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Application Number: 11938483 Document Date: 11/12/2007

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Form Revision Date: February 8, 2006

Inari Exhibit 1094
Inari v. Corteva
IPR2024-01014

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 11938483 Document Date: 11/12/2007

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Form Revision Date: February 8, 2006

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. 1.53(b))

Attorney Docket No.	1895D9
First Inventor	James Wayne Bing
Title	Corn Event DAS-59122-7 and methods for Detection Thereof
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form (e.g., PTO/SB/17)**
   (Submit an original and a duplicate for fee processing)
2. ☐ **Applicant claims small entity status.**
   See 37 CFR 1.27.
3. ☒ **Specification** [*Total Pages* 43]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ **Drawing(s)** (*35 U.S.C.113*) [*Total Sheets* 7]
5. **Oath or Declaration** [*Total Sheets* 13]
   a. ☐ Newly executed (original or copy)
   b. ☒ Copy from a prior application (37 CFR 1.63 (d))
   (for a continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☒ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   (if applicable, items a.-c. are required)
   a. Computer Readable Form (CRF)
      i. ☒ Computer Readable Form (CRF)
      ii. ☐ Transfer Request (37 CFR 1.821(e))
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☒ Statements verifying identity of above copies

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Alexandria VA 22313-1450

ACCOMPANYING APPLICATIONS PARTS

9. ☐ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee _____
10. ☐ **37 C.F.R. 3.73(b) Statement** ☐ **Power of Attorney**
    (when there is an assignee)
11. ☐ **English Translation Document** *(if applicable)*
12. ☒ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of foreign patent documents, publications & other information
13. ☐ **Preliminary Amendment**
14. ☐ **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. ☐ **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. ☒ Other: Filing of an Information Disclosure Statement; Statement regarding sequences; Statement Appendices

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☒ Divisional ☐ Continuation-in-part (CIP) of prior application No: 11 / 237,222

Prior application information: *Examiner* Kubilek, Anne R. *Art Unit:* 1638

19. CORRESPONDENCE ADDRESS

☒ The address associated with Customer Number 27310 *OR* ☐ Correspondence address below

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Signature	/Claire L. Moxon/		Date	Nov. 12, 2007	
Name (Print/Type)	Claire L. Moxon			*Registration No. (Attorney/Agent)*	57,557

This collection of information is required by 37 CFR 1.53(b). 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Patent Application, 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.

CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

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CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional of U.S. Serial. No. 11/237,222 filed September 28, 2005, which claims the benefit of U.S. Provisional Application Serial No. 60/614,225, filed September 29, 2004, the contents of which are herein incorporated by reference in their entirety.

FIELD OF INVENTION

Embodiments of the present invention relate to the field of plant molecular biology, specifically an embodiment of the invention relates to a DNA construct for conferring insect resistance to a plant. Embodiments of the invention more specifically relate to an insect resistant corn plant DAS-59122-7 and to assays for detecting the presence of corn plant DAS-59122-7 DNA in a sample and compositions thereof.

BACKGROUND OF INVENTION

An embodiment of this invention relates to the insect resistant corn (*Zea mays*) plant DAS-59122-7, also referred to as maize line DAS-59122-7 or maize event DAS-59122-7, and

to the DNA plant expression construct of corn plant DAS-59122-7 and the detection of the transgene/flanking insertion region in corn plant DAS-59122-7 and progeny thereof.

Corn is an important crop and is a primary food source in many areas of the world. Damage caused by insect pests is a major factor in the loss of the world's corn crops, despite the use of protective measures such as chemical pesticides. In view of this, insect resistance has been genetically engineered into crops such as corn in order to control insect damage and to reduce the need for traditional chemical pesticides. One group of genes which have been utilized for the production of transgenic insect resistant crops are the delta-endotoxins from *Bacillus thuringiensis (B.t.)*. Delta-endotoxins have been successfully expressed in crop plants such as cotton, potatoes, rice, sunflower, as well as corn, and have proven to provide excellent control over insect pests. (Perlak, F.J *et al.* (1990) *Bio/Technology* 8, 939-943; Perlak, F.J. *et al.* (1993) *Plant Mol. Biol.* 22: 313-321; Fujimoto H. *et al.* (1993) *Bio/Technology* 11: 1151-1155; Tu *et al.* (2000) *Nature Biotechnology* 18:1101-1104; PCT publication number WO 01/13731; and Bing JW *et al.* (2000) Efficacy of Cry1F Transgenic Maize, 14th Biennial International Plant Resistance to Insects Workshop, Fort Collins, CO).

The expression of foreign genes in plants is known to be influenced by their location in the plant genome, perhaps due to chromatin structure (e.g., heterochromatin) or the proximity of transcriptional regulatory elements (e.g., enhancers) close to the integration site (Weising *et al.*, *Ann. Rev. Genet* 22:421-477, 1988). At the same time the presence of the transgene at different locations in the genome will influence the overall phenotype of the plant in different ways. For this reason, it is often necessary to screen a large number of events in order to identify an event characterized by optimal expression of an introduced gene of interest. For example, it has been observed in plants and in other organisms that there may be a wide variation in levels of expression of an introduced gene among events. There may also be differences in spatial or temporal patterns of expression, for example, differences in the relative expression of a transgene in various plant tissues, that may not correspond to the patterns expected from transcriptional regulatory elements present in the introduced gene construct. For this reason, it is common to produce hundreds to thousands of different events and screen those events for a single event that has desired transgene expression levels and patterns for commercial purposes. An event that has desired levels or patterns of transgene expression is useful for introgressing the transgene into other genetic backgrounds by sexual outcrossing using conventional breeding methods. Progeny of such crosses maintain the transgene

expression characteristics of the original transformant. This strategy is used to ensure reliable gene expression in a number of varieties that are well adapted to local growing conditions.

It would be advantageous to be able to detect the presence of a particular event in order to determine whether progeny of a sexual cross contain a transgene of interest. In addition, a method for detecting a particular event would be helpful for complying with regulations requiring the pre-market approval and labeling of foods derived from recombinant crop plants, for example, or for use in environmental monitoring, monitoring traits in crops in the field, or monitoring products derived from a crop harvest, as well as for use in ensuring compliance of parties subject to regulatory or contractual terms.

It is possible to detect the presence of a transgene by any nucleic acid detection method known in the art including, but not limited to, the polymerase chain reaction (PCR) or DNA hybridization using nucleic acid probes. These detection methods generally focus on frequently used genetic elements, such as promoters, terminators, marker genes, etc., because for many DNA constructs, the coding region is interchangeable. As a result, such methods may not be useful for discriminating between different events, particularly those produced using the same DNA construct or very similar constructs unless the DNA sequence of the flanking DNA adjacent to the inserted heterologous DNA is known. For example, an event-specific PCR assay is described in U.S. Patent No. 6,395,485 for the detection of elite event GAT-ZM1. Accordingly, it would be desirable to have a simple and discriminative method for the identification of event DAS-59122-7.

SUMMARY OF INVENTION

Embodiments of this invention relate to methods for producing and selecting an insect resistant monocot crop plant. More specifically, a DNA construct is provided that when expressed in plant cells and plants confers resistance to insects. According to one aspect of the invention, a DNA construct, capable of introduction into and replication in a host cell, is provided that when expressed in plant cells and plants confers insect resistance to the plant cells and plants. The DNA construct is comprised of a DNA molecule named PHI17662A and it includes three (3) transgene expression cassettes. The first expression cassette comprises a DNA molecule which includes the promoter, 5' untranslated exon, and first intron of the maize ubiquitin (Ubi-1) gene (Christensen *et al.* (1992) *Plant Mol. Biol.* 18:675-689 and Christensen

and Quail (1996) *Transgenic Res*. 5:213-218) operably connected to a DNA molecule encoding a *B.t.* δ-endotoxin identified as Cry34Ab1 (U.S. Pat. Nos. 6,127,180, 6,624,145 and 6,340,593) operably connected to a DNA molecule comprising a Pin II transcriptional terminator isolated from potato (Gyheung An *et al.* (1989) *Plant Cell.* 1:115-122). The second transgene expression cassette of the DNA construct comprises a DNA molecule encoding the wheat peroxidase promoter (Hertig *et al.* (1991) *Plant Mol. Biol.* 16:171-174) operably connected to a DNA molecule encoding a *B.t.* δ-endotoxin identified as Cry35Ab1 (U.S. Pat. Nos. 6,083,499, 6,548,291 and 6,340,593) operably connected to a DNA molecule comprising a Pin II transcriptional terminator isolated from potato (Gyheung An *et al.* (1989) *Plant Cell.* 1:115-122). The third transgene expression cassette of the DNA construct comprises a DNA molecule of the cauliflower mosaic virus (CaMV) 35S promoter (Odell J.T. *et al.* (1985) *Nature* 313: 810-812; Mitsuhara *et al.* (1996) *Plant Cell Physiol.* 37: 49-59) operably connected to a DNA molecule encoding a phosphinothricin acetyltransferase (PAT) gene (Wohlleben W. *et al.* (1988) *Gene* 70: 25-37) operably connected to a DNA molecule comprising a 3' transcriptional terminator from (CaMV) 35S (see Mitsuhara *et al.* (1996) *Plant Cell Physiol.* 37: 49-59). Plants containing the DNA construct are also provided.

According to another embodiment of the invention, compositions and methods are provided for identifying a novel corn plant designated DAS-59122-7, which methods are based on primers or probes which specifically recognize the 5' and/or 3' flanking sequence of DAS-59122-7. DNA molecules are provided that comprise primer sequences that when utilized in a PCR reaction will produce amplicons unique to the transgenic event DAS-59122-7. These molecules may be selected from the group consisting of:

5'-GTGGCTCCTTCAACGTTGCGGTTCTGTC-3' (SEQ ID NO: 1);

5'-CGTGCAAGCGCTCAATTCGCCCTATAGTG-3' (SEQ ID NO: 2);

5'-AATTGAGCGCTTGCACGTTT-3' (SEQ ID NO: 3);

5'-AACAACAAGACCGGCCACACCCTC-3' (SEQ ID NO: 4);

5'-GAGGTGGTCTGGATGGTGTAGGTCA-3' (SEQ ID NO: 5);

5'-TACAACCTCAAGTGGTTCCTCTTCCCGA-3' (SEQ ID NO: 6);

5'-GAGGTCTGGATCTGCATGATGCGGA-3' (SEQ ID NO: 7);

5'-AACCCTTAGTATGTATTTGTATT-3' (SEQ ID NO: 8);

5'-CTCCTTCAACGTTGCGGTTCTGTCAG-3' (SEQ ID NO: 9);

5'-TTTTGCAAAGCGAACGATTCAGATG-3' (SEQ ID NO: 10);

5'-GCGGGACAAGCCGTTTTACGTTT-3' (SEQ ID NO: 11);
5'-GACGGGTGATTTATTTGATCTGCAC-3' (SEQ ID NO: 12);
5'-CATCTGAATCGTTCGCTTTGCAAAA-3' (SEQ ID NO: 13);
5'-CTACGTTCCAATGGAGCTCGACTGTC-3' (SEQ ID NO: 14);
5'-GGTCAAGTGGACACTTGGTCACTCA-3' (SEQ ID NO: 15);
5'-GAGTGAAGAGATAAGCAAGTCAAAG-3' (SEQ ID NO: 16);
5'-CATGTATACGTAAGTTTGGTGCTGG-3' (SEQ ID NO: 17);
5'-AATCCACAAGATTGGAGCAAACGAC-3' (SEQ ID NO: 18)
5'-CGTATTACAATCGTACGCAATTCAG-3' (SEQ ID NO: 36);
5'-GGATAAACAAACGGGACCATAGAAG-3' (SEQ ID NO: 37) and complements thereof. The corn plant and seed comprising these molecules is an embodiment of this invention. Further, kits utilizing these primer sequences for the identification of the DAS-59122-7 event are provided.

An additional embodiment of the invention relates to the specific flanking sequences of DAS-59122-7 described herein, which can be used to develop specific identification methods for DAS-59122-7 in biological samples. More particularly, the invention relates to the 5' and/or 3' flanking regions of DAS-59122-7, SEQ ID NO: 19, 5' flanking and SEQ ID NO: 20, 3' flanking, respectively, which can be used for the development of specific primers and probes. A further embodiment of the invention relates to identification methods for the presence of DAS-59122-7 in biological samples based on the use of such specific primers or probes.

According to another embodiment of the invention, methods of detecting the presence of DNA corresponding to the corn event DAS-59122-7 in a sample are provided. Such methods comprise: (a) contacting the sample comprising DNA with a DNA primer set, that when used in a nucleic acid amplification reaction with genomic DNA extracted from corn event DAS-59122-7 produces an amplicon that is diagnostic for corn event DAS-59122-7; (b) performing a nucleic acid amplification reaction, thereby producing the amplicon; and (c) detecting the amplicon.

DNA molecules that comprise the novel transgene/flanking insertion region, SEQ ID NO: 21, 5' flanking plus 1000 internal and SEQ ID NO: 22, 3' flanking plus 1000 internal and are homologous or complementary to SEQ ID NO: 21 and SEQ ID NO: 22 are an embodiment of this invention.

DNA sequences that comprise the novel transgene/flanking insertion region, SEQ ID NO: 21 are an embodiment of this invention. DNA sequences that comprise a sufficient length of polynucleotides of transgene insert sequence and a sufficient length of polynucleotides of maize genomic and/or flanking sequence from maize plant DAS-59122-7 of SEQ ID NO: 21 that are useful as primer sequences for the production of an amplicon product diagnostic for maize plant DAS-59122-7 are included.

In addition, DNA sequences that comprise the novel transgene/flanking insertion region, SEQ ID NO: 22 are provided. DNA sequences that comprise a sufficient length of polynucleotides of transgene insert sequence and a sufficient length of polynucleotides of maize genomic and/or flanking sequence from maize plant DAS-59122-7 of SEQ ID NO: 22 that are useful as primer sequences for the production of an amplicon product diagnostic for maize plant DAS-59122-7 are included.

According to another embodiment of the invention, the DNA sequences that comprise at least 11 or more nucleotides of the transgene portion of the DNA sequence of SEQ ID NO: 21 or complements thereof, and a similar length of 5' flanking maize DNA sequence of SEQ ID NO: 21 or complements thereof are useful as DNA primers in DNA amplification methods. The amplicons produced using these primers are diagnostic for maize event DAS-59122-7. Therefore, embodiments of the invention also include the amplicons produced by DNA primers homologous or complementary to SEQ ID NO: 21.

According to another embodiment of the invention, the DNA sequences that comprise at least 11 or more nucleotides of the transgene portion of the DNA sequence of SEQ ID NO: 22 or complements thereof, and a similar length of 3' flanking maize DNA sequence of SEQ ID NO: 22 or complements thereof are useful as DNA primers in DNA amplification methods. The amplicons produced using these primers are diagnostic for maize event DAS-59122-7. Therefore, embodiments of the invention also include the amplicons produced by DNA primers homologous or complementary to SEQ ID NO: 22.

More specifically, a pair of DNA molecules comprising a DNA primer set, wherein the DNA molecules are identified as SEQ ID NO: 18 or complements thereof and SEQ ID NO: 1 or complements thereof; SEQ ID NO: 2 or complements thereof and SEQ ID NO: 17 or complements thereof; SEQ ID NO: 10 or complements thereof and SEQ ID NO: 9 or complements thereof; SEQ ID NO: 8 or complements thereof and SEQ ID NO: 17 or

complements thereof; and SEQ ID NO: 36 or complements thereof and SEQ ID NO: 37 or complements thereof are embodiments of the invention.

Further embodiments of the invention include the amplicon comprising the DNA molecules of SEQ ID NO: 18 and SEQ ID NO: 1; the amplicon comprising the DNA molecules of SEQ ID NO: 2 and SEQ ID NO: 17; the amplicon comprising the DNA molecules of SEQ ID NO: 10 and SEQ ID NO: 9; the amplicon comprising the DNA molecules of SEQ ID NO: 8 and SEQ ID NO: 17; and the amplicon comprising the DNA molecules of SEQ ID NO: 36 and SEQ ID NO: 37.

Further embodiments of the invention include the following primers, which are useful in detecting or characterizing event DAS-59122-7: SEQ ID NO: 11 or complements thereof; SEQ ID NO: 5 or complements thereof; SEQ ID NO: 4 or complements thereof; SEQ ID NO: 7 or complements thereof; SEQ ID NO: 6 or complements thereof; SEQ ID NO: 3 or complements thereof; SEQ ID NO: 18 or complements thereof; SEQ ID NO: 14 or complements thereof; SEQ ID NO: 13 or complements thereof; SEQ ID NO: 15 or complements thereof; SEQ ID NO: 17 or complements thereof; SEQ ID NO: 16 or complements thereof; and SEQ ID NO: 12 or complements thereof. Further embodiments also include the amplicons produced by pairing any of the primers listed above.

According to another embodiment of the invention, methods of detecting the presence of a DNA molecule corresponding to the DAS-59122-7 event in a sample, such methods comprising: (a) contacting the sample comprising DNA extracted from a corn plant with a DNA probe, molecule that hybridizes under stringent hybridization conditions with DNA extracted from corn event DAS-59122-7 and does not hybridize under the stringent hybridization conditions with a control corn plant DNA; (b) subjecting the sample and probe to stringent hybridization conditions; and (c) detecting hybridization of the probe to the DNA. More specifically, a method for detecting the presence of a DNA molecule corresponding to the DAS-59122-7 event in a sample, such methods, consisting of (a) contacting the sample comprising DNA extracted from a corn plant with a DNA probe molecule that consists of sequences that are unique to the event, e.g. junction sequences, wherein said DNA probe molecule hybridizes under stringent hybridization conditions with DNA extracted from corn event DAS-59122-7 and does not hybridize under the stringent hybridization conditions with a control corn plant DNA; (b) subjecting the sample and probe to stringent hybridization conditions; and (c) detecting hybridization of the probe to the DNA.

In addition, a kit and methods for identifying event DAS-59122-7 in a biological sample which detects a DAS-59122-7 specific region within SEQ ID NO: 23 are provided.

DNA molecules are provided that comprise at least one junction sequence of DAS-59122-7 selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof; wherein a junction sequence spans the junction between heterologous DNA inserted into the genome and the DNA from the corn cell flanking the insertion site, i.e. flanking DNA, and is diagnostic for the DAS-59122-7 event.

According to another embodiment of the invention, methods of producing an insect resistant corn plant that comprise the steps of: (a) sexually crossing a first parental corn line comprising the expression cassettes of the invention, which confers resistance to insects, and a second parental corn line that lacks insect resistance, thereby producing a plurality of progeny plants; and (b) selecting a progeny plant that is insect resistant. Such methods may optionally comprise the further step of back-crossing the progeny plant to the second parental corn line to producing a true-breeding corn plant that is insect resistant.

A further embodiment of the invention provides a method of producing a corn plant that is resistant to insects comprising transforming a corn cell with the DNA construct PHI17662A (SEQ ID NO: 24), growing the transformed corn cell into a corn plant, selecting the corn plant that shows resistance to insects, and further growing the corn plant into a fertile corn plant. The fertile corn plant can be self pollinated or crossed with compatible corn varieties to produce insect resistant progeny.

Another embodiment of the invention further relates to a DNA detection kit for identifying maize event DAS-59122-7 in biological samples. The kit comprises a first primer which specifically recognizes the 5' or 3' flanking region of DAS-59122-7, and a second primer which specifically recognizes a sequence within the foreign DNA of DAS-59122-7, or within the flanking DNA, for use in a PCR identification protocol. A further embodiment of the invention relates to a kit for identifying event DAS-59122-7 in biological samples, which kit comprises a specific probe having a sequence which corresponds or is complementary to, a sequence having between 80% and 100% sequence identity with a specific region of event DAS-59122-7. The sequence of the probe corresponds to a specific region comprising part of the 5' or 3' flanking region of event DAS-59122-7.

The methods and kits encompassed by the embodiments of the present invention can be used for different purposes such as, but not limited to the following: to identify event DAS-

59122-7 in plants, plant material or in products such as, but not limited to, food or feed products (fresh or processed) comprising, or derived from plant material; additionally or alternatively, the methods and kits can be used to identify transgenic plant material for purposes of segregation between transgenic and non-transgenic material; additionally or alternatively, the methods and kits can be used to determine the quality of plant material comprising maize event DAS-59122-7. The kits may also contain the reagents and materials necessary for the performance of the detection method.

A further embodiment of this invention relates to the DAS-59122-7 corn plant or its parts, including, but not limited to, pollen, ovules, vegetative cells, the nuclei of pollen cells, and the nuclei of egg cells of the corn plant DAS-59122-7 and the progeny derived thereof. The corn plant and seed DAS-59122-7 from which the DNA primer molecules provide a specific amplicon product is an embodiment of the invention.

The foregoing and other aspects of the invention will become more apparent from the following detailed description and accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1. DNA sequence (SEQ ID NO: 23) showing the transgenic insert PHI17662A, as well as the sequences flanking the transgenic insert. The 5' and 3' border regions, bp 1 to bp2593 and bp 9937 to bp 11922, respectively, are underlined. Two nucleotide differences (bp 6526 and bp 6562) based on comparison to the transforming plasmid PHP17662 are noted in bold and underlined.

FIG. 2. Schematic diagram of the *B.t.* Cry34/35Ab1 event DAS-59122-7 insert region is divided into three separate sections; the 5' border region with corn genomic DNA, the intact T-DNA insert, and the 3' border region with corn genomic DNA. The two arrows beneath the diagram of the insert indicate the start and end points of the sequence derived from 5' and 3' genome walking fragments. Other boxes beneath the diagram of the insert represent PCR fragments that were amplified from genomic DNA of event DAS-59122-7 and sequenced to cover the intact T-DNA insert and the 5' and 3' insert/border junction regions.

FIG. 3. Schematic diagram of the *B.t.* Cry34/35Ab1 event DAS-59122-7 insert region is divided into three separate sections; the 5' border region with corn genomic DNA, the intact T-DNA insert, and the 3' border region with corn genomic DNA. Boxes beneath the diagram of the insert represent PCR fragments located in either the genomic border regions or across the

5' and 3' junction regions of the T-DNA insert with corn genomic DNA that were amplified from genomic DNA from event DAS-59122-7.

DETAILED DESCRIPTION

The following definitions and methods are provided to better define the present invention and to guide those of ordinary skill in the art in the practice of the present invention. Unless otherwise noted, terms are to be understood according to conventional usage by those of ordinary skill in the relevant art. Definitions of common terms in molecular biology may also be found in Rieger *et al.*, *Glossary of Genetics: Classical and Molecular, 5th edition,* Springer-Verlag; New York, 1991; and Lewin, *Genes V,* Oxford University Press: New York, 1994. The nomenclature for DNA bases as set forth at 37 CFR §1.822 is used.

As used herein, the term "comprising" means "including but not limited to".

As used herein, the term "corn" means *Zea mays* or maize and includes all plant varieties that can be bred with corn, including wild maize species.

As used herein, the term "DAS-59122-7 specific" refers to a nucleotide sequence which is suitable for discriminatively identifying event DAS-59122-7 in plants, plant material, or in products such as, but not limited to, food or feed products (fresh or processed) comprising, or derived from plant material.

As used herein, the terms "insect resistant" and "impacting insect pests" refers to effecting changes in insect feeding, growth, and/or behavior at any stage of development, including but not limited to: killing the insect; retarding growth; preventing reproductive capability; inhibiting feeding; and the like.

As used herein, the terms "pesticidal activity" and "insecticidal activity" are used synonymously to refer to activity of an organism or a substance (such as, for example, a protein) that can be measured by numerous parameters including, but not limited to, pest mortality, pest weight loss, pest attraction, pest repellency, and other behavioral and physical changes of a pest after feeding on and/or exposure to the organism or substance for an appropriate length of time. For example "pesticidal proteins" are proteins that display pesticidal activity by themselves or in combination with other proteins.

"Coding sequence" refers to a nucleotide sequence that codes for a specific amino acid sequence. As used herein, the terms "encoding" or "encoded" when used in the context of a specified nucleic acid mean that the nucleic acid comprises the requisite information to guide

translation of the nucleotide sequence into a specified protein. The information by which a protein is encoded is specified by the use of codons. A nucleic acid encoding a protein may comprise non-translated sequences (e.g., introns) within translated regions of the nucleic acid or may lack such intervening non-translated sequences (e.g., as in cDNA).

"Gene" refers to a nucleic acid fragment that expresses a specific protein, including regulatory sequences preceding (5' non-coding sequences) and following (3' non-coding sequences) the coding sequence. "Native gene" refers to a gene as found in nature with its own regulatory sequences. "Chimeric gene" refers any gene that is not a native gene, comprising regulatory and coding sequences that are not found together in nature. Accordingly, a chimeric gene may comprise regulatory sequences and coding sequences that are derived from different sources, or regulatory sequences and coding sequences derived from the same source, but arranged in a manner different than that found in nature. "Endogenous gene" refers to a native gene in its natural location in the genome of an organism. "Foreign" refers to material not normally found in the location of interest. Thus "foreign DNA" may comprise both recombinant DNA as well as newly introduced, rearranged DNA of the plant. A "foreign" gene refers to a gene not normally found in the host organism, but that is introduced into the host organism by gene transfer. Foreign genes can comprise native genes inserted into a non-native organism, or chimeric genes. A "transgene" is a gene that has been introduced into the genome by a transformation procedure. The site in the plant genome where a recombinant DNA has been inserted may be referred to as the "insertion site" or "target site".

As used herein, "insert DNA" refers to the heterologous DNA within the expression cassettes used to transform the plant material while "flanking DNA" can exist of either genomic DNA naturally present in an organism such as a plant, or foreign (heterologous) DNA introduced via the transformation process which is extraneous to the original insert DNA molecule, e.g. fragments associated with the transformation event. A "flanking region" or "flanking sequence" as used herein refers to a sequence of at least twenty (20) base pair, preferably at least fifty (50) base pair, and up to five thousand (5000) base pair which is located either immediately upstream of and contiguous with or immediately downstream of and contiguous with the original foreign insert DNA molecule. Transformation procedures leading to random integration of the foreign DNA will result in transformants containing different flanking regions characteristic and unique for each transformant. When recombinant DNA is introduced into a plant through traditional crossing, its flanking regions will generally not be

changed. Transformants will also contain unique junctions between a piece of heterologous insert DNA and genomic DNA, or two (2) pieces of genomic DNA, or two (2) pieces of heterologous DNA. A "junction" is a point where two (2) specific DNA fragments join. For example, a junction exists where insert DNA joins flanking DNA. A junction point also exists in a transformed organism where two (2) DNA fragments join together in a manner that is modified from that found in the native organism. "Junction DNA" refers to DNA that comprises a junction point.

As used herein, "heterologous" in reference to a nucleic acid is a nucleic acid that originates from a foreign species, or, if from the same species, is substantially modified from its native form in composition and/or genomic locus by deliberate human intervention. For example, a promoter operably linked to a heterologous nucleotide sequence can be from a species different from that from which the nucleotide sequence was derived, or, if from the same species, the promoter is not naturally found operably linked to the nucleotide sequence. A heterologous protein may originate from a foreign species, or, if from the same species, is substantially modified from its original form by deliberate human intervention.

"Regulatory sequences" refer to nucleotide sequences located upstream (5' non-coding sequences), within, or downstream (3' non-coding sequences) of a coding sequence, and which influence the transcription, RNA processing or stability, or translation of the associated coding sequence. Regulatory sequences may include promoters, translation leader sequences, introns, and polyadenylation recognition sequences.

"Promoter" refers to a nucleotide sequence capable of controlling the expression of a coding sequence or functional RNA. In general, a coding sequence is located 3' to a promoter sequence. The promoter sequence consists of proximal and more distal upstream elements, the latter elements are often referred to as enhancers. Accordingly, an "enhancer" is a nucleotide sequence that can stimulate promoter activity and may be an innate element of the promoter or a heterologous element inserted to enhance the level or tissue-specificity of a promoter. Promoters may be derived in their entirety from a native gene, or be composed of different elements derived from different promoters found in nature, or even comprise synthetic nucleotide segments. It is understood by those skilled in the art that different promoters may direct the expression of a gene in different tissues or cell types, or at different stages of development, or in response to different environmental conditions. Promoters that cause a nucleic acid fragment to be expressed in most cell types at most times are commonly referred

to as "constitutive promoters". New promoters of various types useful in plant cells are constantly being discovered; numerous examples may be found in the compilation by Okamuro and Goldberg (1989) *Biochemistry of Plants* 15:1-82. It is further recognized that since in most cases the exact boundaries of regulatory sequences have not been completely defined, nucleic acid fragments of different lengths may have identical promoter activity.

The "translation leader sequence" refers to a nucleotide sequence located between the promoter sequence of a gene and the coding sequence. The translation leader sequence is present in the fully processed mRNA upstream of the translation start sequence. The translation leader sequence may affect numerous parameters including, processing of the primary transcript to mRNA, mRNA stability and/or translation efficiency. Examples of translation leader sequences have been described (Turner and Foster (1995) *Mol. Biotechnol.* 3:225-236).

The "3' non-coding sequences" refer to nucleotide sequences located downstream of a coding sequence and include polyadenylation recognition sequences and other sequences encoding regulatory signals capable of affecting mRNA processing or gene expression. The polyadenylation signal is usually characterized by affecting the addition of polyadenylic acid tracts to the 3' end of the mRNA precursor. The use of different 3' non-coding sequences is exemplified by Ingelbrecht *et al.* (1989) *Plant Cell* 1:671-680.

A "protein" or "polypeptide" is a chain of amino acids arranged in a specific order determined by the coding sequence in a polynucleotide encoding the polypeptide.

A DNA construct is an assembly of DNA molecules linked together that provide one or more expression cassettes. The DNA construct may be a plasmid that is enabled for self replication in a bacterial cell and contains various endonuclease enzyme restriction sites that are useful for introducing DNA molecules that provide functional genetic elements, i.e., promoters, introns, leaders, coding sequences, 3' termination regions, among others; or a DNA construct may be a linear assembly of DNA molecules, such as an expression cassette. The expression cassette contained within a DNA construct comprise the necessary genetic elements to provide transcription of a messenger RNA. The expression cassette can be designed to express in prokaryote cells or eukaryotic cells. Expression cassettes of the embidoments of the present invention are designed to express in plant cells.

The DNA molecules of embodiments of the invention are provided in expression cassettes for expression in an organism of interest. The cassette will include 5' and 3'

regulatory sequences operably linked to a coding sequence. "Operably linked" means that the nucleic acid sequences being linked are contiguous and, where necessary to join two protein coding regions, contiguous and in the same reading frame. Operably linked is intended to indicate a functional linkage between a promoter and a second sequence, wherein the promoter sequence initiates and mediates transcription of the DNA sequence corresponding to the second sequence. The cassette may additionally contain at least one additional gene to be cotransformed into the organism. Alternatively, the additional gene(s) can be provided on multiple expression cassettes or multiple DNA constructs.

The expression cassette will include in the 5' to 3' direction of transcription: a transcriptional and translational initiation region, a coding region, and a transcriptional and translational termination region functional in the organism serving as a host. The transcriptional initiation region (*i.e.*, the promoter) may be native or analogous, or foreign or heterologous to the host organism. Additionally, the promoter may be the natural sequence or alternatively a synthetic sequence. The expression cassettes may additionally contain 5' leader sequences in the expression cassette construct. Such leader sequences can act to enhance translation.

It is to be understood that as used herein the term "transgenic" includes any cell, cell line, callus, tissue, plant part, or plant, the genotype of which has been altered by the presence of a heterologous nucleic acid including those transgenics initially so altered as well as those created by sexual crosses or asexual propagation from the initial transgenic. The term "transgenic" as used herein does not encompass the alteration of the genome (chromosomal or extra-chromosomal) by conventional plant breeding methods or by naturally occurring events such as random cross-fertilization, non-recombinant viral infection, non-recombinant bacterial transformation, non-recombinant transposition, or spontaneous mutation.

A transgenic "event" is produced by transformation of plant cells with a heterologous DNA construct(s), including a nucleic acid expression cassette that comprises a transgene of interest, the regeneration of a population of plants resulting from the insertion of the transgene into the genome of the plant, and selection of a particular plant characterized by insertion into a particular genome location. An event is characterized phenotypically by the expression of the transgene. At the genetic level, an event is part of the genetic makeup of a plant. The term "event" also refers to progeny produced by a sexual outcross between the transformant and another variety that include the heterologous DNA. Even after repeated back-crossing to a

recurrent parent, the inserted DNA and flanking DNA from the transformed parent is present in the progeny of the cross at the same chromosomal location. The term "event" also refers to DNA from the original transformant comprising the inserted DNA and flanking sequence immediately adjacent to the inserted DNA that would be expected to be transferred to a progeny that receives inserted DNA including the transgene of interest as the result of a sexual cross of one parental line that includes the inserted DNA (e.g., the original transformant and progeny resulting from selfing) and a parental line that does not contain the inserted DNA.

An insect resistant DAS-59122-7 corn plant can be bred by first sexually crossing a first parental corn plant consisting of a corn plant grown from the transgenic DAS-59122-7 corn plant and progeny thereof derived from transformation with the expression cassettes of the embodiments of the present invention that confers insect resistance, and a second parental corn plant that lacks insect resistance, thereby producing a plurality of first progeny plants; and then selecting a first progeny plant that is resistant to insects; and selfing the first progeny plant, thereby producing a plurality of second progeny plants; and then selecting from the second progeny plants an insect resistant plant. These steps can further include the back-crossing of the first insect resistant progeny plant or the second insect resistant progeny plant to the second parental corn plant or a third parental corn plant, thereby producing a corn plant that is resistant to insects.

As used herein, the term "plant" includes reference to whole plants, plant organs (e.g., leaves, stems, roots, etc.), seeds, plant cells, and progeny of same. Parts of transgenic plants understood to be within the scope of the invention comprise, for example, plant cells, protoplasts, tissues, callus, embryos as well as flowers, stems, fruits, leaves, and roots originating in transgenic plants or their progeny previously transformed with a DNA molecule of the invention and therefore consisting at least in part of transgenic cells, are also an embodiment of the present invention.

As used herein, the term "plant cell" includes, without limitation, seeds, suspension cultures, embryos, meristematic regions, callus tissue, leaves, roots, shoots, gametophytes, sporophytes, pollen, and microspores. The class of plants that can be used in the methods of the invention is generally as broad as the class of higher plants amenable to transformation techniques, including both monocotyledonous and dicotyledonous plants.

"Transformation" refers to the transfer of a nucleic acid fragment into the genome of a host organism, resulting in genetically stable inheritance. Host organisms containing the

transformed nucleic acid fragments are referred to as "transgenic" organisms. Examples of methods of plant transformation include *Agrobacterium*-mediated transformation (De Blaere *et al*. (1987) *Meth. Enzymol*. 143:277) and particle-accelerated or "gene gun" transformation technology (Klein *et al*. (1987) *Nature* (London) 327:70-73; U.S. Patent No. 4,945,050, incorporated herein by reference). Additional transformation methods are disclosed below.

Thus, isolated polynucleotides of the invention can be incorporated into recombinant constructs, typically DNA constructs, which are capable of introduction into and replication in a host cell. Such a construct can be a vector that includes a replication system and sequences that are capable of transcription and translation of a polypeptide-encoding sequence in a given host cell. A number of vectors suitable for stable transfection of plant cells or for the establishment of transgenic plants have been described in, e.g., Pouwels *et al*., (1985; Supp. 1987) *Cloning Vectors: A Laboratory Manual*, Weissbach and Weissbach (1989) *Methods for Plant Molecular Biology*, (Academic Press, New York); and Flevin *et al*., (1990) *Plant Molecular Biology Manual*, (Kluwer Academic Publishers). Typically, plant expression vectors include, for example, one or more cloned plant genes under the transcriptional control of 5' and 3' regulatory sequences and a dominant selectable marker. Such plant expression vectors also can contain a promoter regulatory region (e.g., a regulatory region controlling inducible or constitutive, environmentally- or developmentally-regulated, or cell- or tissue-specific expression), a transcription initiation start site, a ribosome binding site, an RNA processing signal, a transcription termination site, and/or a polyadenylation signal.

It is also to be understood that two different transgenic plants can also be mated to produce offspring that contain two independently segregating added, exogenous genes. Selfing of appropriate progeny can produce plants that are homozygous for both added, exogenous genes. Back-crossing to a parental plant and out-crossing with a non-transgenic plant are also contemplated, as is vegetative propagation. Descriptions of other breeding methods that are commonly used for different traits and crops can be found in one of several references, e.g., Fehr, in *Breeding Methods for Cultivar Development*, Wilcos J. ed., American Society of Agronomy, Madison Wis. (1987).

A "probe" is an isolated nucleic acid to which is attached a conventional detectable label or reporter molecule, e.g., a radioactive isotope, ligand, chemiluminescent agent, or enzyme. Such a probe is complementary to a strand of a target nucleic acid, in the case of the present invention, to a strand of isolated DNA from corn event DAS-59122-7 whether from a

corn plant or from a sample that includes DNA from the event. Probes according to the present invention include not only deoxyribonucleic or ribonucleic acids but also polyamides and other probe materials that bind specifically to a target DNA sequence and can be used to detect the presence of that target DNA sequence.

"Primers" are isolated nucleic acids that are annealed to a complementary target DNA strand by nucleic acid hybridization to form a hybrid between the primer and the target DNA strand, then extended along the target DNA strand by a polymerase, e.g., a DNA polymerase. Primer pairs of the invention refer to their use for amplification of a target nucleic acid sequence, e.g., by the polymerase chain reaction (PCR) or other conventional nucleic-acid amplification methods. "PCR" or "polymerase chain reaction" is a technique used for the amplification of specific DNA segments (see, U.S. Patent Nos. 4,683,195 and 4,800,159; herein incorporated by reference).

Probes and primers are of sufficient nucleotide length to bind to the target DNA sequence specifically in the hybridization conditions or reaction conditions determined by the operator. This length may be of any length that is of sufficient length to be useful in a detection method of choice. Generally, eleven (11) nucleotides or more in length, eighteen (18) nucleotides or more, and twenty-two (22) nucleotides or more, are used. Such probes and primers hybridize specifically to a target sequence under high stringency hybridization conditions. Probes and primers according to embodiments of the present invention may have complete DNA sequence similarity of contiguous nucleotides with the target sequence, although probes differing from the target DNA sequence and that retain the ability to hybridize to target DNA sequences may be designed by conventional methods. Probes can be used as primers, but are generally designed to bind to the target DNA or RNA and are not used in an amplification process.

Specific primers can be used to amplify an integration fragment to produce an amplicon that can be used as a "specific probe" for identifying event DAS-59122-7 in biological samples. When the probe is hybridized with the nucleic acids of a biological sample under conditions which allow for the binding of the probe to the sample, this binding can be detected and thus allow for an indication of the presence of event DAS-59122-7 in the biological sample. Such identification of a bound probe has been described in the art. In an embodiment of the invention the specific probe is a sequence which, under optimized conditions, hybridizes specifically to a region within the 5' or 3' flanking region of the event and also comprises a part

of the foreign DNA contiguous therewith. The specific probe may comprise a sequence of at least 80%, between 80 and 85%, between 85 and 90%, between 90 and 95%, and between 95 and 100% identical (or complementary) to a specific region of the event.

Methods for preparing and using probes and primers are described, for example, in *Molecular Cloning: A Laboratory Manual, 2nd ed.*, vol. 1-3, ed. Sambrook *et al.*, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y. 1989 (hereinafter, "Sambrook *et al.*, 1989"); *Current Protocols in Molecular Biology*, ed. Ausubel *et al.*, Greene Publishing and Wiley-Interscience, New York, 1992 (with periodic updates) (hereinafter, "Ausubel *et al.*, 1992"); and Innis *et al.*, *PCR Protocols: A Guide to Methods and Applications*, Academic Press: San Diego, 1990. PCR primer pairs can be derived from a known sequence, for example, by using computer programs intended for that purpose such as the PCR primer analysis tool in Vector NTI version 6 (Informax Inc., Bethesda MD); PrimerSelect (DNASTAR Inc., Madison, WI); and Primer (Version 0.5©, 1991, Whitehead Institute for Biomedical Research, Cambridge, Mass.). Additionally, the sequence can be visually scanned and primers manually identified using guidelines known to one of skill in the art.

A "kit" as used herein refers to a set of reagents for the purpose of performing the method embodiments of the invention, more particularly, the identification of the event DAS-59122-7 in biological samples. The kit of the invention can be used, and its components can be specifically adjusted, for purposes of quality control (e.g. purity of seed lots), detection of event DAS-59122-7 in plant material, or material comprising or derived from plant material, such as but not limited to food or feed products. "Plant material" as used herein refers to material which is obtained or derived from a plant.

Primers and probes based on the flanking DNA and insert sequences disclosed herein can be used to confirm (and, if necessary, to correct) the disclosed sequences by conventional methods, e.g., by re-cloning and sequencing such sequences. The nucleic acid probes and primers of the present invention hybridize under stringent conditions to a target DNA sequence. Any conventional nucleic acid hybridization or amplification method can be used to identify the presence of DNA from a transgenic event in a sample. Nucleic acid molecules or fragments thereof are capable of specifically hybridizing to other nucleic acid molecules under certain circumstances. As used herein, two nucleic acid molecules are said to be capable of specifically hybridizing to one another if the two molecules are capable of forming an anti-parallel, double-stranded nucleic acid structure.

A nucleic acid molecule is said to be the "complement" of another nucleic acid molecule if they exhibit complete complementarity. As used herein, molecules are said to exhibit "complete complementarity" when every nucleotide of one of the molecules is complementary to a nucleotide of the other. Two molecules are said to be "minimally complementary" if they can hybridize to one another with sufficient stability to permit them to remain annealed to one another under at least conventional "low-stringency" conditions. Similarly, the molecules are said to be "complementary" if they can hybridize to one another with sufficient stability to permit them to remain annealed to one another under conventional "high-stringency" conditions. Conventional stringency conditions are described by Sambrook *et al.*, 1989, and by Haymes *et al.*, In: *Nucleic Acid Hybridization, a Practical Approach,* IRL Press, Washington, D.C. (1985), departures from complete complementarity are therefore permissible, as long as such departures do not completely preclude the capacity of the molecules to form a double-stranded structure. In order for a nucleic acid molecule to serve as a primer or probe it need only be sufficiently complementary in sequence to be able to form a stable double-stranded structure under the particular solvent and salt concentrations employed.

