molecular and genetic basis of plant species, c q Arabidopsis, tomato and potato.

6. From 2006, I was director R&D of De Ruiter Seeds. After the acquisition of De Ruiter Seeds by Monsanto, I was appointed as Monsanto's Global Breeding Lead of the Vegetable Seed Division.

7. I am familiar with the contents of the Office Actions issued by the United States Patent and Trademark Office in respect of U.S. patent application No.:13/504,156, and the claims that are prosecuted thereunder.

8. I understand that the United States Patent and Trademark Office, in assessing the patentability of the referenced patent application, has *inter alia* rejected the claims for failing to comply with 35 U.S.C. paragraph 103, i.e. failing to comply with the requirement of non-obviousness.

9. Although I am no specialist in patent matters, I understand that the obviousness rejection is based on an alleged suggestion in the art on the possibility of hybrid potato breeding in *S. tuberosum*, under utilization of homozygous inbreds, and an absence of any prejudice against the use of such a breeding technique in the art of potato breeding.

10. For the purpose of pursuing a patent under the invention described in the present application, I have requested and received a number of signed testimonies from Experts in the field of potato breeding, which experts I consider key authorities in this particular field of art, which testimonies all indicate that these Experts are surprised by the concept of hybrid potato breeding and the breeding results presently disclosed.

11. The Experts include
- **Sanwen Huang**, a citizen of China, and a Professor at the Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing, China. Prof. Huang isolated one of the first *Phytophthora* resistance genes in 2005, and was the leading scientist for the sequencing of homozygous diploid potato by next generation sequencing, which work has resulted in a Nature publication about the sequence of the potato genome in 2011.
- **Evert Jacobsen**, a citizen of the Netherlands, and a Professor at Wageningen University in Plant Breeding. Prof. Jacobsen's experience is based on 30 years of scientific research in potato genetics and potato breeding at the Max-Planck Institut für Pflanzenzüchtungsforschung in Köln, Germany, at the University of Groningen, and the Wageningen University, both in the Netherlands.
- **Jonathan Jones**, a citizen of the United Kingdom, and Group Leader of the Jonathan Jones Group at The Sainsbury Laboratory (TSL), Norwich, United Kingdom, Professor of Biology at East Anglia University, Norwich, UK, and Fellow of the Royal Society, London, UK. Prof. Jones' work focuses on genetic

improvement of crop plants. He is a founder of Mendel Biotechnology, and of Norfolk Plant Sciences Ltd, which companies are dedicated to improving the genetic basis of potato and tomato.
- **Maarten Koornneef**, a citizen of The Netherlands, present Director Plant Breeding and Genetics at the Max-Planck-Institut für Pflanzenzüchtungsforschung, Cologne, Germany, and Professor Emeritus at both Wageningen University, The Netherlands, and University of Cologne, Germany. In the early 1980s, prof. Koornneef developed the first genetic map of *Arabidopsis*. Later achievements were the use of quantitative genetics in this species and the cloning of a number of quantitative trait loci. Part of his research program was focused on similar studies in tomato and followed plant genetic research at the university in Wageningen where potato was an important topic of research. Prof. Koornneef has been elected as member of various Academies of Sciences in the Netherlands, Europe and the USA. Being a former professional plant breeder, he has always maintained an interest in plant breeding and has a broad knowledge in this field.
- **Jan van Loon**, a citizen of the Netherlands. Mr. Van loon holds a Masters' degree (Ir.) in Plant Breeding and Agricultural Crops, from Wageningen University since 1974. His experience in Potato Breeding and introduction of new varieties in the market includes 9 years as potato breeder at the potato department of the Plant Breeding station Cebeco-Handelsraad, Lelystad, the Netherlands; 19 years as potato breeder at Hettema, potato export company, Emmeloord, the Netherlands (a.k.a. HZPC); and the last 15 years as a private potato breeder, Dronten, the Netherlands.

11. These testimonies have already been filed in the European Patent Office in support of Inventive step, and are herewith reproduced as annexed copies.

12. The testimonies are consistent in their conclusion and reflect my own experience in potato breeding, namely:
- That classical potato breeding methods have existed for over 100 years, but that the breeding strategies remained unchanged;
- That the strategy of using a hybrid potato seed approach as presently disclosed was considered a completely new way of potato breeding and a pioneering approach that produced surprising results;
- That many have tried this approach, but that no successes have ever been reported with *S. tuberosum,* and that all attempts have failed to produce homozygous inbred lines as parents for a variety from true potato seed;
- That potato is suffering from severe inbreeding depression and that this cannot be overcome using traditional approaches;

- That homozygosity increases upon inbreeding results in inbreeding depression in potato, which is quite serious due to the many non- or less-functional alleles in potato;
- That as soon as a genotype becomes homozygous for negative alleles of which the negative is not compensated by functional paralogues, such genotypes might show very poor performance and low viability;
- That inbreeding depression is manifested as a reduced fitness with a loss in both yield and fertility;
- That inbreeding depression is mainly due to the presence of many (semi) lethal alleles, and alleles with a deleterious effect, that become visible more frequently at the diploid level when the maximum number of possible alleles is reduced from four to two, resulting in homozygosity of such alleles.
- That the chance of obtaining a progeny plant, by crossing different genotypes, which is not suffering from inbreeding depression in potato is infinitesimally small, and that starting from a heterozygous diploid potato genotypes, the chance of identifying a plant without homozygous deleterious alleles is, in practice, impossible;
- That to start a project aimed at developing a good performing homozygous potato plant for the purpose of hybrid production is a daring undertaking with very little expectation of success;
- That the fact that diploid potatoes cannot be selfed due to self-incompatibility further prevents the start of such projects;
- That in potato breeding, Experts were convinced that inbreeding depression and self- incompatibility at the diploid level justified the traditional way of breeding and that the approach of Lindhout *et al.* was considered unrealistic and unfeasible for the development of commercial cultivars;
- That attempts to back-cross the *S. chacoense Sli*-gene into *Solanum tuberosum* has not been done as this was considered as useless as the progenies would suffer from the many wild species and deleterious alleles from *S. chacoense;*
- That the leading opinion was, therefore, to back-cross the *S. chacoense Sli*-gene into *Solanum phureja* or selfing of *S. chacoense* lines that carry the *Sli*-gene. However, this also never resulted in the successful development of any promising material in the form of fertile homozygotes that could be uses in hybrid breeding and that could tolerate recurrent selfing;
- That for the first time the present inventors now have established a hybrid breeding approach in potato using fertile homozygotes with good agronomical properties.

13. I have discovered, and disclosed in the present application for patent, how a fertile homozygote in potato with good agronomical properties can be produced. The method as disclosed indicates that selection for fertility is a crucial element in an inbreeding program, and that inbreeding depression can in fact be

overcome at the diploid level of potato. This was unknown, and contrary to all beliefs in the field.

14. Decades ago, *S. tuberosum* dihaploids (2n = 2x = 24) were envisioned as a tool to simplify the breeding of *S. tuberosum* cultivar production by reducing tetraploid germplasm to a diploid level. In fact, Hougas and Peloquin (Amer. Potato J. 35:701-07), already indicated in 1958 that such diploids would present a rapid method for obtaining a high degree of homozygosity, and that the use of chromosome doubling in monoploids (haploids derived from diploid species) would result in completely homozygous individuals. Diploid *S. tuberosum* clones obtained through haploidization, however, suffer from inbreeding depression due to the reduction of the tetraploid genome to the diploid level. Such diploids are weak and feeble plants, that produce hardly any tubers and are self-incompatible. Self-incompatible plants do not form berries upon self-fertilization, or berries do not contain viable seeds after selfing. Hence, despite having been proposed some 51 years before the priority date of the present application, these diploid *S. tuberosum* breeding programs have never resulted in vigorous fertile homozygous diploid *S. tuberosum* lines due to self-incompatibility and inbreeding depression.

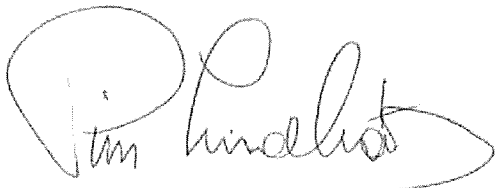
A second use of diploid potatoes was that of a 'genetic bridge' between the genomes of the various *Solanaceae* species. By this technique, ploidy barriers between cultivated *S. tuberosum* and wild *Solanum* species could be circumvented by reducing tetraploid *S. tuberosum* to the diploid level and crossing the resultant dihaploids to the wild diploid *Solanum* spp. In the background of this wild diploid *Solanum* spp material, the *S. tuberosum* genes were recombined. Novel combinations of genes were then incorporated back into tetraploid *S. tuberosum* via sexual crosses between tetraploid *S. tuberosum* and colchicine-doubling of the *S. tuberosum* diploids, or through 4x-2x crosses utilizing unreduced gamete formation. This breeding strategy is indicated as "germplasm enhancement", which is basically a diploid breeding scheme using wild *Solanum* relatives. This breeding strategy is *inter alia* described in Watanabe et al., 1996. However, these *S. tuberosum* diploids are not essentially homozygous as presently claimed.

Jansky, 2009 (In: Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62) also does not disclose that homozygous diploids for *S. tuberosum* as claimed can be created. Jansky refers to Birhman and Hosaka, 2000, for an approach that could allow for the development of clones with fixed (homozygous) genes for traits of interest but that approach does not relate to *S. tuberosum*. Moreover, Jansky, indicates that this approach to homozygosity may not work in potato. Hence, Jansky provides no solution to the problem at hand.

It is submitted that it is not *prima facie* obvious to select for increased fertility in the field of potato breeding where plant vigour is crucial, and inbreeding results in a decrease in both vigour and fertility. There was no indication in the art that inbreeding in *S. tuberosum* could ever result in homozygous, vigorous and fertile plants.

I hereby declare that all statements made of my own knowledge are true and all statements made on information are believed to be true and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under § 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Date: 15-08-2016



Signature Willem Hendrik Lindhout

WAGENINGEN UNIVERSITY
WAGENINGEN UR

Solynta
Att. Mr. Dr. W.H. Lindhout
Delhorstpad 1A
6703BE Wageningen

Wageningen, February 21th, 2012

Dear Dr. Lindhout

You have requested me to describe my experiences with inbreeding in potato and I am happy to provide you a short overview. My experiences are based on 30 years of scientific research on potato genetics and breeding at the Max-Planck-Institut für Pflanzenzüchtungsforschung in Köln, University of Groningen and at the Wageningen University, resp.

It is generally observed that tetraploids suffer severe inbreeding depression and that the increase of homozygosity level in tetraploids by inbreeding is a slow process that has never resulted in plants with a high level of homozygosity. The inbreeding process can be speeded up by inducing dihaploids. Dihaploidization as such is comparable with 4 times selfing at the tetraploid level. Therefore, we have observed a very strong inbreeding depression at the induction of dihaploids from tetraploid cultivars. This is manifested as a reduced fitness with yield and fertility loss as the most important traits that are affected. This is mainly due to the presence of many (semi) lethal alleles and other alleles with a deleterious effect that become visiblemore frequently at the diploid level when the maximum number of possible alleles is reduced from four into two.

All commercial potato cultivars are tetraploid and there is a common belief that tetraploids will always outperform diploids. Your F1 hybrid method relies on diploid breeding. That your approach is successful is surprising to me. The basic idea behind tetraploids is that:

- multi-allelism provides an extra possibility to increase yield
- multi-allelism is crucial for adaptation

Your approach shows that di-allelism may bring the same yield as multi-allelism by using the right combination of alleles at the diploid level. Possibly, di-allelic heterozygosity is already sufficient to generate adaptation to various environments and multi-allelism is not required. A wide adaptation is crucial commercially to allow the potential cultivation of cultivars over a large region with environmental differences.

It is clear that in potato breeding, we were convinced that inbreeding depression and self-incompatibility at the diploid level and the need for multi-allelism justified the traditional way of breeding and that your approach has been considered as unrealistic and unfeasible for the development of commercial cultivars.

I am very curious to watch the progress in your research and will keep track on your advanced breeding germplasm.

Sincerely yours,

Prof. Dr. Ir. E. Jacobsen
Plant Breeding
Wageningen University

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11th Dec 2012

Dear Pim,

As you know, potato breeding is problematic. Traditional tetraploid level breeding, with continued outcrossing by plant breeders, can shuffle allelic combinations, but is unable to purge bad alleles from the breeding population. This can only be achieved by selfing to expose them in the homozygous state, and then select against them.

Ever since I read Don Duvick's great review on the history of the development of hybrid maize in Nature Reviews Genetics of 2001, I have wondered about whether the same approach could be implemented for hybrid potato. This would have multiple advantages. (1) Hybrid seed could be produced that avoid propagation of viruses. (2) Heterosis could be taken advantage of (3) It would be cheap to ship superior germplasm as seed rather than tubers to developing countries to increase the yield potential of their crop varieties. (4) Potato genetics would be greatly simplified; potentially useful new genes (whether by GM or by introgression from wild relatives) could be back-crossed into viable inbreds to improve their performance.

In fact, in the mid 2000s we attempted to produce hybrid potato ourselves. No successes had ever been reported with *S. tuberosum*. In order to work at the diploid level, we back-crossed the *S. chacoense Sli-* gene into *Solanum phureja*. In addition, we selfed the lines that carry the Sli- gene. However, we never succeeded in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing.

We considered that this was due to our inability to cross the Sli- self-compatibility locus into good enough or diverse enough diploid *Solanum* germplasm. In addition, we were not able to select in large enough populations of self-progeny in the field for rare recombinants; we only selected in glasshouse conditions. The fact that you have been able to obtain viable inbred lines using selfed diploids of *Sli* lines is very significant; we had a similar objective but we were unable to achieve it.

This means that for the first time you now have established fertile homozygotes with good agronomical properties in potato that can be used to test for heterosis on intercrossing. I sincerely congratulate you on this success, and look forward to cooperating with you in order to take advantage of some of the opportunities these lines provide.

Best regards,

Jonathan Jones

Prof Jonathan D G Jones FRS

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Institute of Vegetables & Flowers

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To who it may concern,

China is the largest potato producing and consuming country in the world. For cultivation, it requires much less water than rice and wheat and it has a favourable nutrition quality. Therefore, it is a priority crop in China. The increasing population size and consumers´ demands put a lot of pressure to the Chinese agriculture to secure the future Chinese potato production.

The potato species (*Solanum tuberosum*) and its wild relatives harbour a rich reservoir of genetic variation that has been used by potato breeders since the early breeding in the 1850s. I believe that we need more scientific knowledge to better take advantage of this genetic potential. One of the major assets is the potato DNA genome sequence. Therefore I have initiated the sequencing of a homozygous diploid potato clone, designated DM (doubled monoploid), by using the next generation sequencing tools. This has resulted in the Nature publication about the sequence of the potato genome in 2011.

I am proud about the scientific achievements that we have made on the genetic dissection of many important traits in potato. For example, there are dozens of genes for resistance to *Phytophthora infestans*. I have isolated one of the first *Phytophthora* resistance genes in 2005 and more than 10 other *Phytophthora* resistance genes have been cloned since then.

Efficient breeding systems are a prerequisite to use scientific results in breeding. However, the present potato breeding is characterized by unpredictability, which makes the present breeding very inefficient and unmanageable. For instance, the introduction of a single resistance gene from a wild species into the cultivated potato species may take more than years! For durable resistance to *Phytophthora infestans* we need at least four different resistance genes. To stack these genes in cultivated potato will require more than 50 years by applying traditional potato breeding

I feel very responsible to contribute to the future Chinese food security and I believe that the present potato breeding will be difficult to deliver the products that China needs. Therefore I have been searching for alternatives for the traditional potato breeding. In many crops hybrids are routinely used and I have seen the great advantages of the hybrid breeding method. Homozygous lines are a prerequisite for hybrid breeding. In addition, as stated above, I needed a homozygous diploid clone for potato genome sequencing. Therefore, when I decided to sequence the potato genome, I have been looking for the best homozygous diploid(s), that I could find in the world. I have experienced from personal talks and literature, that since the late 1970s very few homozygous diploid potato clones have been generated, with the

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most important research labs in Wageningen, NL (Jan Hermsen & Evert Jacobsen), Virginia USA, (Robert Vielleux) and at Kobe University in Japan (Kazuyoshi Hosaka). I selected the DM clone for my research as this was the most established clone, which has been maintained for nearly 20 years. This clone provided me high quality DNA for successful sequencing the potato genome. However, the agricultural performance of this clone was very poor and I was convinced that this clone was not suitable for breeding.

In 2011 I was informed about the revolutionary results of Solynta in the research on hybrid potato breeding. I was surprised by the progress they made on developing self-compatible homozygous diploid potato with good agronomic performance. This research is the breakthrough we have been waiting for since nearly a century when the first hybrid maize was developed in the 1920s. This is crucial for the potato breeding worldwide and especially for the food security in China.

I am so convinced that hybrid potato will be the future standard for potato breeding that I decided to change my potato research programme completely and develop F_1 hybrid potato varieties for the Chinese markets. I have established contact with Solynta to provide me with their material.

I am very happy indeed that Solynta provides me with these solutions.

Yours sincerely,



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Dronten December 5th, 2012.

To whom it may concern.

Subject: Research for Hybrid Potato Breeding.

My name is Jan van Loon, I hold a Masters degree (Ir.) in Plant Breeding and Agricultural Crops, from Wageningen University since 1974.
My experience in Potato Breeding and introduction of new varieties in the market is the following:

1973-1982	potato breeder at potato department of Plant Breeding station Cebeco-Handelsraad, Lelystad, the Netherlands.
1982-2001	potato breeder at Hettema, (from 1999 HZPC) potato export company, Emmeloord, the Netherlands.
2001-present	private potato breeder (see letter head).

The classical potato breeding methods exist for over 100 years. During this period many extra tools became available to increase the efficiency of the breeding and selection process. Nevertheless, in essence, the breeding strategy is still the same, based on evaluation of phenotypic characteristics. Perhaps with the availability of new techniques it will be possible to select also on genotype.

In this field it is very interesting that Solynta started a completely new way in potato breeding with a hybrid seed potato approach. The possible use of true potato seed in stead of potato tubers has been the subject of research for many years. But up till now this has not been successful. Most researchers believe it is impossible to produce commercial potatoes from seed. From own experience I can declare that it is very difficult, if not impossible to produce homozygous inbred lines as parents for a variety from true potato seed. The pioneering approach of Solynta with non common techniques in potato breeding has produced surprising results, recently honoured with the Food Valley Award.

As a "classical" potato breeder I am very interested in this new approach. In other crops like sugar beet and maize hybrid varieties are available for a long time. The potato market is dominated by classical breeders, and it will probably be a long way, as it was in the other crops, but it is a very likely route to provide the real Potato Hybrid Varieties in the long run.

Jan van Loon

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18 December 2012

Dear Pim,

During my study in Plant Breeding and Genetics at Wageningen University I became familiar with many aspects of plant breeding and genetics. After having worked for two years in a plant breeding company, I started a PhD on Arabidopsis genetics, using mutant selection and genetic mapping in this species before it became the favorite model plant for plant molecular genetics. In this period in the early 1980s I developed the first genetic map of Arabidopsis based on a large number of mutants affecting plant specific pathways, which mutants were often characterized in detail at the physiological and biochemical level. Later achievements were the use of quantitative genetics in this species and the cloning of a number of quantitative trait loci. Part of my research programme was focused on similar studies in tomato and followed plant genetic research at my university in Wageningen where potato was an important topic of research.

In my scientific carrier I have been elected as member of the Academies of Sciences in the Netherlands, Europe and the USA. Presently, I am director at the Max Planck Institute for Plant Breeding Research in Cologne, Germany where one of our research group leaders is one of the leaders of potato research in Germany. Being a former professional plant breeder, I have always maintained an interest in plant breeding and have a broad knowledge in this field.

With today's knowledge, - including the recently published genome sequence of a diploid heterozygous genotype supplemented by sequencing of many loci in other (including tetraploid genotypes) - one can better understand why potato is suffering severe inbreeding depression. The potato genome sequence was published in 2011, and the genome shows some remarkable features: It contains 39,000 genetic loci and harbors at least 1,000 loci containing premature stop-codons in the coding sequences. Moreover, the average allele frequency in the tetraploid genome is more than three alleles per locus. This means that the cultivated potato contains many recessive non-functional alleles, which are hidden by functional alleles at the same loci. However, as soon as a genotype becomes homozygous for negative alleles of which the negative is not compensated by functional paralogues, such genotypes might show a very poor performance and low viability. This is the case when such genes are important for plant growth and development.

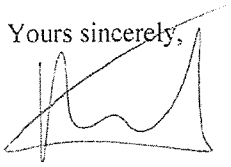
Genetic theory and practice predicts that homozygosity increases upon inbreeding which results in inbreeding depression when deleterious alleles are present in large numbers in the genotype (such as potato) that is inbred (in plants often by selfing)

Inbreeding depression in potato is quite serious due to the many less or non-functional alleles (see above). Taking that for each heterozygous locus, the chance of not being homozygous for at least one deleterious allele in a selfed progeny is ¾, the chance of obtaining a progeny plant which is not homozygous recessive for each of 50 loci that is heterozygous for one deleterious allele in the parent plant, is $(¾)^{50}$, or about 5.10^{-7}, which are numbers that are not amenable for breeding programmes.

This shows that starting from a heterozygous diploid potato genotype, the chance to identify a plant without homozygous deleterious alleles is extremely small, if not practically impossible. Therefore, to start a project aiming at developing a good performing homozygous potato plant for the purpose of hybrid production is a daring undertaking with very little chance of success. I believe that this has been the reason that for many decades potato geneticists and breeders have been convinced that inbreeding depression in potato cannot be overcome. The fact that diploid potatoes could not be selfed due to selfincompatibility further prevented the start of such projects as obtaining inbreeding by intermating close relatives goes very slow. Tetraploid genotypes will keep on segregating of types upon inbreeding as homozygosity will be obtained much slower.

Ever since Lindhout and his co-workers published their results in Potato Research volume 54 of 2011, showing high yielding hybrids from 87% homozygous F3 inbreds, I have been positively surprised that Solynta has managed to challenge this dogma. Solynta could successfully obtain essentially homozygous inbred lines by making use of genotypes that are selfcompatible and by choosing the right starting material that apparently is heterozygous for a lower number of deleterious alleles. This provides the basis of generating useful inbred lines that can become parents of F_1 hybrids. I wish Solynta much success in further advancing the F_1 hybrid method for potato.

Yours sincerely,



Dr Maarten Koornneef
Director, Plant Breeding and Genetics

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2012/050269

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82 A01H1/04 A01H4/00 A01H5/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CHALERMPOL PHUMICHAI ET AL: "Cryptic improvement for fertility by continuous selfing of diploid potatoes using Sli gene", EUPHYTICA, KLUWER ACADEMIC PUBLISHERS, DO, vol. 149, no. 1-2, 2 June 2006 (2006-06-02), pages 251-258, XP019395452, ISSN: 1573-5060, DOI: 10.1007/S10681-005-9072-5 abstract page 251, right-hand column, line 8 - page 252, left-hand column, line 2 figure 1 Plant material; page 252, right-hand column ----- -/--	1-18

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 September 2012	19/09/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Mundel, Christophe

Form PCT/ISA/210 (second sheet) (April 2005)

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IPR2025-00136
Page 691

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CHALERMPOL PHUMICHAI ET AL: "Expression of S-locus inhibitor gene (Sli) in various diploid potatoes", EUPHYTICA, KLUWER ACADEMIC PUBLISHERS, DO, vol. 148, no. 3, 28 April 2006 (2006-04-28), pages 227-234, XP019395412, ISSN: 1573-5060, DOI: 10.1007/S10681-005-9004-4 abstract page 227, left-hand column, line 4 - page 228, left-hand column, line 3 Plant material; page 228 figure 1 table 1 page 233, left-hand column, line 26 - line 36	1-18

Y	PHUMICHAI CHALERMPOL ET AL: "Toward the development of highly homozygous diploid potato lines using the self-compatibility controlling Sli gene", GENOME, OTTAWA, CA, vol. 48, no. 6, 1 December 2005 (2005-12-01), pages 977-984, XP002577501, ISSN: 0831-2796, DOI: 10.1139/G05-066 abstract page 978, left-hand column, line 39 - right-hand column, line 7 Plant material; page 978 figure 1 tables 1, 2 page 982, left-hand column, line 1 - line 21	1-18

Y	MARIS B: "COMPARISON OF DIPLOID AND TETRAPLOID POTATO FAMILIES DERIVED FROM SOLANUM-PHUREJA X DIHAPLOID SOLANUM-TUBEROSUM HYBRIDS AND THEIR VEGETATIVELY DOUBLED COUNTERPARTS", EUPHYTICA, KLUWER ACADEMIC PUBLISHERS, NL, vol. 46, no. 1, 1 March 1990 (1990-03-01), pages 15-33, XP008132658, ISSN: 0014-2336, DOI: 10.1007/BF00057615 page 16 - page 17	1-18

	-/--	

Agventure B.V. Ex. 2009
IPR2025-00136
Page 692

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2012/050269

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SHELLEY HERMUNDSTAD ET AL: "Tuber yield and tuber traits of haploid-wild species F1 hybrids", POTATO RESEARCH, ASSOCIATION FOR POTATO RESEARCH, WAGENINGEN, NL, vol. 29, 1 September 1986 (1986-09-01), pages 289-297, XP008132723, ISSN: 0014-3065, DOI: 10.1007/BF02359958 Material and methods; page 290 Results; page 290 figure 1 -----	1-18

1

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

Agventure B.V. Ex. 2009
IPR2025-00136
Page 693

Electronic Patent Application Fee Transmittal

Application Number:	13504156
Filing Date:	10-Jul-2012
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Filer:	Kristin Anne Connarn
Attorney Docket Number:	091876-0014

Filed as Small Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Multiple dependent claims	2616	1	390	390
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	700	700
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
		Total in USD ($)		**1180**

Electronic Acknowledgement Receipt

EFS ID:	26869526
Application Number:	13504156
International Application Number:	
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	23630
Filer:	Kristin Anne Connarn
Filer Authorized By:	
Attorney Docket Number:	091876-0014
Receipt Date:	08-SEP-2016
Filing Date:	10-JUL-2012
Time Stamp:	15:55:34
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1180
RAM confirmation Number	2946
Deposit Account	501133
Authorized User	CONNARN, KRISTIN

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 CFR 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

Charge any Additional Fees required under 37 CFR 1.492(a) (basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amendment.pdf	1467135 80a6efa638de8f2237d48d122656cc24794775ed	yes	36

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Abstract	2	2
Specification	3	5
Claims	6	15
Applicant Arguments/Remarks Made in an Amendment	16	36

Warnings:

Information:

2	Extension of Time	Ext.pdf	595296 9b4dba6b13e4f120ed96891f476db9a3b8d0f2fd	no	1

Warnings:

Information:

3	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	807730 dfea5f51d9ece445fa7b4ce4afd735b97788e07f	no	5

Warnings:

Information:

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4	Miscellaneous Incoming Letter	Statement.pdf	1091765 6ce29e107dd950fb651b9e8609946193e33a3cc3	no	17

Warnings:

Information:					
5	Oath or Declaration filed	Declaration.pdf	630098 e924ec072ae447615bf39cf98de7bc585f8d968a	no	13
Warnings:					
Information:					
6	Non Patent Literature	Uijtewaal_Euphytica_1987_36_745-753.pdf	1037912 9a996d5fbeace44f4743325686ece0044a38713	no	9
Warnings:					
Information:					
7	Non Patent Literature	Jackson_PeruConference_1984_169-179.pdf	1779317 df492c4b088c58c6ed0f6772130eff476aa3644b	no	12
Warnings:					
Information:					
8	Non Patent Literature	Hougas_AmPotatoJ_1958_35_701-707.pdf	968979 1200571edf6684809b80111fc5f7358c65ac1963	no	7
Warnings:					
Information:					
9	Non Patent Literature	Haynes_Symposium_1972_101-110.pdf	5331733 456c290abb3c23b82db8bcd8ac6a22449c0e4720	no	7
Warnings:					
Information:					
10	Non Patent Literature	Jacobsen_TheoApplGenet_1978_52_119-123.pdf	959736 99a71d28c27083c2578be6a86d2a3c45957fef70	no	5
Warnings:					
Information:					
11	Non Patent Literature	Bachem_FAO_2008.pdf	108715 e609bf0f938a5316faeab66732f50cb3703009ae	no	2
Warnings:					
Information:					

12	Non Patent Literature	Simko_Genetics_2006_173_2237-2245.pdf	343421 b938ce656a0436ddec2a67ff1ae92a95883c2ada	no	9
Warnings:					
Information:					
13	Non Patent Literature	Bradshaw_2007_157-77.pdf	2197523 26af64b30a02336209784 3c0260f400c01d285d6	no	11
Warnings:					
Information:					
14	Non Patent Literature	Pumichai_Euphytica_2006_149_251-258.pdf	200601 eb7fb3241c565e5cc43c0035c70761e1e6263356	no	8
Warnings:					
Information:					
15	Non Patent Literature	Krantz_PotatoBreedingMethods_1924A.pdf	15825914 232648d0f0920e296d1631066b24e4ee2e6d30eb	no	17
Warnings:					
Information:					
16	Non Patent Literature	Pumichai_Euphytica_2006_148_227-234.pdf	218468 6640eb822f9ff53c719346ee6effc6bbc94c378a	no	8
Warnings:					
Information:					
17	Non Patent Literature	ISR_PCT_NL_2012_050269.pdf	293509 07bb420ef2543c1b21200988cab32c5edc9bb39b	no	3
Warnings:					
Information:					
18	Non Patent Literature	Birhman_Genome_2000_43_495-502A.pdf	22782075 9cb4d242ef6c8df473e350b9f5bc05635e34143d	no	8
Warnings:					
Information:					

19	Fee Worksheet (SB06)	fee-info.pdf	33982 86ff727b71766f72033c1ad559083461d50a8641	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	56673909

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/504,156	Filing Date 07/10/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **09/08/2016**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 32	Minus	** 34	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 7	Minus	***7	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
MARISSA BLYTHER

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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OPAP AKIMA-16
SEP 1 3 2016
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Docket No.: 091876-0014 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem Hendrik LINDHOUT, et al.	: Customer Number: 23630
Application No.: 13/504,156	: Confirmation No.: 6337
Filed: July 10, 2012	: Art Unit: 1663
For: Hybrid Seed Potato Breeding	: Examiner: Russell T. BOGGS

RESPONSE TO REQUEST FOR INFORMATION UNDER 37 C.F.R. 1.105

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

In response to the Office Action dated March 8, 2016, Applicant submits the information requested by the Examiner under 37 CFR 1.105.

According to the Examiner, the instant application is silent about what starting materials and methods were used to produce plant variety 'AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765)'. The Examiner has therefore requested information under 37 CFR 1.105 in order to carry out a complete prior art search.

A response is included in the attached sheets.

Applicant views that the information submitted herewith under 37 CFR 1.105 constitutes proprietary information or material, not to be disclosed to the public.

REMARKS

Applicant does not specifically wish to pursue specific protection for deposited varieties AGVD1, AGVD2, AGVD3, or AGVD17. All of these lines are deposited with the intent to provide full disclosure, that is, access to the public, of a suitable and self-compatible *Sli*-gene donor plant, as used in the present invention. However, should such a claim be held allowable, this would at least provide a means to protect public use of the disclosed varieties for hybrid breeding in potato.

CONCLUSION

Should the Examiner be of the view that an interview would expedite consideration of the application, request is made that the Examiner telephone the applicant's attorney at (617) 535-4453 in order that any outstanding issues be resolved.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1133, under Order No. 091876-0014 from which the undersigned is authorized to draw.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Kristin A. Connarn
Registration No. 57,025

Please recognize our Customer No. 23630 as our correspondence address

28 State Street
Boston, MA 02109-1775
Phone: 617-535-4453
Facsimile: 617-535-3800
Date: September 8, 2016

DM_US 75997387-1.091876.0014

ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C …). The first artifact folder for an artifact type receives the letter A, the second B, etc..
Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

13504156XA

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

☐ CD(s) containing:
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- pages of specification and/or sequence listing and/or table — ☐ Doc Code: Artifact — Artifact Type Code: S
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1 Confidential Information Disclosure Statement or Other Documents marked Proprietary, Trade Secrets, Subject to Protective Order, Material Submitted under MPEP 724.02, etc.
Doc Code: Artifact Artifact Type Code X

☐ Other, description: _____
Doc Code: Artifact Artifact Type Code: Z

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13504156
Filing Date	2012-07-10
First Named Inventor	Willem Hendrik LINDHOUT
Art Unit	1663
Examiner Name	Russell T BOGGS
Attorney Docket Number	091876-0014

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13504156
	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

	1	Trofimov et al., Translated Title: "Utilizing Diploid Varieties and Dihaploids to Intensify Potato Selection and How to Better Preserve The Viability of The Pollen of Various Species of Gourds", Translated Journal Title: Potatoes and Vegetables 6 (2007) (English translation)	☐
	2	Trofimov et al., "Ispol'zovaniye Diploidnykh Vidov I Digaploidov Dlya Intensifikatsii Selektsii Kartofelya And Kak Lushche Sokhranit' Zhiznesposobnost' Pylytsy Raznykh Vidov Tykvy", Kartofel' I Ovoshchi 6 (2007) (Russian)	☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13504156
Filing Date	2012-07-10
First Named Inventor	Willem Hendrik LINDHOUT
Art Unit	1663
Examiner Name	Russell T BOGGS
Attorney Docket Number	091876-0014

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

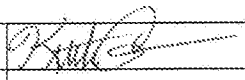
☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2017-01-13
Name/Print	Kristin A Connarn	Registration Number	57,025

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	13504156
Filing Date:	10-Jul-2012
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Filer:	Kristin Anne Connarn
Attorney Docket Number:	091876-0014

Filed as Small Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	90	90
		Total in USD ($)		**90**

Electronic Acknowledgement Receipt

EFS ID:	28057381
Application Number:	13504156
International Application Number:	
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	23630
Filer:	Kristin Anne Connarn/Sarah Walsh
Filer Authorized By:	Kristin Anne Connarn
Attorney Docket Number:	091876-0014
Receipt Date:	13-JAN-2017
Filing Date:	10-JUL-2012
Time Stamp:	13:09:17
Application Type:	U.S. National Stage under 35 USC 371

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Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$90
RAM confirmation Number	011317INTEFSW00011072501133
Deposit Account	501133
Authorized User	Sarah Walsh

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	0014_IDS.pdf	780205 86cece9126e0b08c80c0a42d82df74b58b88f548	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Non Patent Literature	Trofimov_2007_EnglishTranslation.pdf	1126587 cb7cb12374b29df8387518a234c0b05dcbd32961	no	8
Warnings:					
Information:					
3	Non Patent Literature	Trofimov_2007_Russian.pdf	199855 f2219f172bfd6b26b3282b2eaf2da5b66366c1bf	no	1
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30655 983628116ecfb6fa3173536df5db2ec772234722	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2137302		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/504,156	07/10/2012	Willem Hendrik Lindhout	091876-0014	6337

23630 7590 02/21/2017

McDermott Will & Emery
The McDermott Building
500 North Capitol Street, N.W.
Washington, DC 20001

EXAMINER
BOGGS, RUSSELL T

ART UNIT	PAPER NUMBER
1663	

NOTIFICATION DATE	DELIVERY MODE
02/21/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

Office Action Summary	Application No. 13/504,156	Applicant(s) LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8 September 2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1,3-9,11-13,16,18-32 and 34-39* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1,3-9,11-13,16,18-32 and 34-39* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Agventure B.V. Ex. 2009
IPR2025-00136

DETAILED ACTION

The present application is being examined under the pre-AIA first-to-invent provisions.