In hybridization reactions, specificity is typically the function of post-hybridization washes, the critical factors being the ionic strength and temperature of the final wash solution. The thermal melting point (Tm) is the temperature (under defined ionic strength and pH) at which 50% of a complementary target sequence hybridizes to a perfectly matched probe. For DNA-DNA hybrids, the Tm can be approximated from the equation of Meinkoth and Wahl (1984) *Anal. Biochem.* 138:267-284: Tm = 81.5°C + 16.6 (log M) + 0.41 (%GC) - 0.61 (% form) - 500/L; where M is the molarity of monovalent cations, %GC is the percentage of guanosine and cytosine nucleotides in the DNA, % form is the percentage of formamide in the hybridization solution, and L is the length of the hybrid in base pairs. Tm is reduced by about 1°C for each 1% of mismatching; thus, Tm, hybridization, and/or wash conditions can be adjusted to hybridize to sequences of the desired identity. For example, if sequences with >90% identity are sought, the Tm can be decreased 10°C. Generally, stringent conditions are selected to be about 5°C lower than the Tm for the specific sequence and its complement at a defined ionic strength and pH. However, severely stringent conditions can utilize a hybridization and/or wash at 1, 2, 3, or 4°C lower than the Tm; moderately stringent conditions can utilize a hybridization and/or wash at 6, 7, 8, 9, or 10°C lower than the Tm; low stringency

conditions can utilize a hybridization and/or wash at 11, 12, 13, 14, 15, or 20°C lower than the Tm.

Using the equation, hybridization and wash compositions, and desired Tm, those of ordinary skill will understand that variations in the stringency of hybridization and/or wash solutions are inherently described. If the desired degree of mismatching results in a Tm of less than 45°C (aqueous solution) or 32°C (formamide solution), it is preferred to increase the SSC concentration so that a higher temperature can be used. An extensive guide to the hybridization of nucleic acids is found in Tijssen (1993) *Laboratory Techniques in Biochemistry and Molecular Biology—Hybridization with Nucleic Acid Probes*, Part I, Chapter 2 (Elsevier, New York); and Ausubel *et al.*, eds. (1995) *Current Protocols in Molecular Biology*, Chapter 2 (Greene Publishing and Wiley-Interscience, New York). See Sambrook *et al*. (1989) *Molecular Cloning: A Laboratory Manual* (2d ed., Cold Spring Harbor Laboratory Press, Plainview, New York).

As used herein, a substantially homologous sequence is a nucleic acid molecule that will specifically hybridize to the complement of the nucleic acid molecule to which it is being compared under high stringency conditions. Appropriate stringency conditions which promote DNA hybridization, for example, 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by a wash of 2X SSC at 50°C, are known to those skilled in the art or can be found in *Current Protocols in Molecular Biology*, John Wiley & Sons, N.Y. (1989), 6.3.1-6.3.6. Typically, stringent conditions will be those in which the salt concentration is less than about 1.5 M Na ion, typically about 0.01 to 1.0 M Na ion concentration (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30°C for short probes (e.g., 10 to 50 nucleotides) and at least about 60°C for long probes (e.g., greater than 50 nucleotides). Stringent conditions may also be achieved with the addition of a destabilizing agent such as formamide. Exemplary low stringency conditions include hybridization with a buffer solution of 30 to 35% formamide, 1 M NaCl, 1% SDS (sodium dodecyl sulphate) at 37°C, and a wash in 1X to 2X SSC (20X SSC = 3.0 M NaCl/0.3 M trisodium citrate) at 50 to 55°C. Exemplary moderate stringency conditions include hybridization in 40 to 45% formamide, 1 M NaCl, 1% SDS at 37°C, and a wash in 0.5X to 1X SSC at 55 to 60°C. Exemplary high stringency conditions include hybridization in 50% formamide, 1 M NaCl, 1% SDS at 37°C, and a wash in 0.1X SSC at 60 to 65°C. A nucleic acid of the invention may specifically hybridize to one or more of the nucleic acid molecules unique

to the DAS-59122-7 event or complements thereof or fragments of either under moderately stringent conditions.

Methods of alignment of sequences for comparison are well known in the art. Thus, the determination of percent identity between any two sequences can be accomplished using a mathematical algorithm. Non-limiting examples of such mathematical algorithms are the algorithm of Myers and Miller (1988) *CABIOS* 4:11-17; the local homology algorithm of Smith *et al*. (1981) *Adv. Appl. Math*. 2:482; the homology alignment algorithm of Needleman and Wunsch (1970) *J. Mol. Biol*. 48:443-453; the search-for-similarity-method of Pearson and Lipman (1988) *Proc. Natl. Acad. Sci*. 85:2444-2448; the algorithm of Karlin and Altschul (1990) *Proc. Natl. Acad. Sci. USA* 87:2264, modified as in Karlin and Altschul (1993) *Proc. Natl. Acad. Sci. USA* 90:5873-5877.

Computer implementations of these mathematical algorithms can be utilized for comparison of sequences to determine sequence identity. Such implementations include, but are not limited to: CLUSTAL in the PC/Gene program (available from Intelligenetics, Mountain View, California); the ALIGN program (Version 2.0); the ALIGN PLUS program (version 3.0, copyright 1997); and GAP, BESTFIT, BLAST, FASTA, and TFASTA in the Wisconsin Genetics Software Package, Version 10 (available from Accelrys, 9685 Scranton Road, San Diego, CA 92121, USA). Alignments using these programs can be performed using the default parameters.

The CLUSTAL program is well described by Higgins and Sharp, *Gene* 73: 237-244 (1988); Higgins and Sharp, *CABIOS* 5: 151-153 (1989); Corpet, *et al., Nucleic Acids Research* 16: 10881-90 (1988); Huang, *et al., Computer Applications in the Biosciences* 8: 155-65 (1992), and Pearson, *et al., Methods in Molecular Biology* 24: 307-331 (1994). The ALIGN and the ALIGN PLUS programs are based on the algorithm of Myers and Miller (1988) *supra.* The BLAST programs of Altschul *et al.* (1990) *J. Mol. Biol.* 215:403 are based on the algorithm of Karlin and Altschul (1990) *supra.* The BLAST family of programs which can be used for database similarity searches includes: BLASTN for nucleotide query sequences against nucleotide database sequences; BLASTX for nucleotide query sequences against protein database sequences; BLASTP for protein query sequences against protein database sequences; TBLASTN for protein query sequences against nucleotide database sequences; and TBLASTX for nucleotide query sequences against nucleotide database sequences. See, *Current Protocols in Molecular Biology*, Chapter 19, Ausubel, *et al.*, Eds., Greene Publishing

and Wiley-Interscience, New York (1995). Alignment may also be performed manually by visual inspection.

To obtain gapped alignments for comparison purposes, Gapped BLAST (in BLAST 2.0) can be utilized as described in Altschul *et al.* (1997) *Nucleic Acids Res.* 25:3389. Alternatively, PSI-BLAST (in BLAST 2.0) can be used to perform an iterated search that detects distant relationships between molecules. See Altschul *et al.* (1997) supra. When utilizing BLAST, Gapped BLAST, PSI-BLAST, the default parameters of the respective programs (e.g., BLASTN for nucleotide sequences, BLASTX for proteins) can be used. See www.ncbi.hlm.nih.gov.

As used herein, "sequence identity" or "identity" in the context of two nucleic acid or polypeptide sequences makes reference to the residues in the two sequences that are the same when aligned for maximum correspondence over a specified comparison window. When percentage of sequence identity is used in reference to proteins it is recognized that residue positions which are not identical often differ by conservative amino acid substitutions, where amino acid residues are substituted for other amino acid residues with similar chemical properties (e.g., charge or hydrophobicity) and therefore do not change the functional properties of the molecule. When sequences differ in conservative substitutions, the percent sequence identity may be adjusted upwards to correct for the conservative nature of the substitution. Sequences that differ by such conservative substitutions are said to have "sequence similarity" or "similarity". Means for making this adjustment are well known to those of skill in the art. Typically this involves scoring a conservative substitution as a partial rather than a full mismatch, thereby increasing the percentage sequence identity. Thus, for example, where an identical amino acid is given a score of 1 and a non-conservative substitution is given a score of zero, a conservative substitution is given a score between zero and 1. The scoring of conservative substitutions is calculated, e.g., as implemented in the program PC/GENE (Intelligenetics, Mountain View, California).

As used herein, "percentage of sequence identity" means the value determined by comparing two optimally aligned sequences over a comparison window, wherein the portion of the polynucleotide sequence in the comparison window may comprise additions or deletions (i.e., gaps) as compared to the reference sequence (which does not comprise additions or deletions) for optimal alignment of the two sequences. The percentage is calculated by determining the number of positions at which the identical nucleic acid base or amino acid

residue occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the window of comparison, and multiplying the result by 100 to yield the percentage of sequence identity.

Regarding the amplification of a target nucleic acid sequence (e.g., by PCR) using a particular amplification primer pair, "stringent conditions" are conditions that permit the primer pair to hybridize only to the target nucleic-acid sequence to which a primer having the corresponding wild-type sequence (or its complement) would bind and preferably to produce a unique amplification product, the amplicon, in a DNA thermal amplification reaction.

The term "specific for (a target sequence)" indicates that a probe or primer hybridizes under stringent hybridization conditions only to the target sequence in a sample comprising the target sequence.

As used herein, "amplified DNA" or "amplicon" refers to the product of nucleic acid amplification of a target nucleic acid sequence that is part of a nucleic acid template. For example, to determine whether a corn plant resulting from a sexual cross contains transgenic event genomic DNA from the corn plant of the invention, DNA extracted from the corn plant tissue sample may be subjected to a nucleic acid amplification method using a DNA primer pair that includes a first primer derived from flanking sequence adjacent to the insertion site of inserted heterologous DNA, and a second primer derived from the inserted heterologous DNA to produce an amplicon that is diagnostic for the presence of the event DNA. Alternatively, the second primer may be derived from the flanking sequence. The amplicon is of a length and has a sequence that is also diagnostic for the event. The amplicon may range in length from the combined length of the primer pairs plus one nucleotide base pair to any length of amplicon producible by a DNA amplification protocol. Alternatively, primer pairs can be derived from flanking sequence on both sides of the inserted DNA so as to produce an amplicon that includes the entire insert nucleotide sequence of the PHI17662A expression construct as well as the sequence flanking the transgenic insert, see FIG. 1 (SEQ ID NO: 23), approximately twelve (12) Kb in size. A member of a primer pair derived from the flanking sequence may be located a distance from the inserted DNA sequence, this distance can range from one nucleotide base pair up to the limits of the amplification reaction, or about twenty thousand nucleotide base pairs. The use of the term "amplicon" specifically excludes primer dimers that may be formed in the DNA thermal amplification reaction.

Nucleic acid amplification can be accomplished by any of the various nucleic acid amplification methods known in the art, including the polymerase chain reaction (PCR). A variety of amplification methods are known in the art and are described, inter alia, in U.S. Pat. Nos. 4,683,195 and 4,683,202 and in *PCR Protocols: A Guide to Methods and Applications,* ed. Innis *et al.,* Academic press, San Diego, 1990. PCR amplification methods have been developed to amplify up to 22 Kb of genomic DNA and up to 42 Kb of bacteriophage DNA (Cheng *et al., Proc. Natl. Acad. Sci. USA* 91:5695-5699, 1994). These methods as well as other methods known in the art of DNA amplification may be used in the practice of the embodiments of the present invention. It is understood that a number of parameters in a specific PCR protocol may need to be adjusted to specific laboratory conditions and may be slightly modified and yet allow for the collection of similar results. These adjustments will be apparent to a person skilled in the art.

The amplicon produced by these methods may be detected by a plurality of techniques, including, but not limited to, Genetic Bit Analysis (Nikiforov, *et al. Nucleic Acid Res*. 22:4167-4175, 1994) where a DNA oligonucleotide is designed which overlaps both the adjacent flanking DNA sequence and the inserted DNA sequence. The oligonucleotide is immobilized in wells of a microwell plate. Following PCR of the region of interest (using one primer in the inserted sequence and one in the adjacent flanking sequence) a single-stranded PCR product can be hybridized to the immobilized oligonucleotide and serve as a template for a single base extension reaction using a DNA polymerase and labeled ddNTPs specific for the expected next base. Readout may be fluorescent or ELISA-based. A signal indicates presence of the insert/flanking sequence due to successful amplification, hybridization, and single base extension.

Another detection method is the Pyrosequencing technique as described by Winge (*Innov. Pharma. Tech.* 00: 18-24, 2000). In this method an oligonucleotide is designed that overlaps the adjacent DNA and insert DNA junction. The oligonucleotide is hybridized to a single-stranded PCR product from the region of interest (one primer in the inserted sequence and one in the flanking sequence) and incubated in the presence of a DNA polymerase, ATP, sulfurylase, luciferase, apyrase, adenosine 5' phosphosulfate and luciferin. dNTPs are added individually and the incorporation results in a light signal which is measured. A light signal indicates the presence of the transgene insert/flanking sequence due to successful amplification, hybridization, and single or multi-base extension.

Fluorescence Polarization as described by Chen *et al.*, (*Genome Res.* 9:492-498, 1999) is also a method that can be used to detect an amplicon of the invention. Using this method an oligonucleotide is designed which overlaps the flanking and inserted DNA junction. The oligonucleotide is hybridized to a single-stranded PCR product from the region of interest (one primer in the inserted DNA and one in the flanking DNA sequence) and incubated in the presence of a DNA polymerase and a fluorescent-labeled ddNTP. Single base extension results in incorporation of the ddNTP. Incorporation can be measured as a change in polarization using a fluorometer. A change in polarization indicates the presence of the transgene insert/flanking sequence due to successful amplification, hybridization, and single base extension.

Taqman® (PE Applied Biosystems, Foster City, Calif.) is described as a method of detecting and quantifying the presence of a DNA sequence and is fully understood in the instructions provided by the manufacturer. Briefly, a FRET oligonucleotide probe is designed which overlaps the flanking and insert DNA junction. The FRET probe and PCR primers (one primer in the insert DNA sequence and one in the flanking genomic sequence) are cycled in the presence of a thermostable polymerase and dNTPs. Hybridization of the FRET probe results in cleavage and release of the fluorescent moiety away from the quenching moiety on the FRET probe. A fluorescent signal indicates the presence of the flanking/transgene insert sequence due to successful amplification and hybridization.

Molecular Beacons have been described for use in sequence detection as described in Tyangi *et al.* (*Nature Biotech.* 14:303-308, 1996). Briefly, a FRET oligonucleotide probe is designed that overlaps the flanking and insert DNA junction. The unique structure of the FRET probe results in it containing secondary structure that keeps the fluorescent and quenching moieties in close proximity. The FRET probe and PCR primers (one primer in the insert DNA sequence and one in the flanking sequence) are cycled in the presence of a thermostable polymerase and dNTPs. Following successful PCR amplification, hybridization of the FRET probe to the target sequence results in the removal of the probe secondary structure and spatial separation of the fluorescent and quenching moieties. A fluorescent signal results. A fluorescent signal indicates the presence of the flanking/transgene insert sequence due to successful amplification and hybridization.

A hybridization reaction using a probe specific to a sequence found within the amplicon is yet another method used to detect the amplicon produced by a PCR reaction.

Embodiments of the present invention are further defined in the following Examples. It should be understood that these Examples are given by way of illustration only. From the above discussion and these Examples, one skilled in the art can ascertain the essential characteristics of this invention, and without departing from the spirit and scope thereof, can make various changes and modifications of the embodiments of the invention to adapt it to various usages and conditions. Thus, various modifications of the embodiments of the invention, in addition to those shown and described herein, will be apparent to those skilled in the art from the foregoing description. Such modifications are also intended to fall within the scope of the appended claims.

The disclosure of each reference set forth herein is incorporated herein by reference in its entirety.

EXAMPLES

Example 1. Transformation of Maize by *Agrobacterium* transformation and Regeneration of Transgenic Plants Containing the Cry34Ab1 and Cry35Ab1 (Cry34/35Ab1) Genes

A DNA molecule of approximately 7.4 Kb, designated PHI17662A (SEQ ID NO: 24), which includes a first transgene expression cassette comprising a DNA molecule which includes the promoter, 5' untranslated exon, and first intron of the maize ubiquitin (Ubi-1) gene (Christensen *et al.* (1992) *Plant Mol. Biol.* 18:675-689 and Christensen and Quail (1996) *Transgenic Res*. 5:213-218) operably connected to a DNA molecule encoding a *B.t.* δ-endotoxin identified as Cry34Ab1 (U.S. Pat. Nos. 6,127,180, 6,624,145 and 6,340,593) operably connected to a DNA molecule comprising a Pin II transcriptional terminator isolated from potato (Gyheung An *et al.* (1989) *Plant Cell.* 1:115-122). The second transgene expression cassette of the DNA construct comprises a DNA molecule encoding the wheat peroxidase promoter (Hertig *et al.* (1991) *Plant Mol. Biol.* 16:171-174) operably connected to a DNA molecule encoding a *B.t.* δ-endotoxin identified as Cry35Ab1 (U.S. Pat. Nos. 6,083,499, 6,548,291 and 6,340,593) operably connected to a DNA molecule comprising a Pin II transcriptional terminator isolated from potato (Gyheung An *et al.* (1989) *Plant Cell.* 1:115-122). The third transgene expression cassette of the DNA construct comprises a DNA molecule of the cauliflower mosaic virus (CaMV) 35S promoter (Odell J.T. *et al.* (1985) *Nature* 313: 810-812; Mitsuhara *et al.* (1996) *Plant Cell Physiol.* 37: 49-59) operably

connected to a DNA molecule encoding a phosphinothricin acetyltransferase (PAT) gene (Wohlleben W. *et al.* (1988) *Gene* 70: 25-37) operably connected to a DNA molecule comprising a 3' transcriptional terminator from (CaMV) 35S (see Mitsuhara *et al.* (1996) *Plant Cell Physiol.* 37: 49-59) was used to transform maize embryo tissue.

B.t. Cry34/35 Ab1 maize plants were obtained by *Agrobacterium* transformation, the method of Zhao was employed (U.S. Patent No. 5,981,840, and PCT patent publication WO98/32326; the contents of which are hereby incorporated by reference). Briefly, immature embryos were isolated from maize and the embryos contacted with a suspension of *Agrobacterium*, where the bacteria was capable of transferring PHI17662 DNA (SEQ ID NO:24) to at least one cell of at least one of the immature embryos (step 1: the infection step). Specifically, in this step the immature embryos were immersed in an *Agrobacterium* suspension for the initiation of inoculation. The embryos were co-cultured for a time with the *Agrobacterium* (step 2: the co-cultivation step). Specifically, the immature embryos were cultured on solid medium following the infection step. Following this co-cultivation period a "resting" step was provided. In this resting step, the embryos were incubated in the presence of at least one antibiotic known to inhibit the growth of *Agrobacterium* without the addition of a selective agent for plant transformants (step 3: resting step). In particular, the immature embryos are cultured on solid medium with antibiotic, but without a selecting agent, for elimination of *Agrobacterium* and for a resting phase for the infected cells. Next, inoculated embryos were cultured on medium containing a selective agent and growing transformed callus was recovered (step 4: the selection step). Specifically, the immature embryos were cultured on solid medium with a selective agent resulting in the selective growth of transformed cells. The callus was then regenerated into plants (step 5: the regeneration step), and, specifically, calli grown on selective medium were cultured on solid medium to regenerate the plants. Individual embryos were kept physically separate during culture, and the majority of explants died on the selective medium.

Those embryos that survived and produced healthy, glufosinate-resistant callus tissue were assigned unique identification codes representing putative transformation events, and continually transferred to fresh selection medium. Plants were regenerated from tissue derived from each unique event and transferred to the greenhouse. Leaf samples were taken for molecular analysis to verify the presence of the transgene by PCR and to confirm expression of the Cry34/35Ab1 protein by ELISA. Plants were then subjected to a whole plant bioassay

using western corn rootworm insects. Positive plants were crossed with inbred lines to obtain seed from the initial transformed plants. A number of lines were evaluated in the field. The DAS-59122-7 event was selected from a population of independent transgenic events based on a superior combination of characteristics, including insect resistance and agronomic performance.

Example 2. Identification of *Bacillus thuringiensis* Cry34/35Ab1 maize line DAS-59122-7

Seed from event DAS-59122-7 was evaluated. The T1S2 seed represents transformation into the Hi-II background, followed by a cross with inbred line PH09B and two rounds of self-crossing. All seed were obtained from Pioneer Hi-Bred (Johnston, IA). Primary characterization was conducted on plant leaf tissue during the study by confirmation of phosphinothricin acetyltransferase (PAT) activity via herbicide leaf painting and Cry34Ab1 expression using lateral flow devices.

Control substances in this study were defined as unmodified seed representative of the test substance background. Control seeds of Hi-II and PH09B backgrounds were used as negative controls. These unmodified seed do not contain the plant transcription units for the *cry*34Ab1, *cry*35Ab1, and *pat* genes. All seed were obtained from Pioneer Hi-Bred (Johnston, IA).

DNA samples from two additional B.t. Cry34/35Ab1 events, event DAS-45214-4 and event DAS-45216-6, were used as negative controls for event specific PCR analysis. The two events were produced through Agrobacterium transformation using the same vector used to produce event DAS-59122-7 and therefore contained the plant transcription units for the cry34Ab1, cry35Ab1, and pat genes. However, the insertions sites of the T-DNA in events DAS-45214-4 and DAS-45216-6, including genomic DNA border regions, were different from that in event DAS-59122-7. DNA samples from event DAS-45214-4 and event DAS-45216-6 were isolated and characterized by Southern blot analysis. (Data not shown.)

Corn seed for event DAS-59122-7 and unmodified control seed (Hi-II and PH09B) were planted in growth chambers at the DuPont Experimental Station (Wilmington, DE) to produce sufficient numbers of plants for DNA analysis. For characterization of event DAS-59122-7, ten (10) T1S2 seeds were planted. Ten (10) seeds were also planted for each unmodified control line. One (1) seed was planted per pot, and the pot was uniquely identified.

Planting and growing conditions were conducive to healthy plant growth including regulated light and water.

Leaf samples were collected for each of the control and event DAS-59122-7 plants. For each sample, sufficient leaf material from above the growing point was collected and placed in a pre-labeled sample bag. The samples were placed on dry ice and were transferred to an ultralow freezer following collection. All samples were maintained frozen until processing. All leaf samples were uniquely labeled with the plant identifier and the date of harvest.

To confirm the expression of the Cry34Ab1 protein in event DAS-59122-7 and the absence of expression in the controls, leaf samples were collected from all event DAS-59122-7 and control plants, and screened for transgenic protein using lateral flow devices specific for Cry34Ab1 (Strategic Diagnostics, Inc., Newark, DE). Leaf punches were taken from each plant and ground in a phosphate buffered saline solution with Tween 20 to crudely extract the protein. A strip device was dipped into the extract to determine the presence or absence of the Cry34Ab1 protein. The immunoassay results were used to confirm the identity of the test substance plants prior to molecular analysis as shown in Table 1.

To confirm the expression of phosphinothricin acetyltransferase (PAT) in event DAS-59122-7 plants, herbicide leaf painting was conducted. All plants used in this study were leaf painted to confirm plant identity. Plants were assayed prior to the R1 growth stage. Assays were conducted following a standard procedure known in the art for herbicide leaf painting for the identification of PAT-expressing transgenic plants. Specifically, a portion of one leaf of each plant was treated with approximately 2% solution of glufosinate herbicide, Basta® (Bayer CropScience) in water and visually checked for brown or necrotic tissue in the painted leaf area 4–12 days after application. Results for each plant were recorded and used to determine expression of PAT in each test plant as shown in Table 1. As shown in Table 1, of the ten (10) plants tested for event DAS-59122-7 T1S2 generation, six (6) plants expressed both Cry34Ab1 and PAT, while four (4) plants did not express either protein. All unmodified controls tested negative for both CryAb1 And PAT assays (data not shown).

Table 1: Cry34Ab1 and PAT Protein Expression and Southern Hybridization Data for *B.t.* Cry34/35Ab1 Event DAS-59122-7

Plant ID	Sample ID	Cry34Ab1 and PAT Expression[1]	Southern Blot *cry*34Ab1 Probe[2]	Southern Blot *cry*35Ab1 Probe[2]	Southern Blot *pat* Probe[2]
02-122C 1	DAS59122-7 T1S2 1	positive	+	+	+
02-122C 2	DAS59122-7 T1S2 2	positive	+	+	+
02-122C 3	DAS59122-7 T1S2 3	positive	+	+	+
02-122C 4	DAS59122-7 T1S2 4	negative	-	-	-
02-122C 5	DAS59122-7 T1S2 5	positive	+	+	+
02-122C 6	DAS59122-7 T1S2 6	negative	-	-	-
02-122C 7	DAS59122-7 T1S2 7	positive	+	+	+
02-122C 8	DAS59122-7 T1S2 8	negative	-	-	-
02-122C 9	DAS59122-7 T1S2 9	negative	-	-	-
02-122C 10	DAS59122-7 T1S2 10	positive	+	+	+

1. Positive Cry34Ab1 expression indicates detection of protein expression as determined by the immunoassay-based lateral flow device specific for Cry34Ab1 protein detection. Negative indicates no detection of the Cry34Ab1 protein. Positive PAT expression indicates plants that were tolerant to the herbicide treatment and negative indicates plants that were sensitive to the herbicide.
2. + indicates hybridization signal on Southern blot; - indicates no hybridization signal on Southern blot. The cry34Ab1 gene probe hybridized to the expected internal T-DNA fragment of 1.915 kb, the cry35Ab1 gene probe hybridized to the expected internal T-DNA fragment of 2.607 kb, and the pat gene probe hybridized to a 3.4 kb border fragment consistent with a single intact T-DNA insertion as determined by Southern blot analysis.

Example 3. Southern Blot Analysis of *Bacillus thuringiensis* Cry34/35Ab1 maize line DAS-59122-7

One gram quantities of leaf samples were ground under liquid nitrogen, and the genomic DNA was isolated using DNeasy® Plant Mini Kit (Qiagen, Valencia, CA) or using a standard Urea Extraction Buffer procedure. Following extraction, the DNA was visualized on

an agarose gel to determine the DNA quality, and was quantified using Pico Green® reagent (Molecular Probes, Inc., Eugene, OR) and spectrofluorometric analysis.

The 1 Kb DNA Ladder (Invitrogen, Carlsbad, CA) was used to estimate DNA fragment sizes on agarose gels.

Genomic DNA isolated from event DAS-59122-7 plants was digested with *Nco* I and electrophoretically separated, transferred to nylon membranes, and hybridized to the *cry*34Ab1, *cry*35Ab1 and *pat* gene probes using standard procedures known in the art. Blots were exposed to X-ray film for one or more time periods to detect hybridizing fragments and to visualize molecular weight standards. Images were then digitally captured by photographing X-ray films and/or by detection with a Lumi-Imager™ instrument (Roche, Indianapolis, IN). The sizes of detected bands were documented for each probe. Southern blot analysis was used as a means of verifying the presence of the insertion in the test plants and confirming that all plants from event DAS-59122-7 contained the same insertion as shown in Table 1. (Southern blots not shown.) Southern blot analysis indicated that event DAS-59122-7 contained a single insertion consisting of an intact copy of the T-DNA region from plasmid PHP17662, while the null segregants, as determined by the protein expression analysis did not hybridize to the gene probes. Further, event DAS-59122-7 plants expressing the two proteins exhibited identical hybridization patterns on Southern blots (data not shown). Specifically, the *cry*34Ab1 gene probe hybridized to the expected internal T-DNA fragment of 1.915 kb, the *cry*35Ab1 gene probe hybridized to the expected internal T-DNA fragment of 2.607 kb, and the *pat* gene probe hybridized to a 3.4 kb border fragment consistent with a single intact T-DNA insertion as determined by Southern blot results.

Example 4. T-DNA Insert and Flanking Border Region Sequencing of *Bacillus thuringiensis* Cry34/35Ab1 maize line DAS-59122-7

The T-DNA insert and flanking border regions were cloned from *B.t.* Cry34/35Ab1 event DAS59122-7 using PCR based methods as diagramed in Figures 2 and 3. Specifically, sequences bordering the 5' and 3' ends of the insert in event DAS-59122-7 were obtained using two genome walking techniques. The first walking method was essentially the method as described for the Universal Genome Walker Kit (BD Biosciences Clontech, Palo Alto, CA), and the second method was conducted according to the splinkerette protocol outlined in Devon

et al., (1995) *Nucleic Acids Research* 23 (9):1644-1645, with modifications as described by Stover (2001), U.C. Irvine (personal communication).

Briefly, genomic DNA was digested with various restriction enzymes (*Dra* I, *Eco*R V, *Pvu* II, *Sma* I and *Stu* I for the Universal Genome Walker method and *Bam*H I, *Eco*R I, *Hin*d III, and *Xba* I for the splinkerette method) and then ligated to blunt-end adaptors for the Genome Walker method and to adaptors specific for the restriction enzyme used for the splinkerette method. The adaptors for both genome walking methods were designed to prevent extension of the 3' end of the adaptor during PCR and thus reduce or eliminate nonspecific amplification. The adaptor-ligated genomic DNA fragments were then referred to as genome walker libraries or splinkerette libraries, one library for each restriction enzyme. Libraries were prepared from genomic DNA isolated from three individual T1S2 plants of *B.t.* Cry34/35Ab1 event DAS-59122-7; plants DAS-59122-7 T1S2 1, DAS-59122-7 T1S2 2 and DAS-59122-7 T1S2 10, and from one Hi-II and one PH09B control plant.

Following construction of the libraries, nested PCR amplifications were completed to amplify the target sequence using Advantage™-GC Genomic PCR kit (BD Biosciences Clontech, Palo Alto, CA). The primary PCR amplification used one primer with identity to the adaptor and one gene specific primer. The adaptor primer will not amplify a product in the first cycle of the primary PCR and only products from the gene specific primer will be produced. Annealing and amplification from the adaptor primer only occurs after the complementary strand has been produced from the gene specific primer. Following primary PCR amplification, a secondary nested PCR reaction was performed to increase the specificity of the genomic PCR reactions. The nested primers consisted of gene-specific and adaptor-specific sequences internal to the respective primers used in the primary PCR.

For 5' flanking border sequences, nested PCR was initiated using primers specific to the 5' end of the inserted T-DNA along with primers complementary to the adaptor sequence ligated onto the digested DNA. Similarly, cloning of the 3' flanking border sequence started with a primer specific for the 3' end of the inserted T-DNA and a primer complementary to the adaptor sequence. DNA sequences internal to the T-DNA Right Border and Left Border sequences within the T-DNA region were used as the starting points for "walking out" to the maize genomic sequence, because they represented unique sequence (not homologous to endogenous maize genomic sequences) from which to anchor the genome walking primers.

The products produced by the nested PCR were analyzed by agarose gel electrophoresis (data not shown). Fragments visible in libraries prepared from one or more of the event DAS-59122-7 DNA samples and absent in libraries prepared from the Hi-II and PH09B genomic DNA samples were identified for further characterization. The identified PCR amplified fragments were separated by preparatory gel electrophoresis, isolated using a QIAquick Gel Extraction Kit (Qiagen), and sent directly for sequencing or cloned into a pGEM-T Easy plasmid vector using the pGEM-T Easy Vector System I (Promega Corp., Madison, WI) prior to DNA sequencing. Sequencing reactions were carried out with primers used for the nested PCR amplification or with primers specific for use with the pGEM-T Easy vector. The sequence obtained was used to design additional gene specific primers to continue "walking out" into the unknown maize genomic sequence. Multiple rounds of genome walking were performed until at least 500 bp of border sequence from the ends of the T-DNA insert were obtained.

To ensure validity of the flanking border sequences, additional event-specific PCR amplifications on genomic DNA from event DAS-59122-7 were performed. The amplified fragments were sequenced in order to further extend the region of sequence overlap from the T-DNA insert region into the 5' and 3' bordering genomic DNA. Primers, shown in Table 2, were designed based on the sequence obtained from the genome walking experiments to amplify a fragment spanning the unique junction of the T-DNA with the corn genomic DNA. Primer set 03-O-506/02-O-476 (SEQ ID NO: 10/SEQ ID NO:9) spanned the 5' junction and amplified a 313 bp fragment (from bp 2427 to bp 2739, see Figure 1), and primer set 02-O-447/03-O-577 (SEQ ID NO: 8/SEQ ID NO:17) spanned the 3' junction and amplified a 754 bp fragment (from bp 9623 to bp 10376, see Figure 1).

Table 2. Primer Sequences

Primer Name	Sequence (5' – 3')	Target Sequence Location (bp to bp)[1]
02-O-215	(SEQ ID NO: 1) GTGGCTCCTTCAACGTTGCGGTTCTGTC	2743-2716
02-O-219	(SEQ ID NO: 2) CGTGCAAGCGCTCAATTCGCCCTATAGTG	9830-9858
02-O-227	(SEQ ID NO: 3) AATTGAGCGCTTGCACGTTT	9846-9827

02-O-370	(SEQ ID NO: 4) AACAACAAGACCGGCCACACCCTC	4871-4894
02-O-371	(SEQ ID NO: 5) GAGGTGGTCTGGATGGTGTAGGTCA	5187-5163
02-O-372	(SEQ ID NO: 6) TACAACCTCAAGTGGTTCCTCTTCCCGA	7017-7044
02-O-373	(SEQ ID NO: 7) GAGGTCTGGATCTGCATGATGCGGA	7897-7873
02-O-447	(SEQ ID NO: 8) AACCCTTAGTATGTATTTGTATT	9623-9645
02-O-476	(SEQ ID NO: 9) CTCCTTCAACGTTGCGGTTCTGTCAG	2739-2714
03-O-506	(SEQ ID NO: 10) TTTTGCAAAGCGAACGATTCAGATG	2427-2451
03-O-514	(SEQ ID NO: 11) GCGGGACAAGCCGTTTTACGTTT	2687-2709
03-O-542	(SEQ ID NO: 12) GACGGGTGATTTATTTGATCTGCAC	10766-10742
03-O-543	(SEQ ID NO: 13) CATCTGAATCGTTCGCTTTGCAAAA	2451-2427
03-O-564	(SEQ ID NO: 14) CTACGTTCCAATGGAGCTCGACTGTC	2324-2299
03-O-569	(SEQ ID NO: 15) GGTCAAGTGGACACTTGGTCACTCA	10150-10174
03-O-570	(SEQ ID NO: 16) GAGTGAAGAGATAAGCAAGTCAAAG	10275-10299
03-O-577	(SEQ ID NO: 17) CATGTATACGTAAGTTTGGTGCTGG	10376-10352
03-O-784	(SEQ ID NO: 18) AATCCACAAGATTGGAGCAAACGAC	2189-2213
67609	(SEQ ID NO: 36) CGTATTACAATCGTACGCAATTCAG	9862-9886
69240	(SEQ ID NO: 37) GGATAAACAAACGGGACCATAGAAG	9941-9965

[1.] Location in sequence of Event DAS-59122-7 (see Figure 1). Bases 1 - 2593 = 5' border, bases 2594 - 9936 = T-DNA insert, bases 9937 - 11922 = 3' border.

For verification of the DNA sequence that inserted into the maize genome, PCR was performed to amplify, clone, and sequence the inserted T-DNA from event DAS-59122-7. PCR primer sets, (SEQ ID NO: 11/SEQ ID NO:5); (SEQ ID NO: 4/SEQ ID NO:7); and (SEQ ID NO: 6/SEQ ID NO:3) shown in Table 3 were used to amplify three overlapping fragments labeled 22I-1 (SEQ ID NO: 25), 22I-2 (SEQ ID NO: 26), and 22I-3 (SEQ ID NO: 27) representing sequence from the 5' region of the T-DNA running through to the 3' region of the

T-DNA insert from bp 2687 to bp 9846 for event DAS-59122-7 (see Figure 1). PCR amplicon information is reported in Table 3 and primer sequences are listed in Table 2.

Table 3. PCR Primer and Amplicon Descriptions

PCR Amplicon	Size (bp)	Target Sequence	Forward Primer	Reverse Primer	Location of PCR Amplicon (bp to bp)[1]
22I-1 (SEQ ID NO:25)	2501	T-DNA insert	03-O-514 (SEQ ID NO:11)	02-O-371 (SEQ ID NO:5)	2687 – 5187
22I-2 (SEQ ID NO:26)	3027	T-DNA insert	02-O-370 (SEQ ID NO:4)	02-O-373 (SEQ ID NO:7)	4871 – 7897
22I-3 (SEQ ID NO:27)	2830	T-DNA insert	02-O-372 (SEQ ID NO:6)	02-O-227 (SEQ ID NO:3)	7017 - 9846
O784/O564 (SEQ ID NO:28)	136	5' genomic border	03-O-784 (SEQ ID NO:18)	03-O-564 (SEQ ID NO:14)	2189 – 2324
O784/O543 (SEQ ID NO:29)	263	5' genomic border	03-O-784 (SEQ ID NO:18)	03-O-543 (SEQ ID NO:13)	2189 - 2451
O569/O577 (SEQ ID NO:30)	227	3' genomic border	03-O-569 (SEQ ID NO:15)	03-O-577 (SEQ ID NO:17)	10150 - 10376
PCR Amplicon	Size (bp)	Target Sequence	Forward Primer	Reverse Primer	Location of PCR Amplicon (bp to bp)[1]
O570/O542 (SEQ ID NO:31)	492	3' genomic border	03-O-570 (SEQ ID NO:16)	03-O-542 (SEQ ID NO:12)	10275 – 10766
O784/O215 (SEQ ID NO:32)	555	5' junction	03-O-784 (SEQ ID NO:18)	02-O-215 (SEQ ID NO:1)	2189 – 2743
O219/O577 (SEQ ID NO:33)	547	3' junction	02-O-219 (SEQ ID NO:2)	03-O-577 (SEQ ID NO:17)	9830 – 10376
O506/O476 (SEQ ID NO:34)	313	5' junction	03-O-506 (SEQ ID NO:10)	02-O-476 (SEQ ID NO:9)	2427 - 2739
O447/O577 (SEQ ID NO:35)	754	3' junction	02-O-447 (SEQ ID NO:8)	03-O-577 (SEQ ID NO:17)	9623 - 10376
67609/69240 (SEQ ID NO:38)	104	3' junction	67609 (SEQ ID NO:36)	69240 (SEQ ID NO:37)	9862-9965

[1] Location in sequence of Event DAS-59122-7 (see Figure 1). Bases 1 - 2593 = 5' border, bases 2594 - 9936 = T-DNA insert, bases 9937 - 11922 = 3' border.

PCR GC2 Advantage™ Polymerase kit (BD Biosciences Clontech, Inc.) was used according to manufacturer's instructions to amplify the insert fragments (22I-1 (SEQ ID NO: 25), 22I-2 (SEQ ID NO: 26), and 22I-3 (SEQ ID NO: 27)). Briefly, a 50μL reaction contained 5' and 3' primers at a final concentration of 0.2μM and 40 ng of genomic DNA. PCR reactions were set up in duplicate using genomic DNA preparation from plants DAS-59122-7 T1S2 1 and DAS-59122-7 T1S2 2. PCR conditions were as follows: initial denaturation at 95°C for 1 min, followed by 35 cycles of 94°/95°C for 30 sec, 55°C for 30 sec, and 68°C for 5 min, with final extension at 68°C for 6 min. PCR amplification products were visualized under UV light, following electrophoresis through a 1% agarose gel in 1X TBE (89mM Tris-Borate, 2mM EDTA, pH 8.3) stained with ethidium bromide.

PCR fragments 22I-1 (SEQ ID NO: 25), 22I-2 (SEQ ID NO: 26), and 22I-3 (SEQ ID NO: 27) were purified by excising the fragments from 0.8% agarose gel in 1X TBE stained with ethidium bromide, and purifying the fragment from the agarose using a QIAquick Gel Extraction Kit (Qiagen). PCR fragments were cloned into a pGEM-T Easy plasmid vector using the pGEM-T Easy Vector System I (Promega Corp.). Cloned fragments were verified by minipreparation of the plasmid DNA (QIAprep Spin Miniprep Kit, Qiagen) and restriction digestion with *Not* I. Plasmid clones and/or purified PCR insert fragments were then sent for sequencing of the complete insert. Sequencing reactions were carried with primers designed to be specific for known T-DNA sequences or with primers specific for use with the pGEM-T Easy vector. Sigma-Genosys, Inc. (The Woodlands, TX) synthesized all PCR primers, which were used at a final concentration of 0.2 – 0.4 μM in the PCR reactions.

PCR reactions with genomic DNA isolated from *B.t.* Cry34/35Ab1 events DAS-59122-7, DAS-45214-4, and DAS-45216-6, and unmodified control lines Hi-II and PH09B were used to confirm (1) the presence of maize genomic DNA in the sequenced border regions of event DAS-59122-7, and (2) event specific amplification across the junctions of the T-DNA insert and genomic DNA borders in event DAS-59122-7.

PCR primers designed to amplify the border sequence flanking the insert in event DAS-59122-7 were used to confirm the presence of those regions in unmodified control lines as well as in event DAS-59122-7. Two (2) sets of primers each, for the 5' and 3' borders (four

(4) sets total) were tested. Primer sets 03-O-784/03-O-564 (SEQ ID NO: 18/SEQ ID NO:14) and 03-O-784/03-O-543 (SEQ ID NO: 18/SEQ ID NO:13) were used to amplify 136 bp and 263 bp fragments, respectively, from border sequence 5' to the T-DNA insert in event DAS-59122-7 (Figures 2 and 3). Similarly, primer sets 03-O-569/03-O-577 (SEQ ID NO: 15/SEQ ID NO:17) and 03-O-570/03-O-542 (SEQ ID NO: 16/SEQ ID NO:12) were used to amplify 227 bp and 492 bp fragments, respectively, from the 3' genomic border (Figures 2 and 3).