Claim Status

1. Claims 1-34 were examined on the merits in the Office action mailed 14 October 2014 and rejected. Applicant responded on 14 January 2015 amending several claims and cancelling claims 2, 10 and 17. Claims 1, 3-9, 11-16 and 18-34 were examined and rejected in the final rejection mailed 18 May 2015.

Applicant filed an RCE on 18 November 2015. Claims 1, 3-9, 11-16, 18-32 and 34-36 were examined and rejected on 8 March 2016. Applicant responded on 8 September 2016 cancelling claims 14-15 and adding claims 37-39. Claims 1, 3-9, 11-13, 16, 18-32 and 34-39 are examined herein.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Withdrawal of Objections and Rejections

2. The objection to the abstract is withdrawn in view of Applicant's amendments.

3. The objections to the specification are withdrawn in view of Applicant's amendments to the specification.

4. The objections to claims 4-6, 9, 10-13, 19, 21 and 35 are withdrawn in view of Applicant's amendments to the claims.

5. Aspects of the objections to claim 1 are withdrawn in view of Applicant's amendments to the claim.

6. Aspects of the objections to claim 8 are withdrawn in view of Applicant's amendments to the claim.

7. The rejection of claims 3 and 36 under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite, are withdrawn in view of Applicant's amendments to the claims.

8. The rejection of claim 8 under 35 USC 112(b) for lacking an antecedent basis in its recitation of "said [*S.*] *tuberosum* potato line" in lines 9-10; its recitation of "said potato line" in line 17; and "said hybrid offspring potato plant" in line 25 is withdrawn in view of Applicant's amendments to the claim.

9. The rejection of claims 1, 3-9, 11-13, 16, 18-32 and 34-36 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement is withdrawn in view of Applicant's amendments to the claims.

10. The rejection of claims 1, 3-9, 12-16, 18, 20, 22-26 and 29-34 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009) in view of Phumichai et al., Genome 48:977-84 (2005), in further

view of Maris (Euphytica 46:15-33 (1990), Simmonds, Potato Res 40:191-214 (1997), and in further view of Watanabe et al. (Breed Sci 46:329-36 (1996) is withdrawn in view of Applicant's amendments to the claims, arguments and the Lindhout declaration.

11. The rejection of claims 27 and 28 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009) in view of Phumichai et al., Genome 48:977-84 (2005), in further view of Maris (Euphytica 46:15-33 (1990), and in further view of Wang & Ran (NZ J Crop Hort Sci 28:1-8 (2000)) is withdrawn in view of Applicant's amendments to the claims, arguments and the Lindhout declaration.

12. Any objections to and rejections of cancelled claims are rendered moot.

Claim Objections

13. Claims 1, 6, 8 and 37-38 are objected to because of the following informalities.

Claim 1 is objected to because lines 2-3 recite "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*." The word "species" is either redundant or, in the alternate, seems to apply via the conjunctive "or" to the "*Solanum tuberosum* comprising introgression segments of other tuber-bearing Solanum [sic] species crossable to *Solanum tuberosum* " which is, of course, not a species.

Enhancing the clarity of this limitation is requested. One way to accomplish this would be to amend the limitation to read "(1) the species *Solanum tuberosum* or (2) *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*."

Due to Applicant's amendments to the claims, the rejection is modified from the rejection set forth in the Office action mailed 8 March 2016 as applied to the above-referenced claims. Applicant traverses the rejection in the paper filed 8 September 2016 but did not specifically address this objection.

Claim 6 is objected to because it uses the indefinite article "a" to reference the plant of claim 5.

Claim 8 is objected to because it recites "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" in lines 2-4 of the preamble and lines 2-4 of part (b). The word "species" is either redundant or, in the alternate, seems to apply via the conjunctive "or" to the "*Solanum tuberosum* comprising introgression segments of other tuber-bearing Solanum [sic] species crossable to *Solanum tuberosum* " which is, of course, not a species. Enhancing the clarity of this limitation is requested. One way to accomplish this would be to amend the limitation to read "(i) the species *Solanum tuberosum* or (ii) *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*."

This is a new objection.

Claim 8 is also objected to because of the discordance between plural plants and a single plant in part (e). Applicant amended part (e) to reflect obtaining plural plants in part (d), however Applicant only amended the first occurrence of “plant” to “plants” in part (e). The first occurrence of “plant” in line 2 should be changed to "plants." Optionally, "a potato plant" in line 2 could be amended to "potato plants."

Claim 8 is also objected to because, after Applicant's amendments to part (c), the subject of "said hybrid offspring seed" in line 1 of part (d) is now singular and thus cannot be grown into a population. One way to obviate this rejection would be to amend part (d) to reference a multiplicity of the hybrid offspring seed.

This is a new objection.

Claim 8 is also objected to because when Applicant amended the beginning of part (a) to refer to a first potato plant, Applicant did not amend the reference to a “first potato plant” at the end of part (a) since it is not the same potato plant referenced at the beginning of part (a). If Applicant amends the reference to a “first potato plant” at the end of part (a) to a second potato plant, Applicant is requested to amend the numbering of potato plants throughout the claim.

This is a new objection.

Claim 8 is also objected to because it recites "said potato line" in line 4 of part (b). Clarification of which potato line is being referenced is requested – it appears to be the diploid potato line referenced in line 2 of part (b).

This is a new objection.

New claim 37 is objected to because it uses the indefinite article "a" to refer to the plant of claim 5.

New claim 38 is objected to because it uses the indefinite article "a" to refer to the tetraploid potato line of claim 37.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

> (B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1, 3-9, 11-13, 16, 18-32 and 34-39 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Due to Applicant's amendments to the claims, the rejection is modified from the rejection set forth in the Office action mailed 8 March 2016 as applied to the above-referenced claims. Applicant traverses the rejection in the paper filed 8 September 2016. Applicant's arguments have been fully considered but are not persuasive.

Claims 1, 8, 16, 32 and 34-35 are rejected because of the recitation of "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*." Claim 1 (lines 2-3); claim 8 (lines 2-4 of the preamble, lines 2-4 of part (b), and lines 5-6 of part (e)); claim 16 (lines 3-4 of part (a) and lines 3-4); claim 20 (lines 3-4); claim 32 (lines 2-4); claim 34 (lines 3-4 of the preamble, lines 2-3 of part (a), lines 2-3 of part (b) and claim 35 (lines 2-4 of the preamble, lines 2-3 of part (b), and lines 4-5 of part (e)) recite the limitation "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*." The limitation is indefinite because it appears to require that the plant have some relationship to *Solanum tuberosum* but the extent of that relationship is indefinite. Since there is no lower limit to the amount of *Solanum tuberosum* DNA that is present, the claim encompasses a tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with a potentially trivial amount of *Solanum tuberosum* DNA present in the genome. See, for example, Veilleux, which states that "*Solanum phureja* is a diploid (2n=2x=24), primitive cultivated species that has little genetic distinction from and is completely cross compatible with *S. tuberosum*."

Veilleux, Sol CAP News 3(2):4-4 (2011), p. 4. Thus the limitation appears to read on *S. phureja* in spite of the phrasing of the limitation.

Furthermore, a recent review by Spooner et al. teaches that "[h]undreds of successful interspecific hybrids have been reported in the literature" and that "the biological concept of a species is difficult to apply to potatoes." Spooner et al., Bot Rev 80:283-383 (2014), p. 303 & see also pp. 303-18. Thus, herein, the limitation "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" is indefinite. It is interpreted herein to read on any other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*.

For example, in the response filed on 8 September 2016, Applicant emphasizes the difference between the plants of Phumichai et al. and *S. tuberosum*. Response, pp. 26-29. For example, Applicant states that "[t]he difference between the present invention and Phumichai, or Jansky for that matter, is that the potato plant is a *Solanum tuberosum* plant" (*Id.*, p. 29, ll. 6-7), but claim 8, part (b), for example, doesn't require a *S. tuberosum* plant.

Applicant's Arguments and Response

Due to Applicant's amendments to the claims, the rejection is modified from the rejection set forth in the Office action mailed 8 March 2016 as applied to the above-referenced claims. Applicant traverses the rejection in the paper filed 8 September 2016. Applicant asserted that the amendments added clarity to the claim but did not otherwise address the rejection. Applicant's arguments have been fully considered but are not persuasive.

Claim 8 is also rejected under 35 USC 112(b) for lacking an antecedent basis in its recitation of "said potato line" in line 6 of part (e) because there are two potato lines referenced in part (e) alone. The rejection would be obviated by amending this limitation to define whether the antecedent basis is either "said line of said first potato plant" in line 2 of part (e) or the "breeding line" referenced in line 4 of part (e).

Applicant's Arguments and Response

Due to Applicant's amendments to the claims, the rejection is modified from the rejection set forth in the Office action mailed 8 March 2016 as applied to the above-referenced claims. Applicant traverses the rejection in the paper filed 8 September 2016. Applicant asserted that the amendments added clarity to the claim but did not otherwise address the rejection. Applicant's arguments have been fully considered but are not persuasive.

Claim 8 is rejected because it recites "said first . . . potato plant" in line 1 of part (c) but, following the amendment of 8 September 2016, there are now two first potato plants in part (a) and thus the antecedent basis of this limitation in part (c) is indefinite.

This is a new rejection necessitated by Applicant's amendments to the claim.

Thus the metes and bounds of the above claims cannot be determined.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

The following is a quotation of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

15. Claims 1, 3-6, 8-9, 12-13, 16, 18-20, 22-32, 34 and 36 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Due to Applicant's amendments to the claims, the rejection is modified from the rejection set forth in the Office action mailed 8 March 2016 as applied to the above-referenced claims. Applicant traverses the rejection in the paper filed 8 September 2016. Applicant's arguments have been fully considered but are not persuasive.

Claim 1 is drawn to a diploid, fertile, self-compatible and essentially homozygous potato line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression

segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant a tuber yield expressed in grams of fresh weight of at least 200 grams; wherein at least 50% of loci in said plant are homozygous, wherein self-compatibility originating from *S. chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, and wherein at least 25% of the plants of said line produce seed-carrying berries.

Dependent claims are drawn to properties of the potato line (claims 3 and 4); and a plant line of claim 1 or a seed of the plant (claims 5 and 6). Claim 37 reads on a tetraploid line derived from the plant of claim 5 and claim 38 reads on a plant of such a line. Claim 39 requires that the plant of claim 1 has at least 75% of loci in said line are homozygous.

Claim 8 is a method claim drawn to producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams, comprising:
(a) providing a first potato plant, which first potato plant is a plant of a diploid, fertile, self-compatible and essentially homozygous potato line obtained by selfing a plant of diploid, self-compatible potato line for at least 3 times while selecting for plants that produce fertile offspring, wherein said self-compatibility originates from *S. chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession

number 41664, NCIMB accession number 41665, or NCIMB accession number 41765 to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line,

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid potato line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum* said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross-pollinating said first and second potato plant to provide a seed and collecting said seed to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plants and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plants or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, and selecting for plants that produce fertile offspring, to thereby provide a diploid, fertile, self-compatible and essentially homozygous potato breeding line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising plant having a tuber yield expressed in grams of fresh weight of at least 200 grams;

and wherein at least 50% of loci in the plant provided in step (e) are homozygous.

Dependent claims are drawn to properties of the potato line (claims 9 and 12-13); and where the method yields as a first potato plant one of four deposited lines (claim 11).

Claim 16 is a method claim drawn to producing a uniform hybrid potato seed starting with a first plant from a diploid, fertile, self-compatible and essentially homozygous potato line of (i) the species *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant and wherein at least 50% of the loci are homozygous; and crossing the first plant with a second plant with the same or similar recited limitations.

Dependent claims are drawn to properties of the potato line (claims 18 and 20); where the method yields as a first potato plant one of four deposited lines (claim 19); a seed produced by the claimed method (claim 22); and a plant or part thereof from the seed of claim 22 (claims 23-26); a tissue culture and a plant produced from this tissue culture (claims 27-28); and a method using the seed to produce a plant (claim 30) as well as a plant thus produced or a part thereof (claim 31).

Claims 34 and 35 are independent claims: claim 34 reads on hybrid potato seed produced by a plant where the plant is obtained by a method similar to, e.g., claim 16; and claim 35 reads on a method for producing a diploid, fertile, self-compatible and essentially homozygous potato line using the deposited lines.

Claim 36 depends from claims 6, 25 or 31 and reads on, e.g., a food product.

In the specification, Applicant describes obtaining the IVP07-1001/4 line from publically available germplasm and plants that contain the *Sli* gene and using these plants to breed AGVD1, AGVD2, and AGVD3. Specification ("Spec."), pp. 44-45.

Applicant describes the deposited lines by breeders reference: AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765). Id., pp. 33-34. Applicant describes a breeding process according to the instant invention starting with AGVD1-3 or AGVD17 on page 37.

Applicant generally describes adding an agronomically desirable trait to a potato genotype on page 38. Applicant describes crossing the Sli gene donor with various potato clones designated: IVP97-079-9, IVPAA-096-l8 and SH83-92-488 to generate clones D1, D2 and D3. Id., p. 47. Applicant describes creating a line containing the *Sli* gene with enhanced agricultural quality in Example 2, pp. 46-50. Applicant describes creating a molecular marker platform, i.e., SNPs, in Example 3, pp. 50-58. In Example 4, Applicant describes the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. Id., pp. 58-62.

Applicant describes the meaning of the claim term "essentially homozygous" on pages 30-31 of the instant specification and suggests that the term reflects a level of homozygosity that is above 25% or 75%. Id., p. 37.

In contrast to the limited description, the claimed genera are quite large. For example, the claimed genera include those set forth in the following exemplary claims: claim 1 and claim 16 – any "diploid, fertile, self-compatible and essentially homozygous

potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" with certain recited characteristics, wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

claim 8 – a plant of a diploid, fertile, self-compatible and essentially homozygous potato line obtained by selfing wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

Jansky indirectly describes the breadth of the of the claimed genus by "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" as extremely large. Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009), pp. 27-29. See also, for example, Veilleux, which states that "*Solanum phureja* is a diploid (2n=2x=24), primitive cultivated species that has little genetic distinction from and is completely cross compatible with *S. tuberosum*." Veilleux, Sol CAP News 3(2):4-4 (2011), p. 4. Thus the limitation appears to read on *S. phureja* in spite of the phrasing of the limitation. Spooner et al. confirms the breadth of the claimed genus - a recent review teaches that "[h]undreds of successful interspecific hybrids have been reported in the literature" and that "the biological concept of a species is difficult to apply to

potatoes." Spooner et al., Bot Rev 80:283-383 (2014), p. 303 & see also pp. 303-18, Table 1, and pp. 286-94.

Applicant has amended the claims to largely require that the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765. This, however, does not require that the self-compatibility is the same self-compatibility that is found in one of the deposited lines. The claims encompass the genus of all self-compatibility that is "as present" in the deposited lines as well as other potato lines. Applicant fails to describe the scope of "as present." It is well-accepted that the meaning of "as" includes "for instance" and thus the claims also read on other embodiments of self-compatibility with the deposited lines merely representing particular embodiments. Merriam-Webster, "as", accessed 2 December 2016.

Claims 8, 16 and 34 are broader because they are not tied to the deposit.

Applicant fails to describe any structure associated with the claimed self-compatibility, such as the genes required or the sequences of the genes. Applicant only describes the self-compatibility via the deposited lines.

Additionally, several other claims represent other broad genera. Claim 22 reads on all seeds produced by the method of claim 16 without further describing the seeds or requiring any specific structure. Claims 23-25 read on all plants, and parts thereof, produced by the method of claim 23 without further describing the plants or requiring any specific structure such as the genetic structure described by the deposits. Claim 26 requires all the physiological and morphological characteristics of the plant of claim 23,

but claim 23 does not require any physiological and morphological characteristics except a tuber weight of 200 grams per plant. Similarly, claim 27 reads on a broad genus of tissue cultures. Claim 28, which reads on a plant produced by the tissue culture, also reads on a broad genus of plants because somaclonal variation of a plant obtained from tissue culture increases the size of the genus encompassed by claim and further does not require the presence of the genetic structure described by the deposits.

Further, claim 1 recites only a handful of physiological and morphological characteristics – arguably just the tuber weight, and because claim 8 is a cross with another plant, the physiological and morphological characteristics which will be passed to any given offspring is uncertain and thus the plants produced by the method of claim 8 constitute a large genus.

To claim a genus under the written description requirement, Applicant is required to describe a representative number of species to reflect the variation within the genus or structures sufficient to define the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof.

Does Applicant describe a representative number of species in comparison to the size of the genus claimed? In the instant application, Applicant describes only four potato lines to use in the claimed methods and all were created from the same line, the IVP07-1001/4 line. Spec., p. 33. Applicant fails to describe working examples of the broad genus of other potato lines falling within the scope of the claims. Applicant only

describes one parental line and fails to describe examples of claimed potato lines descending from different parents. However, in contrast to the limited description, as noted above, Applicant claims several large genera.

Applicant fails to describe a representative number of species in comparison to the size of the genus claimed. Applicant also fails to describe any structure / function relationship necessary and/or sufficient for a potato line to be included in the claimed genus. Applicant only provides written description under 35 USC 112(a) for the deposited lines and the *Sli* gene by depositing the lines. Four potato lines are not a representative number of species in comparison to the size of the genus claimed, and thus Applicant fails to describe a representative number of species in comparison to these genera.

The specification therefore fails to provide an adequate written description to support the breadth of the claims. Applicant has not demonstrated possession to one of skill in the art of the instant invention as broadly as claimed at the time of filing, and one of skill in the art would not believe Applicant to be in possession of the genus as broadly as claimed.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Applicant's Arguments

In the argument against the rejection under 35 USC 112(a) written description, Applicant argues that the claims now require the species *S. tuberosum*. Response, p. 20. Applicant argues that the four deposited lines represent four examples of levels of

homozygosity. *Id.* Applicant argues that they have demonstrated the methods can be used to produce a diploid potato breeding line. *Id.*

Response to Applicant's Arguments

The invention appears to involve novel plants and the declaration by Mr. Lindhout and supporting letters document how novel these potato lines are. The instant composition claims and method claims encompass a vast genus of potato plants / lines as set forth above. Applicant has fully provided written description by deposit, but only for four lines. Applicant argues that these lines were obtained by breeding an unnamed parental line for fertility. Applicant, however, fails to provide any working examples starting from a different parental line. Yet the claimed genera, for example, encompass as a starting material any potato plant that can be crossed with *S. tuberosum*. Especially in view of the letter supporting Dr. Lindhout's declaration, one of ordinary skill in the art would not believe Applicant to be in possession of the genus as broadly as claimed. For example, Dr. J.D.G. Jones states that

> "[I]n the mid 2000s we attempted to produce hybrid potato ourselves. . . . However, we never succeeded in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing. . . . We considered that this was due to our inability to cross the Sli- self-compatibility locus into <u>good enough or diverse enough diploid *Solanum* germplasm</u>.

Letter from Dr. Jonathan D.G. Jones (2012), p. 1 (underlining added).

Therefore Applicant's invention appears to require both the *Sli* gene as represented by the deposits and other specific *S. tuberosum* diploid plants that are not described except potentially by reference to the deposit.

16. Claims 1, 3-6, 8-9, 12-13, 16, 18-20, 22-32, 34 and 36 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, because the specification, while being enabling for the deposited cell lines, does not reasonably provide enablement for forms of self-compatibility as broadly as claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

This is a new rejection necessitated by Applicant's amendments to the claims.

The invention appears to employ plants with novel characteristics. Since these plant characteristics are essential to the claimed invention it must be obtainable by a repeatable method set forth in the specification or otherwise be readily available to the public. If the plant is not so obtainable or available, the requirements of 35 USC § 112 may be satisfied by a deposit of the seeds. Deposits under NCIMB accession numbers 41663, 41664, 41665 and 41765 were made and the deposits were perfected. However the claims are not drawn solely to the deposits.

Claim 1 is drawn to a diploid, fertile, self-compatible and essentially homozygous potato line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant a tuber yield expressed in grams of fresh weight of at least 200 grams; wherein at least 50% of loci in said plant are homozygous, wherein self-compatibility originating from *S. chacoense* as present in a plant of potato lines

NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, and wherein at least 25% of the plants of said line produce seed-carrying berries.

Dependent claims are drawn to properties of the potato line (claims 3 and 4); and a plant line of claim 1 or a seed of the plant (claims 5 and 6). Claim 37 reads on a tetraploid line derived from the plant of claim 5 and claim 38 reads on a plant of such a line. Claim 39 requires that the plant of claim 1 has at least 75% of loci in said line are homozygous.

Claim 8 is a method claim drawn to producing a diploid, fertile, self-compatible and essentially homozygous potato line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams, comprising:
(a) providing a first potato plant, which first potato plant is a plant of a diploid, fertile, self-compatible and essentially homozygous potato line obtained by selfing a plant of diploid, self-compatible potato line for at least 3 times while selecting for plants that produce fertile offspring, wherein said self-compatibility originates from *S. chacoense* as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765 to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line,

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid potato line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum* said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross-pollinating said first and second potato plant to provide a seed and collecting said seed to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plants and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plants or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, and selecting for plants that produce fertile offspring, to thereby provide a diploid, fertile, self-compatible and essentially homozygous potato breeding line of the species (i) *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising plant having a tuber yield expressed in grams of fresh weight of at least 200 grams;

and wherein at least 50% of loci in the plant provided in step (e) are homozygous.

Dependent claims are drawn to properties of the potato line (claims 9 and 12-13); and where the method yields as a first potato plant one of four deposited lines (claim 11).

Claim 16 is a method claim drawn to producing a uniform hybrid potato seed starting with a first plant from a diploid, fertile, self-compatible and essentially homozygous potato line of (i) the species *S. tuberosum* or (ii) *S. tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant and wherein at least 50% of the loci are homozygous; and crossing the first plant with a second plant with the same or similar recited limitations.

Dependent claims are drawn to properties of the potato line (claims 18 and 20); where the method yields as a first potato plant one of four deposited lines (claim 19); a seed produced by the claimed method (claim 22); and a plant or part thereof from the seed of claim 22 (claims 23-26); a tissue culture and a plant produced from this tissue culture (claims 27-28); and a method using the seed to produce a plant (claim 30) as well as a plant thus produced or a part thereof (claim 31).

Claims 34 and 35 are independent claims: claim 34 reads on hybrid potato seed produced by a plant where the plant is obtained by a method similar to, e.g., claim 16; and claim 36 reads on a method for producing a diploid, fertile, self-compatible and essentially homozygous potato line using the deposited lines.

Claim 36 depends from claims 6, 25 or 31 and reads on, e.g., a food product.

The claimed genera, in particular, include those set forth in the following exemplary claims:

claim 1 and claim 16 – any "diploid, fertile, self-compatible and essentially homozygous potato line of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" with certain recited characteristics, wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

claim 8 – a plant of a diploid, fertile, self-compatible and essentially homozygous potato line obtained by selfing wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

The above-rejected claims, however, are not limited to the self-compatibility gene and potato lines described by the deposited accessions. The claims encompass the genus of all self-compatibility genes that are "as present" in the deposited lines. Applicant fails to describe the scope of "as present." For example, the meaning of "as" includes "for instance" and thus the claims also read on other embodiments of self-compatibility genes and potato lines. Merriam-Webster, "as", accessed 2 December 2016.

The Federal Circuit in *In re Wands* lists eight considerations for determining whether or not undue experimentation would be necessary to practice an invention. *In re Wands*, 858 F2d 731, 8 USPQ2d 1400, 1406 (Fed. Cir. 1988). These factors are:

the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claims. *Id.*

In the specification, Applicant teaches obtaining the IVP07-1001/4 line from publically available germplasm and plants that contain the *Sli* gene and using these plants to breed AGVD1, AGVD2, and AGVD3. Spec., pp. 44-45.

Applicant teaches the deposited lines by breeders reference: AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765). Id., pp. 33-34. Applicant teaches a breeding process according to the instant invention starting with AGVD1-3 or AGVD17 on page 37.

Applicant generally teaches adding an agronomically desirable trait to a potato genotype on page 38. Applicant teaches crossing the *Sli* gene donor with various potato clones designated: IVP97-079-9, IVPAA-096-I8 and SH83-92-488 to generate clones D1, D2 and D3. Id., p. 47. Applicant teaches creating a line containing the *Sli* gene with enhanced agricultural quality in Example 2, pp. 46-50. Applicant teaches creating a molecular marker platform, i.e., SNPs, in Example 3, pp. 50-58. In Example 4, Applicant teaches the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. Id., pp. 58-62.

Applicant states the meaning of the claim term “essentially homozygous” on pages 30-31 of the instant specification and suggests that the term reflects a level of homozygosity that is above 25% or 75%. Id., p. 37.

The art generally teaches this breeding strategy, or similar strategies. For example, Jansky teaches first obtaining homozygous diploids using a self-incompatibility inhibitor. J Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009), p. 46. Jansky teaches that "[h]ighly homozygous inbreds could be also be used for heterosis breeding. Jansky, p. 46. Jansky teaches that such an approach would be difficult. *Id.*

Phumichai et al. confirms the approach of Jansky, and documents the use of the *Sli* gene in the approach. Phumichai et al., Genome 48:977-84 (2005), abstract.

> Potato . . . is an auto- or segmental allo-tetraploid showing tetrasomic inheritance, which results in complicated genetic segregation. Since potatoes are propagated vegetatively, highly heterotic genotypes can be maintained, which facilitates the use of heterosis, an essential factor in potato breeding, particularly for tuber yield. Alternatively, open-pollinated true potato seed (TPS) can be used as a low-cost planting material for potato production.
>
> Highly homozygous inbreds, once amply produced, would be highly useful for the development of TPS varieties with genetic uniformity, as well as for the investigation of heterosis.
>
> A scheme for hybrid breeding using homozygous diploids and subsequent somatic hybridization has been proposed, for which the availability of highly homozygous diploid (or pure) lines is a key for success. In considering the use of pure lines for the development of genetically uniform [true potato seed] varieties, self-fertile, seed-propagated lines are highly desirable, and simple techniques to develop such lines are necessary.

Id., pp. 977-78 (citations omitted).

In the response filed on 14 September 2016, Applicant traverses the rejection under 35 USC § 103 and argues that one of skill in the art would not have a reasonable

expectation of success in attempted to develop the potato lines necessary for the instant invention. Response, pp. 21-35. As part of the argument, Applicant reviews the scope and content of the prior art, including, inter alia, the Phumichai et al. reference. Id., pp. 27-28. Applicant argues that Watanabe et al. (Breed Sci 46:329-36 (1996)) teaches "homozygous inbred lines have not been obtained at the diploid level due to both inbreeding depression and self-incompatibility." Id., p. 23. Applicant also cites to Jansky as downplaying the possibility of hybrid breeding as 'commercially unfeasible due to "dramatic reductions in fertility and vigor.'" Id., (quoting Jansky, p. 46). Applicant argues that Uijtewaal et al. (Euphytica, 36: 745-753, 1987) confirms this teaching. Id., p. 23 & p. 25. Applicant concludes the argument with citation of additional material supporting their position that one of skill in the art would not have a reasonable expectation of success in combining the art cited in the rejection under 35 USC 103.

In support of the argument, Applicant also filed a declaration under 37 CFR 1.132 by Dr. Lindhout with supporting letters. The supporting letters were initially filed in European Application EP2699684 (04 June 2014) and appear to be copies therefrom. The letters teach that the success of Applicant's invention, as broadly as claimed, was unpredictable. For example, on page 2 of his letter, Dr. Koornneef states that

> Ever since Lindhout and his co-workers published their results in Potato Research volume 54 of 2011, showing high yielding hybrids from 87% homozygous F3 inbreds, I have been positively surprised that Solynta has managed to challenge this dogma. Solynta could successfully obtain essentially homozygous inbred lines by making use of genotypes that are selfcompatible and by choosing the right starting material that apparently is heterozygous for a lower number of deleterious alleles. This provides the basis of generating useful inbred lines that can become parents of F1 hybrids.

Letter from Koornneef (2012) p. 2 (underlining added). Earlier, Dr. Koornneef also states that "to start a project aiming at developing a good performing homozygous potato plant for the purpose of hybrid production is a daring undertaking with very little chance of success. *Id.*

In another letter supplied in support of Dr. Lindhout's declaration, Dr. J.D.G. Jones states that

> "[I]n the mid 2000s we attempted to produce hybrid potato ourselves. . . . However, we never succeeded in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing. . . . We considered that this was due to our inability to cross the Sli- self-compatibility locus into good enough or diverse enough diploid *Solanum* germplasm.

Letter from Dr. Jonathan D.G. Jones (2012), p. 1 (underlining added).

Applicant claims a large genus of potato plants. Jansky and Spooner et al. describes the breadth of the of the claimed genus as extremely large. See, e.g., Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June, 2009), pp. 27-29; Spooner et al., Bot Rev 80:283-383 (2014), Table 1, pp. 286-94. Applicant's invention in claim 1 reads on any potential potato line that is a "diploid, fertile, self-compatible and essentially homozygous potato line" where the self-compatibility is "as present" in the deposited samples. Claims 8, 16 and 34 are broader because they are not tied to the deposit.

In view of Applicant's arguments in response to the rejection under 35 USC § 103 and Dr. Lindhout's declaration with its supporting letters, success in practicing Applicant's claimed invention would be unpredictable and would depend on the

genotype of the potato lines. Therefore, extensive guidance would be required to enable the invention as broadly as claimed. Such guidance is not provided.

The specification therefore does not enable one skilled in the art to make and use members of the species of the claimed genus other than the deposited lines. See, for example, MPEP 2164.06(a)(II), citing to *Ex parte Jackson*, 217 USPQ 804, 806 (Bd. App. 1982). The issue before the Board in *Ex parte Jackson* was:

> The issue squarely raised by this rejection is whether or not a description of several newly discovered strains of bacteria having one particularly desirable metabolic property in terms of the conventionally measured culture characteristics and a number of metabolic and physiological properties would enable one of ordinary skill in the relevant art to independently discover additional strains having the same specific, desirable metabolic property, i.e., the production of a particular antibiotic.
>
> To state the issue somewhat differently, it is whether a verbal description of a new species would enable one of ordinary skill in the relevant art to obtain strains of that species over and above the specific strains made available through deposit in one of the recognized culture depositories.

Ex parte Jackson, 217 USPQ 804, 806 (Bd. App. 1982). In the instant application, the issue is similar to the one before the Board in that Applicant made deposits with unique characteristics but not taught how to make and use other lines similar to the deposited lines. In *Ex parte Jackson*, the Board held that the deposit, without a detailed explanation of how to obtain more species, did not enable the generic claims. *Id.*, p. 808. The board found that "the degree of experimentation involved in locating new [organisms] apart from deposited cultures is undue in light of the enablement requirement of 35 U.S.C. 112." *Id.* The *Jackson* decision was considered and distinguished by the Federal Circuit in the *Wands* decision in view of the routine experimentation required to obtain hybridomas that were before the bar in the Wands

application. *In re Wands*, pp. 1403-04. Therefore, in view of the *Ex parte Jackson* decision, the generic scope of claims 1, 8, 16 and 34, reading on the genus as set forth above, is not enabled. Obtaining further species falling within the scope of the generic claims would require undue experimentation.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Conclusion

17. No claim is allowed.

18. The subject matter of claims 11, 19, 21 and 35, which each require the use of one of the deposited lines, appears to be allowable over the prior art made of record.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUSSELL BOGGS whose telephone number is (571)272-2805. The examiner can normally be reached on Monday through Friday between 8:00 AM to 6:30 PM (Mountain Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amjad Abraham, can be reached at 571-270-7058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RUSSELL BOGGS/
Examiner, Art Unit 1663

/AMJAD ABRAHAM/
Supervisory Patent Examiner, Art Unit 1663

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination LINDHOUT ET AL.	
	Examiner RUSSELL BOGGS	Art Unit 1663	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
	A	US-				
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Merriam-Webster, "as", accessed 2 December 2016
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	69635	potato.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:18
L2	21632	inbred near line	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:18
L3	61	L1 and L2	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:18
L4	69965	potato.ab. or tuberosum.ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:18
L5	61	L4 and L2	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:18
L6	47	L5 and @ad<="20091026"	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:19
L7	499	l4 AND COMPatible	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:21
L8	4	L4 AND (selfCOMPatible or (self compatible))	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:21
L9	5	L4 AND (selfCOMPatibility or (self compatibility))	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:22
L10	5	L8 or L9	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/01/06 12:22

EAST Search History (Interference)

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Receipt date: 09/08/2016
Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13504156
Filing Date	2012-07-10
First Named Inventor	Willem Hendrik LINDHOUT
Art Unit	1663
Examiner Name	Russell T BOGGS
Attorney Docket Number	091876-0014

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/R.T.B/	1	20140115736		2014-04-24	Lindhout et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

Receipt date: 09/08/2016	Application Number	13504156
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
(Not for submission under 37 CFR 1.99)	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

/R.T.B/	1	UIJTEWAAL, et al., "Morphology and Vigour of Monohaploid Potato Clones, Their Corresponding Homozygous Diploids and Tetraploids and Their Heterozygous Diploid Parent", Euphytica, 10 April 1987, pp. 745-753, v. 36.	☐
/R.T.B/	2	KRANTZ, "Potato Breeding Methods", Technical Bulletin 25, December 1924, pp.1-32, The University of Minnesota Department of Agriculture, University Farm, St. Paul.	☐
/R.T.B/	3	JACKSON, et al., "Inbreeding and True Potato Seed Production", Innovative Methods for Propagating Potatoes, Report of the XXVIII Planning Conference, December 10-14, 1984, pp. 169-179, International Potato Center (CIP), Lima, Peru.	☐
/R.T.B/	4	BIRHMAN, et al., "Production of Inbred Progenies of Diploid Potatoes Using an S-locus Inhibitor (Sli) Gene, and Their Characterization", Genome, (2000) pp. 495-502, v. 43.	☐
/R.T.B/	5	HOUGAS, et al., "The Potential of Potato Haplois in Breeding and Genetic Research", Am. Potato Journal, 1958, v. 35, pp. 701-707.	☐
/R.T.B/	6	HAYNES, "The Use of Cultivated Diploid Solanum Species in Potato Breeding", Prospects for the Potato in the Developing World, Symposium held at Lima, Peru, July 17-19, 1972, pp. 101-110.	☐
/R.T.B/	7	JACOBSEN, et al., "The Influence and Possible Recombination of Genotypes on the Production of Microspore Embryoids in Anther Cultures of Solanum Tuberosum and Dihaploid Hybrids", Theor. Appl. Genet., 1978, pp. 119-123, v. 52.	☐
/R.T.B/	8	BACHEM, "Unravelling the Potato Genome", Retrieved from the Internet: http://www.fao.org/potato-2008/en/perspectives/bachem.html, International year of the potato (2008).	☐
/R.T.B/	9	SIMKO, et al., "Assessment of Linkage Disequilibrium in Potato Genome with Single Nucleotide Polymorphism Markers", Genetics, August 2006, pp. 2237-2245, v. 173.	☐
/R.T.B/	10	BRADSHAW, "New and Modern Methods of Potato Breeding", Chapter 8, pp. 157-77 (2007).	☐
/R.T.B/	11	PHUMICHAI et al., "Cryptic Improvement for Fertility by Continuous Selfing of Diploid Potatoes using Sli Gene," Euphytica, 149: pp. 251-258 (2006).	☐