Primers designed to amplify fragments across the junction of the border sequence and T-DNA insert were used to establish event-specific PCR fragments for event DAS-59122-7. One primer set was selected for each of the two junctions. Primer set 03-O-784/02-O-215 (SEQ ID NO: 18/SEQ ID NO:1) was designed to amplify a 555 bp fragment across the 5' junction, and primer set 02-O-219/03-O-577 (SEQ ID NO: 2/SEQ ID NO:17) was designed for amplification of a 547 bp fragment at the 3' junction. A set of primers, IVR1(O197) (SEQ ID NO: 39) 5'- CCGCTGTATCACAAGGGCTGGTACC-3' and IVR2(O198) (SEQ ID NO: 40) 5'- GGAGCCCGTGTAGAGCATGACGATC-3', based on the endogenous maize invertase gene (Hurst *et al.*, (1999) *Molecular Breeding* 5 (6):579-586), was used to generate a 226 bp amplification product as an internal positive control for all maize genomic DNA samples.

All PCR primers were synthesized by Sigma-Genosys, Inc. and used at a final concentration of 0.2 – 0.4 μM in the PCR reactions. PCR primer sequences are listed in the Table 2. For PCR amplifications, Advantage™-GC 2 PCR kit (BD Biosciences) was used according to manufacturer's instructions. Approximately 10-100 ng of genomic DNA template was used per 50 μL PCR reaction. PCR conditions were as follows: initial template denaturation at 94°C for 5 min, followed by 35 cycles of 95°C for 1 minute, 60°C for 2 minutes, and 72°C for 3 min, with final extension at 72°C for 7 min. The PCR amplification products were visualized under UV light following electrophoresis through a 1% agarose gel with 1X TBE and ethidium bromide.

Sequence data obtained for the T-DNA insert and border regions of event DAS-59122-7 was reviewed and assembled using Seqman II™ software Version 4.0.5 (DNAStar, Inc., Madison, WI). The 5' and 3' border sequences flanking the insert present in event DAS-59122-7 were used for homology searching against the GenBank public databases in order to further characterize the site of insertion in the maize genome. Analysis to identify

open reading frames in the junction regions between the flanking borders and T-DNA insert in event DAS-59122-7 was conducted using Vector NTI 8.0 (InforMax™, Inc., Frederick, MD).

In total, 11922 bp of sequence from genomic DNA of event DAS-59122-7 was confirmed (see Figure 1). At the 5' end of the T-DNA insert, 2593 bp of flanking border sequence was identified, and 1986 bp of flanking border sequence was obtained on the 3' end from fragments derived from genome walking experiments. A total of 7160 bp of the T-DNA insert was cloned and sequenced using PCR primer sets designed to amplify three overlapping fragments labeled 22I-1 (2501 bp) (SEQ ID NO:25), 22I-2 (3027 bp) (SEQ ID NO:26), and 22I-3 (2830 bp) (SEQ ID NO:27) representing sequence from the 5' region of the T-DNA running through to the 3' region of the T-DNA insert for event DAS-59122-7 from bp 2687 to bp 9846 (see Figure 1). The remainder of the T-DNA insert region was sequenced from two PCR fragments, O506/O476 (SEQ ID NO: 10/SEQ ID NO:9) and O447/O577 (SEQ ID NO: 8/SEQ ID NO:17) that spanned the 5' and 3' junctions, respectively, of the T-DNA insert with corn genomic DNA. Primers used were designed based on the sequence obtained from the genome walking experiments to amplify a fragment spanning the unique junction of the T-DNA with the corn genomic DNA. Primer set 03-O-506/03-O-476 (SEQ ID NO: 10/SEQ ID NO:9) spanned the 5' junction and amplified a 313 bp fragment (from bp 2427 to bp 2739) and primer set 03-O-447/03-O-577 (SEQ ID NO: 8/SEQ ID NO:17) spanned the 3' junction and amplified a 754 bp fragment (from bp 9623 to bp 10376). Combined, a total of 7343 bp of the T-DNA insert in event DAS-59122-7 was cloned and sequenced (from bp 2594 to bp 9936, see Figure 1) and compared to the sequence of the transforming plasmid, PHP17662. Two nucleotide differences at bp 6526 and bp 6562 were observed in the non-translated wheat peroxidase promoter region of the T-DNA insert (see Figure 1). Neither of the observed base changes affected the open reading frame composition of the T-DNA insert. Both the 3' and 5' end regions of the T-DNA insert were found to be intact, except for deletion of the last 22 bp at the 5' end and 25 bp at the 3' end encompassing the Right and Left T-DNA Border regions, respectively. While T-DNA border sequences are known to play a critical role in T-DNA insertion into the genome, this result is not unexpected since insertions are often imperfect, particularly at the Left T-DNA Border (Tinland (1996) *Trends in Plant Science* 1(6):178-184).

BLAST (Basic Local Alignment Search Tool) analysis of the genomic border regions of event DAS-59122-7 showed limited homology with publicly available sequences (Release 138.0 GenBank, Oct 25, 2003). Analysis of the 5' border region found two areas with

significant homology to maize genomic and EST (Expressed Sequence Tag) sequences. The first area encompasses 179 bp (bp 477 to bp 655 of the border sequence) and displays similarity to several molecular markers, chromosomal sequences, and consensus sequences obtained by alignment of various ESTs. The second area occurs at bp 1080 to bp 1153 (74 bp) of the 5' border sequence, and shows similarity to a number of different maize ESTs and genomic sequences. The 3' border region also had two small non-contiguous regions of similarity to plant DNA sequences. The inner 3' region of 162 bp (bp 9954 to bp 10115) showed similarity to the 3' untranslated end of two genomic *Zea mays* alcohol dehydrogenase (*adh1*) genes as well as to several EST consensus sequences. A smaller region (57 bp) in the middle of the 3' border (bp 10593 to bp10649) showed similarity to non-coding regions from multiple maize genomic sequences.

Overall, no homologous regions greater than 179 base pairs were identified in either of the genomic border sequences, nor was more than one homologous region from the same known sequence found. Individual accessions displaying similarity to the event DAS-59122-7 border sequences were examined to determine if the insertion in event DAS-59122-7 occurred in a characterized protein coding sequence. None of the regions of similarity occurred within any known protein coding sequences. Local alignment of the entire transformation plasmid sequence, PHP17662, with the event DAS-59122-7 border sequences showed no significant homologies, indicating that the border regions flanking the T-DNA insert did not contain fragments of the transforming plasmid. Therefore, identification and characterization of the genomic sequence flanking the insertion site in event DAS-59122-7 was limited due to the absence of significant regions of homology to known sequences.

The 5' and 3' junction regions between the maize genomic border sequence and the T-DNA insert in event DAS-59122-7 were analyzed for the presence of novel open reading frames. No open reading frames of significant size (> 100 amino acids) were identified in the 5' or 3' border junction regions, indicating that no novel open reading frames were generated as a result of the T-DNA insertion. Additionally, the homology searches did not indicate the presence of endogenous maize open reading frames in the border regions that might have been interrupted by the T-DNA insertion in *B.t.* Cry34/35Ab1 event DAS-59122-7.

Example 5. PCR Primers

DNA event specific primer pairs were used to produce an amplicon diagnostic for DAS-59122-7. These event primer pairs include, but are not limited to, SEQ ID NO: 18 and SEQ ID NO: 1; SEQ ID NO: 2 and SEQ ID NO: 17; SEQ ID NO: 10 and SEQ ID NO: 9; and SEQ ID NO: 8 and SEQ ID NO: 17; and SEQ ID NO: 36 and SEQ ID NO: 37. In addition to these primer pairs, any primer pair derived from SEQ ID NO: 21 and SEQ ID NO: 22 that when used in a DNA amplification reaction produces a DNA amplicon diagnostic for DAS-59122-7 is an embodiment of the present invention. Any modification of these methods that use DNA primers or complements thereof to produce an amplicon DNA molecule diagnostic for DAS-59122-7 is within the ordinary skill of the art. In addition, control primer pairs, which include IVR1(O197)/IVR2(O198) (SEQ ID NO: 39/SEQ ID NO: 40) for amplification of an endogenous corn gene are included as internal standards for the reaction conditions.

The analysis of plant tissue DNA extracts to test for the presence of the DAS-59122-7 event should include a positive tissue DNA extract control (a DNA sample known to contain the transgenic sequences). A successful amplification of the positive control demonstrates that the PCR was run under conditions that allow for the amplification of target sequences. A negative, or wild-type, DNA extract control in which the template DNA provided is either genomic DNA prepared from a non-transgenic plant, or is a non-DAS-59122-7 transgenic plant, should also be included. Additionally a negative control that contains no template corn DNA extract will be a useful gauge of the reagents and conditions used in the PCR protocol.

Additional DNA primer molecules of sufficient length can be selected from SEQ ID NO: 21 and SEQ ID NO: 22 by those skilled in the art of DNA amplification methods, and conditions optimized for the production of an amplicon diagnostic for event DAS-59122-7. The use of these DNA primer sequences with modifications to the methods shown in these Examples are within the scope of the invention. The amplicon wherein at least one DNA primer molecule of sufficient length derived from SEQ ID NO: 21 and SEQ ID NO: 22 that is diagnostic for event DAS-59122-7 is an embodiment of the invention. The amplicon wherein at least one DNA primer of sufficient length derived from any of the genetic elements of PHI17662A that is diagnostic for event DAS-59122-7 is an embodiment of the invention. The assay for the DAS-59122-7 amplicon can be performed by using a Stratagene Robocycler, MJ

Engine, Perkin-Elmer 9700, or Eppendorf Mastercycler Gradient thermocycler, or by methods and apparatus known to those skilled in the art.

Having illustrated and described the principles of the present invention, it should be apparent to persons skilled in the art that the invention can be modified in arrangement and detail without departing from such principles. We claim all modifications that are within the spirit and scope of the appended claims.

All publications and published patent documents cited in this specification are incorporated herein by reference to the same extent as if each individual publication or patent application was specifically and individually indicated to be incorporated by reference.

WHAT IS CLAIMED IS:

1. An isolated DNA molecule comprising a junction sequence comprising a sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof.

2. An insect resistant corn plant, or parts thereof, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof forms part of the plant's genome.

3. A descent plant of the insect resistant corn plant of claim 2, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof, forms part of the plant's genome.

4. Seed of a plant of claim 2 or 3.

5. A method of producing an insect resistant corn plant comprising breeding with a plant of claim 2 or 3, and selecting progeny by analyzing for at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof.

6. A method of detecting the presence of the DAS-59122-7 event insertion in corn tissue comprising:

(a) contacting a sample of said corn tissue with a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof;

(b) subjecting said sample and probe to stringent hybridization conditions; and

(c) analyzing for hybridization of the probe.

7. A DNA detection kit comprising a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof.

ABSTRACT OF THE DISCLOSURE

The invention provides DNA compositions that relate to transgenic insect resistant maize plants. Also provided are assays for detecting the presence of the maize DAS-59122-7 event based on the DNA sequence of the recombinant construct inserted into the maize genome and the DNA sequences flanking the insertion site. Kits and conditions useful in conducting the assays are provided.

Figure 1/3

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   1  CTGAGCGCAC AACAGCGAGT CGCATGGCAC CGGACGACAT GAGCGAGATT
  51  TAGATCGGAG GGTGCGGACA TGGGGCAACC TGCGCAGCTA ACGCAGGGAT
 101  CCACACGACC ACCAACGAAG CCAAGCCCGG GCACGTCCCC AGGCAGGTTG
 151  GGCCCTGGTT CCACCAGCGG ATGCATGCAG TGAAGCGGGG ACGGAGAGAC
 201  AAGCCGAGGG CGCGGGTGGG AATGGCGTCC GGGAGGACGA GTGGAGGAGA
 251  AGAATCTAGA GGCATCGAGA TTCGAGAAGC CGACGGAGAC AAGATTCGTG
 301  TGGGGGGAGA CAAACCGCGG GGCTGAGCGC CGTTGATATG GGATCAGACG
 351  GTGTGGATAA AAAAAGTGAC GTTGATAGAA CGTCTGGCCA GTGAAAAAAC
 401  AAAACAACTC CAACAAAATA CTTTAAAAGC TCTTATACCC TAAATGTAGG
 451  GGATCAAACA CGTCTCTACA CTATTTAGCA GCGTCCTCTA AATGATCCTC
 501  TAAATTTAGA GAACGCTACT AGATTCTCTA TATATAGTTT CTCTAAACGA
 551  TCTTTTATCC ATTTAAATAC TTTAAATAAC CGGTTTAACA AAACTAAAAT
 601  ATATACAATA CATTTGAGAG TATGACAAAT ACGTATGTAT AAAAATAAAA
 651  AATAAAATAA TGTATTAGTC TACTTTGAAT CTTCTTTTCT TCATAATATA
 701  ATGATGTATA GCTCTCATGT GCGTTGAGAA AAAAGTTAGA GCTAGACGTT
 751  TAATGTGTAG TGACAGTCTT CGACGAAATC TCCCTAATGA GATGAATTAC
 801  TGGAGGTTCC ATCAGAAAGT CCCCTGAAAA GAGGCATTTA TTTAGTTTAG
 851  TCAGCAATTT CTGGGAACAC AAATATTCTT TTGTTATCAC CACTATTAAA
 901  AATCTATGGT TATAACTTAT AATAACATGA AAAAATAATT TAGCATCCCA
 951  TATATATAAA AACTGAAGGA AGCCATATAT ACTAACATAA GTTAGGAGAA
1001  ACTAAGAAGG TTGTGCAAAG CTTGCACTGC TCCAAAATAC TGCAAACAAC
1051  CACTCTCCTC TACCAACCAA AGAAACTCAT GTACTCCCTC CGTTCTTTTT
1101  TATTTGTCGC ATTTTAGTTT AAAAATGAAC TAGCAGTCGA CAAATATTCG
1151  AGAACAGATA TAGTATATAC TAACATAACT TAGGAGATAC TAAGAAAGTT
1201  GCGCAGAGCT TTCACTGTTC CAAATTACTG CAAAGCCTCT CCCCTCTGCC
1251  AGTACATCTA CGAGATGTTT CAGTTAAACA AAGATTCAGA CAAGTGATGA
1301  GCCACTTCTT GTCATAGATT GTGTGGTCAA CCAACCCATT GATGCCACGG
1351  TTTTTGTGCA TCCATGCTTT TGTATTAAAA CATCAGTTAT GTTTACCATG
1401  TCCGATATGC TCTACATAAT GACAATCAAC TTGGTGTTCA TTATATTTAC
1451  AATGTTAGGA ATTTCAATAG CTACGAACAC TTCAATAGAA GTGCCTTTGT
1501  GGGATCACCT TAATGTGTTG TTGATGTAAG GAGAAGAATC TTAATTTACT
1551  CTTGCTAAAT TTGAACTACA CAAAACCACT GCACTGAGGA TTGTCCTAAT
1601  AAATTACTGC TCATACACGT TAGCATCTGT TCAGATACTG AGCTAATCCC
1651  TAGGATTAAA GGATTTGTAA AAGATATGCC CAATCATTCA TTTTAGTTAT
1701  TTATTTCTTA GTTATCCACT TGAAGATTTA CATACATTTG AAATAAATTT
1751  CTTAGAGGTA AAGTGAAAAT CAGTTATTTA AATACATTTT AGTTATTTAT
1801  TTTCTTCTTT TTCCTAATTT TTCCTTGTAT TTGAAGTCTG AAAAGATAAC
1851  TTTGCCCTTA TACATATTTT ATCTTCTACG TACGCATCTG AACAACGTCT
1901  CTTTGTCCCC TGATCGTGCA GCAATTAGTG CTATGAATCG CGTTTAAGCG
1951  CTGCAAAATC ATGGCTGGGG CTTCGTCCTC GAGTCGTCCT GCTGCTCGAT
2001  GTCACCTCGA GTCCCGCACC GACCTCAGTG CTTGTTCTTG TTGGAGCCAC
2051  CTCTCTCGGA CGATCGCCAA AGACGGATAA GGCCGAAGCC GTCACTTCAG
2101  ACCGCGCTCA TGCGCCGTAG CAGACTCCTA CATAGCAGGG CCAGGGTATG
2151  TGGACCTTTG CAAGTTTAGG ATTGGAACCA GCGACCAGAA TCCACAAGAT
2201  TGGAGCAAAC GACCAAAAAT TCACAAGGAT TGGCGGCTGA CATTGCCAGC
2251  GCGGGATCGC ATGCGGCGGC GGCGGCCGGG GCGAGCACGG GAGCAGGCGA
2301  CAGTCGAGCT CCATTGGAAC GTAGAAATAC TTAAGGGCAA GGTCTCCAAA
2351  TACTTGAAAA AATAGGAAAA AGAAGAAAAT ACATGAAATG ATATTGAAAT
2401  CAATTGGAAG ATGTTATGAA TCTTGTTTTT GCAAAGCGAA CGATTCAGAT
2451  GGCAAAACTA TGAATCTTTT TGTTTGAAGT CCCAAATATA AAATTTTCTC
2501  GTACTCACCA ACATTGGTGC GCACCTGTGA TTGGCTCATA AAAATTCTTG
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2551    GAGGGACGGA AGAAAGAGTG AAGGGATAAG CAAGTAAAAG CGCTCAAACA
2601    CTGATAGTTT AAACTGAAGG CGGGAAACGA CAATCTGATC ATGAGCGGAG
2651    AATTAAGGGA GTCACGTTAT GACCCCCGCC GATGACGCGG GACAAGCCGT
2701    TTTACGTTTG GAACTGACAG AACCGCAACG TTGAAGGAGC CACTCAGCAA
2751    GCTTACTAGT AGCGCTGTTT AAACGCTCTT CAACTGGAAG AGCGGTTACC
2801    CGGACCGAAG CTTGCATGCC TGCAGTGCAG CGTGACCCGG TCGTGCCCCT
2851    CTCTAGAGAT AATGAGCATT GCATGTCTAA GTTATAAAAA ATTACCACAT
2901    ATTTTTTTTG TCACACTTGT TTGAAGTGCA GTTTATCTAT CTTTATACAT
2951    ATATTTAAAC TTTACTCTAC GAATAATATA ATCTATAGTA CTACAATAAT
3001    ATCAGTGTTT TAGAGAATCA TATAAATGAA CAGTTAGACA TGGTCTAAAG
3051    GACAATTGAG TATTTTGACA ACAGGACTCT ACAGTTTTAT CTTTTTAGTG
3101    TGCATGTGTT CTCCTTTTTT TTTGCAAATA GCTTCACCTA TATAATACTT
3151    CATCCATTTT ATTAGTACAT CCATTTAGGG TTTAGGGTTA ATGGTTTTTA
3201    TAGACTAATT TTTTTAGTAC ATCTATTTTA TTCTATTTTA GCCTCTAAAT
3251    TAAGAAAACT AAAACTCTAT TTTAGTTTTT TTATTTAATA ATTTAGATAT
3301    AAAATAGAAT AAAATAAAGT GACTAAAAAT TAAACAAATA CCCTTTAAGA
3351    AATTAAAAAA ACTAAGGAAA CATTTTTCTT GTTTCGAGTA GATAATGCCA
3401    GCCTGTTAAA CGCCGTCGAC GAGTCTAACG GACACCAACC AGCGAACCAG
3451    CAGCGTCGCG TCGGGCCAAG CGAAGCAGAC GGCACGGCAT CTCTGTCGCT
3501    GCCTCTGGAC CCCTCTCGAG AGTTCCGCTC CACCGTTGGA CTTGCTCCGC
3551    TGTCGGCATC CAGAAATTGC GTGGCGGAGC GGCAGACGTG AGCCGGCACG
3601    GCAGGCGGCC TCCTCCTCCT CTCACGGCAC CGGCAGCTAC GGGGGATTCC
3651    TTTCCCACCG CTCCTTCGCT TTCCCTTCCT CGCCCGCCGT AATAAATAGA
3701    CACCCCCTCC ACACCCTCTT TCCCCAACCT CGTGTTGTTC GGAGCGCACA
3751    CACACACAAC CAGATCTCCC CCAAATCCAC CCGTCGGCAC CTCCGCTTCA
3801    AGGTACGCCG CTCGTCCTCC CCCCCCCCCC CTCTCTACCT TCTCTAGATC
3851    GGCGTTCCGG TCCATGGTTA GGGCCCGGTA GTTCTACTTC TGTTCATGTT
3901    TGTGTTAGAT CCGTGTTTGT GTTAGATCCG TGCTGCTAGC GTTCGTACAC
3951    GGATGCGACC TGTACGTCAG ACACGTTCTG ATTGCTAACT TGCCAGTGTT
4001    TCTCTTTGGG GAATCCTGGG ATGGCTCTAG CCGTTCCGCA GACGGGATCG
4051    ATTTCATGAT TTTTTTTGTT TCGTTGCATA GGGTTTGGTT TGCCCTTTTC
4101    CTTTATTTCA ATATATGCCG TGCACTTGTT TGTCGGGTCA TCTTTTCATG
4151    CTTTTTTTTG TCTTGGTTGT GATGATGTGG TCTGGTTGGG CGGTCGTTCT
4201    AGATCGGAGT AGAATTCTGT TTCAAACTAC CTGGTGGATT TATTAATTTT
4251    GGATCTGTAT GTGTGTGCCA TACATATTCA TAGTTACGAA TTGAAGATGA
4301    TGGATGGAAA TATCGATCTA GGATAGGTAT ACATGTTGAT GCGGGTTTTA
4351    CTGATGCATA TACAGAGATG CTTTTTGTTC GCTTGGTTGT GATGATGTGG
4401    TGTGGTTGGG CGGTCGTTCA TTCGTTCTAG ATCGGAGTAG AATACTGTTT
4451    CAAACTACCT GGTGTATTTA TTAATTTTGG AACTGTATGT GTGTGTCATA
4501    CATCTTCATA GTTACGAGTT TAAGATGGAT GGAAATATCG ATGTAGGATA
4551    GGTATACATG TTGATGTGGG TTTTACTGAT GCATATACAT GATGGCATAT
4601    GCAGCATCTA TTCATATGCT CTAACCTTGA GTACCTATCT ATTATAATAA
4651    ACAAGTATGT TTTATAATTA TTTTGATCTT GATATACTTG GATGATGGCA
4701    TATGCAGCAG CTATATGTGG ATTTTTTTAG CCCTGCCTTC ATACGCTATT
4751    TATTTGCTTG GTACTGTTTC TTTTGTCGAT GCTCACCCTG TTGTTTGGTG
4801    TTACTTCTGC AGGTCGACTC TAGAGGATCC ACACGACACC ATGTCCGCCC
4851    GCGAGGTGCA CATCGACGTG AACAACAAGA CCGGCCACAC CCTCCAGCTG
4901    GAGGACAAGA CCAAGCTCGA CGGCGGCAGG TGGCGCACCT CCCCGACCAA
4951    CGTGGCCAAC GACCAGATCA AGACCTTCGT GGCCGAATCC AACGGCTTCA
5001    TGACCGGCAC CGAGGGCACC ATCTACTACT CAATTAATGG CGAGGCCGAG
5051    ATCAGCCTCT ACTTCGACAA CCCGTTCGCC GGCTCCAACA AATACGACGG
5101    CCACTCCAAC AAGTCCCAGT ACGAGATCAT CACCCAGGGC GGCTCCGGCA
5151    ACCAGTCCCA CGTGACCTAC ACCATCCAGA CCACCTCCTC CCGCTACGGC
5201    CACAAGTCCT GAGTCATGAG TCATGAGTCA GTTAACCTAG ACTTGTCCAT
5251    CTTCTGGATT GGCCAACTTA ATTAATGTAT GAAATAAAAG GATGCACACA
5301    TAGTGACATG CTAATCACTA TAATGTGGGC ATCAAAGTTG TGTGTTATGT
5351    GTAATTACTA GTTATCTGAA TAAAAGAGAA AGAGATCATC CATATTTCTT
5401    ATCCTAAATG AATGTCACGT GTCTTTATAA TTCTTTGATG AACCAGATGC
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5451    ATTTCATTAA CCAAATCCAT ATACATATAA ATATTAATCA TATATAATTA
5501    ATATCAATTG GGTTAGCAAA ACAAATCTAG TCTAGGTGTG TTTTGCGAAT
5551    GCGGCCGCGG ACCGAATTGG GGATCTGCAT GAAAGAAACT GTCGCACTGC
5601    TGAACCGCAC CTTGTCACTT TCATCGAACA CGACCTGTGC CCAAGATGAC
5651    GGTGCTGCGG TCTAAGTGAG GCTGAATTGC CTTGGACAGA AGCGGACTCC
5701    CTACAATTAG TTAGGCCAAA CGGTGCATCC ATGTGTAGCT CCGGGCTCGG
5751    GCTGTATCGC CATCTGCAAT AGCATCCATG GAGCTCGTTC CATGTAGTTG
5801    GAGATGAACC AATGATCGGG CGTGTGGACG TATGTTCCTG TGTACTCCGA
5851    TAGTAGAGTA CGTGTTAGCT CTTTCATGGT GCAAGTGAAA TTTGTGTTGG
5901    TTTAATTACC CCTACGTTAG TTGCGGGACA GGAGACACAT CATGAATTTA
5951    AAGGCGATGA TGTCCTCTCC TGTAATGTTA TTCTTTTGAT GTGATGAATC
6001    AAAATGTCAT ATAAAACATT TGTTGCTCTT TAGTTAGGCC TGATCGTAGA
6051    ACGAAATGCT CGTGTAGCGG GGCTACGAGC CTATGACGCA ATAACACTGG
6101    TTTGCCGGCC CGGAGTCGCT TGACAAAAAA AAGCATGTTA AGTTTATTTA
6151    CAATTCAAAA CCTAACATAT TATATTCCCT CAAAGCAGGT TCACGATCAC
6201    ACCTGTACCT AAAAAAAACA TGAAGAATAT ATTACTCCAT TATTATGAGA
6251    TGAACCACTT GGCAAGAGTG GTAAGCTATA TAAAAAAATG AACATTATTA
6301    CGAGATGTTA TATGCCATTA TATTGATTCG AAGATATATG TTTCTTTCTC
6351    CCACGGGCAC CTAACGGATA CATGATAAGG CCAAGGCAGA TCACGGGAAA
6401    TTATTCGAAT ACATGTTACG CCCTATTGCC GGAAAAAAAA TGCAGGGCAG
6451    GTGTTGGCCG TAGCGATTTA AGCACTTAAG CTGGAGGTTG CCACACTTGG
6501    ATGCAAGCGT CTGACCCTTC TAAAACATCG GCGGCTTTGT CCGTATCCGT
6551    ATCCCCTATC CGACATCTAG CTGGCCACAC GACGGGGCTG GGCAGATCGT
6601    GGATGCCGGG TCGACGTCGA TCGTCAGCCA TCATAGACCA ATCGACCATC
6651    TGTTATGGAT GCTTGCTAGC TAGACTAGTC AGACATAAAA TTTGGATACT
6701    TTCTCCCAAC TGGGAGACGG GGACTGATGT GCAGCTGCAC GTGAGCTAAA
6751    TTTTTCCCTA TAAATATGCA TGAAATACTG CATTATCTTG CCACAGCCAC
6801    TGCCACAGCC AGATAACAAG TGCAGCTGGT AGCACGCAAC GCATAGCTCT
6851    GGACTTGTAG CTAGGTAGCC AACCGGATCC ACACGACACC ATGCTCGACA
6901    CCAACAAGGT GTACGAGATC AGCAACCACG CCAACGGCCT CTACGCCGCC
6951    ACCTACCTCT CCCTCGACGA CTCCGGCGTG TCCCTCATGA ACAAGAACGA
7001    CGACGACATC GACGACTACA ACCTCAAGTG GTTCCTCTTC CCGATCGACG
7051    ACGACCAGTA CATCATCACC TCCTACGCCG CCAACAACTG CAAGGTGTGG
7101    AACGTGAACA ACGACAAGAT TAATGTGTCA ACCTACTCCT CCACCAACTC
7151    CATCCAGAAG TGGCAGATCA AGGCCAACGG CTCCTCCTAC GTGATCCAGT
7201    CCGACAACGG CAAGGTGCTC ACCGCCGGCA CCGGCCAGGC CCTCGGCCTC
7251    ATCCGCCTCA CCGACGAGTC CTCCAACAAC CCGAACCAGC AATGGAACCT
7301    GACGTCCGTG CAGACCATCC AGCTCCCGCA GAAGCCGATC ATCGACACCA
7351    AGCTCAAGGA CTACCCGAAG TACTCCCCGA CCGGCAACAT CGACAACGGC
7401    ACCTCCCCGC AGCTCATGGG CTGGACCCTC GTGCCGTGCA TCATGGTGAA
7451    CGACCCGAAC ATCGACAAGA ACACCCAGAT CAAGACCACC CCGTACTACA
7501    TCCTCAAGAA GTACCAGTAC TGGCAGAGGG CCGTGGGCTC CAACGTCGCG
7551    CTCCGCCCGC ACGAGAAGAA GTCCTACACC TACGAGTGGG GCACCGAGAT
7601    CGACCAGAAG ACCACCATCA TCAACACCCT CGGCTTCCAG ATCAACATCG
7651    ACAGCGGCAT GAAGTTCGAC ATCCCGGAGG TGGGCGGCGG TACCGACGAG
7701    ATCAAGACCC AGCTCAACGA GGAGCTCAAG ATCGAGTATT CACATGAGAC
7751    GAAGATCATG GAGAAGTACC AGGAGCAGTC CGAGATCGAC AACCCGACCG
7801    ACCAGTCCAT GAACTCCATC GGCTTCCTCA CCATCACCTC CCTGGAGCTC
7851    TACCGCTACA ACGGCTCCGA GATCCGCATC ATGCAGATCC AGACCTCCGA
7901    CAACGACACC TACAACGTGA CCTCCTACCC GAACCACCAG CAGGCCCTGC
7951    TGCTGCTGAC CAACCACTCC TACGAGGAGG TGGAGGAGAT CACCAACATC
8001    CCGAAGTCCA CCCTCAAGAA GCTCAAGAAG TACTACTTCT GAGTCATGAG
8051    TCATGAGTCA GTTAACCTAG ACTTGTCCAT CTTCTGGATT GGCCAACTTA
8101    ATTAATGTAT GAAATAAAAG GATGCACACA TAGTGACATG CTAATCACTA
8151    TAATGTGGGC ATCAAAGTTG TGTGTTATGT GTAATTACTA GTTATCTGAA
8201    TAAAAGAGAA AGAGATCATC CATATTTCTT ATCCTAAATG AATGTCACGT
8251    GTCTTTATAA TTCTTTGATG AACCAGATGC ATTTCATTAA CCAAATCCAT
8301    ATACATATAA ATATTAATCA TATATAATTA ATATCAATTG GGTTAGCAAA
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 9501    CCCGCTGAAA TCACCAGTCT CTCTCTACAA ATCTATCTCT CTCTATAATA
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 9651    AATACTTCTA TCAATAAAAT TTCTAATTCC TAAAACCAAA ATCCAGGGCG
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11651    TATCGACCAC AGGACTGAGC CCAGCACTTT CCATCTCATT CCACAATGTC
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11751    GTATATCTTG AGATCTGGTG GACACCGGCA CTCCCGCATC CTCTCCATCA
11801    GCTCCAAGCA CTCCTCAAGC TGCTCCTTCT TCTCGTGTGC TACAAAGAAA
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Figure 2/3

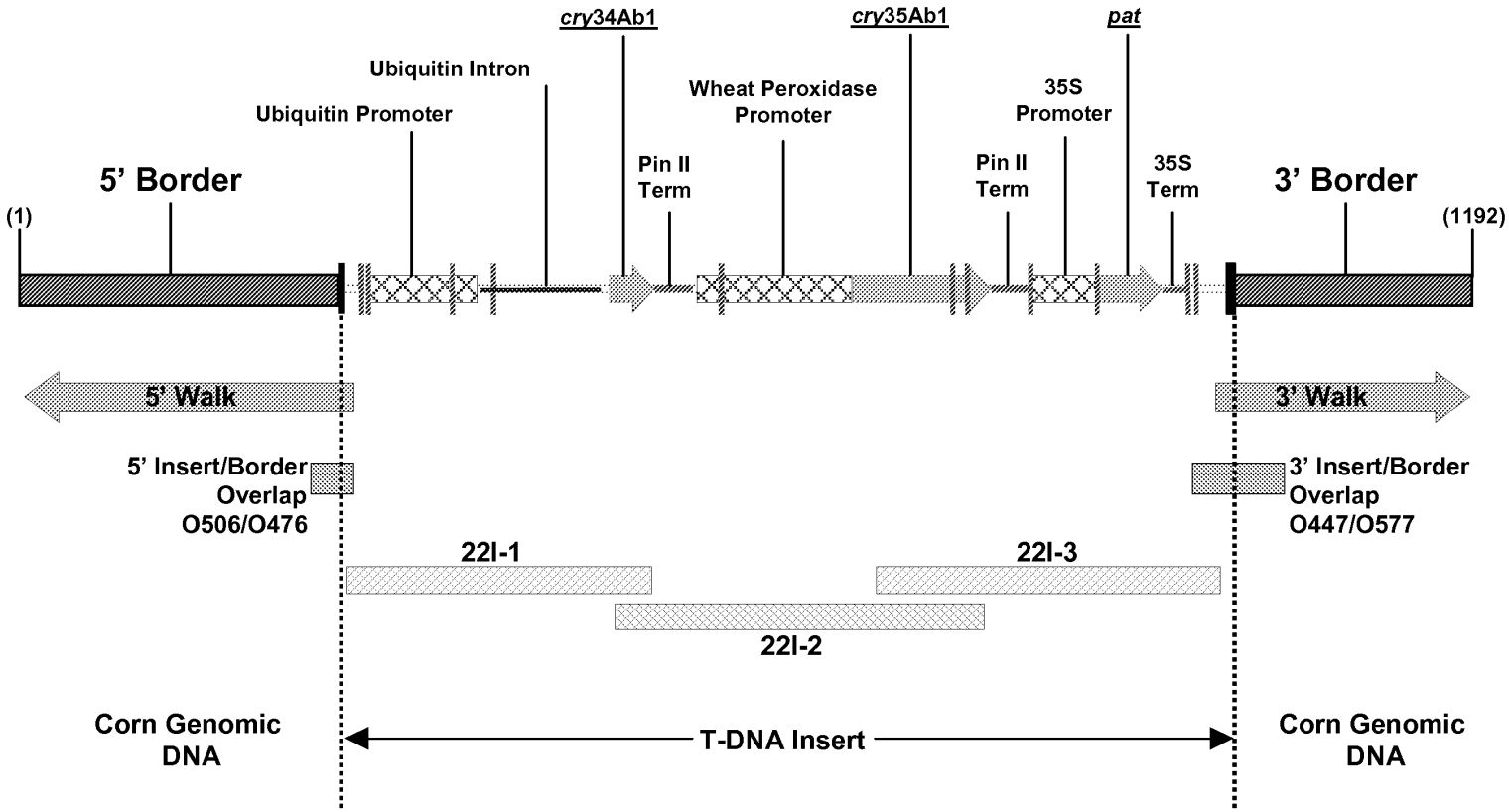
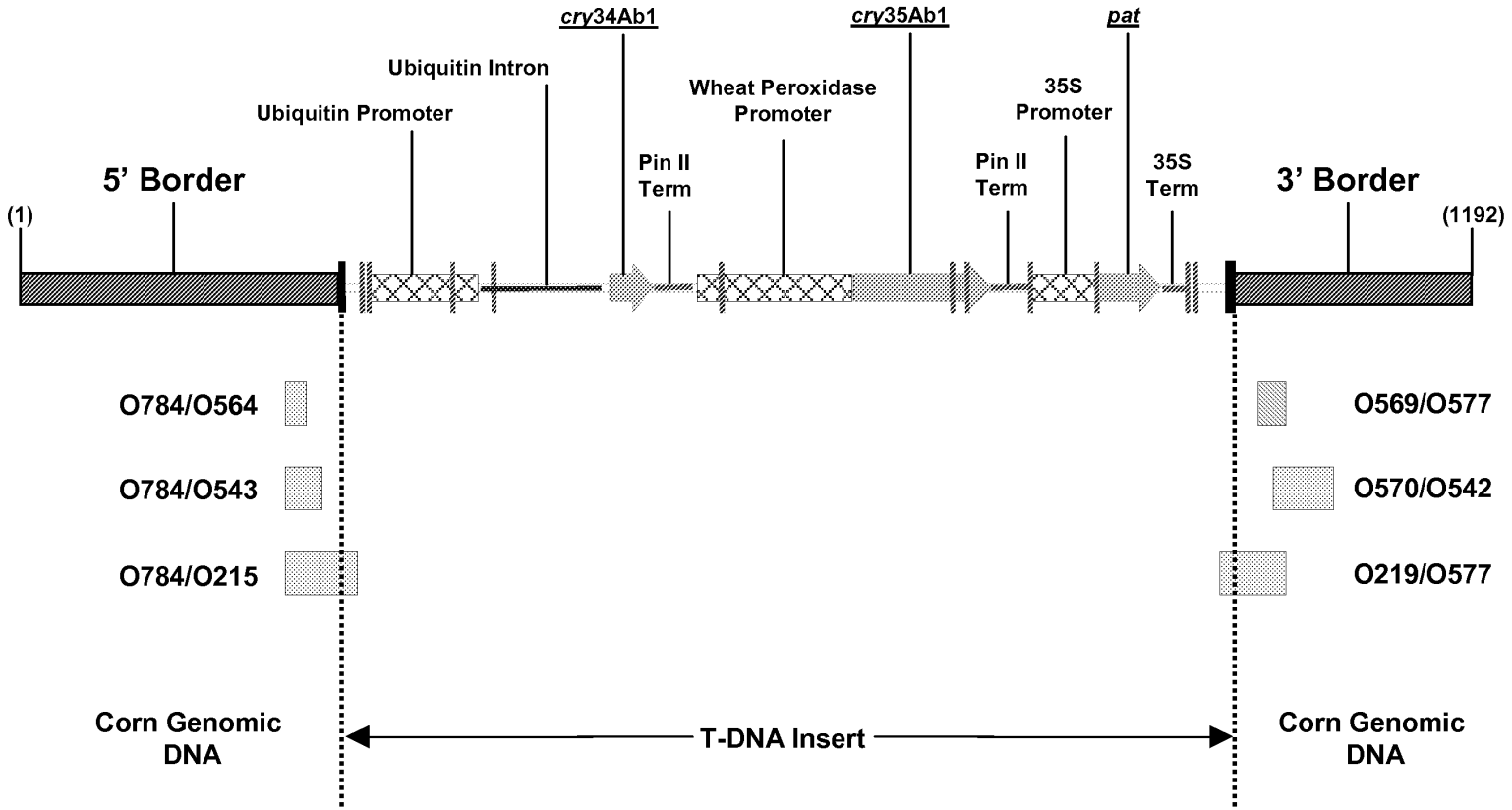
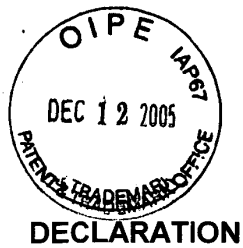

cry34Ab1
cry35Ab1
pat
Ubiquitin Intron
Ubiquitin Promoter
Wheat Peroxidase Promoter
35S Promoter
Pin II Term
Pin II Term
35S Term
5' Border
3' Border
(1)
(1192)
5' Walk
3' Walk
5' Insert/Border Overlap O506/O476
3' Insert/Border Overlap O447/O577
22I-1
22I-3
22I-2
Corn Genomic DNA
T-DNA Insert
Corn Genomic DNA

Figure 3/3


cry34Ab1
cry35Ab1
pat
Ubiquitin Intron
Ubiquitin Promoter
Wheat Peroxidase Promoter
35S Promoter
Pin II Term
Pin II Term
35S Term
5' Border
3' Border
(1)
(1192)
O784/O564
O784/O543
O784/O215
O569/O577
O570/O542
O219/O577
Corn Genomic DNA
T-DNA Insert
Corn Genomic DNA



Attorney Docket No. 1895

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if multiple names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Corn Event DAS-59122-7 and Methods for Detection Thereof

the specification of which (check one)

☐ is attached hereto

☒ was filed on 09/28/2005 as Application Serial No. 11/237,222 or PCT International Application No. and was amended on (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known by me to be material to patentability as defined in Title 37, Code of Federal Regulations §1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or (f), or §365(b), of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or under Title 35, United States Code, §365(a), of any PCT international application which designated at least one country other than the United States of America, listed below; and I have also identified below any related foreign application for patent, inventor's or plant breeder's rights certificate(s), or any related PCT International application, having a filing date before that of the application on which priority is claimed.

NUMBER	COUNTRY	MM/DD/YYYY FILED	PRIORITY CLAIMED
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

As a named inventor, I hereby appoint the practitioners associated with the Customer Number provided below to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to that Customer Number:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Application Data Sheet

Application Information

Application Type::	Regular
Subject Matter::	Utility
Suggested Classification::	
Suggested Group Art Unit::	
CD-ROM or CD-R?::	
Number of CD disks::	
Number of copies of CDs::	
Sequence submission?::	Electronic
Computer Readable Form (CRF)?::	
Number of copies of CRF::	
Title::	Corn Event DAS-59122-7 and Methods for Detection Thereof
Attorney Docket Number::	1895D9
Request for Early Publication?::	No
Request for Non-Publication?::	No
Suggested Drawing Figure::	02
Total Drawing Sheets::	07
Small Entity::	
Petition included?::	
Secrecy Order in Parent Appl.?::	No

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Correspondence Information

Correspondence Customer Number:: 27310

Representative Information

Representative Customer Number:: 27310

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	Division of	11/237,222	09/28/2005
11/237,222	An application claiming the benefit under 35 USC 119(e)	60/614,225	09/29/2004

Assignee Information

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Assignee Name::	Dow AgroSciences LLC
Assignee Name::	E.I. DuPont deNemours and Company

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:		Confirmation No. :
Applicant	:	James Wayne Bing, et al.	
Filed	:	November 12, 2007	
TC/A.U.	:		
Examiner	:		
Docket No.	:	1895D9	
Customer No.	:	27310	
Title	:	Corn Event DAS-59122-7 and Methods for Detection Thereof	

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

STATEMENT TO SUPPORT FILING OF SEQUENCE LISTING

I hereby state that the content of the Sequence Listing text file electronically filed with the above-referenced application does not contain new matter that extends beyond the original disclosure. The Sequence Listing is herein incorporated by reference into application as filed.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	Confirmation No. :
Applicant	:	James Wayne Bing, et al.
Filed	:	11/12/2007
Examiner	:	
Docket No.	:	1895D9
Customer No.	:	27310
Title	:	Corn Event DAS-59122-7 and Methods for Detection Thereof

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

FILING OF AN INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.97

Attached is a list of documents on form PTO-1449.