Receipt date: 09/08/2016	Application Number	13504156
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
(Not for submission under 37 CFR 1.99)	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

/R.T.B/	12	PHUMICHAI et al., "Expression of S-locus Inhibitor Gene (Sli) in Various Diploid Potatoes," Euphytica, 148: pp. 227-234 (2006).	☐
/R.T.B/	13	The International Search Report from corresponding PCT/NL2012/050269, dated September 19, 2012.	☐

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EXAMINER SIGNATURE

Examiner Signature	/RUSSELL T BOGGS/	Date Considered	12/26/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Receipt date: 09/08/2016

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13504156
	Filing Date	2012-07-10
	First Named Inventor	Willem Hendrik LINDHOUT
	Art Unit	1663
	Examiner Name	Russell T BOGGS
	Attorney Docket Number	091876-0014

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Kristin A. Connarn/	Date (YYYY-MM-DD)	2016-09-08
Name/Print	Kristin A. Connarn	Registration Number	57,025

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13504156	LINDHOUT ET AL.
	Examiner	Art Unit
	RUSSELL BOGGS	1638

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
STIC search of STN	8/12/14	/RTB/
STN, EAST and Google search as per attached	9/28/14	/RTB/
STIC search	9/23/14	/RTB/
EAST search as per attached	5/11/15	/RTB/
discuss claims and rejections with A.M. Grunberg	5/8/15	/RTB/
EAST search as per attached	1/31/16	/RTB/
extensive literature search by cross-referencing, Google Scholar & PubMed	1/19 to 2/2/16	/RTB/
EAST search as per attached	1/6/17	/RTB/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/RUSSELL BOGGS/ Examiner.Art Unit 1638	

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	13/504,156	Filing Date	2012-07-10	Docket Number (if applicable)	091878-0014	Art Unit	6337
First Named Inventor	Willem Hendrik LINDHOUT			Examiner Name	BOGGS, Russell T		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 50-1133

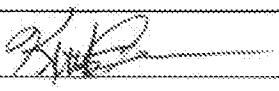
SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Signature of Registered U.S. Patent Practitioner			
Signature		Date (YYYY-MM-DD)	2017-05-19
Name	Kristin A. Connarn	Registration Number	57025

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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Agventure B.V. Ex. 2009
IPR2025-00136
Page 758

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Willem Hendrik Lindhout *et al.*,	Group Art Unit: 1663
Serial No.: 13/504,156	Examiner: Boggs, Russell T
Filing or 371 (c) date: 10 July 2012	Atty. Dkt. No.: 091876-0014
For: HYBRID SEED POTATO BREEDING	Confirmation no.: 6337

DECLARATION OF WILLEM HENDRIK LINDHOUT UNDER 37 C.F.R. § 1.132.

I, Willem Hendrik Lindhout, hereby declare as follows:

1. I am a citizen of the Netherlands, residing in Wageningen, the Netherlands.

2. I am a named inventor of U.S. patent application No.: 13/504,156 to Lindhout et al., assigned to Agventure B.V.

3. I am founder and Director R&D of Florere B.V., operating under the tradename Solynta, a privately held limited liability company dedicated to F1 hybrid potato breeding and holding company of Agventure B.V.

4. I hold an MSc degree in Biology, an MSc degree in chemistry, and a PhD in Molecular Biology from the University of Leiden, the Netherlands.

5. Until 2006, I was Associate Professor of Plant Breeding at Wageningen University, the Netherlands. During this period, I published more than 100 scientific publications related to plant breeding, served as the Coordinator of Bachelors and Masters Studies in Plant Sciences, Wageningen University and served as the National Coordinator of Tomato Genomics Research as part of the Centre for Biosystems Genomics (CBSG), a national network of biological sciences aiming at a better understanding of the biochemical, molecular and genetic basis of plant species, eg Arabidopsis, tomato and potato.

6. From 2006, I was director R&D of De Ruiter Seeds. After the acquisition of De Ruiter Seeds by Monsanto, I was appointed as Monsanto's Global Breeding Lead of the Vegetable Seed Division.

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7. I understand that the United States Patent and Trademark Office is in charge of assessing the patentability of the referenced patent application. I am familiar with the contents of the Office Actions issued by the United States Patent and Trademark Office in respect of U.S. patent application No.: 13/504,156, and the claims that are prosecuted thereunder.

8. I understand that the United States Patent and Trademark Office has rejected the claims for failing to comply with the requirements of written description and enablement. It is the view of the United States Patent and Trademark Office that (i) no representative number of species were described in comparison to the size of the genera claimed and (ii) practicing the claimed invention would depend on the genotype of the starting potato lines and would be unpredictable. Extensive guidance would therefore be required to practice the invention as broadly claimed.

9. In this Declaration, I wish to specifically comment on the arguments of the Examiner that the practicability of the invention would depend on the genotypes of the *S. tuberosum* potato lines, i.e. starting material, which are to contain the introgressed self-compatibility from *Solanum chacoense* and which are to be selfed.

Practicability of the invention

10. In its argumentation to reject the claims for lack of written description and enablement, the Examiner cites the following passage from the supporting letter of Dr. Jones:

> "*In fact, in the mid 2000s we attempted to produce hybrid potato ourselves. No successes had ever been reported with S. tuberosum. In order to work at the diploid level, we back-crossed the S. chacoense Sli- gene into Solanum phureja. In addition, we selfed the lines that carry the Sli- gene. However, we never succeeded in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing.*
>
> *We considered that this was due to our inability to cross the Sli- self-compatibility locus into good enough or diverse enough diploid Solanum germplasm.*"

In the same context, the Examiner cites from the supporting letter of Dr. Koornneef the following passage:

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Page 760

"Ever since Lindhout and his co-workers published their results in Potato Research volume 54 of 2011, showing high yielding hybrids from 87% homozygous F3 inbreds, I have been positively surprised that Solynta has managed to challenge this dogma. Solynta could successfully obtain essentially homozygous inbred lines by making use of genotypes that are selfcompatible and by choosing the right starting material that apparently is heterozygous for a lower number of deleterious alleles. This provides the basis of generating useful inbred lines that can become parents of F 1 hybrids."

11. The Examiner argues that it would follow from these supporting letters that only specific diploid *Solanum* germplasm would allow for the invention to be practicable, and that therefore selection of an appropriate *Solanum tuberosum* parent line is essential for practicing the invention.

12. This is a too narrow interpretation on the invention. Dr. Jones has not appreciated that the gist of the invention is to focus on, and select for, plants that produce fertile offspring, instead of focusing on an agronomical parameter such as tuber yield. It is without technical basis and with prejudice to conclude that the invention is simply based on luck in selecting an appropriate *Solanum tuberosum* parent line which allows for inbreeding after an initial cross with a *Sli* gene donor. *Solanum tuberosum* parent lines D1, D2 and D3 were selected without any specific preselection for fertility. In addition, they were not selected for good combining ability with a *Sli* gene donor. One cannot speak of luck or unpredictability if all three *Solanum tuberosum* parents used in first crossings with a *Sli* gene donor provide for plants of the invention (see Table 3 on page 49 of the published international application WO2011/053135).

I am convinced that the invention can also be practiced by introgressing the self-compatibility originating from *Solanum chacoense* into *Solanum tuberosum* parent lines other than D1 – D3.

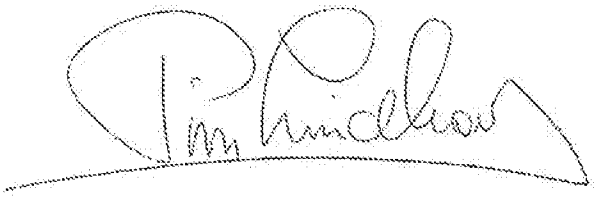
13. I further note that Dr. Jones executed his experimentation under glasshouse conditions, which means that he was not able to select from sufficient large populations, as was important to arrive at the present invention, as described in the Examples of this patent application.

14. In other words, there are other factors at play to arrive at a diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* plant, rather than a selection of an appropriate *Solanum tuberosum* parent line. These other

factors include the generation of sufficiently large inbred populations and the selection of fertile progeny plants, as is clearly taught in the application as filed.

15. I hereby declare that all statements made of my own knowledge are true and all statements made on information are believed to be true and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under § 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Date:
May 8th, 2017



Signature Willem Hendrik Lindhout

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IPR2025-00136
Page 762

Electronic Patent Application Fee Transmittal

Application Number:	13504156
Filing Date:	10-Jul-2012
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Filer:	Kristin Anne Connarn/Michelle DeFalco
Attorney Docket Number:	091876-0014

Filed as Large Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	1700	1700
		Total in USD ($)		**1700**

Electronic Acknowledgement Receipt

EFS ID:	29259924
Application Number:	13504156
International Application Number:	
Confirmation Number:	6337
Title of Invention:	Hybrid Seed Potato Breeding
First Named Inventor/Applicant Name:	Willem Hendrik Lindhout
Customer Number:	23630
Filer:	Kristin Anne Connarn
Filer Authorized By:	
Attorney Docket Number:	091876-0014
Receipt Date:	19-MAY-2017
Filing Date:	10-JUL-2012
Time Stamp:	17:14:31
Application Type:	U.S. National Stage under 35 USC 371

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Payment was successfully received in RAM	$1700
RAM confirmation Number	052217INTEFSW00003905501133
Deposit Account	501133
Authorized User	Kristin Connarn

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response_to_Final_Office_Action.pdf	2592793 480736085052c6e091611a9263bc67887441f7e0	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	10
	Applicant Arguments/Remarks Made in an Amendment	11	15

Warnings:

Information:

2	Request for Continued Examination (RCE)	RCE_Transmittal.pdf	597095 fae41d10556ea4459e5b3727a7bc3dd74ace2bbd	no	3

Warnings:

This is not a USPTO supplied RCE SB30 form.

Information:

3	Miscellaneous Incoming Letter	Declaration_of_Willem_Hendrik_Lindhout.pdf	646467 f6961828437ec22475a5f2362c68b0a505826d2c	no	4

Warnings:

Information:

4	Fee Worksheet (SB06)	fee-info.pdf	30646 3bf558762055747ae1aab1c063111464853 9fdd9	no	2

Warnings:

Information:

Total Files Size (in bytes):	3867001

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: 8/19/2017 Signature: /Michelle DeFalco/
(Michelle DeFalco)

Docket No.: 091876-0014 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Willem Hendrik Lindhout, et al.	: Customer Number: 23630
Application No.: 13/504,156	: Confirmation No.: 6337
Filed: July 10, 2012	: Art Unit: 1663
For: Hybrid Seed Potato Breeding	: Examiner: Russell T. Boggs

Mail Stop – Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO FINAL OFFICE ACTION

Sir:

In response to the final Office Action dated February 21, 2017, please amend the above-identified U.S. as directed herein. A Declaration under 37 CFR 1.132 and a Request for Continued Examination are concurrently filed herewith. Reconsideration and further examination of the present application is requested in light of the following:

Amendments to the Claims begin on Page 2.

Remarks/Arguments begin on Page 11.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams; wherein at least 50% of loci in said plant are homozygous, wherein said self-compatibility originating from *Solanum chacoense* and is referred to as S-locus inhibitor (*Sli*) gene, as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, and wherein at least 25% of the plants of said line produce seed-carrying berries.

2. (Cancelled)

3. (Previously Presented) The potato line of claim 1, wherein said plant of said line, in addition to said tuber yield, comprises at least one agronomically desirable trait selected from the group consisting of insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color and cold-sweetening resistance.

4. (Previously Presented) The potato line of claim 1, wherein said plant of said line, when mature, attains a fresh weight of the foliage and shoots of at least 500 grams.

5. (Previously Presented) A plant of the line according to claim 1.

6. (Currently Amended) A seed or tuber of [[a]] the plant according to claim 5.

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7. (Cancelled)

8. (Currently Amended) A method for producing a diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a diploid, fertile, self-compatible and essentially homozygous potato line, obtained by selfing a plant of a diploid, self-compatible potato line for at least 3 times while selecting for plants that produce fertile offspring, wherein said self-compatibility originates from *Solanum chacoense* and is referred to as S-locus inhibitor (*Sli*) gene, as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively,

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum,* said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first potato plant and said second potato plant to provide a seed and collecting said seed to thereby provide a hybrid offspring seed;

(d) growing a multiplicity of said hybrid offspring seed into a population of hybrid offspring potato plants and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plants or backcrossing said hybrid offspring potato plant to a potato plants of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, and selecting for plants that produce fertile offspring, to thereby provide a diploid,

fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato breeding line, said potato breeding line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams;

and wherein at least 50% of loci in the plant provided in step (e) are homozygous.

9. (Previously Presented) The method of claim 8, wherein step (b) comprises the provision of a second potato plant, wherein said second potato plant is a donor for an additional agronomically desirable trait, wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

10. (Cancelled)

11. (Previously Presented) The method of claim 8, wherein said first potato plant is a plant of potato line NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively.

12. (Previously Presented) The method of claim 8, wherein said second potato plant is the plant of a second diploid, fertile, self-compatible and essentially homozygous potato line.

13. (Previously Presented) The method of claim 8, wherein said second potato plant is the plant of a second diploid, fertile, self-incompatible potato line.

14-15. (Cancelled)

16. (Currently Amended) A method for producing a uniform hybrid potato seed, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a first diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of loci in said first potato plant are homozygous; and wherein said self-compatibility originates from *Solanum chacoense* and is referred to as S-locus inhibitor (*Sli*) gene, as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively,

(b) providing a second potato plant, wherein said second potato plant is a plant of a second diploid or tetraploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said second potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant; wherein at least 50% of loci in said second potato plant are homozygous; and wherein said self-compatibility originates from *Solanum chacoense* and is referred to as S-locus inhibitor (*Sli*) gene, as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, and wherein said first and second plant contain at least 20 % contrasting homozygous loci as determined by molecular marker analysis, and

(c) cross pollinating said first and second potato plant and allowing one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide a hybrid offspring seed.

17. (Cancelled)

18. (Previously Presented) Method according to claim 16, wherein at least one of said first and second potato plants comprises at least one agronomically desirable trait selected from the group consisting of insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color and cold-sweetening resistance.

19. (Previously Presented) The method of claim 16, wherein said first potato plant is a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland.

20. (Currently Amended) The method of claim 16, wherein said second potato plant is a plant of a second diploid or tetraploid, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said second potato line comprising an additional agronomically desirable trait; and wherein said trait is insect tolerance, nematode resistance, disease resistance, herbicide tolerance, cold tolerance, drought tolerance, wet tolerance, tolerance to dry and wet rot, salinity tolerance, yellow flesh color or cold-sweetening resistance.

21. (Previously Presented) A seed of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland.

22. (Previously Presented) A seed produced by the method of claim 16.

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23. (Previously Presented) A hybrid potato plant, or part thereof, produced by growing the seed of claim 22.

24. (Previously Presented) Pollen or an ovule of the plant of claim 23.

25. (Previously Presented) A tuber from the plant of claim 23.

26. (Cancelled)

27. (Previously Presented) A tissue culture of the plant of claim 23.

28. (Previously Presented) A potato plant regenerated from the tissue culture of claim 27.

29. (Previously Presented) A method for producing a hybrid potato seed wherein the method comprises crossing a first potato plant with a second potato plant and harvesting a hybrid potato seed resulting from said crossing, wherein said first or second parent potato plant is the potato plant of claim 5 or claim 38, wherein said first and second parent potato have at least 20 % contrasting homozygous loci as determined by molecular genetic marker analysis.

30. (Previously Presented) A method of producing a hybrid potato plant, said method comprising producing a seed according to a method of claim 16 and growing said seed into a potato plant.

31. (Previously Presented) A potato plant produced by the method of claim 30, or a tuber thereof.

32. (Currently Amended) A set of 2 homozygous diploid, fertile, self-compatible and essentially homozygous potato lines ~~of the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum*~~

~~*tuberosum*~~ according to claim 1 for intercrossing, wherein each of said lines differ from another line in said set by having at least 20% contrasting homozygous loci as determined by molecular genetic marker analysis; and wherein at least 50% of loci in said plants are homozygous.

33. (Cancelled)

34. (Currently Amended) A hybrid potato seed which seed, when sown produces a diploid, fertile, self-compatible and essentially heterozygous *Solanum tuberosum* potato plant, said potato plant may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, said plant being obtained by:

(a) providing a first diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein at least 50% of loci in a plant of said first potato line are homozygous; wherein said self-compatibility originates from *Solanum chacoense* and is referred to as S-locus inhibitor (*Sli*) gene, as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively;

(b) providing a second diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, wherein said first and second plant contain at least 20 % contrasting homozygous loci as determined by molecular marker

analysis, and wherein at least 50% of loci in a plant of said second potato line are homozygous; wherein said self-compatibility originates from *Solanum chacoense* and is referred to as S-locus inhibitor (*Sli*) gene, as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds,of said lines having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively, [[and]] and

(c) cross pollinating said first and second potato plant and allowing at least one of said parent plants to produce berries with seeds and collecting said seeds from said berries to provide a hybrid offspring seed.

35. (Currently Amended) A method for producing a diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum-tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant, comprising:

(a) providing a first potato plant, which first potato plant is a plant of potato line NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, representative seeds of said line having been deposited with the NCIMB, Aberdeen, Scotland under breeders reference AGVD1, AGVD2, AGVD3, and AGVD17 respectively;

(b) providing a second potato plant, wherein said second potato plant is a plant of a diploid or tetraploid *Solanum tuberosum* potato line, said potato line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line of said second potato plant ~~which may have~~ having any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross pollinating said first and second potato plant to provide seeds and collecting said seeds to thereby provide a hybrid offspring seed;

(d) growing said hybrid offspring seed into a population of hybrid offspring potato plant and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plant or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, to thereby provide a diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato breeding line, said potato breeding line may ~~of the species *Solanum tuberosum* or *Solanum tuberosum*~~ comprise[[ing]] minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*, said potato line comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

and wherein at least 50% of loci in a plant provided in step (e) are homozygous.

36. (Previously Presented) Starch, potato chips, or French fries produced from the tuber of any of claims 6, 25 or 31.

37. (Currently Amended) A tetraploid potato line produced by doubling the genome of [[a]] the plant of claim 5.

38. (Currently Amended) A plant of [[a]] the tetraploid potato line according to claim 37.

39. (Previously Presented) The potato line according to claim 1, wherein at least 75% of loci in said plant of said line are homozygous.

Remarks/Arguments

Status of Claims

Claims 1, 3-9, 11-13, 16, 18-32 and 34-39 were pending in this application. Claims 1, 6, 8, 16, 20, 32, 34, 35, 37 and 38 have been amended. Claim 26 is cancelled without prejudice. Claims 2, 7, 10, 14, 15, 17 and 33 were previously cancelled.

Basis for this amendment is present throughout the application as filed. For example, support for the amendment to claims 1, 8, 16, 20, 34 and 35 can be found at page 6, lines 5-7, page 17, lines 14-17, page 33, lines 11 to page 34, line 14, page 37, lines 23-24 and page 44, lines 15-18.

Claims 6, 32, 37 and 38 have been amended to correct informalities. No new matter is believed to be added herein.

Claim Objections

Claims 1, 6, 8 and 37-38 are objected to because of informalities.

A. Claim 1 is objected to in the recitation of the phrase "the species *Solanum tuberosum* or *Solanum tubersosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*".

Claim 1 is amended to delete the phrase "the species *Solanum tuberosum* or *Solanum tubersosum*".

B. Claim 6 is objected to because it uses the indefinite article in the recitation of "a plant".

Claim 6 is amended to recite the phrase "the plant".

C. Claim 8 is objected to in the recitation of the phrase "the species *Solanum tuberosum* or *Solanum tubersosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" in part (b).

Claim 8 is amended to delete the phrase "the species *Solanum tuberosum* or *Solanum tubersosum*".

D. Claim 8 is objected to because of discordance between plural plants and a single plant in part (e).

Claim 8 is amended to recite "plants" in plural in part (e).

E. Claim 8 is objected to in the recitation of "said hybrid offspring seed" in part (d).

Claim 8 is amended to reference a multiplicity of said hybrid offspring seed in part (d).

F. Claim 8 is objected to in the recitation of the phrase "first potato plant" at the end of part (a).

Claim 8 is amended to delete the phrase "to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line".

G. Claim 8 is objected to in the recitation of the phrase "said potato line" in part (b).

Claim 8 as amended refers to the diploid potato line referenced in part (b).

H. Claim 37 is objected to because it uses the indefinite article in the recitation of "a plant".

Claim 37 is amended to recite the phrase "the plant".

I. Claim 38 is objected to because it uses the indefinite article in the recitation of "a plant".

Claim 38 is amended to recite the phrase "the plant".

Reconsideration and withdrawal of objection are respectfully requested.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 1, 3-9, 11-13, 16, 18-32 and 34-39 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite, for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

A. According to the Examiner, claims 1, 8, 16, 32 and 34-35 are indefinite in their recitation of "*Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*", since it appears to require that the plant have some relationship to *Solanum tuberosum* but the extent of that relationship is indefinite.

Claims 1, 8, 16, 32, 34 and 36 have been amended for clarity purposes and are directed to *Solanum tuberosum* plants and lines, which may comprise minor introgression segments from other crossable *Solanum* species.

B. According to the Examiner, claim 8 is indefinite in the recitation of "said potato line" in part (e), as there is insufficient antecedent basis.

Claim 8 as amended refers to only one potato line, namely the diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line.

C. According to the Examiner, claim 8 is indefinite in the recitation of "said first and second potato plant" in part (c), as there is insufficient antecedent basis.

The phrase "said first and second potato plant" in claim 8 is amended to recite "said first potato plant and said second potato plant".

Reconsideration and withdrawal of rejection are respectfully requested.

Rejections under 35 U.S.C. § 112, first paragraph

A. Claims 1, 3-6, 8-9, 12-13, 16, 18-20, 22-32, 34 and 36 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

According to the Examiner, the claims are broadly drawn to a diploid, fertile, self-compatible and essentially homozygous potato line, or a seed thereof, comprising plants that have an average tuber yield of at least 200 g/plant. Independent method claims 8, 16, 34 and 35 are drawn to a method to produce such a line and a method for producing a uniform hybrid potato seed. Dependent claims relate to, e.g., crosses made, adding agronomically desirable traits, and potato lines deposited with the NCIMB in Aberdeen, Scotland. According to the Examiner, the Applicant claims a large genus, whereas the instant application describes only four potato lines to use in the claimed methods that were created from the same line, the IVP07-1001/4 line.

Claims 1, 8, 16 and 34 have been amended and commensurate with the specification as filed.

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Applicant has disclosed that the source of self-compatibility is the *Sli* gene and that the invention is specifically drawn to *Solanum tuberosum* potato lines and plants.

Further limiting the claims to any one of the four deposited lines with NCIMB accession numbers 41663, 41664, 41665, or 41765, or the use of these lines in the methods of the invention, would deprive the Applicant of the useful protection sought out of this invention. This would also be unfair given the pioneering nature of the present invention, as previously established and presented in the Declarations from the experts.

In addition, the Declaration by Willem Hendrik Lindhout under 37 CFR 1.132 submitted concurrently herewith, makes it very clear that the invention can be broadly applied to other diploid *Solanum tuberosum* parent lines.

Reconsideration and withdrawal of rejection are respectfully requested.

B. Claims 1, 3-6, 8-9, 12-13, 16, 18-20, 22-32, 34 and 36 are rejected under 35 U.S. C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. According to the Examiner, the genus set forth in claims 1, 8, 16 and 34 is not enabled and therefore obtaining further species falling within the scope of the generic claims would require undue experimentation.

Claims 1, 8, 16 and 34 have been amended and the source of self-compatibility is the *Sli* gene. The Applicant has concurrently submitted herewith a Declaration by Willem Hendrik Lindhout under 37 CFR 1.132 that attests to the fact that the invention can be practiced over the whole scope of the claims and does not require undue experimentation.

Reconsideration and withdrawal of rejection are respectfully requested.

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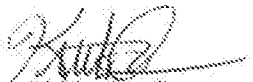
CONCLUSION

Should the Examiner be of the view that an interview would expedite consideration of the application, request is made that the Examiner telephone the applicant's attorney at (617) 535 4453 in order that any outstanding issues be resolved.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1133, under Order No. 091876-0014 from which the undersigned is authorized to draw.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/504,156	Filing Date 07/10/2012	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☒ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	**190**
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	**190**

APPLICATION AS AMENDED – PART II

AMENDMENT **05/19/2017**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 34	Minus	** 34	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 6	Minus	***7	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	**0**

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
GLORIA J. TRAMMELL

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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     (FILE 'HOME' ENTERED AT 14:08:00 ON 02 SEP 2017)

     FILE 'MEDLINE, CROPU, AGRICOLA, CABA, CAPLUS, BIOSIS' ENTERED AT 14:08:21
     ON 02 SEP 2017
L1          2004 S TUBEROSUM/AB AND (DIPLOID OR 2N)/AB
L2          1934 S L1 NOT VIRUS/TI
L3          1846 S L2 NOT PHUREJA/TI
L4          1811 S L3 NOT (COGNATE OR CHIP OR ABSCISIC OR DROUGHT OR AN1 OR ASE
L5          1777 S L4 NOT (RNASE OR CRISPR OR HRM OR PURPLE OR CAROTENOID OR ST
L6          1668 S L5 NOT (GIBBERELLIN OR (EMBRYO (A) SACS) OR POLLEN OR AGROBA
L7          1537 S L6 NOT (ANTHER OR PROTOPLAST OR CHLOROPLAST OR (LIQUID (A) M
L8          1379 S L7 NOT (CYTOLOG? OR ABORTIVE OR NUCLEOLAR OR BEHRENS OR NICO
L9          1106 S L8 NOT (TETRAPLOID OR SUGAR OR INSECT OR NEMATODE OR FROST O
L10         1011 S L9 NOT (INFESTANS OR 1EBN OR PAPITA OR MICROPROTOPLAST OR TN
L11          969 S L10 NOT (TOMATO OR DROOPY OR GLYCOALKALOID OR TRISOMICS OR LI
L12          941 S L11 NOT (FISH OR PELOQUIN OR ALLOTETRAPLOID OR MEXICO OR BRID
L13          571 DUPLICATE REMOVE L12 (370 DUPLICATES REMOVED)
L14          543 S L13 NOT (IRISH OR PLASTID OR WILT OR ENDOSPERM OR (BLACK (A)
L15           96 S L14 AND ((SLI (A) GENE) OR CHACOENSE)/AB

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Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination Lindhout et al.	
	Examiner RUSSELL T BOGGS	Art Unit 1663	Page 1 of 4

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
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FOREIGN PATENT DOCUMENTS

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	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Spooner et al., Bot Rev 80:283-383 (2014) (Year: 2014)
*	V	Veilleux, Sol CAP News 3(2):4-4 (2011) (Year: 2011)
*	W	Phumichai et al., Genome 48:977-94 (2005) (Year: 2006)
*	X	Phumichai et al., Euphytica 148:227-34 (2006) (Year: 2006)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination Lindhout et al.	
	Examiner RUSSELL T BOGGS	Art Unit 1663	Page 2 of 4

U.S. PATENT DOCUMENTS

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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	J Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June 2009)
	V	Lindhout et al., Potato Res 54:301-12 (2011)
*	W	Watanabe et al., Breed Sci 46:329-36 (1996)
*	X	Uijtewaal et al., Euphytica 36: 745-53 (1987)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination Lindhout et al.	
	Examiner RUSSELL T BOGGS	Art Unit 1663	Page 3 of 4

U.S. PATENT DOCUMENTS

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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	EP 2 493 286 A2, Remarks to EPO (21 Dec. 2012)
	V	Bairu et al., Plant Growth Regul 63:147-73 (2011)
*	W	Merriam-Webster, "as", accessed 2 December 2016
	X	Mullins et al., Trends Plant Sci 11(5):254-60 (2006)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/504,156	Applicant(s)/Patent Under Reexamination Lindhout et al.	
	Examiner RUSSELL T BOGGS	Art Unit 1663	Page 4 of 4

U.S. PATENT DOCUMENTS

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FOREIGN PATENT DOCUMENTS

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	Q					
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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Jansky et al., Crop Sci. 56:1412-22 (2016)
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	12	(tuberosum.ab.) and (diploid or 2n)	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/09/02 12:02
L2	53	(tuberosum.clm.) and (diploid or 2n)	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/09/02 12:04
L3	51	L2 not L1	US-PGPUB; USPAT; EPO; JPO; DERWENT	ADJ	ON	2017/09/02 12:04

EAST Search History (Interference)

<This search history is empty>

9/2/2017 12:06:52 PM
C:\Users\rboggs\Documents\EAST\Workspaces\13504156.wsp

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/504,156	07/10/2012	Willem Hendrik Lindhout	091876-0014	6337

23630 7590 09/07/2017

McDermott Will & Emery
The McDermott Building
500 North Capitol Street, N.W.
Washington, DC 20001

EXAMINER	
BOGGS, RUSSELL T	

ART UNIT	PAPER NUMBER
1663	

NOTIFICATION DATE	DELIVERY MODE
09/07/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

Office Action Summary	Application No. 13/504,156	Applicant(s) Lindhout et al.	
	Examiner RUSSELL T BOGGS	Art Unit 1663	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 19 May 2017 .

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____ .

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☑ Claim(s) 1,3-6,8-9,11-13,16,18-25,27-32 and 34-39 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☑ Claim(s) 21 is/are allowed.

7)☑ Claim(s) 1,3-6,8-9,12-13,16,18,20,22-25,27-32,34 and 36-39 is/are rejected.

8)☑ Claim(s) 11,19 and 35 is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____ .

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____ .

4) ☐ Other: _____ .

Agventure B.V. Ex. 2009
IPR2025-00136

DETAILED ACTION

The present application is being examined under the pre-AIA first-to-invent provisions.

Status

1 Claims 1-34 were examined on the merits in the Office action mailed 14 October 2014 and rejected. Applicant responded on 14 January 2015 amending several claims and cancelling claims 2, 10 and 17. Claims 1, 3-9, 11-16 and 18-34 were examined and rejected in the final rejection mailed 18 May 2015.

Applicant filed an RCE on 18 November 2015. Claims 1, 3-9, 11-16, 18-32 and 34-36 were examined and rejected on 8 March 2016. Applicant responded on 8 September 2016 cancelling claims 14-15 and adding claims 37-39. Claims 1, 3-9, 11-13, 16, 18-32 and 34-39 were examined and rejected in an Office action mailed 21 February 2017.

Applicant filed a second RCE on 19 May 2017. Applicant amended claims and cancelled claim 26. Claims 1, 3-6, 8-9, 11-13, 16, 18-25, 27-32 and 34-39 are examined herein.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Withdrawal of Objections and Rejections

2 The objections to claims 1 and 8 because they recited "the species *Solanum tuberosum* or *Solanum tuberosum* comprising introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*" is withdrawn in view of Applicant's amendments to the claims.

3 The objection to claims 6 and 37-38 because they used the indefinite article "a" to reference the plant of claim 5 or claim 37 is withdrawn in view of Applicant's amendments to the claims.

4 The objection to claim 8 because of the discordance between plural plants and a single plant in part (e) is withdrawn in view of Applicant's amendments to the claim.

5 The objection to claim 8 regarding the discordance between the singular subject of part (c) and the plural subject of part (d) is withdrawn in view of Applicant's amendments to the claim.

5 Any objections to and rejections of cancelled claims are rendered moot.

Examiner's Note

6 The amended claims, response and declaration filed on 19 May 2017, due to some aspect of the typeface used by Applicant, are not capable of being fully converted into text by optical character recognition (OCR). Rule 1.52(a)(1)(v) requires that all documents submitted to the Office must "permit the direct reproduction of readily legible

copies in any number by use of photographic, electrostatic, photo-offset, and microfilming processes and electronic capture by use of digital imaging and optical character recognition." The remarks and claims filed 8 September 2016, on the other hand, can be readily converted to text via OCR.

Citations to Applicant's specification are abbreviated herein "Spec."

Claim Rejections - 35 USC § 112(b)

The following is a quotation of 35 U.S.C. 112(b):

> (B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7 Claims 1, 3-6, 8-9, 11-13, 16, 18-20, 23-25, 27-32 and 34-39 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claims 1, 8, 16, 20 and 34-35 are rejected because they recite the limitation "minor introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*." The limitation occurs, for example, in line 3 of claim 1; line 3, line 3 of part (b), and line 6 of part (e) of claim 8; line 4, and line 4 of part (b) of claim 16; line 4 of claim 20; line 3, line 3 of part (a), and line 3 of part (b) of claim 34; and line 3, line 3

of part (b), and line 5 of part (e) of claim 35. The metes and bounds of what constitutes "minor" introgression segments is indefinite. For example, in a 2014 review Spooner et al. teaches that the line between *S. tuberosum* and other *Solanum* species is not well defined. Spooner et al., Bot Rev 80:283-383 (2014). The Spooner et al. review states that "[h]undreds of successful interspecific hybrids have been reported in the literature" and that "the biological concept of a species is difficult to apply to potatoes." Spooner et al., p. 303 & see also pp. 303-18, Table 1, and pp. 286-94. Similarly, Veilleux teaches that "*Solanum phureja* is a diploid (2n=2x=24), primitive cultivated species that has little genetic distinction from and is completely cross compatible with *S. tuberosum*." Veilleux, Sol CAP News 3(2):4-4 (2011), p. 4. Thus the limitation may read on *S. phureja* in spite of the phrasing of the limitation. Therefore, given the uncertainty in the art regarding the distinct identity of *S. tuberosum* as a species, the scope of "minor" is indefinite and the metes and bounds of these claims cannot be determined.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Claim Rejections - 35 USC § 112 / written description

The following is a quotation of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim Rejections - 35 USC § 112(a) / written description / new matter

8 Claims 1, 3-6, 8-9, 11-13, 16, 18-20, 22-25, 27-32 and 34-39 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant filed amended claims that contain new matter.

Applicant amended several claims to add the word "minor" to modify "introgression segments." The limitation occurs, for example, in line 3 of claim 1; line 3, line 3 of part (b), and line 6 of part (e) of claim 8; line 4, and line 4 of part (b) of claim 16; line 4 of claim 20; line 3, line 3 of part (a), and line 3 of part (b) of claim 34; and line 3, line 3 of part (b), and line 5 of part (e) of claim 35.

Since the word "minor" does not occur in the specification, abstract or claims-as-filed; the limitation "minor introgression fragments" necessarily also does not occur.