It is requested that the Examiner consider these documents and officially make them of record in accordance with the provisions of 37 CFR §1.97 and Section 609 of the MPEP. By submitting the listed documents, Applicant in no way makes any admission as to the prior art status of the listed documents, but is instead submitting the listed documents for the sake of full disclosure.

Any foreign patents or non-patent literature documents are attached except those that were supplied in, or cited by the Office during prosecution of, parent Application No. 11/237,222, filed 09/28/2005. Since the benefit of this application was claimed under 35 USC 120, no copies need to be furnished in accordance with 37 CFR §1.98(d); however, copies will be furnished on request.

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PTO/SB/08A (07-05)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	
Filing Date	11/12/2007
First Named Inventor	James Wayne Bing
Art Unit	
Examiner Name	
Attorney Docket Number	1895D9

U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No.[1]	Document Number Number - Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	US-6,395,485	05-28-2002	Marc DeBeuckeleer	Entire document

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	A2	WO 2004/011601 A2	02-05-2004	Monsanto Technology, LLC	Entire document	
	A3	EP 1 167 531 A1	02-01-2002	Monsanto Technology, LLC	Entire document	
	A4	WO 84/02913	08-02-1984	Monsanto Company	Entire document	
	A5	WO 01/14417	03-01-2001	Mycogen Corporation	Entire document	
	A6	WO 03/052073	06-26-2003	Syngenta Participations AG	Entire document	
	A7	WO 2002/15701	02-28-2002	Syngenta Participations Ag	Entire document	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	A8	KARIN RICKER, Biotechnology Consultation Note to the File BNF No. 000081, U.S. Food and Drug Administration, (2004), Pages 1-6, XP002384225	
	A9	HUNST AND ROOD, Application for the Determinatino of Nonregulated Status for *B.t.* Cry34/35Ab1 Insect-Resistant, Glufosinate-Tolerant Corn: Corn Line 59122, U.S. Department of Agriculture, Animal and Plant Health Inspection Service, (2004), Pages 1-237, XP 002384226	
	A10	WHITELAW, ET AL., PUFTW67TB ZM_0.6_1.0_KB Zea mays genomic clone ZMMBTa0732K13, genomic survey sequence, (2003), EMBL Accession No. CG069192	
	A11	ELLIS, ET AL., Novel *Bacillus thuringiensis* Binary Insecticidal Crystal Proteins Active on Western corn Rootworm, *Diabrotica virgifera virgifera* LeConte, App and Envir Microbiology, 68(3): 1137-1145, XP002985898	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	
Applicant	:	James Wayne Bing, et al.
Filed	:	November 12, 2007
TC/A.U.	:	
Examiner	:	
Docket No.	:	1895D9
Title	:	Corn Event DAS-59122-7 and Methods for Detection Thereof

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

STATEMENT REGARDING SEQUENCES

The following statement is intended to provide information to the Examiner about the sequences of the invention and how they are positioned in the transformation event of the invention. The attached appendices were submitted to Examiner Kubelik in the parent application (Application Serial No. 11/237,222) in order to assist with explaining the function and importance of each sequence. It is believed that these appendices were helpful to the Examiner and thus they are resubmitted in an effort to assist with prosecution of divisional applications.

No new matter is presented in the appendices.

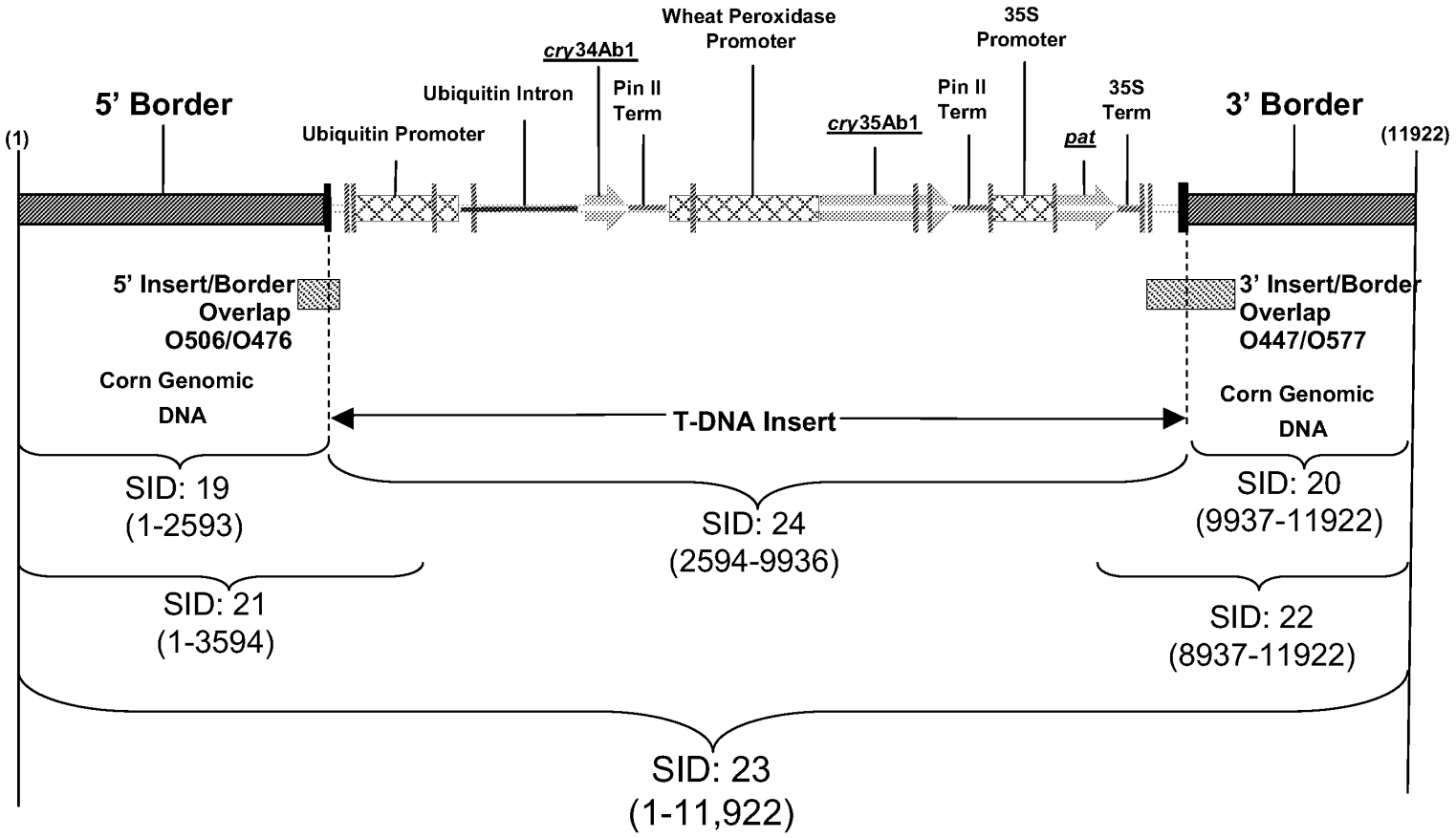
If the Examiner has any questions regarding these explanations or the information provided herein, it is respectfully requested that the Examiner telephone the undersigned agent so that further examination of this application can be expedited.

Respectfully submitted,

/Claire L. Moxon/
Claire L. Moxon, Reg. # 57,557

PIONEER HI-BRED INTERNATIONAL, INC.
Corporate Intellectual Property
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P.O. Box 1000
Johnston, Iowa 50131-1000
Phone: (515) 253-2162
Facsimile: (515) 334-6883

Appendix A


5' Border
(1)
Ubiquitin Promoter
Ubiquitin Intron
cry34Ab1
Pin II Term
Wheat Peroxidase Promoter
cry35Ab1
Pin II Term
35S Promoter
pat
35S Term
3' Border
(11922)
5' Insert/Border Overlap O506/O476
3' Insert/Border Overlap O447/O577
Corn Genomic DNA
T-DNA Insert
Corn Genomic DNA
SID: 19 (1-2593)
SID: 24 (2594-9936)
SID: 20 (9937-11922)
SID: 21 (1-3594)
SID: 22 (8937-11922)
SID: 23 (1-11,922)

Appendix B

Primer Sequences (SEQ ID Nos: 1-18, 36, 37, 39, 40)		
SEQ ID No:	**Description**	**Position on SEQ ID No: 23**
1	O215 primer (reverse)	2743-2716
2	O219 primer (forward)	9830-9858
3	O227 primer (reverse)	9846-9827
4	O370 primer (forward)	4871-4894
5	O371 primer (reverse)	5187-5163
6	O372 primer (forward)	7017-7044
7	O373 primer (reverse)	7897-7873
8	O447 primer (forward)	9623-9645
9	O476 primer (reverse)	2739-2714
10	O506 primer (forward)	2427-2451
11	O514 primer (forward)	2687-2709
12	O542 primer (reverse)	10766-10742
13	O543 primer (reverse)	2451-2427
14	O564 primer (reverse)	2324-2299
15	O569 primer (forward)	10150-10174
16	O570 primer (forward)	10275-10299
17	O577 primer (reverse)	10376-10352
18	O784 primer (forward)	2189-2213
36	67609 primer (forward)	9862-9886
37	69240 primer (forward)	9941-9967
39	IVR1 primer (used to generate a 226 bp amplicon to be used as an internal positive control)	n/a
40	IVR2 primer (used to generate a 226 bp amplicon to be used as an internal positive control)	n/a

Event sequences – borders and insert (SEQ ID Nos: 19-24)		
SEQ ID No:	**Description**	**Position on SEQ ID No: 23**
19	5' border sequence, genomic maize DNA	1-2593
20	3' border sequence, genomic maize DNA	9937-11922
21	5' border sequence plus beginning of insert, spans unique junction point of event	1-3594
22	3' border sequence plus end of insert, spans unique junction point of event	8936-11922
23	Entire event – 5' border, insert, 3' border	1-11922 (all)
24	t-DNA insert	2594-9936

Amplicon sequences made using primers (SEQ ID Nos: 25-35, 38)		
SEQ ID No:	**Description**	**Position on SEQ ID No: 23**
25	Amplicon 22I-1, 2501 bp, within tDNA insert, made with primers of SEQ ID NOs: 11 and 5	2687-5187
26	Amplicon 22I-2, 3027 bp, within tDNA insert, made with primers of SEQ ID NOs: 4 and 7	4871-7897
27	Amplicon 22I-3, 2830 bp, within tDNA insert, made with primers of SEQ ID NOs: 6 and 3	7017-9846
28	Amplicon of 136 bp made with primers of SEQ ID NOs: 18 and 14, within 5' genomic DNA border	2189-2324
29	Amplicon of 263 bp made with primers of SEQ ID NOs: 18 and 13, within 5' genomic DNA border	2189-2451
30	Amplicon of 227 bp made with primers of SEQ ID NOs: 15 and 17, within 3' genomic DNA border	10150-10376
31	Amplicon of 492 bp made with primers of SEQ ID NOs: 16 and 12, within 3' genomic DNA border	10275-10766
32	Amplicon of 555 bp made with primers of SEQ ID NOs: 18 and 1, spans unique junction of 5' border with tDNA insert	2189-2743
33	Amplicon of 547 bp made with primers of SEQ ID NOs: 2 and 17, spans unique junction of 3' border with tDNA insert	9830-10376
34	Amplicon of 313 bp made with primers of SEQ ID NOs: 10 and 9, spans unique junction of 5' border with tDNA insert	2427-2739
35	Amplicon of 754 bp made with primers of SEQ ID NOs: 8 and 17, spans unique junction of 3' border with tDNA insert	9623-10376
38	Amplicon of 104 bp made with primers of SEQ ID NOs: 36 and 37, spans unique junction of 3' border with tDNA insert	9862-9965

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	Claire L. Moxon/Ginny Boesen
Attorney Docket Number:	1895D9

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	310	310
Utility Search Fee	1111	1	510	510
Utility Examination Fee	1311	1	210	210
Pages:				
Claims:				
Independent claims in excess of 3	1201	1	210	210
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1240**

Electronic Acknowledgement Receipt	
EFS ID:	2455148
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	27310
Filer:	Claire L. Moxon/Ginny Boesen
Filer Authorized By:	Claire L. Moxon
Attorney Docket Number:	1895D9
Receipt Date:	12-NOV-2007
Filing Date:	
Time Stamp:	15:32:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1240
RAM confirmation Number	7772
Deposit Account	161852
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. Section 1.17 (Patent application and reexamination processing 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	1895D9_Utility_Transmittal.pdf	112777 7cc4f1d271028c49b9eb60e3334571d149d7f337	no	1
Warnings:					
Information:					
2		1895D9_App.pdf	278622 1691425a81e62b3b6d64930b2836df50ae776f99	yes	43

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	41
Claims	42	42
Abstract	43	43

Warnings:					
Information:					
3	Drawings-only black and white line drawings	1895D9_Figure_1.pdf	93323 dd480fc991757fb5098771b815cdacd91d3c983b	no	5
Warnings:					
Information:					
4	Drawings-other than black and white line drawings	1895D9_Figs_2and3.pdf	113180 4c5a46b1058074041692e0f63e54b1a047264a42	no	2
Warnings:					
Information:					
5	Oath or Declaration filed	1895D9_Declaration.pdf	188830 280862079a24d739d90109df056e290a41d080b1	no	13
Warnings:					
Information:					
6	Application Data Sheet	1895D9_App_Data_Sheet.pdf	70638 3aeb04229f48cc6063b4f0b97ae31784fa3e33f5	no	10
Warnings:					
Information:					

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7	CRF Statement Paper and CRF are the same	1895D9_Seq_List_Statement.pdf	70699 625b50e4f4e0e7602886cebb192879982a068273	no	1
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Information:					
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Warnings:					
Information:					
10	Information Disclosure Statement (IDS) Filed	1895D9_Form_1449.pdf	124806 b873a18e40682191a321432db97f769ea300fa0e	no	1
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11	Miscellaneous Incoming Letter	1895D9_Statement_re_sequences.pdf	71275 8eabdeef49ec82a03f3c97275963b434f4914c3c	no	2
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New International Application Filed with the USPTO as a Receiving Office
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MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET

Substitute for Form PTO-1360

(For use with Form PTO/SB/06)

Application Number	Filing Date
11/938,483	11/12/07

Applicant(s)

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT		*		*		*	
	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend
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2	1						52					
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Total Indep	4						Total Indep					
Total Depend	5						Total Depend					
Total Claims	9						Total Claims					

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PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/938,483	11/12/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	11/12/2007	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 9	Minus	** 20	= 0	X $ =		OR	X $50=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***3	= 1	X $ =		OR	X $210=	210
	☐ 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	210

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/Kim Downing/

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Sequence Listing could not be accepted due to errors.
See attached Validation Report.
If you need help call the Patent Electronic Business Center at (866) 217-9197 (toll free).
Reviewer: markspencer
Timestamp: [year=2007; month=12; day=5; hr=14; min=42; sec=7; ms=540;]
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Reviewer Comments:
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Validated By CRFValidator v 1.0.3

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W 213	Artificial or Unknown found in <213> in SEQ ID (17)
W 213	Artificial or Unknown found in <213> in SEQ ID (18)
W 213	Artificial or Unknown found in <213> in SEQ ID (19)
W 213	Artificial or Unknown found in <213> in SEQ ID (20)

Input Set:

Output Set:

Started: 2007-11-12 15:33:33.111
Finished: 2007-11-12 15:33:36.954
Elapsed: 0 hr(s) 0 min(s) 3 sec(s) 843 ms
Total Warnings: 40
Total Errors: 25
No. of SeqIDs Defined: 40
Actual SeqID Count: 38

Error code	Error Description
	This error has occured more than 20 times, will not be displayed
E 259	Found undefined lettercode; POS (11923) SEQID(23)
E 259	Found undefined lettercode; POS (11924) SEQID(23)
E 259	Found undefined lettercode; POS (11925) SEQID(23)
E 259	Found undefined lettercode; POS (11926) SEQID(23)
E 259	Found undefined lettercode; POS (11927) SEQID(23)
E 259	Found undefined lettercode; POS (11928) SEQID(23)
E 259	Found undefined lettercode; POS (11929) SEQID(23)
E 259	Found undefined lettercode; POS (11930) SEQID(23)
E 259	Found undefined lettercode; POS (11931) SEQID(23)
E 259	Found undefined lettercode; POS (11932) SEQID(23)
E 254	The total number of bases conflicts with running total, Input: 24, Calculated : 11932 SEQID(23)
E 253	The number of bases differs from <211> Input: 11922 Calculated:11932 SEQID (23)
E 259	Found undefined lettercode; POS (7391) SEQID(23)
E 259	Found undefined lettercode; POS (7392) SEQID(23)
E 259	Found undefined lettercode; POS (7393) SEQID(23)
E 259	Found undefined lettercode; POS (7394) SEQID(23)
E 259	Found undefined lettercode; POS (7395) SEQID(23)
E 259	Found undefined lettercode; POS (7396) SEQID(23)
E 259	Found undefined lettercode; POS (7397) SEQID(23)
E 259	Found undefined lettercode; POS (7398) SEQID(23)

Input Set:

Output Set:

Started: 2007-11-12 15:33:33.111
Finished: 2007-11-12 15:33:36.954
Elapsed: 0 hr(s) 0 min(s) 3 sec(s) 843 ms
Total Warnings: 40
Total Errors: 25
No. of SeqIDs Defined: 40
Actual SeqID Count: 38

Error code	Error Description
E 259	Found undefined lettercode; POS (7399) SEQID(23)
E 254	The total number of bases conflicts with running total, Input: 25, Calculated : 7399 SEQID(23)
E 253	The number of bases differs from <211> Input: 7390 Calculated:7399 SEQID (23)
E 212	Invalid Sequence ID Number; Expected 24 as next SeqID but skipped
E 252	Calc# of Seq. differs from actual; 40 seqIds defined; count=38

SEQUENCE LISTING

<110> Bing, James Wayne
Cressman, Jr., Robert F.
Gupta, Manju
Hakimi, Salim M.
Hartnett Locke, Mary E.
Hondred, David
Krone, Todd L.
Luckring, Abigail K.
Meyer, Sandra E.
Moellenbeck, Daniel
Narva, Kenneth Edwin
Olson, Paul D.
Sanders, Craig D.
Wang, Jimei
Zhang, Jian
Zhong, Gan-Yuan

<120> CORN EVENT DAS-59122-7 AND METHODS FOR
DETECTION THEREOF

<130> 1895D9

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<150> 11/237,222
<151> 2005-09-28

<150> 60/614,225
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<223> Oligonucleotide primer

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<210> 19
<211> 2593
<212> DNA
<213> Artificial Sequence

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<223> 5' flanking sequence of DAS 59122-7.

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ccaagcccgg gcacgtcccc aggcaggttg ggccctggtt ccaccagcgg atgcatgcag 180
tgaagcgggg acggagagac aagccgaggg cgcgggtggg aatggcgtcc gggaggacga 240
gtggaggaga agaatctaga ggcatcgaga ttcgagaagc cgacggagac aagattcgtg 300
tgggggggaga caaaccgcgg ggctgagcgc cgttgatatg ggatcagacg gtgtggataa 360
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ctttaaaagc tcttataccc taaatgtagg ggatcaaaca cgtctctaca ctatttagca 480
gcgtcctcta aatgatcctc taaatttaga gaacgctact agattctcta tatatagttt 540
ctctaaacga tcttttatcc atttaaatac tttaaataac cggtttaaca aaactaaaat 600
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<212> DNA
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<223> 3' flanking sequence of DAS 59122-7.

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aagaaaagta acaacgaagc ttcatcagct acaaattttg gcccaactgg ttgcaccagc 420
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tggcccttat ttggttacgt tgcaattcac cccaatccac atgtggattg agatggattg 600
cagtgtagct agacaaaccc ttaggccctg tttgcatagg aatacaccag gaattattcc 660
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tgggat 1986

<210> 21
<211> 3594
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence that represents part of the PHI17662A
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<210> 22
<211> 2987
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence that represents part of the PHI17662A
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caccacaaga gtggattgat gatctagaga ggttgcaaga tagataccct tggttggttg 180
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gtttttggca aagggatttt gagttgccag ctcctccaag gccagttagg ccagttaccc 540
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Electronic Patent Application Fee Transmittal

Application Number:	11938483
Filing Date:	
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	Claire L. Moxon/Ginny Boesen
Attorney Docket Number:	1895D9

03/04/2008 MTEKLEMI 00000005 161852 11938483
01 FC:1203 370.00 DA

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	310	310
Utility Search Fee	1111	1	510	510
Utility Examination Fee	1311	1	210	210
Pages:				
Claims:				
Independent claims in excess of 3	1201	1	210	210
Miscellaneous-Filing:				
Petition:				

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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
11/938,483	11/12/2007	1638	1610	1895D9	7	4

CONFIRMATION NO. 4077

27310
PIONEER HI-BRED INTERNATIONAL, INC.
7250 N.W. 62ND AVENUE
P.O. BOX 552
JOHNSTON, IA 50131-0552

FILING RECEIPT

OC000000028623368

Date Mailed: 03/10/2008

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 write to the Office of Initial Patent Examination's Filing Receipt Corrections. 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**

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Assignment For Published Patent Application

Pioneer Hi-Bred International, Inc.
Dow AgroSciences LLC
E.I. DuPont deNemours and Company

Power of Attorney: The patent practitioners associated with Customer Number 27310

Domestic Priority data as claimed by applicant

This application is a DIV of 11/237,222 09/28/2005 PAT 7,323,556

which claims benefit of 60/614,225 09/29/2004

Foreign Applications

If Required, Foreign Filing License Granted: 03/04/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 11/938,483**

Projected Publication Date: To Be Determined - pending completion of Sequence Disclosures

Non-Publication Request: No

Early Publication Request: No

Title

Corn Event DAS-59122-7 and Methods for Detection Thereof

Preliminary Class

800

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/938,483	11/12/2007	James Wayne Bing	1895D9

CONFIRMATION NO. 4077

27310
PIONEER HI-BRED INTERNATIONAL, INC.
7250 N.W. 62ND AVENUE
P.O. BOX 552
JOHNSTON, IA 50131-0552

FORMALITIES LETTER

OC000000028623369

Date Mailed: 03/10/2008

NOTICE TO COMPLY WITH REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE SEQUENCE AND/OR AMINO ACID SEQUENCE DISCLOSURES

Filing Date Granted

Applicant is given **TWO MONTHS FROM THE DATE OF THIS NOTICE** within which to file the items indicated below to avoid abandonment. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

- A copy of the "Sequence Listing" in computer readable form has been submitted. However, the content of the computer readable form does not comply with the requirements of 37 CFR 1.822 and/or 1.823, as indicated on the attached copy of the marked -up "Raw Sequence Listing." Applicant must provide a substitute computer readable form (CRF) copy of the "Sequence Listing" and a statement that the content of the sequence listing information recorded in computer readable form is identical to the written (on paper or compact disc) sequence listing and, where applicable, includes no new matter, as required by 37 CFR 1.821(e), 1.821(f), 1.821(g), 1.825(b), or 1.825(d). Refer to attachment or PAIR document dated 02/19/08.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

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/lvongxay/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	11/938,483	Confirmation No. : 4077
Applicant	:	James Wayne Bing, et al.	
Filed	:	November 12, 2007	
TC/A.U.	:	Unknown	
Examiner	:	Unknown	
Docket No.	:	1895D9	
Customer No.	:	27310	
Title	:	Corn Event DAS-59122-7 and Methods for Detection Thereof	

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

STATEMENT TO SUPPORT FILING OF SEQUENCE LISTING

I hereby state that the content of the substitute copy of the Sequence Listing text file electronically filed with the above-referenced application in accordance with 37 CFR 1.825(b) is the same as the amended Sequence Listing. The Sequence Listing is herein incorporated by reference into application as filed.

Respectfully submitted,

/Claire L. Moxon/
Claire L. Moxon, Reg. # 57,557

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Corporate Intellectual Property
7250 N.W. 62nd Avenue
P.O. Box 552
Johnston, Iowa 50131-0552
Phone: (515) 253-2162
Facsimile: (515) 334-6883

Electronic Acknowledgement Receipt

EFS ID:	2970606
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	27310
Filer:	Claire L. Moxon/Ginny Boesen
Filer Authorized By:	Claire L. Moxon
Attorney Docket Number:	1895D9
Receipt Date:	10-MAR-2008
Filing Date:	12-NOV-2007
Time Stamp:	10:27:12
Application Type:	Utility under 35 USC 111(a)

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.)
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2	CRF Statement Paper and CRF are the same	1895D9_Supp_Sequence_Listing_Statement.pdf	57073 9a8285c394bf0420e0278f6064bd3d5a9033b44b	no	1
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			Total Files Size (in bytes):	115707	

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.

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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
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.

DocCode – SEQ.TXT

SCORE Placeholder Sheet for IFW Content

Application Number: 11938483 Document Date: 03/10/2008

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.

- Sequence Listing

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.

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- Other USPTO employees can bookmark the current SCORE URL (http://es/ScoreAccessWeb/).
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Form Revision Date: February 8, 2006

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Sequence Listing was accepted.
If you need help call the Patent Electronic Business Center at (866)
217-9197 (toll free).
Reviewer: Anne Corrigan
Timestamp: [year=2008; month=3; day=21; hr=15; min=6; sec=11; ms=776; ]
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Validated By CRFValidator v 1.0.3

Application No: 11938483 Version No: 2.0

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Krone, Todd L.
Luckring, Abigail K.
Meyer, Sandra E.
Moellenbeck, Daniel
Narva, Kenneth Edwin
Olson, Paul D.
Sanders, Craig D.
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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
11/938,483	11/12/2007	1638	1610	1895D9	7	4

CONFIRMATION NO. 4077

UPDATED FILING RECEIPT

27310
PIONEER HI-BRED INTERNATIONAL, INC.
7250 N.W. 62ND AVENUE
P.O. BOX 552
JOHNSTON, IA 50131-0552

OC000000029310881

Date Mailed: 04/15/2008

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Power of Attorney: The patent practitioners associated with Customer Number 27310

Domestic Priority data as claimed by applicant

This application is a DIV of 11/237,222 09/28/2005 PAT 7,323,556

which claims benefit of 60/614,225 09/29/2004

Foreign Applications

If Required, Foreign Filing License Granted: 03/04/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 11/938,483**

Projected Publication Date: 07/24/2008

Non-Publication Request: No

Early Publication Request: No

Title

Corn Event DAS-59122-7 and Methods for Detection Thereof

Preliminary Class

800

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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).

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
11/938,483	11/12/2007	James Wayne Bing	1895D9

CONFIRMATION NO. 4077

27310
PIONEER HI-BRED INTERNATIONAL, INC.
7250 N.W. 62ND AVENUE
P.O. BOX 552
JOHNSTON, IA 50131-0552

PUBLICATION NOTICE

OC000000031168532

Date Mailed: 07/24/2008

Title: Corn Event DAS-59122-7 and Methods for Detection Thereof

Publication No.US-2008-0178323-A1
Publication Date:07/24/2008

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

PTO/SB/80 (01-06)
Approved for use through 12/31/2008. OMB 0651-0035
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 27142

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 27142

OR

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

Assignee Name and Address:

Pioneer Hi-Bred International, Inc.
800 Capital Square, 400 Locust Street
Des Moines, IA 50309

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Louise A. Foutch	Date	November 6, 2008
Name	Louise A. Foutch	Telephone	515-248-4835
Title	Assistant Secretary		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

PTO/SB/96 (09-04)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Bing, James Wayne., et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: 11/12/2007

Entitled: Corn Event DAS-59122-7 and Methods for Detection Thereof

Pioneer Hi-Bred International, Inc., a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title, and interest

The extent (by percentage) of its ownership interest is _____ %

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

A. ☒ 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 016658, Frame 0251, 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 shown below:

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

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ Copies of assignments or other documents in the chain of title are attached.

[**NOTE**: A separate copy (i.e., a true copy of the original document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded 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.

Louise A. Foutch — Signature

11/6/2008 — Date

Louise A. Foutch — Printed or Typed Name

515/248-4835 — Telephone Number

Assistant Secretary — Title

This collection of information is required by 37 CFR 3.73(b). 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. 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.

PTO/SB/80 (11-08)
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b). For Application/Patent No.: 11/938,483

I hereby appoint:

☑ Practitioners associated with the Customer Number: 27142

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 27142

OR

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

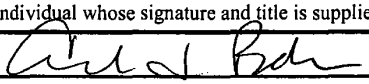
Assignee Name and Address:

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	December 17, 2008
Name	Andrea T. Borucki	Telephone	317-337-4846
Title	General Patent Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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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PTO/SB/96 (08-03)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: **BING, James Wagner, et al.**

Application No./Patent No.: **11/938,483** Filed/Issue Date: **November 12, 2007**

Entitled: **CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF**

DOW AGROSCIENCES LLC., a **Limited Liability Company**
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:
1. ☒ the assignee of the entire right, title, and interest; or

2. ☐ an assignee of less than the entire right, title and interest.
The extent (by percentage) of its ownership interest is ____%
in 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 016876, Frame 0849, 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 shown below:

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.

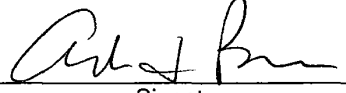
2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel ____, Frame ____, or for which a copy thereof is attached.

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

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

[ ] Copies of assignments or other documents in the chain of title are attached.
[NOTE: A separate copy (i.e., the original assignment document or a true copy of the original document) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded 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.

December 17, 2008	**ANDREA T. BORUCKI**
Date	Typed or printed name
317-337-4846	
Telephone number	Signature
	GENERAL PATENT COUNSEL
	Title

This collection of information is required by 37 CFR 3.73(b). 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.

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

Electronic Acknowledgement Receipt

EFS ID:	4569342
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	27310
Filer:	Heidi S. Nebel/Betty Haverkamp
Filer Authorized By:	Heidi S. Nebel
Attorney Docket Number:	1895D9
Receipt Date:	07-JAN-2009
Filing Date:	12-NOV-2007
Time Stamp:	14:04:56
Application Type:	Utility under 35 USC 111(a)

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		1895D9_BING_POA_373_1-7-09.pdf	214939 08d17fcb9a44a324a2f83f048b256fe8d7f7cdcf	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Change of Address	1	1
	Assignee showing of ownership per 37 CFR 3.73(b).	2	2
	Change of Address	3	3
	Assignee showing of ownership per 37 CFR 3.73(b).	4	4
Warnings:			
Information:			
	Total Files Size (in bytes):	214939	

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
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/938,483	11/12/2007	James Wayne Bing	1895D9

CONFIRMATION NO. 4077

POA ACCEPTANCE LETTER

27142
MCKEE, VOORHEES & SEASE, P.L.C.
ATTN: PIONEER HI-BRED
801 GRAND AVENUE, SUITE 3200
DES MOINES, IA 50309-2721

OC000000034010657

Date Mailed: 01/13/2009

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/07/2009.

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.

/atesfai/

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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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
11/938,483	11/12/2007	James Wayne Bing	1895D9

CONFIRMATION NO. 4077

27310
PIONEER HI-BRED INTERNATIONAL, INC.
7250 N.W. 62ND AVENUE
P.O. BOX 552
JOHNSTON, IA 50131-0552

POWER OF ATTORNEY NOTICE

OC000000034010626

Date Mailed: 01/13/2009

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/07/2009.

- 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).

/atesfai/

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
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	1895D9	4077

27142 7590 03/09/2010

MCKEE, VOORHEES & SEASE, P.L.C.
ATTN: PIONEER HI-BRED
801 GRAND AVENUE, SUITE 3200
DES MOINES, IA 50309-2721

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

NOTIFICATION DATE	DELIVERY MODE
03/09/2010	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):

patatty@ipmvs.com

Office Action Summary	Application No.	Applicant(s)	
	11/938,483	BING ET AL.	
	Examiner	Art Unit	
	Anne R. Kubelik	1638	

-- 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 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 _____.

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

3)☐ 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

4)☒ Claim(s) 1-7 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

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

8)☒ Claim(s) 1-7 are subject to restriction and/or election requirement.

Application Papers

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

10)☐ 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-7, all in part, drawn to a nucleic acid of SEQ ID NO:32 or 34, a plant comprising it and a method of using it, classified in class 800, subclass 320.1.

II. Claims 1-7, all in part, drawn to a nucleic acid of SEQ ID NO:33 or 35, a plant comprising it and a method of using it, classified in class 800, subclass 320.1.

The inventions are distinct, each from the other because of the following reasons:

Different nucleotide sequences are structurally distinct chemical compounds that are unrelated to one another. These sequences are thus deemed to normally constitute **independent and distinct** inventions within the meaning of 35 U.S.C. 121. Each sequence requires an independent search of the sequence databases. Absent evidence to the contrary, each such nucleotide and amino acid sequence is presumed to represent an independent and distinct invention, subject to a restriction requirement pursuant to 35 U.S.C. 121 and 37 CFR 1.141 et seq (see MPEP 803.04 and 2434).

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if the restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic sources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention; and/or

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that for the reply to this requirement to be complete, it must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention.**

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out the supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be present at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of the right petition under 37 CFR 1.144.

Should Applicant traverse on the ground that the inventions are not patently distinct, Applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention(s).

If claims are added after the election, Applicant must indicate which of these claims are readable on the elected invention.

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 petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

March 5, 2010

/Anne R Kubelik/
Primary Examiner, Art Unit 1638

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	James Wayne Bing et al.	Group Art Unit: 1638
Appl. No.:	11/938,483	Examiner Name: Anne R. Kubelik
Filed:	November 12, 2007	Confirmation No.: 4077
For:	CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF	

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

REVOCATION OF POWER OF ATTORNEY AND NEW POWER OF ATTORNEY BY ASSIGNEE AND CHANGE OF CORRESPONDENCE ADDRESS

Pioneer Hi-Bred International, Inc., E.I. DuPont deNemours and Company, and Dow AgroSciences LLC, the Assignees of record hereby revoke all powers of attorney previously granted with respect to the above-identified patent application, and appoints the practitioners associated with the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and directs that all correspondence be addressed to that Customer Number:

Customer Number 29122

with full power of substitution and revocation to transact all business in the Patent and Trademark Office in connection therewith.

Please direct telephone calls to the attention of:

W. Murray Spruill
Registration No. 32,943
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111

Pioneer Hi-Bred International, Inc., E.I. DuPont deNemours and Company, and Dow AgroSciences LLC, the assignees of record, hereby elects under 37 C.F.R. § 3.71 to prosecute this patent application and certifies that they are the assignees of the entire right, title, and interest in the patent application identified above by virtue of the **§ 3.73(b) information cited below**:

Assignments from the inventor(s) of the patent application identified above. The assignments were recorded under US Provisional Application No. 60/614,225 in the United States Patent and Trademark Office at Reel 016658, Frame 0251 and at Reel 016876, Frame 0849.

☒ 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.

The undersigned (whose title is supplied below) is empowered to sign this certificate on behalf of the Assignee.

Assignee of Record:

Pioneer Hi-Bred International, Inc.

By: Louise A. Foutch

Print Name: Louise A. Foutch

Title: Assistant Secretary

Date: 2-4-2010

ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
LEGAL02/31372667v1

☒ 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.

The undersigned (whose title is supplied below) is empowered to sign this certificate on behalf of the Assignee.

Assignee of Record:

E.I. DuPont deNemours and Company

By: Barbara Massie

Print Name: Barbara Massie

Title: Assistant Secretary – Patent Board

Date: February 3, 2010

ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
LEGAL02/31372667v1

☒ 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.

The undersigned (whose title is supplied below) is empowered to sign this certificate on behalf of the Assignee.

Assignee of Record:

Dow AgroSciences LLC

By: Andrea T Borucki

Print Name: Andrea T Borucki

Title: General Patent Counsel

Date: Feb 5, 2010

ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
LEGAL02/31372667v1

Electronic Acknowledgement Receipt

EFS ID:	7168124
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	27142
Filer:	Bruce J. Rose/Kim Shaul
Filer Authorized By:	Bruce J. Rose
Attorney Docket Number:	1895D9
Receipt Date:	09-MAR-2010
Filing Date:	12-NOV-2007
Time Stamp:	11:15:53
Application Type:	Utility under 35 USC 111(a)

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	Power of Attorney	POA384482.pdf	120168 93d4b530098ec4b5b37d293e64b30a605966728a	no	4

Warnings:	
Information:	

Total Files Size (in bytes):	120168

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
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
11/938,483	11/12/2007	James Wayne Bing	1895D9

CONFIRMATION NO. 4077

POWER OF ATTORNEY NOTICE

27142
MCKEE, VOORHEES & SEASE, P.L.C.
ATTN: PIONEER HI-BRED
801 GRAND AVENUE, SUITE 3200
DES MOINES, IA 50309-2721

OC000000040611463

Date Mailed: 03/17/2010

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/09/2010.

- 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).

/nmohammed/

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
11/938,483	11/12/2007	James Wayne Bing	035718/384482

CONFIRMATION NO. 4077

POA ACCEPTANCE LETTER

29122
ALSTON & BIRD LLP
PIONEER HI-BRED INTERNATIONAL, INC.
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

OC000000040611477

Date Mailed: 03/17/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/09/2010.

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.

/nmohammed/

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

Attorney's Docket No. 035718/384482

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Bing et al.	Confirmation No.:	4077
Appl No.:	11/938,483	Group Art Unit:	1638
Filed:	November 12, 2007	Examiner:	Kubelik, Anne R.
For:	Corn Event DAS-59122-7 And Methods For Detection Thereof		

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

RESPONSE TO RESTRICTION REQUIREMENT

This is in response to the Office Action dated March 9, 2010, in which the Examiner has required restriction between Group I, namely Claims 1-7, all in part, drawn to a nucleic acid of SEQ ID NO: 32 or 34, and Group II, namely Claims 1-7, all in part, drawn to a nucleic acid of SEQ ID NO: 33 or 35.

Applicant hereby elects to prosecute the claims of Group I (Claims 1-7 all in part, drawn to a nucleic acid of SEQ ID NO: 32 or 34) and expressly reserves the right to file divisional applications or take such other appropriate measures deemed necessary to protect the inventions in the remaining claims. Should the Examiner have further questions or comments with respect to examination of this case, it is respectfully requested that the Examiner telephone the undersigned so that further examination of this application can be expedited.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those, which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

/david m. saravitz/

David M. Saravitz
Registration No. 55,593

CUSTOMER NO. 29122
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LEGAL02/31801640v1

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON MARCH 30, 2010.

Electronic Acknowledgement Receipt

EFS ID:	7316176
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	29122
Filer:	David Michael Saravitz/Evelyn Casey
Filer Authorized By:	David Michael Saravitz
Attorney Docket Number:	035718/384482
Receipt Date:	30-MAR-2010
Filing Date:	12-NOV-2007
Time Stamp:	14:57:18
Application Type:	Utility under 35 USC 111(a)

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	Response to Election / Restriction Filed	384482-ResponseToRestrictionRequirement.pdf	82975 f198935616 2ff4df24f09a031a7817f88d25d3bb	no	2

Warnings:

Information:

Total Files Size (in bytes):	82975

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

29122 7590 06/14/2010

ALSTON & BIRD LLP
PIONEER HI-BRED INTERNATIONAL, INC.
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	**PAPER NUMBER**
1638	

MAIL DATE	DELIVERY MODE
06/14/2010	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	11/938,483	BING ET AL.	
	Examiner	Art Unit	
	Anne R. Kubelik	1638	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *30 March 2010*.

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

3)☐ 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

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-7* is/are rejected.

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

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

Application Papers

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

10)☐ 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's election without traverse of Group I (claims 1-7 to the extent they read on SEQW ID NO:32 and 34) in the reply filed on 30 March 2010 is acknowledged.

Claim Objections

2. Claims 1-7 are objected to because of the following informalities:

Claims 1-3 and 5-7 are not written in proper Markush format in their recitation "selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof". The claims should be in the format "selected from the group consisting of A, B, C and D." The "and" before "35" should be deleted. See MPEP § 2173.05(h).

In claim 4, there is an improper article before "plant".

In claim 5, --, said method-- should be inserted after "plant" in line 1 and there is an improper article before "plant" in line 2.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> 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.

4. Claims 2-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter that 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 claims are broadly drawn to insect resistant plants comprising SEQ ID NO:32 or 34.

SEQ ID NO:32 or 34 are not sufficient to confer insect resistance to plants, as they do not encode insect resistance genes.

The only insect resistant corn plants taught in the specification are DAS-59122-7 event plants. The specification does not teach a repeatable process to obtain the exact same seed in each occurrence

Since the seed claimed 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 a seed is not so obtainable or available, a deposit thereof may satisfy the requirements of 35 U.S.C. 112. It is not apparent if such a seed is readily available to the public. If the deposit of these seeds is made under the terms of the Budapest Treaty, then an affidavit or declaration by the Applicant, or a statement by an attorney of record over his or her signature and registration number, stating that the seeds will be irrevocably and without restriction or condition released to the public upon the issuance of a patent would satisfy the deposit requirement made herein. A minimum deposit of 2500 seeds is considered sufficient in the ordinary case to assure availability through the period for which a deposit must be maintained.

If the 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, Applicant may provide assurance of compliance by an affidavit or declaration, or by a statement by an attorney of record over his or her signature and registration number showing that

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

(b) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent;

(c) 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 enforceable life of the patent, whichever is longer;

(d) the viability of the biological material at the time of deposit will be tested (see 37 CFR 1.807); and

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

In addition, the identifying information set forth in 37 CFR 1.809(d) should be added to the specification. See 37 CFR 1.801 - 1.809 [MPEP 2401-2411.05] for additional explanation of these requirements.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> 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.

6. Claims 3, 4 and 6 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 that Applicant regards as the invention. Dependent claims are included in all rejections.

In claim 3, line 3, it is not clear if "the plant" refers to the decent plant or the plant of claim 2.

In claim 4 it is unclear if the seed comprises the nucleotide sequence.

Claim 6 lacks antecedent basis for the limitation "the DAS-59122-7 event insertion" in line 1.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 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.

8. Claim 7 is rejected under 35 U.S.C. 102(b) as being anticipated by Whitelaw et al (2003, GenBank Accession No. BZ739496).

Whitelaw et al disclose a polynucleotide that would hybridize to SEQ ID NO:32 or 34 under stringent conditions.

```
BZ739496/c
LOCUS       BZ739496                798 bp    DNA     linear   GSS 03-MAR-2003
DEFINITION  OGECL73TM ZM_0.7_1.5_KB Zea mays genomic clone ZMMBMa0231N02,
            genomic survey sequence.
ACCESSION   BZ739496
VERSION     BZ739496.1  GI:28719206
KEYWORDS    GSS.
SOURCE      Zea mays
  ORGANISM  Zea mays
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            Spermatophyta; Magnoliophyta; Liliopsida; Poales; Poaceae; PACCAD
            clade; Panicoideae; Andropogoneae; Zea.
REFERENCE   1  (bases 1 to 798)
  AUTHORS   Whitelaw,C.A., Quackenbush,J., Van Aken,S., Utterback,T.,
            Resnick,A., Fraser,C.M., Budiman,M.A., Bedell,J.A., Rohlfing,T.,
            Citek,R.W., Nunberg,A., Robbins,D. and Lakey,N.
  TITLE     Consortium for Maize Genomics
  JOURNAL   Unpublished (2002)
COMMENT     Other_GSSs: OGECL73TC
            Contact: Cathy Whitelaw
            TIGR
            9712 Medical Center Drive, Rockville, MD 20850, USA
            Tel: 301-838-5843
            Fax: 301-838-0208
            Email: whitelaw@tigr.org
            Seq primer: TR
            Class: methylation filtered.
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                     /clone="ZMMBMa0231N02"
                     /clone_lib="ZM_0.7_1.5_KB"
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                     /note="Vector: pBCSK-; Site_1: HincII; 0.7-1.5 kb
                     methylation filtered genomic DNA library"
ORIGIN

  Query Match             73.0%;  Score 405;  DB 20;  Length 798;
  Best Local Similarity   100.0%;  Pred. No. 3.2e-89;
  Matches  405;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 AATCCACAAGATTGGAGCAAACGACCAAAAATTCACAAGGATTGGCGGCTGACATTGCCA 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        414 AATCCACAAGATTGGAGCAAACGACCAAAAATTCACAAGGATTGGCGGCTGACATTGCCA 355

Qy         61 GCGCGGGATCGCATGCGGCGGCGGCGGCCGGGGCGAGCACGGGAGCAGGCGACAGTCGAG 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        354 GCGCGGGATCGCATGCGGCGGCGGCGGCCGGGGCGAGCACGGGAGCAGGCGACAGTCGAG 295

Qy        121 CTCCATTGGAACGTAGAAATACTTAAGGGCAAGGTCTCCAAATACTTGAAAAAATAGGAA 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        294 CTCCATTGGAACGTAGAAATACTTAAGGGCAAGGTCTCCAAATACTTGAAAAAATAGGAA 235

Qy        181 AAAGAAGAAAATACATGAAATGATATTGAAATCAATTGGAAGATGTTATGAATCTTGTTT 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        234 AAAGAAGAAAATACATGAAATGATATTGAAATCAATTGGAAGATGTTATGAATCTTGTTT 175

Qy        241 TTGCAAAGCGAACGATTCAGATGGCAAAACTATGAATCTTTTTGTTTGAAGTCCCAAATA 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        174 TTGCAAAGCGAACGATTCAGATGGCAAAACTATGAATCTTTTTGTTTGAAGTCCCAAATA 115

Qy        301 TAAAATTTTCTCGTACTCACCAACATTGGTGCGCACCTGTGATTGGCTCATAAAAATTCT 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        114 TAAAATTTTCTCGTACTCACCAACATTGGTGCGCACCTGTGATTGGCTCATAAAAATTCT 55

Qy        361 TGGAGGGACGGAAGAAAGAGTGAAGGGATAAGCAAGTAAAAGCGC 405
              |||||||||||||||||||||||||||||||||||||||||||||
Db         54 TGGAGGGACGGAAGAAAGAGTGAAGGGATAAGCAAGTAAAAGCGC 10
```

9. Claim 7 is rejected under 35 U.S.C. 102(b) as being anticipated by Zambryski et al (1996, GenBank Accession No. TIP37TD2).

Zambryski et al disclose a polynucleotide that would hybridize to SEQ ID NO:32 or 34 under stringent conditions.

```
TIP37TD2/c
LOCUS       TIP37TD2                279 bp    DNA     linear   BCT 07-MAR-1996
DEFINITION  Ti plasmid (from A. tumefaciens, nopaline strain T37) T-DNA 3'
            (right) border.
ACCESSION   J01826
VERSION     J01826.1  GI:154702
KEYWORDS    nopaline tumor; tRNA gene; tumor DNA boundary.
SEGMENT     2 of 2
SOURCE      Plasmid Ti
  ORGANISM  Plasmid Ti
            other sequences; plasmids.
```

```
REFERENCE   1  (bases 100 to 279)
  AUTHORS   Zambryski,P., Depicker,A., Kruger,K. and Goodman,H.M.
  TITLE     Tumor induction by Agrobacterium tumefaciens: analysis of the
            boundaries of T-DNA
  JOURNAL   J. Mol. Appl. Genet. 1 (4), 361-370 (1982)
   PUBMED   7108407
REFERENCE   2  (bases 1 to 270)
  AUTHORS   Yadav,N.S., Vanderleyden,J., Bennett,D.R., Barnes,W.M. and
            Chilton,M.D.
  TITLE     Short direct repeats flank the T-DNA on a nopaline Ti plasmid
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 79, 6322-6326 (1982)
COMMENT     Original source text: Plasmid Ti DNA.
            [1] compares given sequence of ti plasmid at t-dna borders with
            corresponding sequences of several t37 teratoma (cf <tic58cg> &
            <tit37cg>) and c58 callus t-dna clones and suggests that mechanism
            of t-dna integration and subsequent stabilization is precise at
            right border and imprecise at left. ti plasmid = tumor inducing
            plasmid; t-dna = transferred dna. right border at base 158 [1] or
            121 [2], as defined by sequencing integrated t-dna.
FEATURES             Location/Qualifiers
     source          1. .279
                     /organism="Plasmid Ti"
                     /mol_type="genomic DNA"
                     /host="nopaline strain T37"
                     /db_xref="taxon:2512"
                     /plasmid="Plasmid Ti"
ORIGIN      About 21000 bases after segment 1.

  Query Match             27.5%;  Score 152.8;  DB 14;  Length 279;
  Best Local Similarity   95.7%;  Pred. No. 1.5e-35;
  Matches  157;  Conservative    0;  Mismatches    7;  Indels    0;  Gaps    0;

Qy        392 GCAAGTAAAAGCGCTCAAACACTGATAGTTTAAACTGAAGGCGGGAAACGACAATCTGAT 451
              || | || |  |  ||||||||||||||||||||||||||||||||||||||||||||
Db        174 GCCAATATATCCTGTCAAACACTGATAGTTTAAACTGAAGGCGGGAAACGACAATCTGAT 115

Qy        452 CATGAGCGGAGAATTAAGGGAGTCACGTTATGACCCCCGCCGATGACGCGGGACAAGCCG 511
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        114 CATGAGCGGAGAATTAAGGGAGTCACGTTATGACCCCCGCCGATGACGCGGGACAAGCCG 55

Qy        512 TTTTACGTTTGGAACTGACAGAACCGCAACGTTGAAGGAGCCAC 555
              |||||||||||||||||||||||||||||||||||||||||||
Db         54 TTTTACGTTTGGAACTGACAGAACCGCAACGTTGAAGGAGCCAC 11
```

10. Claims 1-6 are free of the art, given the failure of the prior art to teach or suggest SEQ ID NO:32 or 34, a plant comprising them, a method of breeding the plant, or a method of detecting the sequences in corn tissue.

11. Claims 1 and 6 would be allowable if rewritten or amended to overcome the objection and/or the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Conclusion

12. No claim is allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

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June 12, 2010

/Anne R Kubelik/
Primary Examiner, Art Unit 1638

Notice of References Cited	Application/Control No. 11/938,483	Applicant(s)/Patent Under Reexamination BING ET AL.	
	Examiner Anne R. Kubelik	Art Unit 1638	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	Zambryski et al (1996, GenBank Accession No. TIP37TD2)
	V	Whitelaw et al (2003, GenBank Accession No. BZ739496)
	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
	Examiner	Art Unit

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	
Filing Date	11/12/2007
First Named Inventor	James Wayne Bing
Art Unit	
Examiner Name	
Attorney Docket Number	1895D9

U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No.[1]	Document Number Number - Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	US-6,395,485	05-28-2002	Marc DeBeuckeleer	Entire document

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	A2	WO 2004/011601 A2	02-05-2004	Monsanto Technology, LLC	Entire document	
	A3	EP 1 167 531 A1	02-01-2002	Monsanto Technology, LLC	Entire document	
	A4	WO 84/02913	08-02-1984	Monsanto Company	Entire document	
	A5	WO 01/14417	03-01-2001	Mycogen Corporation	Entire document	
	A6	WO 03/052073	06-26-2003	Syngenta Participations AG	Entire document	
	A7	WO 2002/15701	02-28-2002	Syngenta Participations Ag	Entire document	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	A8	KARIN RICKER, Biotechnology Consultation Note to the File BNF No. 000081, U.S. Food and Drug Administration, (2004), Pages 1-6, XP002384225	
	A9	HUNST AND ROOD, Application for the Determinatino of Nonregulated Status for *B.t.* Cry34/35Ab1 Insect-Resistant, Glufosinate-Tolerant Corn: Corn Line 59122, U.S. Department of Agriculture, Animal and Plant Health Inspection Service, (2004), Pages 1-237, XP 002384226	
	A10	WHITELAW, ET AL., PUFTW67TB ZM_0.6_1.0_KB Zea mays genomic clone ZMMBTa0732K13, genomic survey sequence, (2003), EMBL Accession No. CG069192	
	A11	ELLIS, ET AL., Novel *Bacillus thuringiensis* Binary Insecticidal Crystal Proteins Active on Western corn Rootworm, *Diabrotica virgifera virgifera* LeConte, App and Envir Microbiology, 68(3): 1137-1145, XP002985898	

Examiner Signature	/Anne Kubelik/	Date Considered	06/03/2010

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.K./

(FILE 'HOME' ENTERED AT 16:24:27 ON 09 JUN 2010)

FILE 'BIOSIS, CAPLUS, CABA, AGRICOLA' ENTERED AT 16:24:42 ON 09 JUN 2010

L1 1 S GENE IDENTIFICATION IN THE FUNGAL PATHOGEN BLUMERIA GRAMINIS

L2 54 S DAS-59122-7

L3 24 DUPLICATE REMOVE L2 (30 DUPLICATES REMOVED)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 11/938,483 Confirmation No.: 4077
Applicant(s): Bing *et al.*
Filed: November 12, 2007
Art Unit: 1638
Examiner: Kubelik, Anne R.
Title: CORN EVENT DAS-59122-7 AND METHODS OF DETECTION THEREOF

Docket No.: 035718/384482
Customer No.: 29122

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

AMENDMENT UNDER 37 C.F.R. § 1.111

Sir:

In response to the Office Action dated June 14, 2010, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.

Remarks/Arguments begin on page 4 of this paper.

Amendments to the Claims:

1. (Currently amended) An isolated DNA molecule comprising a junction sequence comprising a sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, ~~and~~ 35, and complements thereof.

2. (Currently amended) An insect resistant corn plant, or parts thereof, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, ~~and~~ 35, and complements thereof, forms part of the plant's genome.

3. (Currently amended) A descent plant of the insect resistant corn plant of claim 2, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, ~~and~~ 35, and complements thereof, forms part of the descent plant's genome.

4. (Currently amended) A ~~Seed~~ seed of ~~a~~ the plant of claim 2 or 3[[.]], wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, forms part of the seed's genome.

5. (Currently amended) A method of producing an insect resistant corn plant, said method comprising breeding with ~~a~~ the plant of claim 2 or 3, and selecting progeny by analyzing for at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, ~~and~~ 35, and complements thereof.

6. (Currently amended) A method of detecting ~~the presence of the DAS-59122-7~~ event DAS-59122-7 ~~insertion~~ in corn tissue comprising:

(a) contacting a sample of said corn tissue with a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA ~~sequence~~ sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, ~~and~~ 35, and complements thereof;

(b) subjecting said sample and probe to stringent hybridization conditions; and

(c) analyzing for hybridization of the probe.

7. (Currently amended) A DNA detection kit comprising a polynucleotide probe capable of uniquely identifying event DAS-59122-7, wherein said probe comprises a sequence of at least eleven contiguous nucleotides, and wherein said probe ~~that~~ hybridizes under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, ~~and~~ 35, and complements thereof.

REMARKS/ARGUMENTS

Status of the Claims

Claims 1-7 are pending, are objected to, and stand rejected.

Applicants respectfully acknowledge that Examiner Kubelik has determined that claims 1-6 are free of the prior art and that claims 1 and 6 would be allowable if rewritten or amended to overcome the objections and/or the rejections under 35 U.S.C. § 112, second paragraph.

Applicants have amended claims 1-7.

Applicants have amended claims 1-3 and 5-7 to delete "and" in the recitation of "SEQ ID NO: 32, 33, 34, and 35" and to add a comma immediately after "35" in response to an objection to the claims that is discussed below. This amendment to the claims is formal in nature, does not introduce new matter, and is fully supported by Applicants' original disclosure.

Applicants have further amended claim 3 to insert "descent" immediately before the recitation of "plant's" in claim line 3 in response to a rejection of this claim under 35 U.S.C. § 112, second paragraph, that is discussed below. This amendment is formal in nature, does not introduce new matter, and is fully supported by Applicants' original disclosure.

Applicants have amended claim 4 to replace the recitation of the indefinite article "a" that appears immediately before "plant" with the definite article --the-- in response to an objection to claim 4 that is discussed below. Applicants have further amended this claim in response to a rejection of this claim under 35 U.S.C. § 112, second paragraph, that is discussed below to clarify that the seed comprises the DNA of claim 2 or 3. In particular, Applicants have added the recitation, "wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, forms part of the seed's genome" to the end of the claim. This recitation finds basis in similar recitations in claims 2 and

3, from which claim 4 depends in the alternative. Finally, Applicants have replaced "Seed" with --A seed-- to improve clarity of the claim. The amendments to claim 4 are fully supported by Applicants' original disclosure and thus, do not introduce new matter.

Applicants have further amended claim 5 to add --, said method-- immediately after the recitation of plant in claim line 1 and to replace the recitation of the indefinite article "a" that appears immediately before "plant" in claim line 2 with the definite article --the--. These amendments to claim 5 were made in response to an objection that is discussed below. The amendment of claim 5 is formal in nature, does not introduce new matter, and is fully supported by Applicants' original disclosure.

Applicants have further amended claim 6 in response to a rejection of this claim under 35 U.S.C. § 112, second paragraph, that is discussed below. In particular, Applicants have amended the preamble of the claim to recite, "A method of detecting event DAS-59122-7 in corn tissue comprising . . . ." Applicants have also amended part (a) of this claim to replace "sequence" with --sequences-- to correct an obvious clerical error. As amended, the relevant portion of this claim recites "one or more DNA sequences". These amendments are formal in nature, do not introduce new matter, and are fully supported by Applicants' original disclosure.

Applicants have further amended claim 7 to point out more distinctly that the polynucleotide probe is capable of uniquely identifying event DAS-59122-7 and comprises a sequence of at least eleven nucleotides. Support for the amendment of claim 7 can be found in the original claims and throughout the specification, particularly on pages 7 (lines 18-31) and 8 (lines 3-7).

The amendments to the claims were made in the interest of expediting examination of the instant application and not to limit the scope of Applicants' claimed invention. Applicants expressly reserve the right to file one or more continuing applications or take such other measures deemed necessary to protect any subject matter that has been excluded from the scope of the amended claims.

No new matter has been added by way of amendment of the claims or by the additional of the new claims.

Reexamination and reconsideration of the application as amended are respectfully requested in view of the following remarks.

The Objections to the Claims Should Be Withdrawn

Claims 1-7 are objected to various informalities.

The Office Action indicates claims 1-3 and 5-7 are not written in proper Markush format because these claims recited more than one "and" in the recitation, "SEQ ID NO: 32, 33, 34, and 35 and complements thereof."

Applicants respectfully disagree with this position of the Office and are unaware of any legal requirement that a Markush group in a claim must strictly adhere to the form, "A, B, C and D" as alleged in the Office Action. Applicants submit that "A, B, C and D" is equivalent in meaning and scope to, for example, both "A and B and C and D" and "A, B, and C and D". Similarly, Applicants submit that "SEQ ID NO: 32, 33, 34, and 35 and complements thereof" is equivalent in meaning and scope to "SEQ ID NO: 32, 33, 34, 35, and complements thereof".

In the interest of expediting the prosecution of the instant applicant and not to limit the scope of their claimed invention, Applicants have amended each of claims 1-3 and 5-7 to delete therein the first "and" in this recitation "SEQ ID NO: 32, 33, 34, and 35 and complements thereof" as suggested by the Examiner. As amended, these claims (and amended claim 4) recite "SEQ ID NO: 32, 33, 34, 35, and complements thereof", wherein "complements thereof" means the complement of SEQ ID NO: 32, the complement of SEQ ID NO: 33, the complement of SEQ ID NO: 34, and the complement of SEQ ID NO: 35.

The Office Action indicates that claim 4 has an improper article before "plant". To overcome this objection, Applicants have amended claim 4 to replace the recitation of the indefinite article "a" that appears immediately before "plant" with the definite article --the--.

The Office Action indicates that in claim 5, --, said method-- should be inserted immediately after the recitation of "plant" in claim line 1 should be added and that the recitation of the indefinite article "a" that appears immediately before "plant" in claim line 2 should be replaced with the definite article --the--. To overcome this objection to claim, Applicants have amended this claim as suggested by the Examiner.

In view of the above amendments and remarks, the objections to the claims should be withdrawn.

The Rejections of the Claims Under 35 U.S.C. § 112, First Paragraph, Should Be Withdrawn

Claims 2-5 are rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. The Office Action indicates that because DAS-59122-7 plants are essential to the invention, they must be attainable by a repeatable method set forth in the specification or otherwise be readily available to the public. The Office Action further indicates that if a seed comprising DAS-59122-7 is not obtainable or available, a seed deposit may satisfy the requirements of 35 U.S.C. § 112. The Office Action then states that the specification does not disclose a repeatable method to obtain the exact same seed and that it is not apparent if such a seed is readily available to the public.

Upon allowance, Applicants will deposit maize seeds comprising event DAS-59122-7 under the provisions of 37 C.F.R. § 1.804 and amend the specification to add the indentifying information set forth in 37 C.F.R. § 1.809(d) including:

(1) the accession number for the deposit;
(2) the date of the deposit;
(3) a description of the deposited biological material sufficient to specifically identify it and to permit examination; and
(4) the name and address of the depository.

Applicants assure the Examiner that at least 2,500 maize seeds comprising event DAS-59122-7 will be deposited with the ATCC and accession numbers will be inserted into the application once allowable claims are determined. Applicant provides assurance that:

(a) during the pendency of this application access to the invention will be afforded to the Commissioner upon request;
(b) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent;
(c) the deposit will be maintained in a public depository for a period of thirty years, or five years after the last request for the enforceable life of the patent, whichever is longer;
(d) a test of the viability of the biological material at the time of deposit was conducted; and
(e) the deposit will be replaced if it should ever become inviable.

In view of the foregoing remarks, the Examiner is respectfully requested to withdraw the rejection of claims 2-5 under 35 U.S.C. § 112, first paragraph.

The Rejections of the Claims Under 35 U.S.C. § 112, Second Paragraph, Should Be Withdrawn

Claims 3, 4, and 6 are rejected under 35 U.S.C. § 112, second paragraph, for being indefinite. Claims 3, 4, and 6 have been amended. This rejection is respectfully traversed.

The Office Action indicates that in claim 3, line 3, it is not clear if "the plant" is the descent plant or the plant of claim 2.

Applicants have amended claim 3 to insert "descent" immediately before the recitation of "plant's" in claim line 3. As amended, claim 3 is not indefinite.

The Office Action indicates that it is unclear if the seed of claim 4 comprises the nucleotide sequence.

Applicants have amended claim 4 to clarify that the seed comprises the DNA of claim 2 or 3. As amended, claim 4 is not indefinite.

The Office Action indicates that claim 6 lacks antecedent basis for the limitation "the DAS-59122-7 event insertion" in claim line 1.

Applicants have amended claim 6 to recite, "A method of detecting event DAS-59122-7 in corn tissue . . . ." As amended, claim 6 is not indefinite.

In view of the amendments and remarks, it is submitted that the rejection of the claims under 35 U.S.C. § 112, second paragraph, should be withdrawn.

The Rejection of the Claims Under 35 U.S.C. § 102(b) Should Be Withdrawn

Claim 7 is rejected under 35 U.S.C. § 102(b) as being anticipated by each of Whitelaw *et al.* (2003, GenBank Accession No. BZ739496) and Zambryski *et al.* (TIP37TD2). Claim 7 has been amended. This rejection is respectfully traversed.

The Office Action indicates that Whitelaw *et al.* teaches a polynucleotide that would hybridize to SEQ ID NO: 32 or 34 under stringent conditions.

The polynucleotide taught by Whitelaw *et al.* corresponds to the sequence of maize genomic DNA. The polynucleotide taught by Whitelaw *et al.* does not comprise a junction sequence of DAS-59122-7.

The Office Action indicates that Zambryski *et al.* teaches a polynucleotide that would hybridize to SEQ ID NO: 32 or 34 under stringent conditions.

The polynucleotide taught by Zambryski *et al.* corresponds to the nucleotide sequence of plasmid Ti DNA. The polynucleotide taught by Zambryski *et al.* does not comprise a junction sequence of DAS-59122-7.

In contrast to the polynucleotides of Whitelaw *et al.* and Zambryski *et al.*, SEQ ID NOS: 32 and 34 each comprise at least one of the unique junction sequences of DAS-59122-7.

Such junctions sequences span the junction between heterologous DNA inserted into the genome and the DNA from the corn cell flanking the insertion site and are diagnostic for the DAS-59122-7 event as disclosed in the following paragraph in Applicants' specification.

> DNA molecules are provided that comprise at least one *junction sequence of DAS-59122-7* selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof; *wherein a junction sequence spans the junction between heterologous DNA inserted into the genome and the DNA from the corn cell flanking the insertion site*, i.e. flanking DNA, and is diagnostic for the DAS-59122-7 event.

Specification, p. 8, lines 3-7 (emphasis added).

Applicants have amended claim 7 to point out more distinctly that the polynucleotide probe of claim 7 is capable of uniquely identifying event DAS-59122-7 and comprises a sequence of at least eleven nucleotides. As disclosed in Applicants' specification in the last paragraph on page 7, such a probe hybridizes under stringent hybridization conditions with DNA extracted from a corn plant comprising event DAS-59122-7 but does not hybridize under the same stringent hybridization conditions with DNA from a control corn plant lacking event DAS-59122-7.

As amended, claim 7 is not anticipated by either Whitelaw *et al.* or Zambryski *et al*. because neither of these references discloses a polynucleotide that:

(*i*) is capable of uniquely identifying event DAS-59122-7 (*i.e.*, hybridizes under stringent hybridization conditions with DNA extracted from a corn plant comprising event DAS-59122-7 but does not hybridize under the same stringent hybridization conditions with DNA from a control corn plant lacking event DAS-59122-7);

(*ii*) is at least 11 contiguous nucleotides; and

(*iii*) hybridizes under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof.

In view of the amendments and remarks, it is submitted that the rejection of the claims under 35 U.S.C. § 102(b) should be withdrawn and not applied to the newly added claims.

Reconsideration of Previously Submitted Information Disclosure Statement

It is noted that on the copy of the PTO Form 1449 that accompanied the Office Action of June 14, 2010, the Examiner lined through the A11 citation of Ellis *et al*., which, according to the copy, is indicative of this reference not having been considered by the Examiner. No explanation was provided in the Office Action as to why the Examiner failed to consider the Ellis *et al.* document.

Applicants respectfully request the Examiner to consider the Ellis *et al.* reference and return an initialed copy of Form 1449 indicating the same with the next communication from the USPTO. In order to facilitate review of this document by the Examiner, Applicants submit concurrently herewith a copy of the Ellis *et al.* document.

CONCLUSION

In view of the above amendments and remarks, Applicants submit that the objections to the claims and the rejections of the claims under 35 U.S.C. §§ 102(b) and 112, first and second paragraphs, are overcome. Applicants respectfully submit that this application is now in condition for allowance. Early notice to this effect is solicited.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required

therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON SEPTEMBER 21, 2010.

APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Mar. 2002, p. 1137–1145 Vol. 68, No. 3
0099-2240/02/$04.00+0 DOI: 10.1128/AEM.68.3.1137–1145.2002
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Novel *Bacillus thuringiensis* Binary Insecticidal Crystal Proteins Active on Western Corn Rootworm, *Diabrotica virgifera virgifera* LeConte

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Received 22 August 2001/Accepted 13 December 2001

A new family of insecticidal crystal proteins was discovered by screening sporulated *Bacillus thuringiensis* cultures for oral activity against western corn rootworm (WCR) larvae. *B. thuringiensis* isolates PS80JJ1, PS149B1, and PS167H2 have WCR insecticidal activity attributable to parasporal inclusion bodies containing proteins with molecular masses of ca. 14 and 44 kDa. The genes encoding these polypeptides reside in apparent operons, and the 14-kDa protein open reading frame (ORF) precedes the 44-kDa protein ORF. Mutagenesis of either gene in the apparent operons dramatically reduced insecticidal activity of the corresponding recombinant *B. thuringiensis* strain. Bioassays performed with separately expressed, biochemically purified 14- and 44-kDa polypeptides also demonstrated that both proteins are required for WCR mortality. Sequence comparisons with other known *B. thuringiensis* insecticidal proteins failed to reveal homology with previously described Cry, Cyt, or Vip proteins. However, there is evidence that the 44-kDa polypeptide and the 41.9- and 51.4-kDa binary dipteran insecticidal proteins from *Bacillus sphaericus* are evolutionarily related. The 14- and 44-kDa polypeptides from isolates PS80JJ1, PS149B1, and PS167H2 have been designated Cry34Aa1, Cry34Ab1, and Cry34Ac1, respectively, and the 44-kDa polypeptides from these isolates have been designated Cry35Aa1, Cry35Ab1, and Cry35Ac1, respectively.

The various isolates and subspecies of *Bacillus thuringiensis* are best known as valuable sources of commercially important biopesticides (41). The most well-studied *B. thuringiensis* insecticidal proteins are the δ-endotoxins, which are parasporal crystalline inclusions that have diverse sizes, shapes, and protein compositions (21). The δ-endotoxins are proteins that belong to a number of sequence similarity groups and have oral activity against a wide range of insect pests (6, 11, 17, 22, 39). Advances in agricultural biotechnology have enabled expression of several *B. thuringiensis* proteins in transgenic plants, thereby imparting intrinsic insect resistance traits to a number of important crops (28, 35, 36, 43).

The larvae of western corn rootworm (WCR), *Diabrotica virgifera virgifera* LeConte (Coleoptera: Chrysomelidae), and related *Diabrotica* species are major coleopteran pests of corn (15). Crop rotation with soybeans, estimated to be used in 80% of north central United States acreage by the National Agricultural Statistics Service, is the most common pest management practice for corn rootworm control. However, newly identified rootworm behavioral adaptations potentially threaten the sustainability of crop rotation as an effective means of controlling this pest complex. In Minnesota a northern corn rootworm, *Diabrotica barberi* Smith & Lawrence biotype, has developed an extended diapause, in which eggs remain in the soil for an extra year and hatching is delayed until corn is planted again (20). In addition, the Illinois Natural History Survey and University of Illinois (http://www.staff.uiuc.edu/~s-isard/WCRStart.html) are tracking a strain of WCR beetles that have evolved behaviorally to lay eggs in soybean fields where corn is planted, and the eggs are ready to hatch the next year (19, 34).

Chemical pesticides are also used to control corn rootworms. The National Agricultural Statistics Service estimates that approximately 8 million pounds of soil insecticides are applied annually to 68 million corn acres in the United States for rootworm control. Some of these pesticides are currently being reviewed by the Environmental Protection Agency under the Food Quality Protection Act and could lose their registrations, while long-term use of some others is threatened by development of resistant rootworms or soil-enhanced microbial degradation (37, 44).

The challenges to corn rootworm management mentioned above reinforce the need to diversify rootworm control measures, and an option that we have explored is to use transgenic corn hybrids expressing *B. thuringiensis*-derived proteins in their roots for protection against larval damage. A first step towards this goal was the discovery of *B. thuringiensis* proteins with effective levels of activity against the economically important rootworm pest complex, and it is thought that the gene(s) encoding these proteins could be engineered for expression in commercial corn hybrids to provide an additional management tool for rootworm control. In this report we describe a novel class of binary *B. thuringiensis* insecticidal crystal proteins that form the basis for highly efficacious control of corn rootworms when the proteins are expressed in transgenic corn hybrids (29).

(Some aspects of this work have been described in patent applications [PCT international applications WO9740162 {30 October 1997}, and WO0114417 {March 2001}] and related U.S. patents [31, 32].)

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TABLE 1. *B. thuringiensis* and *P. fluorescens* bacteria evaluated for insecticidal activity against WCR in this study

Organism	Isolate	Phenotype and/or genotype	Reference
B. thuringiensis	PS80JJ1	Wild type (NRRL B-18679)[a]	This study
B. thuringiensis	PS149B1	Wild type (NRRL B-21553)[a]	This study
B. thuringiensis	PS167H2	Wild type (NRRL B-21554)[a]	This study
B. thuringiensis	Cry$^-$B	Acrystalliferous cloning host	(40)
B. thuringiensis	MR541	Cry$^-$B(pMYC2424); PS80JJ1 14-kDa protein gene	This study
B. thuringiensis	MR542	Cry$^-$B(pMYC2425); PS80JJ1 44-kDa protein gene	This study
B. thuringiensis	MR543	Cry$^-$B(pMYC2426); PS80JJ1 operon	This study
P. fluorescens	MR839	MB214 containing proprietary cloning vector[b]	This study
P. fluorescens	MR1240	MB214(pMYC2580); PS80JJ1 44-kDa protein gene	This study
P. fluorescens	MR1242	MB214(pMYC2581); PS80JJ1 14-kDa protein gene	This study

[a] Deposited in the permanent collection of the Patent Culture Collection (NRRL), Regional Research Center, Peoria, Ill.
[b] MB214 is a *P. fluorescens* host strain of Dow AgroSciences.

MATERIALS AND METHODS

Native bacterial isolates and culture. The bacterial isolates used in this study are listed in Table 1. *B. thuringiensis* isolates PS80JJ1, PS149B1, and PS167H2 were obtained from the Dow AgroSciences proprietary collection of bacteria and were deposited in the permanent collection of the Agricultural Research Service Patent Culture Collection, Regional Research Center, Peoria, Ill. *B. thuringiensis* isolates were grown to lysis in cross-baffled flasks at 30°C with shaking at 250 rpm in PGSM medium (7) supplemented with 10 μg of erythromycin per ml when appropriate. Lysed cultures were centrifuged at 10.8 × *g* for 25 min at 4°C, and the cell pellets were resuspended in small volumes of sterile, deionized water. Sample aliquots were stored on ice at 4°C and used for bioassays immediately, and the remaining portions were either stored at −80°C or lyophilized, stored at room temperature, and used for further purification. Two proteins, which had molecular masses of 14 and 44 kDa, were quantified by densitometry of sodium dodecyl sulfate (SDS)-polyacrylamide gel electrophoresis (PAGE) gels by using a Molecular Dynamics densitometer and bovine serum albumin as the standard.

Bioassays. Test materials were applied to the surface of casein and wheat germ modified artificial diet for corn rootworm (26). Forty-eight-well plates with a surface area of 0.78 cm^2 were treated by using an application rate of 125 μl of treatment suspension per well. Treated bioassay plates were surface dried in a laminar flow hood. The bioassay negative controls were Cry$^-$B (40), a *B. thuringiensis* strain lacking insecticidal protein genes that was tested at a cell mass rate equivalent to that of other *B. thuringiensis* treatments, and water. Each well was infested with approximately six neonate WCR hatched from eggs purchased from French Agricultural Research, Lamberton, Minn. Infested plates were sealed with ventilated film (Clear Lam Packaging, Elk Grove Village, Ill.) and then kept in the dark at 25°C at 40 to 50% relative humidity for 4 days before observations of larval mortality were made. Dose-response data were analyzed by Probit Analysis using POLO-PC software (24). The 50% lethal concentration (LC_{50}) was defined as the concentration that caused 50% mortality of the test population and was expressed in micrograms of protein per square centimeter of diet surface.

Insecticidal gene cloning, plasmid construction, and DNA sequencing. Total cellular DNA was prepared from *B. thuringiensis* cells grown to an optical density at 600 nm of 1.0. Cells were harvested by centrifugation and resuspended in protoplast buffer (20 mg of lysozyme per ml in 0.3 M sucrose–25 mM Tris-Cl [pH 8.0]–25 mM EDTA). After incubation at 37°C for 1 h, protoplasts were lysed by two cycles of freezing and thawing. Nine volumes of a solution containing 0.1 M NaCl, 0.1% SDS, and 0.1 M Tris-Cl was added to complete lysis. The cleared lysate was extracted twice with phenol-chloroform (1:1). Nucleic acids were precipitated with 2 volumes of ethanol and pelleted by centrifugation. The pellet was resuspended in 10 mM Tris-Cl [pH 8.0]–1 mM EDTA (TE) buffer, and RNase was added to a final concentration of 50 μg/ml. After incubation at 37°C for 1 h, the solution was extracted once with phenol-chloroform (1:1) and once with TE-saturated chloroform. DNA was precipitated from the aqueous phase by adding 0.1 volume of 3 M sodium acetate and 2 volumes of ethanol. DNA was pelleted by centrifugation, washed with 70% ethanol, dried, and resuspended in TE buffer.

PS80JJ1 or PS167H2 total DNA was partially digested with *Sau*3AI and fractionated by agarose gel electrophoresis. DNA fragments that were 9.3 to 23 kbp in size were excised from the gel, electroeluted from the gel slice, purified on an Elutip-D ion-exchange column (Schleicher and Schuell, Keene, N.H.), and recovered by ethanol precipitation. The *Sau*3AI inserts were ligated into *Bam*HI-digested LambdaGem-11 (Promega, Madison, Wis.). Recombinant phage were packaged and plated on *Escherichia coli* KW251 cells.

Oligonucleotide probes for the genes encoding the PS80JJ1 14- and 44-kDa proteins were designed on the basis of N-terminal peptide sequence data, and the sequences (IUB codes) were biased for *B. thuringiensis* codon usage. The sequence of the 28-base oligonucleotide probe for the 14-kDa protein gene was 5′ GW GAA GTW CAT ATW GAA ATW AAT AAT AC 3′. The sequence of the 29-base oligonucleotide probe for the 44-kDa protein gene was 5′ ATG YTW GAT ACW AAT AAA GTW TAT GAA AT 3′. The probes were radiolabeled with polynucleotide kinase and [γ-^{32}P]ATP and used for hybridization of phage plaques and Southern blot analysis by standard methods (25). Hybridizing phage were plaque purified and used to infect liquid cultures of *E. coli* KW251 cells for isolation of DNA by standard procedures (25).

Using Southern blot analysis of DNA from recombinant phage containing PS80JJ1 inserts, we identified one clone that contained an approximately 4.8-kbp *Xba*I-*Sac*I fragment suitable for subcloning the PS80JJ1 44-kDa protein gene. The *Sac*I site flanking the PS80JJ1 gene is a phage vector cloning site, while the flanking *Xba*I site is located within the PS80JJ1 DNA insert. This DNA restriction fragment was subcloned by standard methods into pBluescript S/K (Stratagene, San Diego, Calif.) to generate pMYC2421 and into the high-copy-number bifunctional shuttle vector pHT370 (3) to generate pMYC2426.

Using Southern blot analysis of DNA from recombinant phage containing PS167H2 inserts, we identified one clone that contained an approximately 4.0- to 4.4-kbp *Hin*dIII fragment that hybridized to the PS80JJ1 44-kDa protein gene probe. This DNA restriction fragment was isolated, purified, and subcloned into pHT370 to generate pMYC2427.

Using Southern blot analysis of DNA from recombinant phage containing PS149B1 inserts, we identified one clone that contained an approximately 5.9-kbp *Cla*I DNA fragment that hybridized to the PS80JJ1 44-kDa protein gene probe. Complete *Cla*I digests of PS149B1 genomic DNA were size fractionated on agarose gels, cloned into pHT370, and screened by hybridization. One representative clone containing the PS149B1 genes was designated pMYC2429.

DNA inserts containing genes in pMYC2421, pMYC2427, and pMYC2429 were sequenced by using ABI373 or ABI377 automated sequencers and software (PE Biosystems, Foster City, Calif.). Additional sequence analysis was performed by using Wisconsin Package, version 10.2 (Genetics Computer Group, Madison, Wis.).

***B. thuringiensis* transformation.** Recombinant bifunctional shuttle plasmids were transformed into the acrystalliferous *B. thuringiensis* host, Cry$^-$B, by electroporation. Cells were grown in Luria-Bertani medium (25) to an optical density at 600 nm of 0.2 to 0.5, harvested by centrifugation, and washed three times in 0.4 M sucrose. Washed cells were concentrated 1,000-fold and resuspended in 0.4 M sucrose. Plasmid DNA resuspended in 2 to 5 μl of TE was mixed with 50 μl of cells and transferred to a 0.2-cm cuvette on ice. Electroporation was performed with a Bio-Rad Gene Pulser and controller set at 0.9 kV, 25 μF, and 200 Ω. Transformed cells were recovered from the cuvette in 1 ml of cold Luria-Bertani medium containing 0.4 M sucrose and incubated for 2 h at 30°C. Cultures were then plated on DM3-G regeneration medium (10) containing 0.4 M sucrose and 10 μg of erythromycin per ml and incubated overnight at 30°C.

Heterologous expression and protein purification. The 14- and 44-kDa proteins were overexpressed in a Dow AgroSciences proprietary inducible *Pseudomonas fluorescens* plasmid expression system. The 14- and 44-kDa protein genes were first separately engineered into a plasmid vector under control of an inducible promoter by standard DNA cloning methods; the recombinant plasmids were then transformed by electroporation into *P. fluorescens* host strain MB214 to obtain strains MR1242 and MR1240, respectively. Following growth and induction, a portion of either an MR1240 culture or an MR1242 culture was lysed in lysozyme buffer to obtain protein inclusions. These inclusions were then resuspended in 50 mM sodium citrate (pH 3.3) by gentle rocking at 4°C for 1 h. This buffer completely solubilized the 14-kDa protein and partially solubilized the 44-kDa protein. The preparations were then centrifuged at 15,000 × *g* for 20 min, and the supernatants were decanted. The 14-kDa protein was further purified by ion-exchange chromatography. The solubilized 14-kDa protein was bound to an Econo-S column (Bio-Rad, Hercules, Calif.) and eluted with a 0 to 1 M sodium chloride gradient.

To prepare insecticidal proteins from *B. thuringiensis*, 1 g of a lyophilized

TABLE 2. Sequence accession numbers and designations of the binary insecticidal crystal proteins[a]

Designation	GenBank accession no.		Strain	Size (kDa)
	Gene sequence	Protein sequence		
Cry34Aa1	AYO16411	AAG50341	PS80JJ1	14
Cry35Aa1	AYO16411	AAG50342	PS80JJ1	44
Cry34Ab1	AYO11120	AAG41671	PS149B1	14
Cry35Ab1	AYO11120	AAG41672	PS149B1	44
Cry34Ac1	AYO16410	AAG50118	PS167H2	14
Cry35Ac1	AYO16410	AAG50117	PS167H2	44

[a] See Crickmore et al., http://www.biols.susx.ac.uk/Home/Neil_Crickmore/Bt/index.html.

PS80JJ1 or MR543 wet cell pellet was suspended in a wash buffer containing 80 mM Tris-Cl, 5 mM Na_2EDTA, 100 μM phenylmethylsulfonyl fluoride, 5 μg of leupeptin per ml, 0.7 mg of pepstatin per ml, and 40 μg of bestatin per ml (pH 7.8). The resulting suspension was centrifuged at 5,000 × *g* for 30 min. The resulting supernatant was discarded, and the wash procedure was repeated an additional four times. The final pellet was resuspended in 10 ml of the wash buffer. The materials were then processed as described above for the proteins expressed in *P. fluorescens*.

Gene mutagenesis. The PS80JJ1 genes were separately inactivated on two plasmid constructs. The mutated operons were maintained under control of the native promoter for expression in *B. thuringiensis*. First, the 44-kDa protein gene was mutated by truncation at the *Eco*RI site at base position 387 of the open reading frame (ORF). The resulting operon, which included the intact 14-kDa protein gene and the truncated 44-kDa protein gene, was subcloned into pHT370 to generate pMYC2424. Transformation of pMYC2424 into Cry⁻B by electroporation generated recombinant *B. thuringiensis* strain MR541. Next, the 14-kDa protein gene was mutated by insertion of an oligonucleotide linker containing termination codons in all possible reading frames at the *Nru*I site at base position 11 of the 14-kDa protein ORF. The sequence of the mutagenic linker was 5′ TGAGTAACTAGATCTATTCAATTA 3′. The linker introduced a *Bgl*II site for screening putative mutants by *Bgl*II restriction digestion. Plasmid clones containing the mutagenic linker were identified with *Bgl*II and sequenced for verification. The operon insert which encoded the 14-kDa protein nonsense mutations was subcloned into pHT370, resulting in plasmid pMYC2425. This plasmid was transformed into Cry⁻B by electroporation to obtain recombinant *B. thuringiensis* strain MR542.