Thus, the claims as amended comprise NEW MATTER. In response to this rejection, Applicant is required to point to support for the claims or to cancel the new matter.

9 Claims 1, 3-6, 8-9, 12-13, 16, 18, 20, 22-25, 27-32, 34, and 36-39 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

The above claims were rejected in the Office action mailed 21 February 2017. Applicant traverses the rejection of record in the RCE filed 19 May 2017. Applicant's arguments have been fully considered but are not persuasive.

The Claims

Claim 1 is drawn to a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato line, where said potato line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams; wherein at least 50% of loci in said plant are homozygous, wherein self-compatibility originating from *S. chacoense* and is referred to as a S-locus inhibitor (*Sli*) gene as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, and wherein at least 25% of the plants of said line produce seed-carrying berries. Applicant defines the claim limitation "essentially homozygous" (e.g.,

claim 1, line 1) as reflecting a level of homozygosity that is above 25% or preferably 75%. *Id.*, pp. 30-31; see also p. 21.

Dependent claims are drawn to properties of the potato line (claims 3 and 4); and a plant line of claim 1, or a seed or tuber of the plant (claims 5 and 6). Claim 39 requires that the plant of claim 1 has at least 75% homozygous loci.

Claim 32 reads on a set of two homozygous diploid, fertile, self-compatible and essentially homozygous potato lines according to claim 1 wherein each of said lines differ from the other line in the set by having at least 20% contrasting homozygous loci as determined by molecular genetic marker analysis; and wherein at least 50% of loci in said plants are homozygous. Claim 37 reads on a tetraploid line derived from the plant of claim 5 and claim 38 reads on a plant of the line of claim 37. Claim 29 is drawn to a method using either the plant of claim 5 (a diploid plant) or the plant of claim 38 (a tetraploid plant).

Claim 8 is a method claim drawn to producing a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato line, wherein said line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a diploid, fertile, self-compatible and essentially homozygous potato line obtained by selfing a plant of diploid, self-compatible potato line for at least 3 times while selecting for plants that produce fertile offspring, wherein said self-compatibility originates from the *Sli* gene as

present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765 to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line,

(b) providing a second potato plant, wherein said second potato plant is a plant of a *S. tuberosum* diploid potato line which may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum* said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross-pollinating said first potato plant and second potato plant to provide a seed and collecting said seed to thereby provide a hybrid offspring seed;

(d) growing a multiplicity of said hybrid offspring seed into a population of hybrid offspring potato plants and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plants or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, and selecting for plants that produce fertile offspring, to thereby provide a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato breeding line which may comprise minor introgression segments of other tuber bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising plant having a tuber yield expressed in grams of fresh weight of at least 200 grams;

and wherein at least 50% of loci in the plant provided in step (e) are homozygous.

Dependent claims are drawn to properties of the potato line (claims 9 and 12-13); and where the method uses as a first potato plant one of four deposited lines (claim 11) (not included in this rejection).

Claim 16 is a method claim drawn to producing a uniform hybrid potato seed starting with a first plant from a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato line that may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant and wherein at least 50% of the loci are homozygous and wherein said self-compatibility originates from *S. chacoense* and is referred to as a S-locus inhibitor (*Sli*) gene as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765; and crossing the first plant with a second plant with the same or similar recited limitations.

Claim 21, not rejected under 35 USC 112(a), is an independent claim drawn to a seed of one of the deposited lines.

Dependent claims are drawn to properties of the potato line (claims 18 and 20); where the method uses as a first potato plant one of four deposited lines (claim 19 (not included in this rejection); a seed produced by the claimed method (claim 22); and a plant or part thereof produced from the seed of claim 22 (claims 23-25); a tissue culture of the plant of claim 23 and a plant produced from this tissue culture (claims 27-28); and

a method using the seed to produce a plant (claim 30) as well as a plant thus produced or a tuber thereof (claim 31).

Claims 34 and 35 are independent claims. Claim 34 reads on hybrid potato seed produced by a plant where the plant is obtained by a method similar to, e.g. claim 16; and claim 35 reads on a method for producing a diploid, fertile, self-compatible and essentially homozygous potato line using a method similar to, e.g. claim 16, with one of the deposited lines used as the first plant; claim 35 is not included in this rejection.

Claim 36 depends from claims 6, 25 or 31 and reads on, e.g., a food product.

Applicant's Description

Applicant describes the deposited lines by breeders reference: AGVD1 (NCIMB 41663), AGVD2 (NCIMB 41664), AGVD3 (NCIMB 41665) and AGVD17 (NCIMB 41765). Spec., pp. 33-34.

In the specification, Applicant describes a breeding process according to the instant invention starting with a self-compatible line, e.g. AGVD1-3 or AGVD17. *Id.*, p. 37. Applicant states that "[n]o or at least little, attention is paid to the agronomical appearance of the plants at this stage." *Id.* One aspect of the recited breeding steps includes the possibility of adding a desired trait, such as vigor. *Id.*, p. 38. Continuing this aspect, after adding the trait, the hybrid is backcrossed to the self-compatible line while selecting for, e.g. vigor. *Id.* After adding numerous traits, and performing test crosses, inbred elite diploid breeding lines can be obtained which can be used to produce commercially valuable hybrids. *Id.* Applicant reviews the steps: develop a "a vigorous fertile homozygous self-compatible diploid potato line;" "a diploid breeding

line;" and then an "elite diploid potato breeding line." *Id.*, p. 40. On page 43, Applicant concludes that "[t]he above method now provides a breeding process for the production of homozygous breeding lines or elite breeding lines based on the background of population AGVD1, AGVD2, AGVD3 or AGVDI7, to which background successively additional alleles are added, thereby providing elite breeding lines wherein desirable traits are stacked." *Id.*, p. 43.

In particular, in Example 1, Applicant describes obtaining the IVP07-1001/4 line from publically available germplasm where the IVP07-1001/4 plants contained the *Sli* gene after repeated selfing. Spec., p. 44. Applicant cites to the 2006 Euphytica publication by Phumichai et al. as well as the 2005 Genome publication by Phumichai et al. regarding the source of the *Sli* gene. *Id.*, p. 44 & p. 57 (citing to Phumichai et al., Genome 48:977-94 (2005) and Phumichai et al., Euphytica 148:227-34 (2006)). Applicant describes that these plants are of no commercial value. *Id.* Applicant crossed these plants to three different diploid donor lines, D1-3, in order to acquire commercially valuable traits carried by the donor lines. *Id.*, pp. 44-45. The F1 cross with D1 was selfed and the progeny deposited as AGVD1, which was estimated as 50% homozygous. *Id.*, p. 45. The F1(D1) was crossed with F1(D2) and the progeny deposited under AGVD2, and this was estimated to be 25% homozygous with respect to alleles originating from IVP07-1001/4. *Id.* The F1(D1) was backcrossed to obtain progeny 25% homozygous with respect to alleles originating from IVP07-1001/4; these were deposited as AGVD3. *Id.*

In Example 2, Applicant describes crossing the *Sli* gene donor with various publically available potato clones designated: IVP97-079-9, IVPAA-096-I8 and SH83-92-488 to generate clones D1, D2 and D3. *Id.*, p. 47. Applicant describes this created a diploid trait donor lines containing the *Sli* gene with enhanced agricultural quality. *Id.*, pp. 46-50. Applicant provides a more detailed description of the potato lines used in Table 6. *Id.*, pp. 57-58.

Applicant describes creating a molecular marker platform, i.e. SNPs, in Example 3. *Id.*, pp. 50-58.

In Example 4, Applicant describes the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. *Id.*, pp. 58-62. Applicant describes that it is "often stated" that potatoes are very prone to inbreeding depression. *Id.*, p. 60. A cause of this might be deleterious alleles; Applicant potentially identified a few such deleterious alleles, with one allele almost being lethal. *Id.*

Applicant concludes, on page 62, that

> It was found that after two generations of selfings homozygous diploid potato plants were obtained comprising alleles from both parents. Not a single marker out of 36 markers tested provided proof for a lethal allele. Furthermore, plants with more than 84% homozygous loci can be successfully crossed to obtain hybrid plants with at least five heterozygous chromosome regions. This means that hybrid seeds that are essentially uniform and that represent true potato seed have now been produced.

Id., p. 62.

The Scope of the Claims

In contrast to the limited description – four deposited lines – the claimed genus is quite large. For example, the claimed genera include those set forth in the following exemplary claims:

In claim 1, which is a composition claim drawn to a plant, and in claim 16, which uses such a plant in a method – the genus includes any diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, [where] said potato line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with certain recited characteristics, wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

In claim 8 – a plant of a diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line where the line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* obtained by selfing wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

Without initially considering the possible presence of minor introgression fragments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, the claimed genus of potato plants encompasses the genus of all:

diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams

per plant and wherein at least 50% of the loci are homozygous together with the *Sli* gene. Returning the limitation "minor introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*." Applicant fails to describe what constitutes "minor" introgression segments and there is no evidence that one of skill in the art would understand the scope of genus encompassed by this the limitation and thus the claim limitation forms the basis of a rejection of certain claims under 35 USC 112(b), *supra*. Whatever the meaning of the limitation, it can be taken to broaden the scope of the claimed genera.

In the record, Applicant argues that the plants of the invention are distinguishable from the prior art plants because they have a tuber yield in excess of 200 grams per plant even after inbreeding. Remarks, 14 Jan. 2015, p. 17 and Remarks, 8 Sept. 2016, pp. 28-29. Applicant offers a theory that, in the prior art, inbreeding to diploids was associated with severe inbreeding depression because of the presence of deleterious and lethal alleles. Remarks, 8 Sept. 2016, p. 24. Although Applicant is clearly not bound by this theory, Applicant fails to associate any structure with the phenotype of superior tuber yield (at least 200 g pre plant).

Further Applicant has largely amended the claims to require that the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765. This, however, does not require that the self-compatibility in the claims is the same self-compatibility gene that is found in one of the deposited lines since Applicant fails to describe the scope of "as present." It is well-accepted that the meaning of "as" includes

"for instance" and thus the claims also read on other embodiments of self-compatibility with the deposited lines merely representing particular embodiments. Merriam-Webster, "as", accessed 2 December 2016. Again, Applicant fails to describe any specific structure associated with the claimed self-compatibility, such as the genes required or the sequences of the genes.

Additionally, several other claims represent other broad genera. Claim 22 reads on all seeds produced by the method of claim 16 without further describing the seeds or requiring any specific structure. Claims 23-25 read on all plants, and parts thereof, produced from the seed of claim 22 without further describing the plants or requiring any specific structure such as the genetic structure described by the deposits. Claim 27 reads on a broad genus of tissue cultures. Claim 28, which reads on a plant produced by the tissue culture, also reads on a broad genus of plants because somaclonal variation of a plant obtained from tissue culture may increase the size of the genus encompassed by claims. See, e.g., Bairu et al., Plant Growth Regul 63:147-73 (2011).

To claim a genus under the written description requirement, Applicant is required to describe a representative number of species to reflect the variation within the genus or structures sufficient to define the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof.

Applicant Fails to Describe a Representative Number of Species or Structural Features

Applicant clearly provides written description – by deposit – for the deposited lines. But does Applicant describe a representative number of species in comparison to the size of the genus claimed? In the instant application, Applicant only describes by deposit only four potato lines as compositions and for use in the claimed methods. All were created from the same *Sli* donor, the IVP07-1001/4 line, crossed to three diploid donor lines. Spec., p. 44 & pp. 57-58. Applicant cites to Phumichai et al. (2006) as to the source of the *Sli* gene line. *Id.*, p. 44. The IVP07-1001/4 line does not appear to be a *S. tuberosum* line based on a review of the specification and Phumichai et al. (2005) and Phumichai et al. (2006), but its identity is not directly stated. Applicant does not further characterize or describe the *Sli* gene. Similarly, Applicant fails to describe in the file history if the diploid donor lines, or the deposited lines, fall within the scope of the claim limitation in, e.g. claim 1, "*Solanum tuberosum* potato line, said potato line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum*." The most detailed descriptions of D1, D2 and D3 are found in Table 6, but Table 6 fails to provide the genetic background of the lines. Spec., p. 57.

The Art

The art describes basic the approach of Applicant's invention. For example, in a 2009 publication, Jansky describes first obtaining homozygous diploids using a self-incompatibility inhibitor. J Jansky, "Breeding, Genetics, and Cultivar Development," Advances in Potato Chemistry and Technology, ed. J. Singh & L. Kaur, pp. 27-62 (June

2009), p. 46. Jansky teaches that "[h]ighly homozygous inbreds could be also be used for heterosis breeding. Jansky, p. 46. Jansky teaches that such an approach would be difficult. *Id*.

Phumichai et al. confirms the approach of Jansky, and documents the use of the *Sli* gene in the approach. Phumichai et al. (2005), abstract.

> Potato . . . is an auto- or segmental allo-tetraploid showing tetrasomic inheritance, which results in complicated genetic segregation. Since potatoes are propagated vegetatively, highly heterotic genotypes can be maintained, which facilitates the use of heterosis, an essential factor in potato breeding, particularly for tuber yield. Alternatively, open-pollinated true potato seed (TPS) can be used as a low-cost planting material for potato production.
>
> Highly homozygous inbreds, once amply produced, would be highly useful for the development of TPS varieties with genetic uniformity, as well as for the investigation of heterosis.
>
> A scheme for hybrid breeding using homozygous diploids and subsequent somatic hybridization has been proposed, for which the availability of highly homozygous diploid (or pure) lines is a key for success. In considering the use of pure lines for the development of genetically uniform [true potato seed] varieties, self-fertile, seed-propagated lines are highly desirable, and simple techniques to develop such lines are necessary.

Id., pp. 977-78 (citations omitted).

Admissions on the Record and by the Inventors

The claims read on broad genera of *S. tuberosum* diploid plants, but would all be active in the instant invention? What distinguishes a *S. tuberosum* diploid plant with a 200 gram tuber yield from one without such a high tuber yield. In the specification, Applicant states that

> It is often stated that repeated selfings in diploid potato will only result in weak plants due to inbreeding depression. This should be due to

> numerous deleterious alleles that reduce plant fitness, when these alleles are homozygously present. Therefore, we tested the segregation of 36 markers in the six F3 populations mentioned (see Figure 5).

Spec., p. 60. As discussed above, Applicant summarizes the result of the study as identifying some potentially, deleterious alleles, one of which is "very" deleterious, almost lethal. *Id*.

The declaration by Mr. Lindhout dated 15 August 2016 and supporting letters document how unique the potato lines used for the instant invention are. For example, one of the letters supporting Dr. Lindhout's declaration, by Dr. J.D.G. Jones states that

> "[I]n the mid 2000s we attempted to produce hybrid potato ourselves. . . . However, we never succeeded in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing. . . . We considered that this was due to our inability to cross the Sli- self-compatibility locus into good enough or diverse enough diploid *Solanum* germplasm.

Letter from Dr. Jonathan D.G. Jones (2012), p. 1 (appended to Decl. of Dr. Lindhout 15 August 2016, ("Decl. (2016)")) (underlining added).

In his declaration, Dr. Lindhout summarizes the background art prior to the claimed invention. Decl. (2016), pp. 3-4. In particular, Dr. Lindhout states that

> That as soon as a genotype becomes homozygous for negative alleles of which the negative is not compensated by functional paralogues, such genotypes might show very poor performance and low viability;
> That inbreeding depression is manifested as a reduced fitness with a loss in both yield and fertility;
> That inbreeding depression is mainly due to the presence of many (semi) lethal alleles, and alleles with a deleterious effect, that become visible more frequently at the diploid level when the maximum number of possible alleles is reduced from four to two, resulting in homozygosity of such alleles.
> That the chance of obtaining a progeny plant, by crossing different genotypes, which is not suffering from inbreeding depression in potato is infinitesimally small, and that starting from a heterozygous diploid potato

> genotypes, the chance of identifying a plant without homozygous deleterious alleles is, in practice, impossible . . .

Decl. (2016), p. 4.

In a similar vein, in a paper filed with the EPO, Applicant also asserts that "every expert in the field can confirm that due to inbreeding depression, the chances of successfully attaining the plant of the invention are close to zero. Hence, the production of such plants is generally considered impossible." EPO Publication No. EP 2 493 286 A2, Remarks to EPO (21 Dec. 2012), p. 8.

Furthermore, on 15 December 2011, approximately two years after the filing date of the instant application, Lindhout et al. published a paper in the Potato Research journal which appears to correspond to the experiments set forth in the instant examples (all five inventors are listed as authors on the paper). Lindhout et al., Potato Res 54:301-12 (2011). The discussion in the paper is instructive. For example, Lindhout et al. describes that

> As a consequence of the high level of unfavourable alleles, techniques aimed at developing homozygotes in one step, although successful as a technology in various crops, certainly do not generate vigorous homozygous potatoes. For instance, if 20 of the 39,000 protein-encoding genes (PGSC 2011) on the potato genome harbor alleles causing severe fitness reduction, the chance to generate vigorous diploid selfed progenies without homozygous unfavourable loci from a parent genotype, that is heterozygous for these 20 loci, is only 0.3%.

Id., p. 303. Lindhout et al. concludes that "inbred lines were developed that combined self-compatibility with good agronomic performance. Although the number of such plants is still low, the progress made in this breeding programme is significant." *Id.*, p. 304. As a possible reason for success, *Id.* offers "lethal alleles do not occur at high

frequency in our diploid potato germplasm. Lindhout et al., pp. 308-09. The authors continue that

> there are many loci with minor effects involved in these traits (Quantitative Trait Locus, QTL). Our current research focuses on identifying the crucial QTLs for these traits. The results will be applied in breeding and allow to increase efficiencies by using diagnostic markers for these traits.