Nucleotide sequence accession numbers. The GenBank accession numbers for the nucleotide and protein sequences, as well as the designations of the PS80JJ1, PS167H2, and PS149B1 binary insecticidal crystal proteins, are shown in Table 2.

RESULTS

***B. thuringiensis* isolates active on WCR.** *B. thuringiensis* isolates PS80JJ1, PS167H2, and PS149B1 all produced parasporal inclusions comprised primarily of proteins whose molecular masses were approximately 13 to 14 and 44 kDa, as determined by SDS-PAGE (Fig. 1). The *B. thuringiensis* strains were determined to have activity on WCR neonates in surface-applied bioassays. The estimated effective LC_{50} of total 14- and 44-kDa proteins from spore crystal preparations from the three *B. thuringiensis* isolates for WCR were 6 to 8 μg/cm² (Table 3). Tests of these *B. thuringiensis* isolates at estimated concentrations of 100 μg/cm² with the primary lepidopteran corn pests, including European corn borer (*Ostrinia nubilalis* Hubner) (Lepidoptera: Crambidae), corn earworm (*Helicoverpa zea* Boddie), and black cutworm (*Agrotis ipsilon* Hufnagel) (Lepidoptera: Noctuidae), revealed no observable insecticidal effect (data not shown).

Nucleotide and deduced amino acid sequences for the insecticidal protein operons. Southern blot restriction fragment length polymorphism analyses of PS80JJ1 total DNA that was hybridized with oligonucleotide probes based on the N-terminal sequences of the 14- and 44-kDa proteins suggested that the genes encoding these proteins were located adjacent to each other (data not shown). Therefore, phage and plasmid clones encoding the 44-kDa crystal protein from each *B. thuringiensis* isolate were identified by hybridization with the gene probe for the PS80JJ1 44-kDa protein N-terminal sequence. Sequence analyses of the 44-kDa protein loci revealed that all three *B. thuringiensis* isolates active on WCR have the genes encoding the 14- and 44-kDa crystal proteins arranged in an apparent operon. The nucleotide and deduced polypeptide sequences for the PS80JJ1 operon are shown in Fig. 2. The predicted molecular masses of the deduced polypeptides from *B. thuringiensis* isolate PS80JJ1 are 13.2 and 44.3 kDa, whereas the molecular masses of the homologous proteins from both PS149B1 and PS167H2 are 13.6 and 43.8 kDa. The size differences for the ca. 14-kDa proteins are apparent in Fig. 1, lanes 2 to 4. Size comparisons of the ca. 44-kDa proteins were com-

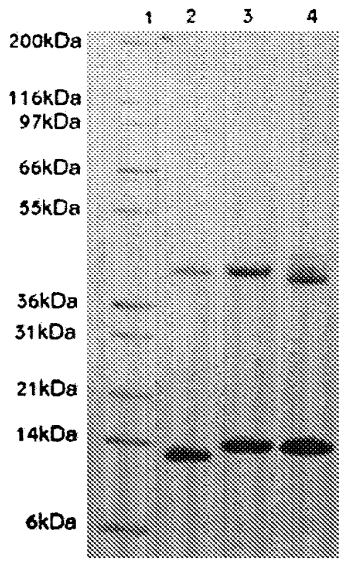


FIG. 1. SDS-PAGE analysis of parasporal crystalline inclusions from isolates active against WCR. Lane 1, molecular mass markers; lane 2, PS80JJ1; lane 3, PS149B1; lane 4, PS167H2.

TABLE 3. Insecticidal activity of *B. thuringiensis* isolates against WCR neonates in three top load artificial diet bioassays

Isolate or treatment	*n*	LC_{50} (μg/cm²)[a]	Slope
PS80JJ1	403	6 (4–8)[b]	1.5
PS167H2	369	6 (4–9)	1.6
PS149B1	369	8 (4–12)	1.8
Water	228	—[c]	NA[d]

[a] LC_{50} was defined as the concentration that caused 50% mortality of the test population. It was expressed in micrograms of protein per square centimeter of diet surface. LC_{50} was calculated by Probit analysis by using POLO-PC for treatments in which larval mortality was observed.

[b] The values in parentheses are 95% confidence intervals.

[c] The effects of negative control treatments were expressed in percent WCR mortality; water treatment resulted in 4% mortality.

[d] NA, not applicable.

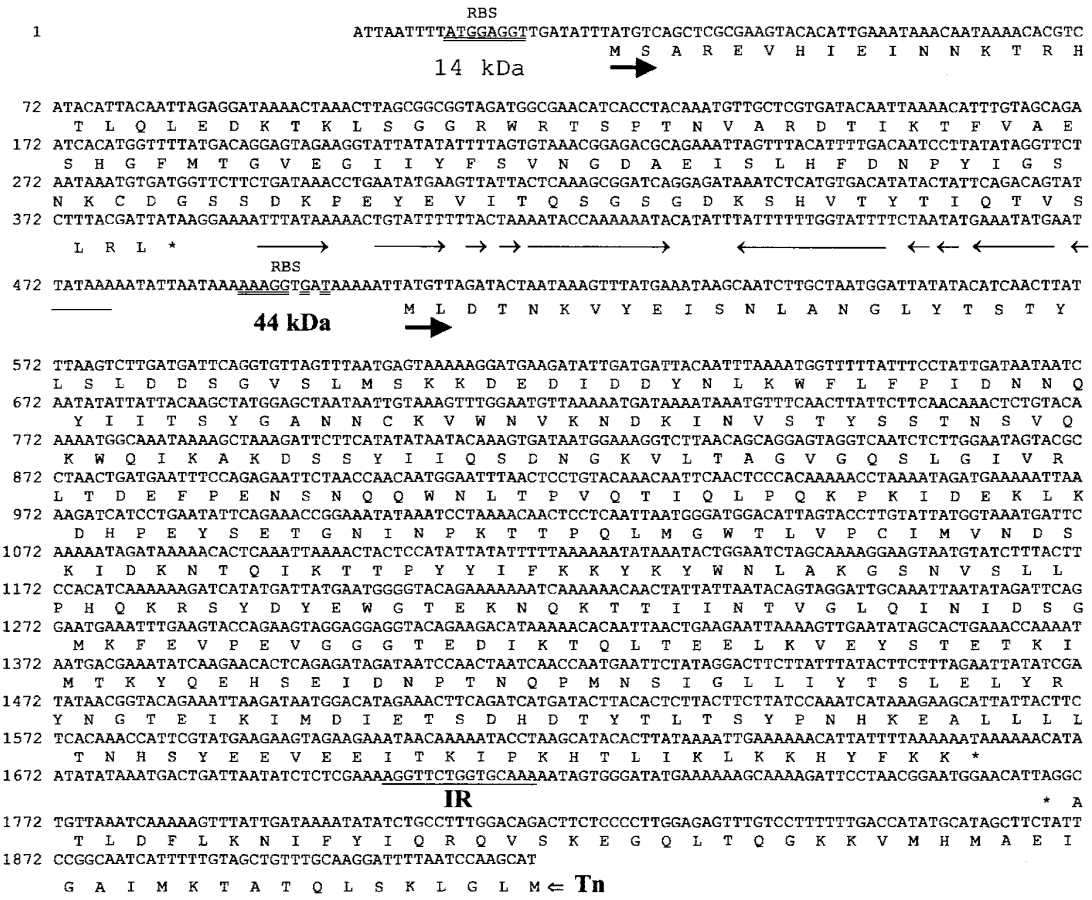


FIG. 2. Nucleotide and deduced amino acid sequences of the PS80JJ1 operon (GenBank accession number AY016411) (Table 2). The positions of the reading frames for the 14- and 44-kDa polypeptides are shown together with the positions of their ribosome binding sites (RBS). The small horizontal arrows indicate inverted repeat motifs. The locations of the C-terminal portion of a transposon-like sequence (Tn) (encoded by the complement of the sequence shown) and an IS*240*-like inverted repeat (IR) are also indicated (both sequences are similar to the sequence deposited under GenBank accession number M23741).

plicated by apparent proteolytic processing (Fig. 1, lane 4; also see below). The genes are arranged with the 14-kDa protein ORF upstream of the 44-kDa protein ORF. Both the 14-kDa protein ORF and the 44-kDa protein ORF are preceded by putative ribosome binding sites. Intergenic spacers separating the 14- and 44-kDa protein ORFs were 121 bp long (PS80JJ1) or 107 bp long (PS149B1 and PS167H2). The intergenic region of the PS80JJ1 sequence contains inverted repeats (Fig. 2) that have the potential to form a secondary structure with a $\Delta G_{folding}$ of −18.8 kcal/mol (estimated at 37°C). Similar patterns, lacking the outermost repeat, occur in the shorter spacers found in PS149B1 and PS167H2 (data not shown). Sequence comparisons of the proteins from the three *B. thuringiensis* isolates revealed that the 14- and 44-kDa proteins comprise two new sequence families and that the PS80JJ1 proteins are more distantly related to the homologous proteins of either PS149B1 or PS167H2. For example, the PS80JJ1 14-kDa protein is 77% identical to the PS149B1 14-kDa protein, whereas the PS80JJ1 44-kDa protein is 80% identical to the PS149B1 44-kDa protein. The homologous 14- and 44-kDa protein pairs for PS149B1 and PS167H2 both exhibit approximately 94% sequence identity. In the case of the PS80JJ1 operon, a portion of an IS*240*-like insertion element, similar to that in the GenBank accession number M23741 sequence, is present in the sequence distal to the gene for the 44-kDa protein, including an inverted repeat and a portion of a transposase (Fig. 2). While this apparent insertion element may have disrupted the normal transcription terminator for the PS80JJ1 sequence, a strong terminator-mRNA stabilizer sequence of the type found for the Cry1 genes (reviewed in reference 39) also appears to be absent in the 120 to 200 bp 3′ to the 44-kDa protein coding sequences in the other two strains.

Expression and mutational analysis of the PS80JJ1 insecticidal protein operon. Recombinant *B. thuringiensis* isolates expressing both the 14- and 44-kDa proteins encoded by the PS80JJ1 operon or these proteins separately were constructed (Fig. 3) to determine if one or both proteins were responsible for WCR mortality. Wild-type and mutant genes were subcloned into an *E. coli-B. thuringiensis* shuttle vector (pHT370)

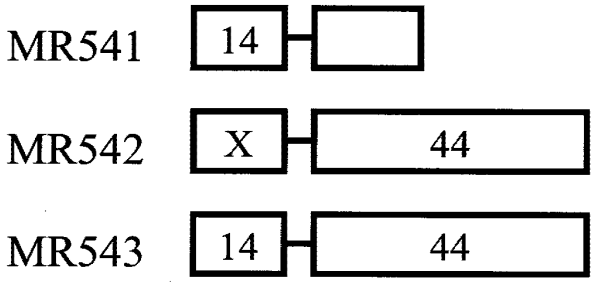


FIG. 3. Schematic representation of recombinant strains used for mutational analysis of the PS80JJ1 operon. MR541 contains a multicopy plasmid construct encoding the 14-kDa protein and the first 129 amino acids (C-terminal deletion of 256 amino acids) of the 44-kDa protein. The truncation was made by using an internal *Eco*RI site at nucleotide 387 of the 44-kDa protein gene. MR542 contains a construct expressing only the 44-kDa protein; X represents a six-frame nonsense codon oligonucleotide linker inserted at an *Nru*I site at nucleotide position 11 of the 14-kDa protein gene. MR543 contains the wild-type operon on a multicopy plasmid vector.

and transformed into the Cry⁻B host. Expression of the 14-kDa protein (Fig. 4, lane 2), the 44-kDa protein (Fig. 4, lane 3), or both proteins together (Fig. 4, lane 4) was observed when recombinant isolates were grown to the sporulation stage. Recombinant *B. thuringiensis* Cry⁻B strains containing the operons from both PS149B1 and PS167H2 also expressed both 14- and 44-kDa proteins (data not shown).

The bioassay results for recombinants expressing proteins derived from isolate PS80JJ1 showed that only the strain expressing both the 14- and 44-kDa proteins, MR543, was insecticidal for WCR larvae. The LC_{50} for MR543 containing coexpressed proteins was estimated to be 37 μg/cm² (90% confidence interval, 17 to 366 μg/cm²; slope, 0.8). The activities of the recombinants that expressed only individual proteins (e.g., MR541 expressing the 14-kDa protein and MR542 expressing the 44-kDa protein) were indistinguishable from the activities of negative controls at similar doses. The negative controls, including water and acrystalliferous Cry⁻B applied at similar biomass rates, caused 4% WCR mortality.

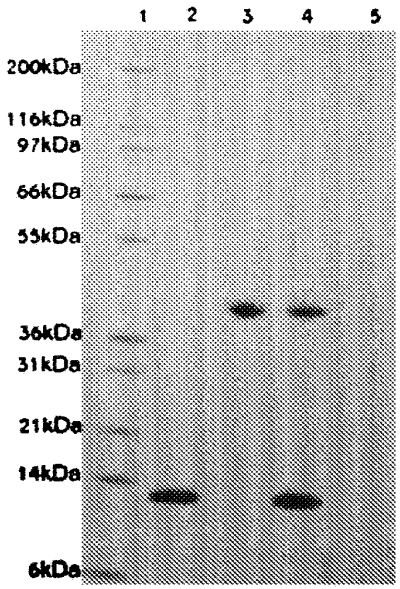


FIG. 4. SDS-PAGE analysis of parasporal crystalline inclusions from recombinant *B. thuringiensis* isolates shown in Fig. 3. Lane 1, molecular mass markers; lane 2, MR541; lane 3, MR542; lane 4, MR543; lane 5, Cry⁻B host strain.

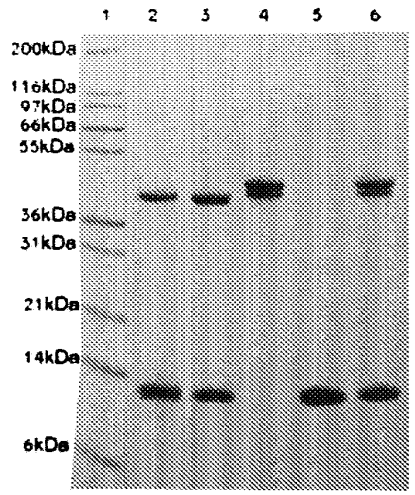


FIG. 5. SDS-PAGE analysis of proteins expressed in *B. thuringiensis* or *P. fluorescens*. Lane 1, molecular mass markers; lane 2, PS80JJ1 native crystals; lane 3, MR543 crystals; lane 4, 44-kDa protein inclusions from MR1240; lane 5, 14-kDa protein inclusions from MR1242; lane 6, mixture of MR1240 and MR1242.

Heterologous insecticidal protein expression. The PS80JJ1 14- and 44-kDa proteins were also expressed individually in recombinant *P. fluorescens* strains designated MR1240 and MR1242 (Fig. 5, lanes 4 and 5, respectively). Doublet bands were observed for the 44-kDa protein expressed in MR1240 (Fig. 5, lane 4), and these bands had slightly slower mobility than the corresponding polypeptide produced in either the native or recombinant *B. thuringiensis* strain (Fig. 5, lanes 2 and 3). The N-terminal sequences of both bands of the doublet from MR1240 were determined by using Edman degradation (27), and the results showed that both protein species in this doublet have the same N-terminal sequence as the deduced 44-kDa polypeptide sequence and the crystals obtained from *B. thuringiensis*. The mobilities of the 44-kDa proteins from the native and recombinant bacterial sources (Fig. 5, lanes 2 to 4) provide indirect evidence that there is C-terminal proteolytic processing of the 44-kDa polypeptides obtained from both sources.

The inclusions produced by the recombinant *P. fluorescens* strains were purified and quantified by gel densitometry for use in bioassays with WCR. Purified recombinant MR1240 expressing the14-kDa protein and purified recombinant MR1242 expressing the 44-kDa protein were tested with WCR individually and at a protein concentration ratio of 1:1. This mass ratio mimics the 3:1 molar ratio of the 14- and 44-kDa proteins observed for wild-type strain PS80JJ1. Similar to the results of the gene knockout experiment, oral activity against WCR was observed when recombinant proteins were added to the WCR

TABLE 4. Activity of 14- and 44-kDa proteins derived from PS80JJ1 coexpressed in *B. thuringiensis* (MR543) or expressed in *P. fluorescens* separately or at a mass ratio of 1:1 (MR1240 and MR242) against WCR neonates in top load bioassays

Treatment	LC_{50} (μg/cm^2)	% Mortality[a]	Slope
PS80JJ1	8 (6–10)[b]		1.8
MR543	35 (24–50)		1.3
MR1240 + MR1242	138 (88–257)		1.5
MR1240		10	NA[c]
MR1242		10	NA
Water		6	NA

[a] The effects of treatments for which LC_{50} could not be calculated are expressed in percent mortality for rates of ≥100 μg/cm^2.
[b] The values in parentheses are 95% confidence intervals.
[c] NA, not applicable.

diet in a mixture (LC_{50}, 138 μg/cm^2), whereas the proteins added individually were not lethal (Table 4).

The bioassay experiments (Tables 3 and 4; also see above) suggested that the levels of activity observed for the 14- and 44-kDa proteins when they were expressed by *B. thuringiensis* clone MR543 and *P. fluorescens* and administered in a mixture were not as high as the levels of activity observed when parent isolate PS80JJ1 was used. However, the combined results of the gene knockout experiment and the heterologous expression experiment provide convincing evidence that both the 14- and 44-kDa proteins were responsible for the lethal effect observed with WCR. This led to further expression experiments performed with the genes from isolates PS167H2 and PS149B1 to determine if insecticidal activity could be optimized with different combinations (data not shown). The results of studies in which we used *B. thuringiensis* operon clones and separately expressed 14- and 44-kDa proteins from PS149B1 in *P. fluorescens* revealed a level of activity that was approximately the same as the level of activity of the PS149B1 *B. thuringiensis* isolate. Based on the higher level of activity of the PS149B1 proteins, we decided to transform corn with the PS149B1 genes for rootworm protection (29).

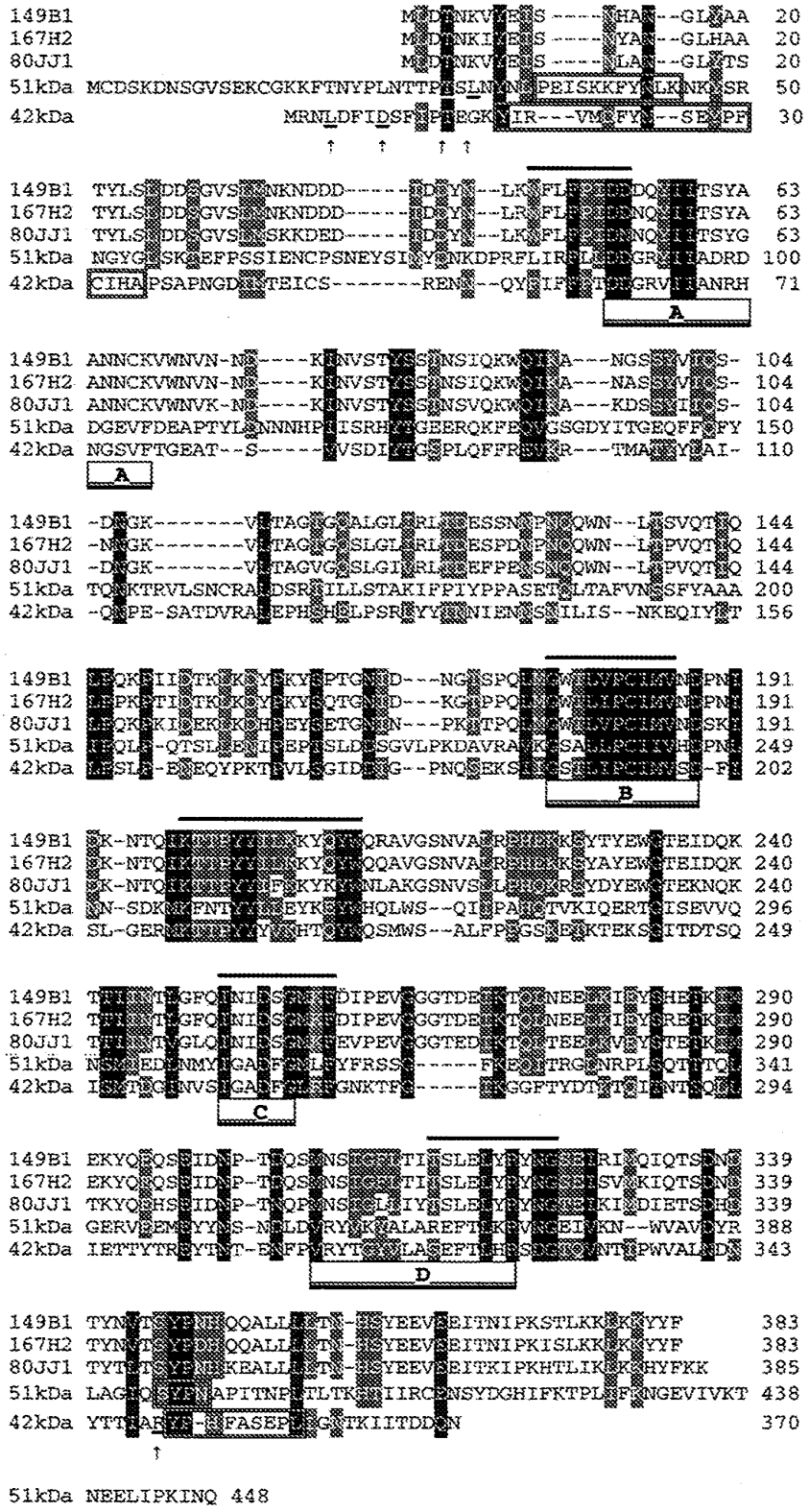
Sequence similarities between the insecticidal proteins and other proteins. Sequence comparisons failed to show a convincing similarity between the 14- and 44-kDa proteins and any of the previously described *B. thuringiensis* Cry, Cyt, or Vip proteins. However, a BLAST (2) database search using the PS149B1 44-kDa protein (as a representative of this family) revealed matches with the 42-kDa *Bacillus sphaericus* crystal inclusion protein (expectation score, 3×10^{-14}) and the 51-kDa *B. sphaericus* crystal inclusion protein (expectation score, 3×10^{-9}). An alignment of the 44-kDa PS149B1 peptide sequence with the 42-kDa *B. sphaericus* crystal inclusion protein sequence revealed 26% identity over 325 residues. A similar comparison of the 44-kDa PS149B1 peptide sequence with the 51-kDa *B. sphaericus* crystal inclusion protein sequence revealed 29% identity over 229 residues. Similar results were obtained when the PS80JJ1 and PS167H2 sequences were used. As shown in the multiple-sequence alignment in Fig. 6, a number of conserved sequence motifs were identified in the three proteins by the MEME algorithm (4). Four of these conserved motifs overlapped with conserved blocks A, B, C, and D identified by Baumann et al. (5) between the 51- and 42-kDa *B. sphaericus* crystal proteins. An additional conserved motif was identified between the B and C motifs due to the greater similarity of the 44-kDa *B. thuringiensis* proteins to the *B. sphaericus* 42-kDa protein in this region. The N termini of the 44-kDa *B. thuringiensis* proteins are aligned near the 10th residue of the *B. sphaericus* 42-kDa protein and the 25th residue of the *B. sphaericus* 51-kDa protein (Fig. 6). This region is close to the segment defining the required functional N terminus of both *B. sphaericus* proteins, as determined by protease cleavage sites or deletion analysis (5, 12, 33), and could indicate that there is a minimal dispensable sequence at the N terminus. The position of the C termini of the 44-kDa *B. thuringiensis* proteins in the alignment is intermediate between the positions of the C termini of the corresponding *B. sphaericus* proteins and well past the positions of the segments required for minimal function. The latter finding is consistent with the apparent C-terminal proteolytic processing of the 44-kDa proteins described above.

A BLAST database (2) search performed with the 14-kDa proteins described here detected no sequences that had significant similarity beyond the similarities of related *B. thuringiensis* crystal protein sequences that were described in recent patent applications (PCT international patent applications WO0114417 [1 March 2001] and WO0066742 [9 November 2000]).

DISCUSSION

B. thuringiensis δ-endotoxins are well known for their ability to control a variety of insect pests, including members of the Lepidoptera, Coleoptera, and Diptera (41). However, only a few previously described *B. thuringiensis* proteins have significant levels of efficacy against WCR. These proteins include the insecticidal crystal proteins Cry3 (13, 14, 18, 23) and Cry6Aa1 (30, 42) and soluble proteins expressed during the vegetative growth phase, Vip1 and Vip2 (9). In addition, genetically engineered derivatives of Cry3Bb1 (16) have been reported to have improved activity against rootworms. The binary insecticidal proteins described here represent new families of insecticidal crystal proteins that are effective against WCR larvae. In tests conducted so far, activity of these insecticidal proteins was observed with other members of the genus *Diabrotica* and certain other members of the Coleoptera, but no insecticidal activity at comparable rates has been observed with primary

FIG. 6. Comparison of the 44-kDa proteins of PS149B1, PS167H2, and PS80JJ1 with the 51.4- and 41.9-kDa proteins of *B. sphaericus*. (GenBank accession number M20390). Previously observed features of the *B. sphaericus* proteins are: blocks of sequence similarity (5) (A to D), protease cleavage sites (5, 11) near the ends (arrows, underlined), and deletion endpoints from a functional analysis (32), indicated by boxed sections near the ends, where terminal endpoints retained toxicity, and internal endpoints were nontoxic, when combined with the intact binary partner. Overlined regions are conserved regions found in register in at least four of the five proteins by the MEME program (4). Black highlighting indicates that conserved residues are present in all five sequences, while gray highlighting indicates that conserved residues are present in four of the five sequences.


149B1
167H2
80JJ1
51kDa
42kDa
A
B
C
D

lepidopteran pests of corn. Recently, the PS149B1 14- and 44-kDa proteins were cotransformed into corn and were shown to provide excellent protection against corn rootworm damage (29); therefore, these proteins provide a biotechnological option for corn rootworm pest control.

The 14- and 44-kDa protein families are unique among the insecticidal proteins both because of their sequence relatedness and because two separate proteins are required for insecticidal activity. While neither of these protein families is related to any previously described Cry proteins, the 44-kDa proteins have significant homology with the *B. sphaericus* 41.9- and 51.4-kDa polypeptides comprising the binary insecticidal proteins active against mosquitoes (5). The *B. sphaericus* proteins affect mosquito midgut cells in a 1:1 association; the 51.4-kDa protein provides the binding function, while the 41.9-kDa protein is required for activity (12, 33). While the *B. thuringiensis* binary corn rootworm insecticidal crystal proteins appear to act on the larval midgut after ingestion (29), further work is necessary to determine the role of each protein component in the intoxication process. Also, mosquito screening assays of the type used to identify mosquitocidal *B. sphaericus* and *B. thuringiensis* strains have not identified a similar level of activity for these *B. thuringiensis* binary toxin proteins.

We concluded that the binary toxins described here are encoded in apparent operons based on their close proximity, coordinate function, and coordinate appearance in crystals. A promoter(s) and terminators of transcription were not mapped or otherwise functionally assessed. Additionally, no strong potential RNA hairpin structure, indicative of a terminator-stabilizer sequence such as that found for the Cry1 genes (reviewed in reference 39), is apparent 3′ to the 44-kDa protein coding sequences reported here. An extensive inverted repeat motif is present in the intergenic region. This inverted repeat structure or other folds that could arise in this sequence could partially terminate transcription and/or modulate mRNA degradation (reviewed in reference 8) and thereby influence the stoichiometry of the proteins. It seems less likely that transcription both terminates and reinitiates within the spacer.

The *B. sphaericus* binary crystal protein genes are found in operons, and several other genes for *B. thuringiensis* insecticidal proteins, including Cry2Aa, Cry11A, and Cyt1Aa, are also known to be organized in operons encoding additional accessory proteins that are implicated in crystallization but do not have a direct effect on insect activity (1). More recently, the 34- and 40-kDa proteins encoded by an operon in *B. thuringiensis* subsp. *thompsoni* were shown to act in a synergistic manner (38). This finding is similar to the findings of the present study, in which it was found that the insecticidal 14- and 44-kDa proteins are both necessary to kill WCR.

ACKNOWLEDGMENTS

We thank Candace Poutre, Leo Kim, and James Bing for their support and encouragement.

ADDENDUM

During the revision of the manuscript, the binary insecticidal crystal proteins described here were designated Cry34Aa1, Cry34Ab1, and Cry34Ac1 (for the 14-kDa polypeptide components) and Cry35Aa1, Cry35Ab1, and Cry35Ac1 (for the 44-kDa polypeptide components), as shown in Table 2 (N. Crickmore, D. R. Zeigler, E. Schnepf, J. Van Rie, D. Lereclus, J. Baum, A. Bravo, and D. H. Dean, http://www.biols.susx.ac.uk/Home/Neil_Crickmore/Bt/index.html).

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Attorney's Docket No. 035718/384482 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Bing *et al.*	Confirmation No.:	4077
Application No.:	11/938,483	Group No.:	1638
Filed:	November 12, 2007	Examiner:	Kubelik, Anne R.
For:	CORN EVENT DAS-59122-7 AND METHODS OF DETECTION THEREOF		

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

PETITION AND FEE FOR EXTENSION OF TIME 37 C.F.R. § 1.136(a)

1. This is a petition for an extension of time for a total period of one month to respond to the Office Action dated June 14, 2010.
2. Applicant is ☒ other than a small entity. ☐ a small entity;
3. Calculation of extension fee (37 C.F.R. § 1.17(a)(1)-(a)(5)):

	Total Months Requested	Fee For Other Than Small Entity	Fee for Small Entity
☒	one month	**$130.00**	~~$65.00~~
☐	two months	$490.00	$245.00
☐	three months	$1,110.00	$555.00
☐	four months	$1,730.00	$865.00
☐	five months*	$2,350.00	$1,175.00

**Cannot be used to exceed six-month statutory limit for response to an Official Action.*

☐ A check in the amount of $ is enclosed.
☒ Charge Deposit Account No. 16-0605 for the extension fee.
☒ All fees are being authorized to be charged to Deposit Account No. 16-0605 when electronically filing
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Respectfully submitted,

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Electronic Patent Application Fee Transmittal

Application Number:	11938483
Filing Date:	12-Nov-2007
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	David Michael Saravitz/Evelyn Casey
Attorney Docket Number:	035718/384482

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
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Pages:				
Claims:				
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Petition:				
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Extension-of-Time:				
Extension - 1 month with $0 paid	1251	1	130	130

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Miscellaneous:				
			Total in USD ($)	**130**

Electronic Acknowledgement Receipt	
EFS ID:	8463094
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	29122
Filer:	David Michael Saravitz/Evelyn Casey
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Receipt Date:	21-SEP-2010
Filing Date:	12-NOV-2007
Time Stamp:	14:33:32
Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		1895D9_384482_Amendment.pdf	140938 85b07aaa57f2e69af79ff8bcd6abc012ac4b51e1	yes	12
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	3	
	Applicant Arguments/Remarks Made in an Amendment		4	12	
Warnings:					
Information:					
2	Examination support document	Ellis.pdf	2630833 5fbc6ca4d86914ce2137d4b751d9b37a3428c56a	no	9
Warnings:					
Information:					
3	Extension of Time	1895D9_384482_Petition.pdf	114128 01ea927e3978c9e6a58a6c573bfbbd5e16f7b137	no	1
Warnings:					
Information:					
4	Fee Worksheet (PTO-875)	fee-info.pdf	30139 0db5b62ff9b1d0a4cffdc3514e9dce71724b6825	no	2
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PATENT APPLICATION FEE DETERMINATION RECORD

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Application or Docket Number	Filing Date	☐ To be Mailed
11/938,483	11/12/2007	

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			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 09/21/2010

	(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 ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 7	Minus	** 20	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ 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	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
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	

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1634
				Examiner Name	Anne R. Kubelik
Sheet	1	of	2	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document Country Code - Number Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	English Language Translation Attached
	29	EP 0 857 791 A2	12-08-1998	Boehringer Mannheim GmbH		

OTHER 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, page(s) , volume-issue number(s), publisher, city and/or country where published.	English Language Translation Attached
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Examiner Signature		Date Considered	

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

Substitute for form 1449/PTO (Revised 07/2007)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
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				Art Unit	1634
				Examiner Name	Anne R. Kubelik
Sheet	2	of	2	Attorney Docket Number	035718/384482

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 857 791 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
12.08.1998 Bulletin 1998/33

(51) Int. Cl.[6]: **C12Q 1/68**

(21) Application number: **97122253.4**

(22) Date of filing: **17.12.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **21.12.1996 EP 96120730**

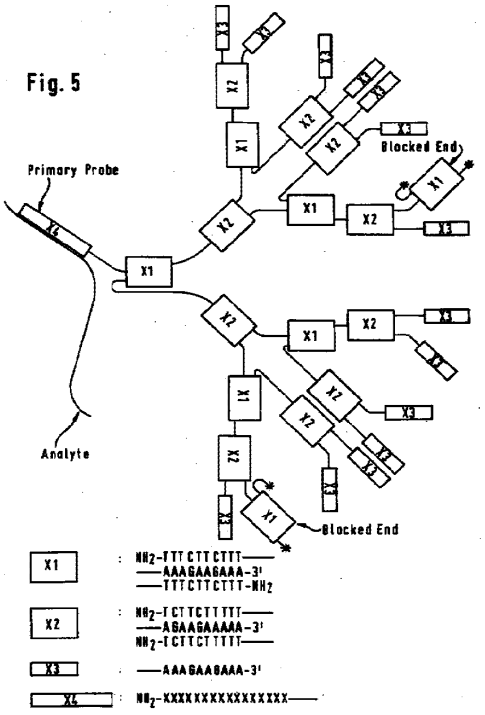
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(54) Method of analysis using signal amplification

(57) A method for determining a molecule A comprising a sample of molecules capable of participating in formation of triplex structures is useful for sensitive determination. The principle can be used to determine any kind of analytes.

Fig. 5



EP 0 857 791 A1

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Description

Field of the invention

The present invention relates to chimeric nucleic acids compounds that have the capacity of forming triplex structures, to the production and purification of such chimeric compounds, and to their use in signal amplification techniques.

Background of the invention

Detection and quantification of nucleic acid molecules constitutes a fundamental trait in several diagnostic techniques. However, the amount of accessible nucleic acid target molecules in a specific sample is in general low, and direct hybridization with a polynucleotide probe therefore in many cases insufficient for detection. In the case of an infectious organism, the classical solution has been enrichment by culturing, but this is time-consuming and therefore unsuitable for rapid diagnosis. A way to circumvent these problems is to amplify the target molecule. This can be accomplished in one of several ways, for example polymerase chain reaction (PCR, as it is described in US-A-4,683,195 or EP-A-0 630 971), ligase chain reaction (LCR, EP-A-0 320 308) or NASBA (EP-A-329 822). However, all of these techniques utilize enzymes for amplification of target nucleic acid molecules and, consequently, they suffer from the drawback that compounds in the sample specimen may inhibit these enzymes. Therefore, current protocols based on these techniques often include laborious sample preparation steps such as, for example purification and concentration of DNA. Furthermore, when the target sequence is amplified the risk of contamination becomes significantly increased. Several methods have been described to overcome contamination problems, including 1) digestion with nucleases that specifically degrades nucleic acid molecules that have been produced during previous analysis (EP-A-0 401 037); and 2) special laboratory practice that minimises carry over between new samples and previously analysed material. However, methods for avoiding contamination and inhibition are in general costly and cumbersome.

Another solution for signal amplification would be to employ a method in which the number of signal-producing compounds is increased. Such methods have been described by for example EP-A-0 317 077, WO 95/01365 and WO 95/08000. These techniques utilize multi-valent intermediate probes containing a large amount of identical nucleotide sequences bound covalently to each other and each intermediate probe being capable of hybridizing with up to 50 signal producing secondary probes simultaneously. However, these techniques utilize large molecules as intermediate probes which results in less favorable kinetics.

Thus, it would be highly desirable to have a method for signal amplification which is rapid, simple, sensitive, based on stable compounds and on non-enzymatical reactions.

Summary of the invention

Subject of the invention is therefore a method of determining a molecule A containing a sequence SA of nucleobases, said molecule being capable of forming a triple helix structure through said sequence SA comprising providing a reaction mixture containing multiple probe molecules B containing a first segment B1 capable of participating in a triple helix structure with A through sequence SA and a segment B2 that allows for direct or indirect detection, incubating said reaction mixture at conditions allowing the formation of triple helices and determining the formation of triple helices using said segment B2.

A further subject of the invention is a molecule especially advantageous for this method.

A further object of the invention is a method for the determination of an analyte using the above mentioned method for determining a molecule A.

A further object of the invention is the use of multiple triple helix structures (triplex structures) for the determination of an analyte.

Brief description of the drawings

Figure 1A is a schematic illustration of structures formed from molecules A and probes B.

Figure 1B is a schematic illustration of structures showing how the structures of Figure 1A can be extended further.

In Figure 2 several ways to link probe segments are given. In the case of the segments comprising DNA and PNA formation of an intramolecular duplex is favored in case A and B. This means that cases C and D are preferred arrangements for forming triple helix structures. Figure 2 contains the nomenclature used throughout the specification for the arrangement and orientation of strands.

In Figure 3 four possible orientations for triple helical structures are given. The arrangement in Figure 3A and 3D are the most preferred.

Figure 4 shows schematically the structure of an exemplified PNA while bound to DNA in the preferred antiparallel

mode. It further shows that nucleic acid analogues can be modified by the attachment of groups improving the solubility of the probe, in case of PNA the addition of a lysine residue.

Figure 5 gives a schematic picture of a construct formed in one of the exemplified methods according to the invention, wherein a target nucleic acid is analyzed using a primary probe, multiple probes composed of each a DNA and a PNA segment and secondary probes containing a reporter group, and having a blocked end that disables the probe in participating in further assembly. It shows that using the invention it is possible to obtain a multiplicity of labeling sites and therefore achieve signal amplification.

In Figure 6A a schematic picture is shown for an exemplified embodiment of the invention using a first probe B containing two segments B1 and B2, and a second probe C containing two segments C1 and C2. The segments B1 and C1 consist of PNA and the segments B2 and C2 consists of DNA.

Figure 6B shows the result of an assembly performed as in 6A but in the presence of four probes, termed B, C, D.and E containing two segments each. Both segments of probes C and E consist of DNA, and both segments of probes B and D consist of PNA.

Figure 7 shows a sequence and binding mode of one molecule of probe C and two molecules of probe D, wherein the second segment of probe D can bind the first segment of probe C.

Figure 8 shows schematically a probe molecule containing two PNA segments, the amino ends being bound together covalently by a linker moiety L.

Figure 9 shows the mode in which two PNA molecules bind to one strand of DNA.

Figure 10 shows an assembly containing only one molecule B. In this case, B1 is PNA and B2 is nucleic acid.

Figure 11 shows the melting curves of complexes formed between the oligos of example 1 (denoted B1 and C2), measured at pH 4.75 and pH 9.5.

Figure 12 shows an autoradiogram showing the different starting compounds and reaction products for the formation of duplexes and triplexes.

Figure 13 shows an autoradiogram for the formation of a complex involving duplexes and a triplex, wherein the amount of the only duplex forming oligonucleotide is increased from lane 1 to lane 7 (0; 1; 5; 10; 20; 40; 100 pmol DA262). Lane 8 contains only the triplex forming component DA256.

Detailed description of the invention

A molecule A can be any moiety containing a sequence SA of nucleobases which sequence is preferably a least 9 bases long, most preferably is between 10 and 30 bases long. The nucleobases are preferably covalently linked in a linear manner to a backbone, especially in a way such that the molecule can bind by base pairing to a nucleic acid containing a sequence of bases complementary to the sequence of bases contained in molecule A. Examples of molecules A are nucleic acids, like RNA, DNA or derivatives thereof and nucleic acid analogues. In very preferred manner the nucleic acid is DNA. Molecule A can also be a molecular moiety, for example a protein or hapten to which a nucleic acid or nucleic acid analogue sequence is attached.

A can be a molecule originating from a sample wherein the presence, absence or amount of this molecule is intended to be determined and analyzed in presence/absence or/and amount, but molecule A can also be a probe or probe unit that is itself intended to be used for the determination of an analyte. Generally the intention behind the occurrence or use of the sequence SA in molecule A is to increase the number of binding sites for labels or the number of labels attached or attachable to molecule A. Therefore the origin and function of the part of molecule A not participating in amplifying a signal can be chosen according to the specific task to be solved. Further the amount of molecule A can be unknown, for example in methods for determining molecule A as an analyte in a sample, or it can be known, for example if a defined amount of molecules A is added to a sample, especially for determining an analyte (for example antigens, antibodies, haptens etc.) different from molecule A.

Sequence SA can contain natural nucleobases, like A, C, G, T and U, or non-natural bases, like 7-deaza-G and mixtures. The important feature of sequence SA is that it has the ability to bind a probe molecule B by base pairing.

A triple helix structure or triplex structure is composed of three strands of molecules, each containing a nucleobase sequence capable of base pairing. Preferably the mode of binding between the three strands involves both Watson/Crick and Hoogsteen base pairing. The formation of triple helix structures requires a high degree of complementarity of the sequence of two of the strands involved to the third strand. In preferred triple helix structures two of the strands are composed of pyrimidine nucleobases of any sequence while the third strand is composed of the complementary purine nucleobase sequence. The triple helical structure therefore preferably has a length of at least six purine or six pyrimidine nucleobases respectively.