Id., p. 309.

Conclusion

Applicant's deposited lines are described and novel. However, in view of the above, especially including Applicant's assertion that "the production of such plants is generally considered impossible," there is nothing in the claims to distinguish Applicant's deposited lines from other *S. tuberosum* lines which fall outside the scope of the claimed tuber yield except for the tuber yield. Yet the claims read on a broad genus *S. tuberosum* lines, provided they have a yield of 200 g per plant and have the *Sli* gene. One of ordinary skill in the art is given no criteria in the claims to distinguish an "impossible" plant from and "possible" plant such as found in Applicant's deposited lines. Applicant fails to describe any distinguishing structure that is necessary and/or sufficient for the instant invention.

Therefore Applicant's invention appears to require both the *Sli* gene as represented by the deposits and other specific *S. tuberosum* diploid plants that are not described except potentially by reference to the deposit. Applicant fails to describe working examples of the broad genus of any other *S. tuberosum* lines, which, if combined with the *Sli* gene, that fall within the scope of the claims. Applicant only describes one *Sli* gene donor line together with only a few diploid donor lines by

deposits. Thus, Applicant fails to describe a representative number of species in comparison to the size of the genus claimed. The claims also fail to require any structure / function relationship that may be necessary and/or sufficient for a potato line to successfully be included in the claimed genus.

The specification therefore fails to provide an adequate written description to support the breadth of the claims. Applicant has not demonstrated possession to one of skill in the art of the instant invention as broadly as claimed at the time of filing. Thus one of skill in the art would not believe Applicant to be in possession of the genus as broadly as claimed especially in view of the discussion of the art by, e.g., Applicant before the EPO and the letter of Dr. Jones.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection.

Applicant's Arguments

Applicant traverses the rejection on pages 13-14 of the response filed on 19 May 2017. Applicant interprets the rejection of record as "[depriving] the Applicant of the useful protection sought out of this invention" and that Applicant's interpretation would be "unfair." *Id.*

Response to Applicant's Arguments

Applicant's arguments fail to address the rejection of record concerning the scope of the claims other than by citing to Dr. Lindhout's declaration dated 8 May 2017.

In the most recent declaration, after introductory remarks, Dr. Lindhout begins the argument in paragraph 12. Dr. Lindhout first disputes Dr. Jones' understanding of

the "gist" of the invention. However, Dr. Lindhout submitted the letter in support of Dr. Lindhout's previous declaration. It is disingenuous to now assert that Dr. Jones does not understand the "gist" of the instant invention. Furthermore, Dr. Lindhout fails to address Dr. Koornneef's letter.

Dr. Lindhout states that the Office is interpreting the invention too narrowly. Decl. (2016), para. 12, 1st line. The invention, however, is not being interpreted. At issue are the pending claims and the claims being examined are extremely broad. The scope of the claims, not the scope of the invention, is the issue in the instant rejection.

Regarding Dr. Lindhout's assertion about "luck" and "unpredictability" (para. 12), the word "luck" does not appear in the Office action mailed on 21 February 2017. Unpredictability is not an issue under the written description rejection, just under the enablement rejection. Therefore the assertion is moot under the context of the written description rejection.

Dr. Lindhout sets forth how the lines represented by D1, D2 and D3 were not selected. *Id.* Dr. Lindhout, however, does not teach any positive steps in how the lines were selected. The claims fail to distinguish between plants falling within the scope of the claimed genus and plants falling outside the scope of the claimed genus, nor do the claims require any specific structure, except for tuber yield.

Dr. Lindhout then states that "other factors [are] at play to arrive at a diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* plant." With all due respect to Dr. Lindhout, the pending claims are being examined. There is no limitation in the pending claims directed at "other factors." "It is improper to import claim

limitations from the specification" into the claims. MPEP § 2111.01(II). "Though understanding the claim language may be aided by explanations contained in the written description, it is important not to import into a claim limitations that are not part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment." *Id.*, (quoting *Superguide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875, 69 USPQ2d 1865, 1868 (Fed. Cir. 2004)).

Turning to the Federal Circuit, in the *Ariad* decision, the Federal Circuit considered the written description requirement. In the decision, the court focused on the size of the genus and the number of examples described.

> [A] generic claim may define the boundaries of a vast genus of chemical compounds, and yet the question may still remain whether the specification, including original claim language, demonstrates that the applicant has invented species sufficient to support a claim to a genus. The problem is especially acute with genus claims that use functional language to define the boundaries of a claimed genus. In such a case, the functional claim may simply claim a desired result, and may do so without describing species that achieve that result. But the specification must demonstrate that the applicant has made a generic invention that achieves the claimed result and do so by showing that the applicant has invented species sufficient to support a claim to the functionally-defined genus…
> [M]erely drawing a fence around the outer limits of purposed genus is not an adequate substitute for describing a variety of materials constituting the genus and showing that one has invented a genus and not just a species.

Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 94 USPQ2d 1161, 1171 (Fed. Cir. 2010). Here, with the claims reading on a broad genera claimed of arguably all diploid *S. tuberosum* plants with a tuber yield of 200 g per plant but with only a few species described and with no associated structure described, Applicant fails to provide

adequate written description for the pending claims. The *Ariad* court considered functional language, but still found that the written description requirement requires a sufficient number of actual invented species sufficient to support the claimed genera. Based on the claims and on Dr. Lindhout's most recent declaration, Applicant is effectively claiming all *S. tuberosum* plants that will function in the instant invention. Applicant fails to describe a sufficient number of species to provide written description for the genus as broadly as claimed.

Therefore the declaration of Dr. Lindhout under 37 CFR 1.132 filed 8 May 2017 is insufficient to overcome the rejections of the above claims as set forth in the last Office action and as set forth above. In fact, neither Applicant's arguments not Dr. Lindhout's declaration addressed the written description rejection, i.e., the number of species compared to the claimed genus nor any structures necessary and/or sufficient for the claimed invention.

Claim Rejections - 35 USC § 112 / scope of enablement

10 Claims 1, 3-6, 8-9, 12-13, 16, 18, 20, 22-25, 27-32, 34, and 36-39 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, because the specification, while being enabling for the deposited cell lines, does not reasonably provide enablement for forms of self-compatibility as broadly as claimed. The specification does not enable any person skilled in the art to which it pertains, or with

which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The above claims were rejected in the Office action mailed 21 February 2017. Applicant traverses the rejection of record in the RCE filed 19 May 2017. Applicant's arguments have been fully considered but are not persuasive.

The invention features plants with novel characteristics. Since these plant characteristics are essential to the claimed invention they must be obtainable by a repeatable method set forth in the specification or otherwise be readily available to the public. If such a plant is not so obtainable or available, the requirements of 35 USC § 112 may be satisfied by a deposit of the seeds. Deposits under NCIMB accession numbers 41663, 41664, 41665 and 41765 were made and the deposits were perfected. However the claims are not drawn solely to the deposits.

The Claims

Claim 1 is drawn to a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato line, where said potato line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams; wherein at least 50% of loci in said plant are homozygous, wherein self-compatibility originating from *S. chacoense* and is referred to as a S-locus inhibitor (*Sli*) gene as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765, and wherein at least 25% of the plants of said line produce seed-

carrying berries. Applicant defines the claim limitation "essentially homozygous" (e.g., claim 1, line 1) as reflecting a level of homozygosity that is above 25% or preferably 75%. *Id.*, pp. 30-31; see also p. 21.

Dependent claims are drawn to properties of the potato line (claims 3 and 4); and a plant line of claim 1, or a seed or tuber of the plant (claims 5 and 6). Claim 39 requires that the plant of claim 1 has at least 75% homozygous loci.

Claim 32 reads on a set of two homozygous diploid, fertile, self-compatible and essentially homozygous potato lines according to claim 1 wherein each of said lines differ from the other line in the set by having at least 20% contrasting homozygous loci as determined by molecular genetic marker analysis; and wherein at least 50% of loci in said plants are homozygous. Claim 37 reads on a tetraploid line derived from the plant of claim 5 and claim 38 reads on a plant of the line of claim 37. Claim 29 is drawn to a method using either the plant of claim 5 (a diploid plant) or the plant of claim 38 (a tetraploid plant).

Claim 8 is a method claim drawn to producing a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato line, wherein said line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising a plant having a tuber yield expressed in grams of fresh weight of at least 200 grams, comprising:

(a) providing a first potato plant, which first potato plant is a plant of a diploid, fertile, self-compatible and essentially homozygous potato line obtained by selfing a plant of diploid, self-compatible potato line for at least 3 times while selecting for plants that

produce fertile offspring, wherein said self-compatibility originates from the *Sli* gene as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765 to thereby provide a first potato plant of a first diploid, self-compatible, fertile and essentially homozygous potato line,

(b) providing a second potato plant, wherein said second potato plant is a plant of a *S. tuberosum* diploid potato line which may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum* said potato line which may have any level of homozygosity, said line of said second potato plant comprising plants having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant;

(c) cross-pollinating said first potato plant and second potato plant to provide a seed and collecting said seed to thereby provide a hybrid offspring seed;

(d) growing a multiplicity of said hybrid offspring seed into a population of hybrid offspring potato plants and selecting from said population plants producing tubers at a yield expressed in grams of fresh weight of at least 200 grams per plant, and

(e) selfing said hybrid offspring potato plants or backcrossing said hybrid offspring potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses, and selecting for plants that produce fertile offspring, to thereby provide a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato breeding line which may comprise minor introgression segments of other tuber

bearing *Solanum* species crossable to *S. tuberosum*, said potato line comprising plant having a tuber yield expressed in grams of fresh weight of at least 200 grams; and wherein at least 50% of loci in the plant provided in step (e) are homozygous.

Dependent claims are drawn to properties of the potato line (claims 9 and 12-13); and where the method uses as a first potato plant one of four deposited lines (claim 11) (not included in this rejection).

Claim 16 is a method claim drawn to producing a uniform hybrid potato seed starting with a first plant from a diploid, fertile, self-compatible and essentially homozygous *S. tuberosum* potato line that may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *S. tuberosum*, said first potato plant having an average tuber yield expressed in grams of fresh weight of at least 200 grams per plant and wherein at least 50% of the loci are homozygous and wherein said self-compatibility originates from *S. chacoense* and is referred to as a S-locus inhibitor (*Sli*) gene as present in a plant of potato lines NCIMB accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, or NCIMB accession number 41765; and crossing the first plant with a second plant with the same or similar recited limitations.

Claim 21, not rejected under 35 USC 112(a), is an independent claim drawn to a seed of one of the deposited lines.

Dependent claims are drawn to properties of the potato line (claims 18 and 20); where the method uses as a first potato plant one of four deposited lines (claim 19 (not included in this rejection); a seed produced by the claimed method (claim 22); and a

plant or part thereof produced from the seed of claim 22 (claims 23-25); a tissue culture of the plant of claim 23 and a plant produced from this tissue culture (claims 27-28); and a method using the seed to produce a plant (claim 30) as well as a plant thus produced or a tuber thereof (claim 31).

Claims 34 and 35 are independent claims. Claim 34 reads on hybrid potato seed produced by a plant where the plant is obtained by a method similar to, e.g. claim 16; and claim 35 reads on a method for producing a diploid, fertile, self-compatible and essentially homozygous potato line using a method similar to, e.g. claim 16, with one of the deposited lines used as the first plant; claim 35 is not included in this rejection.

Claim 36 depends from claims 6, 25 or 31 and reads on, e.g., a food product.

The Scope of the Claims

As noted above, the rejected claims are not limited to the deposited accessions. In contrast to four deposited lines the claimed genus is quite large. For example, the claim encompass the genus set forth in the following exemplary claims:

for claim 1, which is a composition claim drawn to a plant, and claim 16, which uses such a plant in a method – the claimed genus includes any diploid, fertile, self-compatible and essentially homozygous *Solanum tuberosum* potato line, [where] said potato line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* with certain recited characteristics, wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

Claim 8 – a plant of a diploid, fertile, self-compatible and essentially homozygous

Solanum tuberosum potato line where the line may comprise minor introgression segments of other tuber-bearing *Solanum* species crossable to *Solanum tuberosum* obtained by selfing wherein the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765.

Furthermore, various claims recite the recite the limitation "minor introgression segments of other tuber bearing *Solanum* species crossable to *Solanum tuberosum*." Applicant fails to describe what constitutes "minor" introgression segments and there is no evidence that one of skill in the art would understand the scope of the limitation. For example, in a 2014 review Spooner et al. teaches that the line between *S. tuberosum* and other *Solanum* species is not well defined. Spooner et al., Bot Rev 80:283-383 (2014). The Spooner et al. review states that "[h]undreds of successful interspecific hybrids have been reported in the literature" and that "the biological concept of a species is difficult to apply to potatoes." Spooner et al., p. 303 & see also pp. 303-18, Table 1, and pp. 286-94. Similarly, Veilleux teaches that "*Solanum phureja* is a diploid (2n=2x=24), primitive cultivated species that has little genetic distinction from and is completely cross compatible with *S. tuberosum*." Veilleux, Sol CAP News 3(2):4-4 (2011), p. 4.

Further the claims largely require that the self-compatibility originates from *S. chacoense* and is as present in a plant of potato line deposited with NCIMB accession numbers 41663, 41664, 41665, or 41765. This, however, does not require that the self-compatibility is the same self-compatibility that is found in one of the deposited lines.

Applicant fails to define the precise scope of "as present." It is well-accepted that the meaning of "as" includes "for instance" and thus the claims also read on other embodiments of self-compatibility with the deposited lines merely representing particular embodiments. Merriam-Webster, "as", accessed 2 December 2016. In particular, Applicant fails to teach any structure associated with the claimed self-compatibility, such as the gene(s) required or the sequences of the gene(s).

The Federal Circuit in *In re Wands* lists eight considerations for determining whether or not undue experimentation would be necessary to practice an invention. *In re Wands*, 858 F2d 731, 8 USPQ2d 1400, 1406 (Fed. Cir. 1988). These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claims. *Id.*

Applicant's Teachings

In the specification, Applicant teaches a breeding process according to the instant invention starting with a self-compatible line, e.g. AGVD 1-3 or AGVD17. *Id.*, p. 37. Applicant teaches that "[n]o or at least little, attention is paid to the agronomical appearance of the plants at this stage." *Id.* One aspect of the breeding steps taught by the specification includes the possibility of adding a desired trait, such as vigor. *Id.*, p. 38. After adding such a trait, the hybrid is backcrossed to the self-compatible line while selecting for, e.g. vigor. *Id.* After adding numerous traits, and performing test crosses,

inbred elite diploid breeding lines can be obtained which can be used to produce commercially valuable hybrids. *Id.* Applicant reviews the steps: develop a "a vigorous fertile homozygous self-compatible diploid potato line;" "a diploid breeding line;" and then an "elite diploid potato breeding line." *Id.*, p. 40. On page 43, Applicant concludes that "[t]he above method now provides a breeding process for the production of homozygous breeding lines or elite breeding lines based on the background of population AGVD1, AGVD2, AGVD3 or AGVDI7, to which background successively additional alleles are added, thereby providing elite breeding lines wherein desirable traits are stacked." *Id.*, p. 43.

In describing the experiment that underlie the claimed invention, Applicant teaches obtaining the IVP07-1001/4 line from publically available germplasm where the IVP07-1001/4 plants contained the Sli gene after repeated selfing in Example 1. Spec., p. 44. Applicant cites to the 2006 Euphytica publication by Phumichai et al. (Euphytica 148:227-34 (2006)) as well as the 2005 Genome publication by Phumichai et al. Genome 48:977-94 (2005)) regarding the source of the *Sli* gene. *Id.*, p. 44 & p. 57 Applicant teaches that these plants are of no commercial value. *Id.* Applicant crossed these plants to three different diploid donor lines, D1-3, in order to acquire commercially valuable traits carried by the donor lines. *Id.*, pp. 44-45. The F1 cross with D1 was selfed and the progeny deposited as AGVD1, which was estimated as 50% homozygous. *Id.*, p. 45. The F1(D1) was crossed with F1(D2) and the progeny deposited under AGVD2, and this was estimated to be 25% homozygous with respect to alleles originating from IVP07-1001/4. *Id.* The F1(D1) was backcrossed to obtain

progeny 25% homozygous with respect to alleles originating from IVP07-1001/4; these were deposited as AGVD3. *Id.*

In Example 2, Applicant teaches crossing the Sli gene donor with various publically available potato clones designated: IVP97-079-9, IVPAA-096-I8 and SH83-92-488 to generate clones D1, D2 and D3. *Id.*, p. 47. Applicant teaches this created a diploid trait donor lines containing the Sli gene with enhanced agricultural quality. *Id.*, pp. 46-50. Applicant provides a more detailed description of the potato lines used in Table 6. *Id.*, pp. 57-58.

Applicant teaches creating a molecular marker platform, i.e. SNPs, in Example 3. *Id.*, pp. 50-58.

In Example 4, Applicant teaches the development of homozygous diploid potato plants and then F1 hybrid progeny, as well as subsequent generations. *Id.*, pp. 58-62. Applicant teaches that it is "often stated" that potatoes are very prone to inbreeding depression. *Id.*, p. 60. A cause of this might be deleterious alleles; Applicant potentially identified a few such deleterious alleles, with one allele almost being lethal. *Id.*

Applicant concludes, on page 62, that

> It was found that after two generations of selfings homozygous diploid potato plants were obtained comprising alleles from both parents. Not a single marker out of 36 markers tested provided proof for a lethal allele. Furthermore, plants with more than 84% homozygous loci can be successfully crossed to obtain hybrid plants with at least five heterozygous chromosome regions. This means that hybrid seeds that are essentially uniform and that represent true potato seed have now been produced.

Id., p. 62.