It has been shown in WO 95/01370 that peptide nucleic acids (PNAs) have the ability to form triplex structures with nucleic acids. Criteria for forming triple helices can therefore be taken from this patent application. PNAs and their synthesis are disclosed in WO 92/20702 and WO 94/25477. In one embodiment the backbone of PNAs is composed of repeating units of ethylaminoglycine moieties, wherein the nucleobases are bound to the glycine amino group. PNAs in

this definition therefore contain an amino terminus (-NH2) and a carboxylic acid terminus (-COOH). These termini can be modified by the attachment of other moieties or the omission of groups (for example the linkage to groups increasing solubility, like lysine).

In Figure 2 there are shown four possible cases of intramolecular base pairing between a DNA and PNA part of one probe molecule. Prerequisite to Figure 2 is that the PNA and the DNA part are able to hybridize by base pairing. It becomes clear that the way of linking the PNA sequence to a DNA sequence as shown in Figures 2C and 2D is favored over the embodiments shown in Figures 2A and 2B. Case 2C and 2D are referred to as parallel binding. In case A the 5' terminus of the DNA (head) is bound to the carboxyl end of the PNA (tail). For forming triple helix structures, the antiparallel arrangement of the sequences should therefore be avoided, the parallel arrangement should be preferred.

In Figure 3 four cases for arranging the three strands of a hypothetical triple helix structure are shown. Again a prerequisite is an ability to hybridize by base pairing of the segments as pointed out above. For the present invention it has been shown that the arrangement according to case B and C should be avoided in order to receive stable triplex structures. Cases A and D are preferred. These cases may be realized by appropriately choosing the nucleobase sequence of the molecules involved.

A probe according to the invention is an entity used for binding a label of any kind to a molecule to be determined. This binding may be direct or indirect.

An assembly of the present invention is defined to contain at least one, preferably just one, molecule A and a multiplicity of different identical probe molecules, preferably more than 2 and most preferably between 10^3 and 10^7 probe molecules.

Each probe molecule B is defined to contain at least two segments. They are named in the following as B1 and B2. These segments are preferably and most practically linked together covalently, either directly or indirectly via a linker moiety. It will become apparent from the detailed description of the invention, that the linkage of the two segments must essentially fulfill the purpose to fix the arrangements/orientation of the segments within each probe molecule and to space the regions between B1 and B2. The linker moiety L therefore may have the function to provide a chemical entity for connecting the termini of the segments, but may further have the function to provide a defined distance between the segments to be linked. Linker moieties according to the invention are bivalent moieties of 1 to 100 atoms or more. Typical linker moieties are alkylene groups, dicarboxylic acid moieties, diamine moieties or amino acid moieties. Preferred distance is between 20 and 100 atoms, counted between the atoms following the first non-base atom of adjacent bases. One example of a probe molecule is shown in Figure 8. In this schematic presentation two PNA molecules, each having an amino and a carboxyl terminus are linked together by a linker moiety L, connecting two amino termini of the PNAs. Carboxylic acid termini of PNAs can for example be connected by the use of conventional condensing agents like diimides, for example 1-(3-dimethylaminopropyl)-3-ethyl carbodiimide (EDC). Rigid linkers are further advantageous to avoid intramolecular hybridization.

In case of a probe molecule containing a PNA and a DNA segment preferred linking moieties connect hydroxyl groups of the DNA segment with either of the amino or carboxyl end of the PNA segment (compare Figure 2). Molecules containing segments of nucleic acids and nucleic acid analogues are described in WO 95/08556 and WO 95/14706. These chimerical molecules can be used in the present invention as probe molecules. At least one of the segments of the probe molecule is capable of participating in a triple helix structure.

This segment is therefore preferably designed to consist of a sequence of nucleobases complementary to sequence SA of the molecule A.

By complementarity according to the invention there is meant more than 90% complementarity of a consecutive number of nucleobases of a length of at least nine bases. Complementarity is judged by hydrogen bonding between bases.

While segment B1 is designed for binding to molecule A, segment B2 is designed to minimize binding by base pairing to segment B1 of the same probe molecule (intramolecular binding). Therefore the arrangements of Figures 2C and 2D should be chosen. One further way to avoid intramolecular binding is by choosing a linker length, preferably small enough to sterically hinder such binding.

Conditions for formation of triple helical structures may vary dependent upon the kind of moieties making up sequence SA and segment B1. For PNAs and DNA the reaction conditions are described in WO 95/01370. These conditions can be applied for binding of molecule B to molecule A. Preferred these conditions include a pH less than 7, conferring protonation of cytosine molecules. For triple helical structures made up by other strands, a man skilled in the art can determine the optimal conditions for triplex formation by titration experiments or by comparing melting curves and association curves.

The triple helix structure formation reaction is allowed to proceed as long as required to form as much triple helices as intended which will generally be within 1 min. and 12 hours, preferably between 15 and 30 min. Generally, in a way to also estimate the amount of molecules A in the reaction mixture, for example in a quantitative assay, one would stop the reaction after a defined reaction time. Such stopping the reaction can be made by changing the pH such that no further triplex formation can occur. Therefore the pH is changed to more basic conditions, preferably to a pH of more

than 8

The formation of triple helices is determined using segment B2 bound to molecule A, as a measure for the presence, absence or amount of molecule A. There are many ways to determine segment B2, depending upon the molecular structure of this segment. In a first instance segment B2 can be determined using its sequence of nucleobases. This sequence makes possible the use of further probes comprising a nucleobase sequence complementary to the sequence of segment B2.

In one embodiment, determination of segment B2 is by a probe containing a sequence complementary to segment B2 and a reporter group. Reporter groups are generally known as moieties that are itself detectable or can be detected by coupling to a detectable moiety. Examples of reporter groups are fluorescent moieties, like fluorescein, and enzymes, for example, peroxidase, or immunologically active substances, like haptens, for example, digoxigenin or colored substances, like rhodamine, or vitamins, like biotin. This labeled probe will be termed secondary probe in the following. The secondary probes preferably do not contain a further nucleobase sequence complementary to a sequence contained in the reaction mixture and therefore are designed to stop the process of adding more probe molecules to molecule A.

The secondary probe can be added at any time to the reaction mixture or even to one of the reagents of the reaction. In a first embodiment, wherein the secondary probe is used as a blocker for the binding of further probe molecules, the secondary probe is added to the reaction mixture at the start of the incubation. The amount of secondary probe must be chosen such that it still allows enhancing the number of binding sites (for example B2) bound to molecule A, but also consecutive binding to a ratio of these binding sites. Therefore generally the amount of secondary probes will be less than the amount of probe molecules B. Secondary probes can further be used to control the level of amplification.

In a second embodiment the secondary probe is added to the reaction mixture after or before the incubation in order to stop the reaction. In this case the amount of the secondary probe is chosen such that it exceed the amount of free segments B2 likely be created during the incubation. This amount will depend upon the amount of molecules A contained in the mixture, the amount of probe molecules added to the mixture and the length of the incubation time.

The molecule A may then be determined via the label present in the secondary probe. This determination is performed analogous to the methods known in the art for these labels. The determination will preferably include calibration of the system by performing the identical reaction sequence for a reaction mixture containing known amounts of molecule A.

The present invention generally makes use of the idea that the formation of triple helix structures allows the formation of branched structures and thereby the formation of multiple sites for binding labels. The more probe molecules are assembled on one molecule A, the more binding sites are created. Using this principle there are various possibilities to assemble probes using the formation of triple helix structures, depending upon the nature of each of the two segments constituting the probe molecules. According to the invention it is possible to use only one kind of probe molecule, but it is also possible to combine different kinds of probe molecules. While the first approach will have the advantage that it is not necessary to synthesize probe molecules of different sequences the second approach may have the advantage of the possibility to better adapt the assembling reaction to specific requirements. In the following there will be described one embodiment of each approach.

In a first embodiment only one kind of probe molecule is used. This probe molecule therefore constitutes probe molecule B. In Figure 10 a schematic structure of an assembly formed during incubation of multiple probe molecules B with a molecule A is shown. In this embodiment segment B1 is a component participating twice in the formation of a triplex and B2 is a component participating only once in this triple helix structure. An example for component B1 is PNA, while B2 can then be DNA. The sequence and orientation of the segments is chosen according to the principles laid down in Figures 2 and 3. It will be recognized that the longer the incubation time is, the larger the assembly grows and the more binding sites useful for the determination for example segments B2 are available, for example for binding a labeled secondary probe.

In a second embodiment which also uses chimera of one segment capable of occurring twice in triple helix structure and one segment occurring once in a triple helix structure, two kinds or probe molecules are used. These probe molecules differ in structure such that the sequences of segments 1 and 2 of each kind or probe are chosen such that these segments cannot form triple helices with the other segment of the same kind of probe. However, the second segment B2 of the first probe molecule B is capable of participating in triple helix structure with the first segment C1 of the second probe C and the second segment C2 of the second probe C can form a triple helix structure with the first segment B1 of a further probe molecule B. During incubation of these probe molecules with molecule A an assembly will be formed that contains a branched structure wherein the probe molecules are incorporated in an alternating way. Such a structure is shown in Figure 5. Figure 5 in addition shows that secondary probes containing a segment complementary to one of segments B2 or C2 of the probe molecules B or C can be incorporated to put a label on the assembly when the secondary probe acts as a terminator of the assembly process. The secondary probe should then not contain another segment complementary to any other segment of probe molecules B and C. This is named by the term blocked

end. Figure 5 further shows the formation of triplexes of different orientation depending upon the sequence of the probe molecules.

As can be seen further, the segments preferably contain either purines or pyrimidines, such that one segment contains only purines, while the other contains only pyrimidines. This is preferred because highly stable triple helices form when pyrimidines of a PNA base pair to purines of a DNA using Watson/Crick binding and Hoogsteen binding.

The segments of the probe molecules can be synthesized independently, especially if the segments comprise different backbones. The synthesis of PNAs is described in WO 92/20702, whereas the synthesis of deoxyribonucleotides is possible according to a wide variety of methods, comprising chemical synthesis via phosporamidites or, especially for longer sequences, by methods including enzymes, like in the template dependent synthesis or restriction of double stranded nucleic acids. In a subsequent step the two segments are connected by the linker moiety L. The linker can be any molecular unit, such as amino acid residues, e.g., aspartate or glutamate, or other compounds like 8-amino-dioxaoctanoic acid (Ado, according to DE-A-3943522) or hexamethylene.

In a third embodiment, which can involve both, duplex formation and triplex formation, there is used a first kind of probes containing first and second segments which occur twice in a triplex structure, whereas a second kind of probe molecules contains first and second segments that occur only once in triplex structures. In one example probe B contains two PNA segments and probe C contains two DNA segments. The sequence of segment C1 is such that it binds segment B2 and the sequence of segment C2 is chosen such that it binds sequence B1 of an additional molecule of probe B. Again, as outlined above, the sequences are chosen in sequence and symmetry such that the probes cannot bind intramolecularly and such that the overall sequence of probe B is not complementary to overall sequence of probe C. An assembly of those probes B and C leads to alternating assembly of the probes. The synthesis of such probes can be especially advantageous because they can be synthesized without interrupting automated chemical synthesis.

In case the assembly reaction involves four or more compounds (as in Figure 6B), some compounds (for example compounds B and C as well as D and E or B, C and D or C, D, and E) may be combined and reacted prior to the overall mixing. Thus the duplex-or triplex-hybridisations may be conducted separately. Alternatively, each compound may be added stepwise, each step being succeeded by a washing step.

As described above for the chimeric molecules, it is possible to construct assemblies with more probes. An example of such a construct is given in Figure 6B. In this case segment B2 of probe B is complementary to a segment C1 of probe C, segment C2 is complementary to a first segment D1 of a further kind of probe D, which in addition contains a segment D2 which is complementary to a first segment E1 of a further kind of probe molecule E, which in turn contains a segment E2 complementary to the sequence of segment B1. This assembly requires that for example segment C2 is not complementary to a segment B1 and D1 and segment C2 is not complementary to segment B1 and C1. In this way a controlled assembly of a multiplicity of probes using triple helix structures is possible.

The use of probe molecules containing only one kind of backbone in both segments has the advantage of easier synthesis of the probe molecules. The probe molecules can easily be synthesized totally from monomeric units without the need of a subsequent linkage step. If it is desired to use a linker connecting segments 1 and 2, or if an opposing orientation of the segments is chosen, it may be advantageous to synthesize the segments independently and connect them in a subsequent step as pointed out above.

A further subject of the invention is a molecule B containing a nucleobase sequence containing segments B1 and B2 wherein B1 contains a peptide bond containing backbone and B2 contains a natural backbone and wherein said segments are covalently bound together directly or through a linker moiety and wherein said binding is made between the amino terminus of B1 and the 3' terminus of B2 or the carboxylic acid terminus of B1 and the 5' terminus of B2. A peptide bond according to the invention is the chemical bond between a group CO and a group NR, wherein R is hydrogen or C_2-C_6 acyl or C_1-C_6 alkyl. A natural backbone contains sugar-phosphate units.

A further subject of the invention is a method for the determination of an analyte comprising providing a reaction mixture containing a nucleobase SA containing molecule A, said molecule being capable of forming a triple helix structure through said sequence and being capable of binding to said analyte multiple probe molecules B containing a first segment B1 capable of participating in a triple helix structure with A through said sequence SA and a second segment B2 incubating said reaction mixture at conditions allowing the formation of triple helices and determining the formation of triple helices using said segment B2 as a measure for the analyte to be determined. Preferably the molecule A is a probe present in the reaction mixture in an amount dependent upon the presence/absence or amount of said analyte. An analyte according to this method is any molecule desired to be determined. Typical analytes are constituents of body fluids, for example blood or fluids derived therefrom, like serum or plasma, or urine or sputum. Some fluids require preparational steps to bring the analytes into accessible form. For example could it be required to lyse cell walls in order to release analytes. The analytes can be for example antibodies, antigens, haptens or nucleic acids. Nucleic acids are preferred analytes. In order to obtain a flexible system for universal amplification it is preferred to use a primary probe comprising a first segment of nucleobases complementary to the sequence of a stretch of the analyte sequence and a second segment which contains a nucleobase sequence complementary to segment B1. In this system the probe molecules can be used for analytes having different nucleobase sequences. A construct formed is shown in Figure 6.

A further subject of the invention is the use of formation of multiple triple helix structures for the determination of an analyte.

A further subject of the invention is a composition of matter comprising a component N containing a sequence N1 capable of forming a triplex structure and a sequence N2 accessible for further hybridization and a component M containing a sequence M1 capable of forming a triplex structure including sequence N1 and a sequence M2 accessible for further hybridization. Examples of components N and M are molecule A and probe B or probe B and probe C. Those compositions of matter are intermediate products in the assembly of the above process. However, they can be used further to determine nucleic acids. An example of component O is probe D.

The following examples are given to exemplify the invention and determine conditions for successful conduction of the method:

General

The PNAs were synthesized according to WO 92/20702. If applicable, modifying groups are attached while the PNAs were still protected and on the solid phase. The PNAs had an amide function at the COOH end because of the choise of solid support and the subsequent way to decouple the PNA from the solid phase. Thus, in this case we denote the C-end with -$CONH_2$. The amino end is denoted -H. Monomers for synthesis of the PNAs were purchased from Millipore, USA. Oligonucleotides were synthesesized chemically on an automated synthesizer.

Example 1

Analysis of conditions for triplex formation

In order to estimate the of triplex forming capability of oligos (for example PNAs or probes B and c) melting temperature Tm was measured at pH 4.5 and 9.5, since no Hoogsteen base pairing is possible at the higher pH. In total, 1 ml of a solution containing 0.1 M phosphate buffer at the desired pH .Nine μM PNA and 4.5 μM DNA was heated to 95°C for 10 min., and allowed to cool slowly at 22°C for 18 h. Subsequently, 2 ml 0.1 M phosphate buffer at the relevant pH was added, and the optical density was measured ramping the temperature from 25°C to 95°C at 0.5°C/min. As can be seen from Figure 12, Tm of segments B1 and C2 is 90°C at pH 4.5, and 58°C at pH 9.5. Such pH-dependency shows that Hoogsteen base pairing contributes significantly to the stability of the hybridisation complex, and that triplex formation has occurred.

The sequences of segments B1 (PNA) and C2 (DNA) are

B1: Ac-glu-Ado-TTTCTTCTTT-$CONH_2$
C2: NH_2-$(CH_2)_6$-5'-AAAGAAGAAA-3' (SEQ.ID.NO.1)

Example 2

Synthesis of DNA-PNA chimera

A DNA oligo with a six-carbon atom (hexamethylene) linker and a terminal, was linked to a PNA oligo with glutamate residue at the amino terminus, i.e., the DNA oligo SIG1 with PNA187 and the DNA oligo SIG2 with PNA 184. The reaction mixture was as follows:

5 μl DMSO
2 μl EDC, 0.5 M
2 μl imidazole, 1 M
3.6 nmol PNA (PNA187 or PNA184)
3.6 nmol DNA (SIG1 or SIG2)
H_2O to 20 μl

where:

SIG1: 5' NH_2-$(CH_2)_6$-AAAGAAGAAA 3' (SEQ.ID.NO. 1)
SIG2: NH_2-$(CH_2)_6$-5'-AAGAGAAAAA-5' (SEQ.ID.NO. 2)
PNA187: Ac-Glu-Ado-TTTCTTCTTT-$CONH_2$
PNA197: Ac-Glu-Ado- TTTTTCTCTT-$CONH_2$
Ac means Acetyl

The reaction proceeded at 22°C for 1-5 days.

Chimera with the following sequences were produced:

NH_2CO - TTTCTTCTTT- AAGAGAAAAA-3'

NH_2CO - TTCTCTTTTT-AAAGAAGAAA-3'

The DNA was labelled with ^{32}P-ddATP by convential enzymatic terminal elongation.

Example 3

Analysis of chimera by gel chromatography

After reaction, 30 µl was added 5 µl 80% formamide, heated to 95°C for 5 min., cooled on wet ice for 10 min., and applied a 12% denaturing polyacrylamide gel.

18 ml 20% gelmix
10.8ml 8% urea
1.2 ml 10 x TBE (0.9 M Tris-borate, 0.01 M EDTA)
300 µl APS (ammonium per sulphate)
10 µl TEMED (N,N,N'N'tetramethylethylene diamine)

where 20% gelmix consists of 7 M urea, 90 mM tris-borate pH 8.3 and 0.67% bisacrylamid. Electrophoresis was performed for 60 min. at 400 V. After electrophoresis the gel was wrapped in polyethylene film, placed on TLC plate, subjected to UV light and photographed. A reaction product was observed with approximately half the migration rate the DNA oligos.

Example 4

Purification of chimera

After electrophoresis, a gel fragment containing the chimera was excised from the gel, washed in 1 ml TE Buffer for 5 min., subsequently placed into 200 µl TE pH 8.3, and extracted with vigorous shaking overnight at 55°C.

Example 5

Formation of assemblies for signal amplification

In order to show that complexes of DNA with PNA can be formed wherein both, a part of the DNA and a part of the PNA is accessible for binding further probe molecules, the following PNA and DNA molecules were incubated:

DA256: 5'-CGACTTCAGCATGACTCAAAGAAGAAA-3' (SEQ.ID.NO. 3)
DA262: 5'-ATGTGGACATTGTCATCAAGAAAAGAA-3' (SEQ.ID.NO. 4)
PNA380: Ac-Glu-TGACAATGTCCACAT-Ado-Glu-Ado-Glu-Ado-TTTCTTCTTT-Glu-NH_2
PNA414: Ac-Glu-GTCATGCTGAAGTCG-Ado-Glu-Ado-Glu-Ado-TTCTTTTCTT-Glu-NH_2
DA256*: DA256 labelled with ^{32}P-dATP and oligonucleotide kinase.

The results are shown in Fig 12.

Experiment 1:

This is just the preparation of a solution containing 1 pmol DA256* (see lane 1).

Experiment 2:

In this experiment 1 pmol DA256* and 10 pmol PNA414 were mixed in 10 µl water and incubated overnight (see lane 2).

Experiment 3:

In this experiment 1 pmol DA256* and 10 pmol PNA380 were incubated. This experiment yields a DNA having two PNAs bound via triplex formation. This is the first molecule that can be used as a probe in nucleic acid hybridisation assays, if the part of the DNA not participating in the triplex formation is complementary to a selected region of a target nucleic acid. Instead of one binding side, now two binding sites (the free accessible parts of the PNAs) have been created (see lane 3).

Experiment 4:

In this experiment two DNA molecules (1 pmol DA256* and 20 pmol DA262) are incubated together with 10 pmol PNA380. This experiment shows that the binding sides remaining on the PNA380 further react with DNA molecules of complementary sequence forming duplexes. This can be seen from lane 4 of Fig 12, wherein the complex formed as seen in lane 3 disappears in favour of higher molecular weight bands.

Experiment 5:

This experiment shows that also the DNA part of DA256 is accessible to hybridisation with a PNA molecule, forming a duplex. In this experiment 1 pmol DA256*, 5 pmol PNA414 and 10 pmol PNA380 are mixed and incubated overnight. In lane 5 of Fig 5 it can be seen that, compared to lane 3, there is formed a higher molecular weight complex, indicating additional duplex formation with PNA414.

Experiment 6:

In this experiment all four probes were mixed together to create very high molecular weight assemblies. 1 pmol DA256*, 9 pmol DA256, 10 pmol DA262, 10 pmol PNA380 and 10 pmol PNA414 are mixed and incubated overnight. As can be seen from lane 6 of Fig 13 high molecular weight structures have formed. This is the first indication that the binding sites of originally 1 probe is enhanced four times. The conditions for running the gel of Fig 12 is 12% polyacrylamid with the buffer of TAE pH 7.0.

Example 6

Formation of an assembly having doubled binding sites

This experiment shows the formation of the complex containing a first probe (DA256) binding via triplex formation to further probes (PNA380), which bind via duplex formation one further probe (DA262) each. The sequences of the oligomers used are given in Example no. 6. The conditions are the following:

Samples 1-7 contain:

1 pmol DA 256*
9 pmol DA256
40 pmol PNA380
X pmol PNA 262 (X = 0; 1; 5; 10; 20; 40; 100)

Gel: 12 % Polyacrylamid
Buffer: TAE pH 7.0

The results are presented in Fig 13. The lanes correspond to the samples as given above. It can be seen with lower concentrations of DA262 there is formed predominant an assembly of DA256 and PNA380 having a higher molecular weight than DA256. With increasing amount of DA262 there is formed a higher molecular weight complex (especially lanes 6 and 7). In lane 7 the predominant product is the complex containing one triplex structure and two duplex structures.

SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT:
(A) NAME: Boehringer Mannheim GmbH
(B) STREET: Sandhofer Straße 116
(C) CITY: Germany
(E) COUNTRY: DE
(F) POSTAL CODE (ZIP): 68305

(ii) TITLE OF INVENTION: Method of analysis using signal amplification

(iii) NUMBER OF SEQUENCES: 4

(iv) COMPUTER READABLE FORM:
(A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 10 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
(A) DESCRIPTION: /desc = "Oligodeoxyribonucleotide"

(ix) FEATURE:

(A) NAME/KEY: misc_feature

(B) LOCATION:1

(D) OTHER INFORMATION:/note= "at the terminus aminohexyl alkylated amino group"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

AAAGAAGAAA 10

(2) INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "Oligodeoxyribonucleotide"

(ix) FEATURE:

(A) NAME/KEY: misc_feature

(B) LOCATION:1

(D) OTHER INFORMATION:/note= "at the terminus aminohexyl alkylated amino group"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

AAGAGAAAAA 10

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
(A) DESCRIPTION: /desc = "Oligodeoxyribonucleotide"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

CGACTTCAGC ATGACTCAAA GAAGAAA 27

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
(A) DESCRIPTION: /desc = "Oligodeoxyribonucleotide"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

ATGTGGACAT TGTCATCAAG AAAAGAA 27

Claims

1. A method of determining a molecule A containing a sequence SA of nucleobases, said molecule being capable of participating in a triple helical structure through said sequence SA comprising

   - providing a reaction mixture containing multiple probe molecules B containing a first segment B1 capable of participating in a triple helix structure with A through sequence SA and a segment B2,
   - incubating said reaction mixture at conditions allowing the formation of triple helices and
   - determining the formation of triple helices using said segment B2.

2. A method according to claim 1, characterized in that segment B2 is capable of participating in a triple helix structure.

3. A method according to claim 1, characterized in that segments B1 or/and B2 occur twice in said triple helix structure.

4. A method according to any of claims 1 to 3, characterized in that the determination of triple helices is made by means of a probe C containing

   a first segment C1 which can bind to segment B2 and
   a second segment C2
   wherein either or both of C1 and C2 are capable of participating in a triple helix structure
   and determining the formation of triple helices using segment C2.

5. A method according to claim 4, characterized in that segment C2 is capable of participating in a triple helix structure.

6. A method according to claim 4, characterized in that segments C1 and/or C2 occur twice in a triple helix structure.

7. A method according to any of the preceding claims, characterized in that one of segments B1 and B2 contains a nucleobase sequence on a non-natural backbone and the other contains a nucleobase sequence on a natural backbone.

8. A method according to any of claims 4 to 6, characterized in that B1 and B2 contain a nucleobase sequence on a non-natural backbone and C1 and C2 contain a nucleobase sequence on a natural backbone.

9. A method according to any of claims 1 to 3, characterized in that the formation of triple helices is made using a labeled probe C containing a nucleobase sequence complementary to B2.

10. A method according to any of claims 7 and 8, characterized in that the non-natural backbone is a peptide bond containing backbone.

11. A molecule containing nucleobase sequence containing segments B1 and B2, wherein B1 contains a peptide bond containing backbone and B2 contains a natural backbone, and wherein said segments are covalently bound together directly or through a linker moiety, and wherein said binding is between the amino terminus of B1 and the 5' terminus of B2 or the carboxylic acid terminus of B1 and the 3'-terminus of B2.

12. A method for the determination of an analyte comprising

   - providing a reaction mixture with a molecule A containing a nucleobase sequence SA, said molecule being capable of forming a triple helix structure through said sequence SA and further being capable of binding to said analyte and multiple probe molecules B containing

     a first segment B1 capable of participating in a triple helix structure with A through said sequence SA and
     a second segment B2

   - incubating said reaction mixture at conditions allowing the formation of triple helices and
   - determining the formation of triple helices using said segment B2 as a measure for the analyte to be deter-

mined.

13. A method according to claim 12, characterized in that the incubation is stopped at a predetermined time by changing the pH of the reaction mixture or by adding blocking molecules.

14. Use of the formation of multiple triple helix structures for the determination of an analyte.

15. A composition of matter comprising

- a component N containing a sequence N1 capable of forming a triplex structure and sequence N2 accessible for further hybridisation and
- a component M containing a sequence M1 capable of forming a triplex structure including sequence N1 and a sequence M2 accessible for further hybridisation.

16. A composition of matter according to claim 15 wherein sequence N2 does not bind via base pairing to sequence M2.

17. A composition of matter according to claim 15 containing one component N bound to two components M.

18. A composition of matter according to claim 17, wherein the sequences M2 of the components M differ in sequence.

19. A composition of matter of claim 15, further comprising a component O bound to component N or component M via sequence N2 or sequence M2.

20. A composition of matter according to claim 17, wherein the sequences of the components M are identical and each sequence M2 is bound to a further component O.

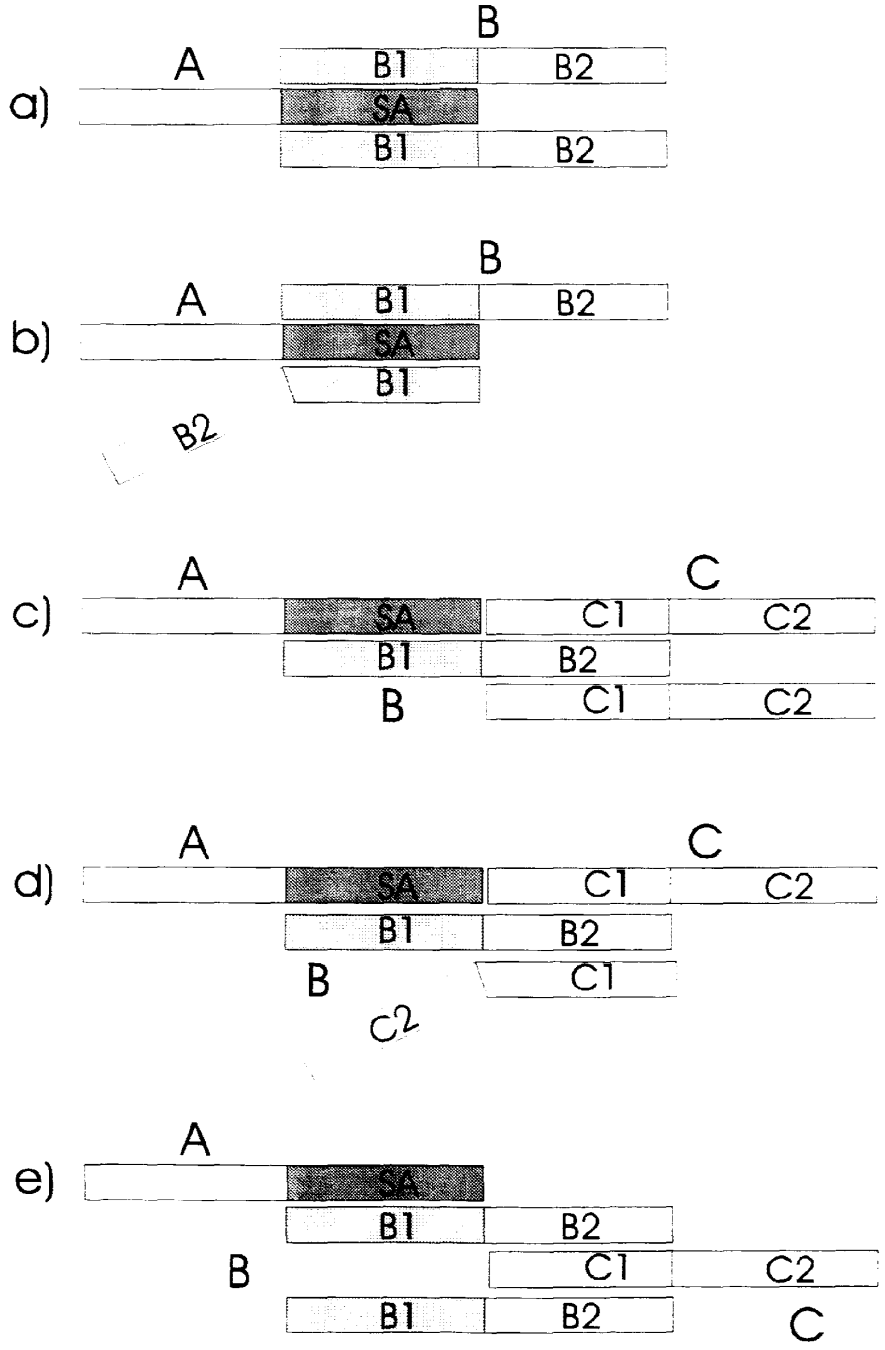
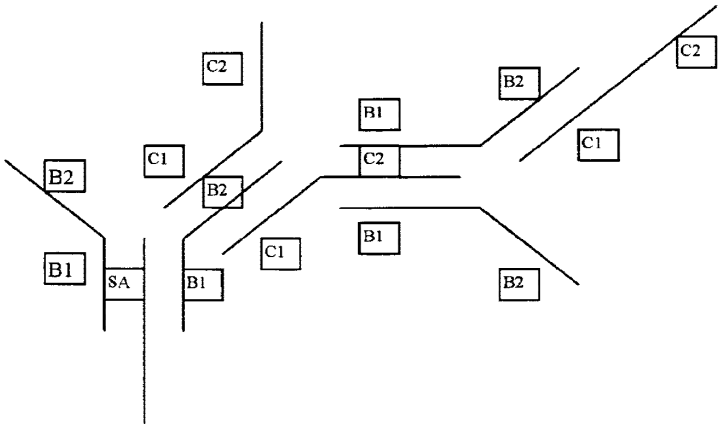

a)
A
B
B1
B2
SA
B1
B2
b)
A
B
B1
B2
SA
B1
B2
c)
A
C
SA
C1
C2
B1
B2
B
C1
C2
d)
A
C
SA
C1
C2
B1
B2
B
C1
C2
e)
A
SA
B1
B2
B
C1
C2
B1
B2
C

FIGURE 1A

FIG 1 B

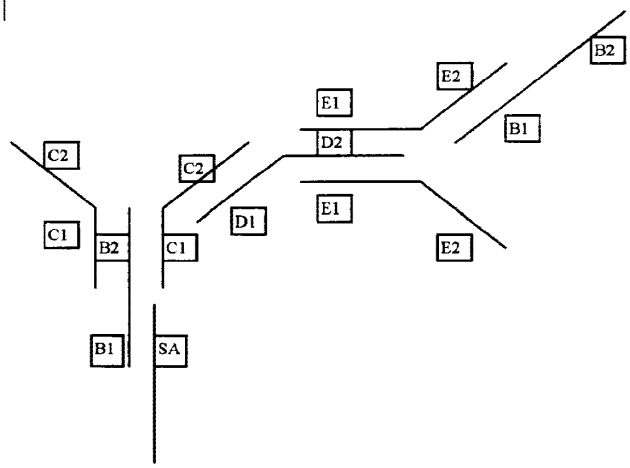
a)

DNA: SA,C1,C2
PNA: B1,B2



b)

DNA: SA,B1,B2,D1,D2
PNA: C1,C2,E1,E2



c)

DNA: SA,C1,C2
PNA: B1,B2

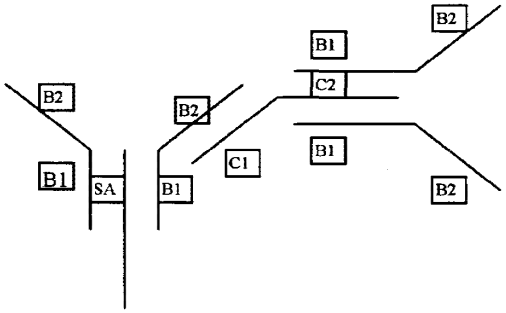
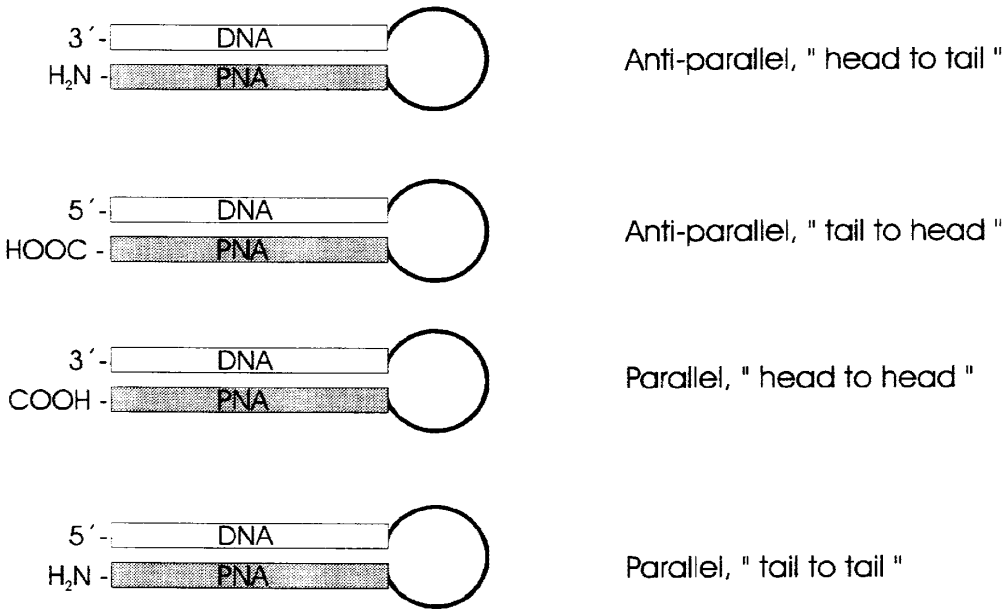


FIGURE 2



FIGURE 3



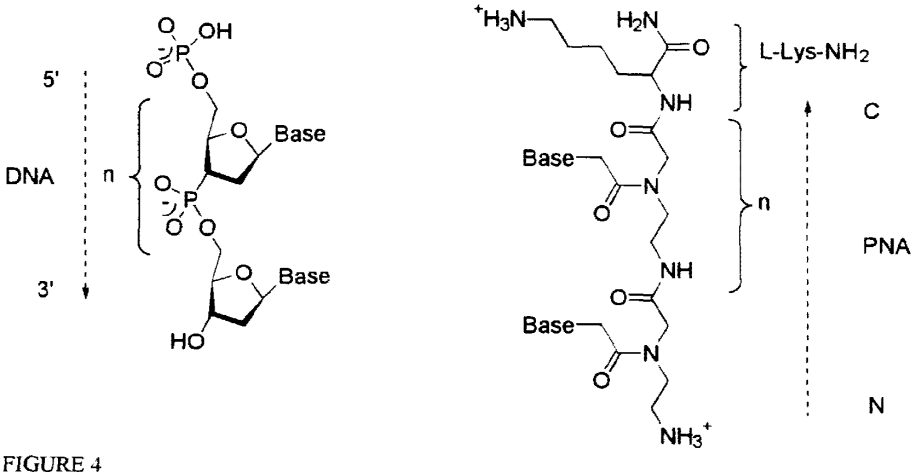

5'
DNA
n
3'
OH
Base
Base
HO
+H3N
H2N
L-Lys-NH2
NH
Base
n
NH
Base
NH3+
C
PNA
N

FIGURE 4

Fig. 5

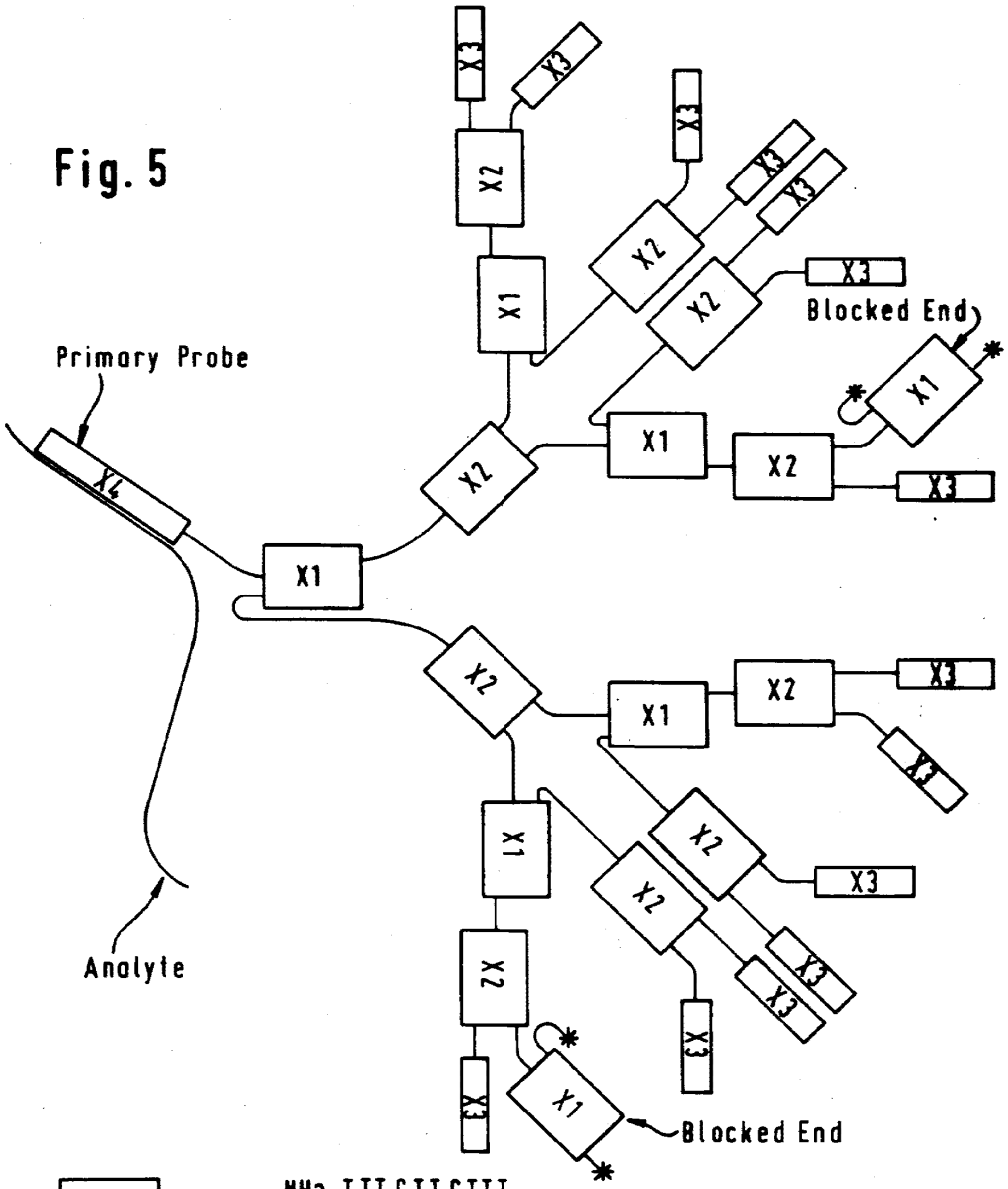

Primary Probe
Analyte
Blocked End
Blocked End
X1
X2
X3
X4
X1 : NH2-TTTCTTCTTT——
——AAAGAAGAAA-3'
——TTTCTTCTTT-NH2
X2 : NH2-TCTTCTTTTT——
——AGAAGAAAAA-3'
NH2-TCTTCTTTTT——
X3 : ——AAAGAAGAAA-3'
X4 : NH2-XXXXXXXXXXXXXXX——

FIGURE 6A

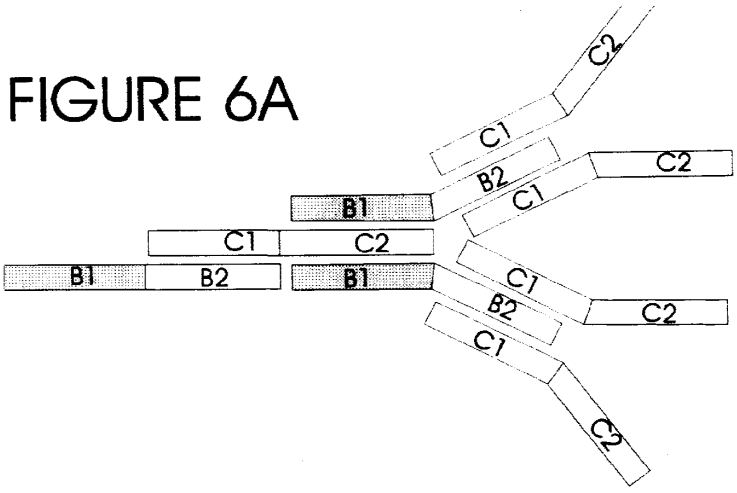


FIGURE 6B

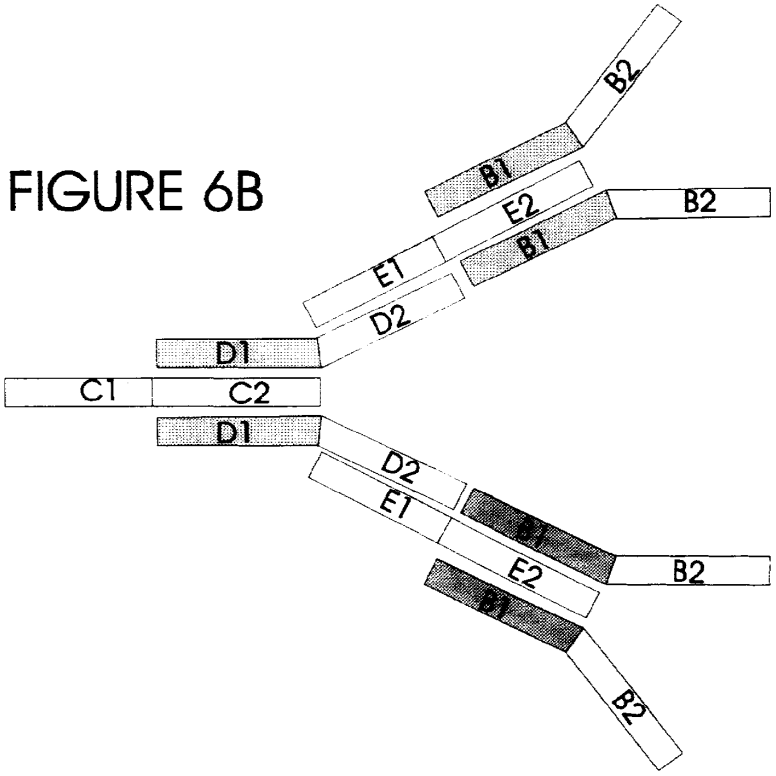


FIGURE 7

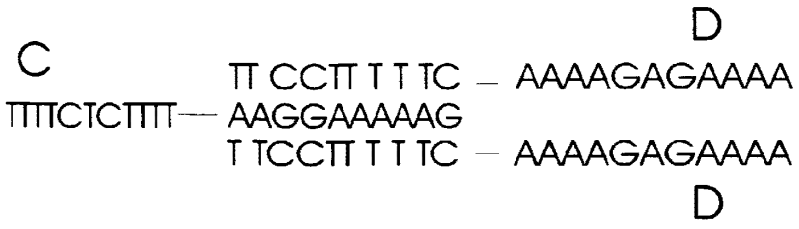


FIGURE 8



FIGURE 9

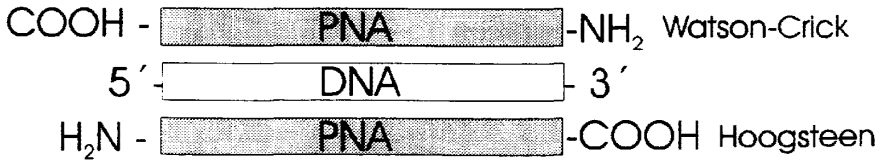


FIGURE 10

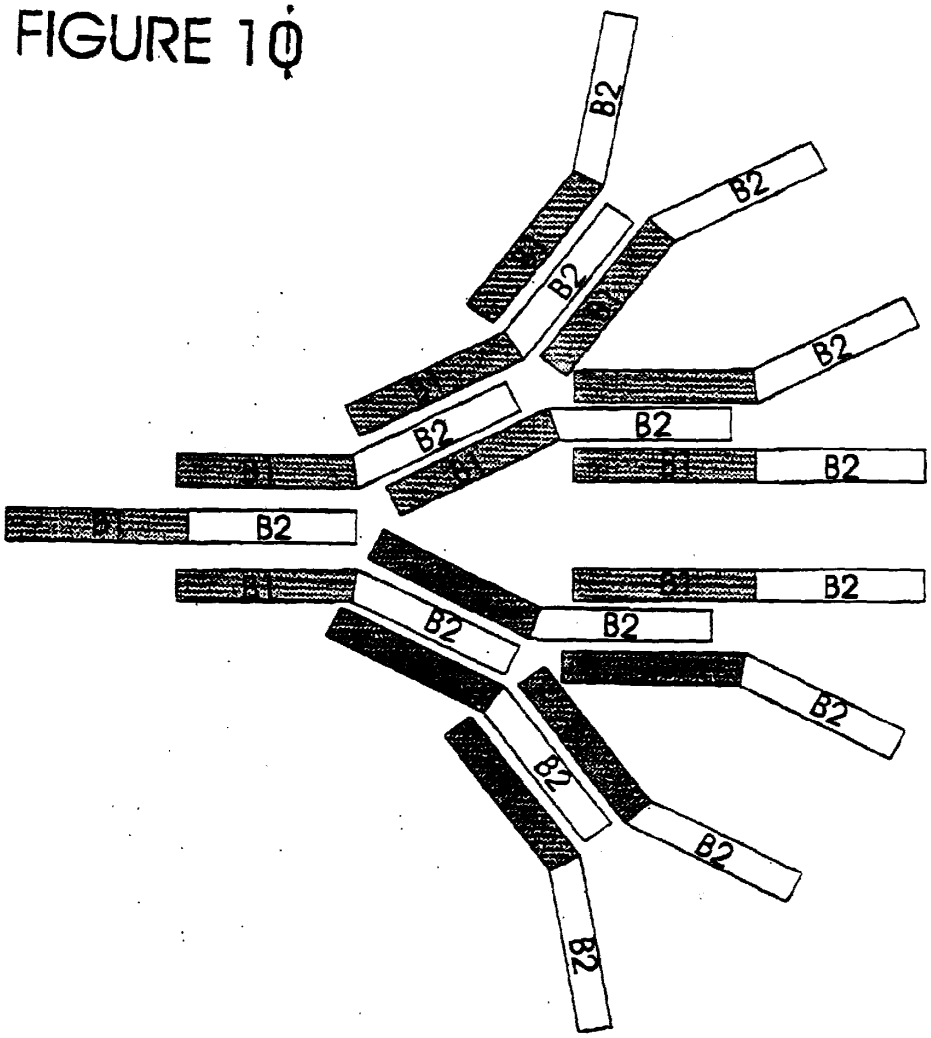


FIG 11

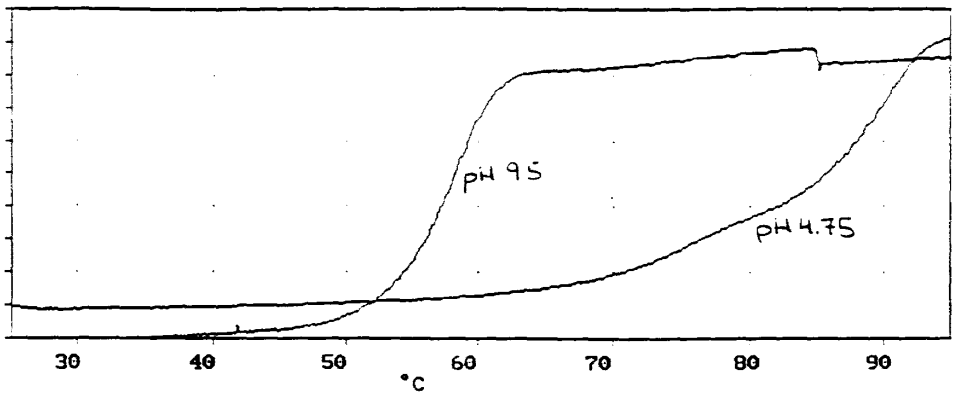

pH 9.5
pH 4.75
30
40
50
60
70
80
90
°C

FIG 12

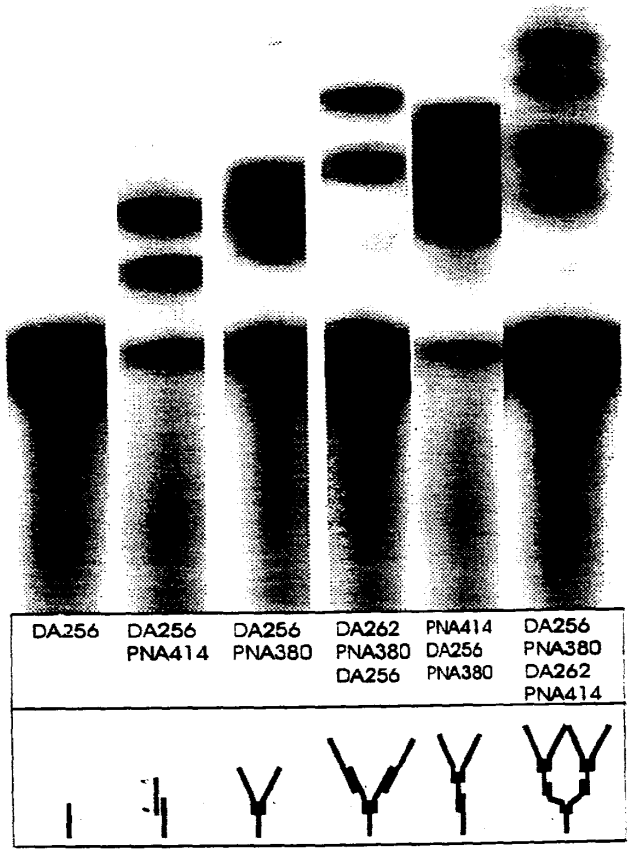
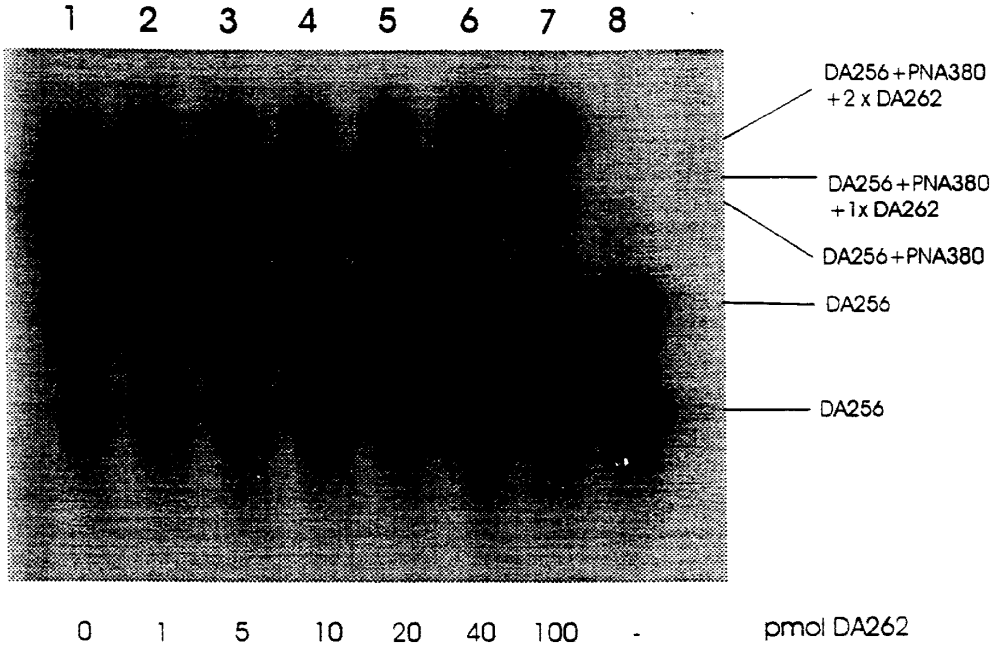

1
2
3
4
5
6
DA256
DA256 PNA414
DA256 PNA380
DA262 PNA380 DA256
PNA414 DA256 PNA380
DA256 PNA380 DA262 PNA414

FIG 13


1 2 3 4 5 6 7 8
DA256+PNA380
+2 x DA262
DA256+PNA380
+1x DA262
DA256+PNA380
DA256
DA256
0 1 5 10 20 40 100 -
pmol DA262

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 12 2253

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,X	WO 95 01370 A (ISIS PHARMACEUTICALS INC ;BUCHARDT OLE (DK); EGHOLM MICHAEL (DK);) * abstract * * page 7, line 1 - line 24 * * page 12, line 29 - page 13, line 2 * * page 20, line 16 - line 24 *	11,15-17	C12Q1/68
Y	* page 27, line 3 - line 25; examples 51,52 *	1-3,7,8, 10,12,14	
D,X	WO 95 14706 A (ISIS PHARMACEUTICALS INC)	11	
Y	* the whole document *	1-3,7,8, 10,12,14	
X	WO 92 11390 A (IDEXX LAB INC)	15-17	
Y	* the whole document *	1-3,7,8, 10,12,14	
Y	WO 95 20320 A (UNIV BOSTON ;UNIV MASSACHUSETTS MEDICAL (US)) * the whole document *	1,4,7,8, 10-14	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Y	IRO T ET AL: "SEQUENCE-SPECIFIC DNA PURIFICATION BY TRIPLEX AFFINITY CAPTURE" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, vol. 89, 1 January 1992, pages 495-498, XP002000128 * the whole document *	1,4,7,8, 10-14	C12Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 March 1998	Knehr, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

Electronic Patent Application Fee Transmittal	
Application Number:	11938483
Filing Date:	12-Nov-2007
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	David Michael Saravitz/Evelyn Casey
Attorney Docket Number:	035718/384482
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

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($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	8523128
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	29122
Filer:	David Michael Saravitz/Evelyn Casey
Filer Authorized By:	David Michael Saravitz
Attorney Docket Number:	035718/384482
Receipt Date:	29-SEP-2010
Filing Date:	12-NOV-2007
Time Stamp:	13:40:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	9723
Deposit Account	160605
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. Section 1.16 (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 1.20 (Post Issuance 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 Letter	1895D9_384482_IDS.pdf	83556 1cd9de18e9d8289f582965eb5f20bddd8b44de62	no	2
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Filed (SB/08)	1895_384482_SuppIDS1449.pdf	119653 21eae25cafcc07f7596f489eb4f828896695d6b3	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	EP0857791A2.pdf	1070265 9ad8411e4c49ee51c54bed779ed0ca3a50e6818e	no	25
Warnings:					
Information:					
4	NPL Documents	Buck.pdf	872932 2440400a98e420597dc913c947b9b95d26848be0	no	9
Warnings:					
Information:					
5	NPL Documents	Crickmore.pdf	775445 f69c901dd04ca3dc05745748f2a154a44f73c32b	no	11
Warnings:					
Information:					
6	NPL Documents	Herman.pdf	496794 0674a6e41b87de7e56a9336508de310bacf3085b	no	5
Warnings:					
Information:					
7	NPL Documents	Lowe.pdf	805767 e46d92963c5a1f654b502da433cc315674934949	no	5
Warnings:					
Information:					

8	NPL Documents	Moellenbeck.pdf	670971 c81757eefec44a85f910802d646ddcfeda423c7e	no	5
Warnings:					
Information:					
9	NPL Documents	Stratagene.pdf	806209 3b6122b77e14cce686f9bbe25023f9a57124e45d	no	2
Warnings:					
Information:					
10	NPL Documents	SequenceSearchReports.pdf	242007 378ab9d077e556b0c3996cdc3dc7c2ca814cb43e	no	6
Warnings:					
Information:					
11	Fee Worksheet (PTO-875)	fee-info.pdf	30187 eb0ee1e182bb1f3a61b2f83f6929f783b8bd2891	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	5973786		

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.

Attorney's Docket No. 035718/384482

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Bing et al.	Confirmation No.:	4077
Appl. No.:	11/938,483	Group Art Unit:	1634
Filed:	November 12, 2007	Examiner:	Kubelik, Anne R.
For:	CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF		

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97(c)

Sir:

Attached is a list of documents on form PTO-1449 along with a copy of any cited foreign patent documents and non-patent literature document in accordance with 37 CFR 1.98(a)(2). Also enclosed is a translation or a concise explanation of each non-English language document. It is requested that the Examiner consider these documents and officially make them of record in accordance with the provisions of 37 C.F.R. § 1.97 and Section 609 of the MPEP. By identifying the listed documents, Applicant in no way makes any admission as to the prior art status of the listed documents, but is instead identifying the listed documents for the sake of full disclosure.

This Information Disclosure Statement is submitted in accordance with 37 C.F.R. § 1.97(c), before final Office Action or Allowance, whichever is earlier.

The Commissioner is authorized to charge the $180.00 fee specified in 37 C.F.R. § 1.17(p) to Deposit Account No. 16-0605 at the time of e-filing. The Commissioner is also authorized to charge any necessary additional fee, or credit any refund, to our Deposit Account No. 16-0605.

Respectfully submitted,

/david m. saravitz/

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Registration No. 55,593

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

29122 7590 11/29/2010

ALSTON & BIRD LLP
PIONEER HI-BRED INTERNATIONAL, INC.
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	**PAPER NUMBER**
1638	

MAIL DATE	DELIVERY MODE
11/29/2010	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	11/938,483	BING ET AL.	
	Examiner	Art Unit	
	Anne R. Kubelik	1638	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *21 September 2010*.

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

3)☐ 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

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1 and 6* is/are allowed.

6)☒ Claim(s) *2-5 and 7* is/are rejected.

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

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

Application Papers

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

10)☐ 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-7 are pending.

2. The claims contain sequences drawn to an invention nonelected without traverse in the response filed 30 March 2010.

3. The objection to claims 1-7 because of informalities is withdrawn in light of Applicant's amendment of the claims.

4. The rejection of claims 3, 4 and 6 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention is withdrawn in light of Applicant's amendment of the claims.

5. The rejection of claim 7 under 35 U.S.C. 102(b) as being anticipated by Whitelaw et al (2003, GenBank Accession No. BZ739496) is withdrawn in light of Applicant's amendment of the claim.

6. The rejection of claim 7 under 35 U.S.C. 102(b) as being anticipated by Zambryski et al (1996, GenBank Accession No. TIP37TD2) is withdrawn in light of Applicant's amendment of the claim.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> 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 2-5 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for maize plants comprising event DAS-59122-7, does not reasonably

provide enablement for other plants comprising SEQ ID NIO:32 or 34. 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/or use the invention commensurate in scope with these claims. The rejection is modified from the full enablement rejection set forth in the Office action mailed 14 June 2010, due to Applicant's making a proper deposit statement for seeds comprising event DAS-59122-7. Applicant's arguments filed 21 September 2010 have been fully considered but they are not persuasive.

The claims are broadly drawn to insect resistant plants comprising SEQ ID NO:32 or 34.

SEQ ID NO:32 or 34 are not sufficient to confer insect resistance to plants, as they do not encode insect resistance genes.

Applicant makes a proper deposit statement for seeds comprising event DAS-59122-7 (response pg 7-8).

This is not found persuasive. The claims are drawn to any insect resistant plant comprising SEQ ID NO:32 or 34, which do not confer insect resistance. The claims are only enabled for a subset of such plants, those comprising the DAS-59122-7 event. Amending the claims to recite that the plants are DAS-59122-7 event plants would overcome the rejection.

9. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claim is drawn to a nucleic acid that comprises 11 base pairs of SEQ ID NO:32 or 34 and that uniquely identifies event DAS-59122-7 under stringent hybridization.

The specification describes no 11 base pair long nucleic acids that uniquely identifies event DAS-59122-7 under stringent hybridization.

The structural features that 11 base pair long fragments of SEQ ID NO:32 that comprise the junction site and that uniquely identify event DAS-59122-7 under stringent hybridization from other 11 base pair long fragments of SEQ ID NO:32 that comprise the junction site are not described in the specification.

One of skill in the art would not recognize that Applicant was in possession of the necessary common attributes or features of the genus in view of the lack of a disclosed species."

Hence, Applicant has not, in fact, described the claimed nucleic acids, and the specification fails to provide an adequate written description of the claimed invention.

Therefore, given the lack of written description in the specification with regard to the structural and functional characteristics of the claimed compositions, Applicant does not appear to have been in possession of the claimed genus at the time this application was filed.

10. Claims 1 and 6 are allowed.

11. Applicant requests consideration of Ellis. However, Ellis is not cited on the 1149 filed 29 September 20101 and the IDS filed 12 November 2007 does not have the date of the Ellis publication on it. Thus, Ellis cannot be considered.

Conclusion

12. 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.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

November 26, 2010

/Anne R Kubelik/
Primary Examiner, Art Unit 1638

Substitute for form 1449/PTO (Revised 07/2007)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1634
				Examiner Name	Anne R. Kubelik
Sheet	1	of	2	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear
	12	US-5,474,796	12-12-1995	Brennan	
	13	US-5,541,308	07-30-1996	Hogan et al.	
	14	US-6,232,063	05-15-2001	Beckmann et al.	
	15	US-6,372,480	04-16-2002	Narva et al.	
	16	US-6,458,584	10-01-2002	Mirzabekov et al.	
	17	US-6,825,400	11-30-2004	Behr et al.	
	18	US-7,112,721	09-26-2006	Fabijanski et al.	
	19	US-7,323,556	01-29-2008	Bing et al.	
	20	US-2002/0013960	01-31-2002	Behr et al.	
	21	US-2002/0102582	08-01-2002	Levine	
	22	US-2002/0199215	12-26-2002	Boets et al.	
	23	US-2003/0198943	10-23-2003	Remacle et al.	
	24	US-2006/0141495	06-29-2006	Wu	
	25	US-2008/0166725	07-10-2008	Bing et al.	
	26	US-2008/0166726	07-10-2008	Bing et al.	
	27	US-2008/0171334	07-17-2008	Bing et al.	
	28	US-2008/0182256	07-31-2008	Bing et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document Country Code - Number Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	English Language Translation Attached
	29	EP 0 857 791 A2	12-08-1998	Boehringer Mannheim GmbH		

OTHER 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, page(s) , volume-issue number(s), publisher, city and/or country where published.	English Language Translation Attached
	30	BUCK, *et al.,* "Design Strategies and Performance of Custom DNA Sequencing Primers," *BioTechniques*, 1999, Vol. 27, pp. 528-536	
	31	CRICKMORE, *et al.,* http://www.lifesci.sussex.ac.uk/Home/Neil_Crickmore/Bt/, 2009, pp. 1-11.	

Examiner Signature	/Anne Kubelik/	Date Considered	11/19/2010

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.K./

Substitute for form 1449/PTO (Revised 07/2007)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1634
				Examiner Name	Anne R. Kubelik
Sheet	2	of	2	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS			
	32	HERMAN, *et al.,* "Binary Insecticidal Crystal Protein from *Bacillus thuringiensis,* Strain PS149B1: Effects of Individual Protein Components and Mixtures in Laboratory Bioassays," *Journal of Economic Entomology*, 2002, Vol. 95(3), pp. 635-639.	
	33	LOWE, *et al.,* "A computer program for selection of oligonucleotide primers for polymerase chain reactions," *Nucleic Acids Research*, 1990, Vol. 18(7), pp. 1757-1761.	
	34	MOELLENBECK, *et al.,* "Insecticidal proteins from *Bacillus thuringiensis* protect corn from corn rootworms," *nature biotechnology*, 2001, Vol. 19, pp. 668-672.	
	35	Stratagene Catalog, page 40, 1988.	
	36	Sequence Search Reports, QM nucleic – nucleic search, 2009, pp. 1-6.	

Examiner Signature	/Anne Kubelik/	Date Considered	11/19/2010

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.K./

REQUEST For CONTINUED EXAMINATION (RCE) TRANSMITTAL Address to: MAIL STOP RCE COMMISSIONER FOR PATENTS P.O. BOX 1450 ALEXANDRIA, VA 22313-1450 (Revised 04/2005)	Application Number: **11/938,483**
	Filing Date: **November 12, 2007**
	First Named Inventor: **James Wayne Bing**
	Art Unit: **1638**
	Examiner Name: **Kubelik, Anne R.**
	Confirmation No.: **4077**
	Attorney Docket No.: **035718/384482**

This is a request for Continued Examination (RCE) under 37 C.F.R. § 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.

1. **Submission required under 37 C.F.R. § 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).

   a. ☐ 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.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on

      ii. ☐ Other

   b. ☒ Enclosed

      i. ☒ Amendment After Final Under 37 CFR § 1.116

      ii. ☐ Affidavits(s)/Declarations(s)

      iii. ☒ Information Disclosure Statement (IDS); 1 cite listed on PTO Form 1449

      iv. ☐ Other

2. **Miscellaneous**

   a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. §1.103(c) for a period of ___ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(g) required)

   b. ☐ Other

3. **Fees** The RCE fee under 37 C.F.R. § 1.17(e) is **required** by 37 C.F.R. § 1.114 when the RCE is filed.
   a. The Director is hereby authorized to charge any fee deficiencies, or credit any overpayments to Deposit Account No. 16-0605.
      i. ☒ RCE fee required under 37 C.F.R. § 1.17(e) (**$810.00 large entity**; ~~$405.00 small entity~~)
      ii. ☐ Extension of Time Fee (37 C.F. R. §§ 1.136 and 1.17)
      iii. ☐ Other
   b. ☐ Check in the amount of $___enclosed

Respectfully submitted,

/david m. saravitz/

David M. Saravitz
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ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON **FEBRUARY 28, 2011.**

PATENT

RESPONSE UNDER 37 C.F.R. 1.116 - EXPEDITED PROCEDURE - EXAMINING GROUP 1638

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.:	11/938,483	Confirmation No.: 4077
Applicant(s):	Bing *et al.*	
Filed:	November 12, 2007	
Art Unit:	1638	
Examiner:	Kubelik, Anne R.	
Title:	CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF	

Docket No.: 035718/384482
Customer No.: 29122

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

AMENDMENT AFTER FINAL UNDER 37 CFR § 1.116

Sir:

In response to the Final Office Action dated November 29, 2010, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.

Remarks/Arguments begin on page 4 of this paper.

Amendments to the Claims:

1. (Previously presented) An isolated DNA molecule comprising a junction sequence comprising a sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof.

2. (Currently amended) An insect resistant corn plant, or parts thereof, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, forms part of the plant's genome[[.]], wherein said plant or said parts thereof comprise corn event DAS-59122-7.

3. (Currently amended) A descent plant of the insect resistant corn plant of claim 2, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, forms part of the descent plant's genome[[.]], wherein said descent plant comprises said corn event DAS-59122-7.

4. (Currently amended) A seed of the plant of claim 2 or 3, wherein DNA having at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, forms part of the seed's genome[[.]], wherein said seed comprises said corn event DAS-59122-7.

5. (Currently amended) A method of producing an insect resistant corn plant, said method comprising breeding with the plant of claim 2 or 3, and selecting progeny by analyzing for at least one nucleotide sequence selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof[[.]], wherein said progeny comprises said corn event DAS-59122-7.

6. (Previously presented) A method of detecting event DAS-59122-7 in corn tissue comprising:

(a) contacting a sample of said corn tissue with a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof;

(b) subjecting said sample and probe to stringent hybridization conditions; and

(c) analyzing for hybridization of the probe.

7. (Currently amended) A DNA detection kit comprising a polynucleotide probe capable of uniquely identifying event DAS-59122-7, wherein said probe comprises a sequence of at least eleven contiguous nucleotides, ~~and~~ wherein said probe hybridizes under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof[[.]], but does not hybridize under said stringent conditions with DNA from a corn plant that lacks event DAS-59122-7.

REMARKS/ARGUMENTS

Status of the Claims

Claims 1-7 are pending, and claims 2-5 and 7 stand rejected.

Applicants respectfully acknowledge that Examiner Kubelik has allowed claims 1-6.

Applicants have amended claims 2-5 as suggested by Examiner Kubelik to recite that the claimed plant, parts thereof, descent plant, seed, or progeny comprises corn event DAS-59122-7. This amendment to the claims is fully supported by the original claims and specification.

Applicants have amended claim 7 to point out more distinctly that the polynucleotide probe, while being capable of uniquely identifying event DAS-59122-7 and hybridizing under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, does not hybridize under said stringent conditions with DNA from a corn plant that lacks event DAS-59122-7. Support for this amendment can be found in the specification, particularly on pages 7 (lines 18-32).

The amendments to the claims were made in the interest of expediting examination of the instant application and not to limit the scope of Applicants' claimed invention. Applicants expressly reserve the right to file one or more continuing applications or take such other measures deemed necessary to protect any subject matter that has been excluded from the scope of the amended claims.

No new matter has been added by way of amendment of the claims.

Reexamination and reconsideration of the application as amended are respectfully requested in view of the following remarks.

The Rejections of the Claims Under 35 U.S.C. § 112, First Paragraph, for Failure to Comply With the Enablement Requirement Should Be Withdrawn

Claims 2-5 are rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. Claims 2 and 3 have been amended. This rejection is respectfully traversed.

The Office Action indicates that the claims are drawn to insect resistant plants comprising SEQ ID NO: 32 or 34, which do not confer insect resistance. The Office Action asserts that claims are only enabled for the subset of plants that comprise the DAS-59122-7 event. The Office Action indicates that this rejection can be overcome by amending the claims to recite that the claimed plants are DAS-59122-7 event plants.

Without acquiescing to the position of the Office that claims 2-5 fail to comply with the enablement requirement and in the interest of expediting examination of the instant application, Applicants have amended claims 2-5 as suggested by Examiner Kubelik to recite that the claimed plant, parts thereof, descent plant, seed, or progeny comprises corn event DAS-59122-7.

In view of the amendments and above remarks and in further view of Applicants' prior statements in their response filed September 21, 2010 concerning the making of a deposit of maize seeds comprising event DAS-59122-7 under the provisions of 37 C.F.R. § 1.804 and amending the specification to add the indentifying information set forth in 37 C.F.R. § 1.809(d), the Examiner is respectfully requested to withdraw the rejection of claims 2-5 under 35 U.S.C. § 112, first paragraph.

The Rejections of the Claims Under 35 U.S.C. § 112, First Paragraph, for Failure to Comply With the Written Description Requirement Should Be Withdrawn

Claim 7 is rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. Claim 7 has been amended. This rejection is respectfully traversed.

The Office Action alleges that the specification describes no 11 base pair long nucleic acid molecule that uniquely identifies event DAS-59112-7 under stringent hybridization conditions. The Office Action further alleges that "[t]he structural features that 11 base pair long fragments of SEQ ID NO:32 that comprise the junction site and that uniquely identify event DAS-59122-7 under stringent hybridization from other 11 base pair long fragments of SEQ ID NO:32 that comprise the junction site are not described in the specification." Office Action, Nov. 29, 2010, p. 4. The Office Action concludes that one of skill in the art would not recognize that Applicants were in possession of the necessary common attributes or features of the genus in view of the lack of a disclosed species.

Applicants respectfully disagree with the position of the Office that the specification does not provide an adequate written description of subject matter encompassed by claim 7. One of ordinary skill in the art in view of Applicants' original disclosure, including the Sequence Listing (particularly SEQ ID NOS: 23, 32, and 34) would be able to identify fragments of at least 11 base pairs that comprise the junction sequences within SEQ ID NOS: 32 and 34. For example, the specification discloses that:

> DNA molecules are provided that ***comprise at least one junction sequence*** of DAS-59122-7 selected from the group consisting of SEQ ID NO: 32, 33, 34, and 35 and complements thereof; wherein a ***junction sequence spans the junction between heterologous DNA inserted into the genome and the DNA from the corn cell flanking the insertion site, i.e. flanking DNA, and is diagnostic for the DAS-59122-7 event.***

Specification, p. 8, lines 3-7 (emphasis added). Applicants' specification further discloses that the "DNA sequence (SEQ ID NO: 23) showing the transgenic insert PHI17662A, as well as the sequences flanking the transgenic insert. The 5' and 3' ***border regions, bp 1 to bp2593 and bp 9937 to bp 11922,*** respectively, are underlined." *Id.* at p. 9, lines 16-20 (emphasis added). *See*, also, FIG. 1. In addition, Applicants' specification discloses the location of SEQ ID NOS: 32 and 34 within SEQ ID NO: 23 in Table 3 on page 35.

In view of the disclosure of the structure of junction sequences within SEQ ID NOS: 32 and 34, a person having ordinary skill in the ordinary skill in the art would recognize the common structural attributes of probes that are encompassed by claim 7, wherein such probes are capable of uniquely identifying event DAS-59122-7, comprise a sequence of at least eleven contiguous nucleotides, hybridize under stringent hybridization conditions with one or more DNA sequences selected from the group consisting of SEQ ID NO: 32, 33, 34, 35, and complements thereof, but do not hybridize under said stringent conditions with DNA from a corn plant that lacks event DAS-59122-7. Accordingly, the specification provides an adequate written description of the genus of probes encompassed by claim 7.

While Applicants believe that the specification provides an adequate written description of the genus of probes encompassed by claim 7, Applicants have amended claim 7, in the interest of expediting prosecution and not to limit their claimed invention, to point out more distinctly that the probe does not hybridize under said stringent conditions with DNA from a corn plant that lacks event DAS-59122-7.

In view of the amendment of claim 7 and above remarks, it is submitted that the rejection of the claims under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement should be withdrawn.

CONCLUSION

In view of the above amendments and remarks, Applicants submit that the rejections of the claims under 35 U.S.C. §112, first paragraph, are overcome. Applicants respectfully submit that this application is now in condition for allowance. Early notice to this effect is solicited.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of

this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON FEBRUARY 28, 2011.

Attorney's Docket No. 035718/384482 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Bing *et al.*	Confirmation No.:	4077
Appl. No.:	11/938,483	Art Unit:	1638
Filed:	November 12, 2007	Examiner:	Kubelik, Anne R.
For:	CORN EVENT DAS 59122-7 AND METHODS FOR DETECTION THEREOF		

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

INFORMATION DISCLOSURE STATEMENT
CITATION UNDER 37 C.F.R. § 1.97

Sir:

Attached is a list of documents on form PTO-1449 along with a copy of any cited foreign patent documents and non-patent literature documents in accordance with 37 CFR 1.98(a)(2).

It is requested that the Examiner consider these documents and officially make them of record in accordance with the provisions of 37 C.F.R. § 1.97 and Section 609 of the MPEP. By identifying the listed documents, Applicant in no way makes any admission as to the prior art status of the listed documents, but is instead identifying the listed documents for the sake of full disclosure.

Respectfully submitted,

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Fax Research Triangle Area Office (919) 862-2260

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON FEBRUARY 28, 2011.

Substitute for form 1449/PTO (Revised 07/2007)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1638
				Examiner Name	Kubelik, Anne R.
Sheet	1	of	1	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document Country Code - Number Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	English Language Translation Attached

OTHER 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, page(s) , volume-issue number(s), publisher, city and/or country where published.	English Language Translation Attached
	37	ELLIS, R. Tracy, *et al.*, "Novel *Bacillus thuringiensis* Binary Insecticidal Crystal Proteins Active on Western Corn Rootworm, *Diabrotica virgifera virgifera* LeConte," *Applied And Environmental Microbiology*, 2002, Vol. 68(3), pp. 1137-1145.	

Examiner Signature		Date Considered	

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

Electronic Patent Application Fee Transmittal	
Application Number:	11938483
Filing Date:	12-Nov-2007
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	David Michael Saravitz/Evelyn Casey
Attorney Docket Number:	035718/384482
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

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($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**810**

Electronic Acknowledgement Receipt	
EFS ID:	9549491
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	29122
Filer:	David Michael Saravitz/Evelyn Casey
Filer Authorized By:	David Michael Saravitz
Attorney Docket Number:	035718/384482
Receipt Date:	28-FEB-2011
Filing Date:	12-NOV-2007
Time Stamp:	16:04:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$810
RAM confirmation Number	3543
Deposit Account	160605
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. Section 1.16 (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 1.20 (Post Issuance 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	Request for Continued Examination (RCE)	384482-RCE.pdf	98645 bd99d57b6a0cd58bee5c0004ad2aa85a7bda3ae1	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		384482-Amendment.pdf	153953 afc5ccedd55c31f5f56b3bb19fffffaccea176b3	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment After Final	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	8

Warnings:					
Information:					
3	Transmittal Letter	384482-IDS.pdf	102416 3ce92ae742105f71dc90ef43e154a810578e51ac	no	1
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Filed (SB/08)	384482-IDS1449.pdf	116527 648f72c6cf1fe58fa5610860bda2cab15205f318	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
5	NPL Documents	Ellis.pdf	791840 478b06f918b7e3592dc5b4a44ee5e14888118236	no	9
Warnings:					
Information:					

6	Fee Worksheet (PTO-875)	fee-info.pdf	30232 2910df9205cf28ec7f219177f1502c305eb01c26	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	1293613	

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. 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	Filing Date	☐ To be Mailed
11/938,483	11/12/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	02/28/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 9	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $220=	0
	☐ 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	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/Kim Downing/

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.

Substitute for form 1449/PTO (Revised 07/2007)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1638
				Examiner Name	Kubelik, Anne R.
Sheet	1	of	1	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document Country Code - Number Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	English Language Translation Attached

OTHER 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, page(s) , volume-issue number(s), publisher, city and/or country where published.	English Language Translation Attached
	38	HAMMACK, L., *et al.*, "Larval Sampling and Instar Determination in Field Populations of Northern and Western Corn Rootworm (Coleoptera: Chrysomelidae)," *Journal of Economic Entomology*, 2003, Vol. 96(4), pp. 1153-1159.	

Examiner Signature		Date Considered	

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

Electronic Acknowledgement Receipt

EFS ID:	13958882
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	29122
Filer:	David Michael Saravitz/Evelyn Casey
Filer Authorized By:	David Michael Saravitz
Attorney Docket Number:	035718/384482
Receipt Date:	11-OCT-2012
Filing Date:	12-NOV-2007
Time Stamp:	11:13:29
Application Type:	Utility under 35 USC 111(a)

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	Transmittal Letter	384482-SupplDS.pdf	104300 fbc6371e8b2341179e95a596e0b2e17f5e82963d	no	1

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	384482-SuppIDS1449.pdf	114940 5973d24accdd22c41ddc5a72aec4fcddb8229101	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	384482-Hammack.PDF	130658 6ee9ddf0287713c0e3c14f6a8f9e912c6a61da6f	no	7
Warnings:					
Information:					
		Total Files Size (in bytes):	349898		

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.

Attorney's Docket No. 035718/384482 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Bing *et al.*	Confirmation No.:	4077
Appl. No.:	11/938,483	Art Unit:	1638
Filed:	November 12, 2007	Examiner:	Kubelik, Anne R.
For:	CORN EVENT DAS 59122-7 AND METHODS FOR DETECTION THEREOF		

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
CITATION UNDER 37 C.F.R. § 1.97

Sir:

Attached is a list of documents on form PTO-1449 along with a copy of any cited foreign patent documents and non-patent literature documents in accordance with 37 CFR 1.98(a)(2).

It is requested that the Examiner consider these documents and officially make them of record in accordance with the provisions of 37 C.F.R. § 1.97 and Section 609 of the MPEP. By identifying the listed documents, Applicant in no way makes any admission as to the prior art status of the listed documents, but is instead identifying the listed documents for the sake of full disclosure.

Respectfully submitted,

/denise m. ray/

Denise M. Ray
Registration No. 69,142

Customer No. 29122
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Research Triangle Area Office (919) 862-2200
Fax Research Triangle Area Office (919) 862-2260

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON OCTOBER 11, 2012.

Doc Code: PET.AUTO Document Description: Petition automatically granted by EFS-Web	PTO/SB/83 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS**
Application Number	11938483
Filing Date	12-Nov-2007
First Named Inventor	James Bing
Art Unit	1638
Examiner Name	ANNE KUBELIK
Attorney Docket Number	035718/384482
Title	Corn Event DAS-59122-7 and Methods for Detection Thereof

◉ Please withdraw me as attorney or agent for the above identified patent application and the practitioners of record associated with Customer Number: 29122

The reason(s) for this request are those described in 37 CFR:

11.116(a)(3)

Certifications

☒ I/We have given reasonable notice to the client, prior to the expiration of the response period, that the practitioner(s) intend to withdraw from employment

☒ I/We have delivered to the client or a duly authorized representative of the client all papers and property (including funds) to which the client is entitled

☒ I/We have notified the client of any responses that may be due and the time frame within which the client must respond

Change the correspondence address and direct all future correspondence to the first named inventor or assignee that has properly made itself of record pursuant to 37 CFR 3.71(for applications filed before September 16, 2012) or the applicant (for applications filed on or after September 16, 2012):

Name	PIONEER HI-BRED INTERNATIONAL, INC.
Address	7100 NW 62nd Avenue P.O. Box 1014
City	Johnston
State	IA
Postal Code	50131-1014
Country	US

I am authorized to sign on behalf of myself and all withdrawing practitioners.	
Signature	/w. murray spruill/
Name	W. Murray Spruill
Registration Number	32943

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Decision Date : September 3, 2013

In re Application of :

James Bing

Application No : 11938483

Filed : 12-Nov-2007

Attorney Docket No : 035718/384482

DECISION ON REQUEST TO WITHDRAW AS ATTORNEY/AGENTOF RECORD

This is an electronic decision on the Request to Withdraw as attorney or agent of record under 37 CFR § 1.36(b), filed September 3, 2013

The request is **APPROVED.**

The request was signed by W. Murray Spruill (registration no. 32943) on behalf of all attorneys/agents associated with Customer Number 29122 . All attorneys/agents associated with Cusotmer Number 29122 have been withdrawn.

Since there are no remaining attorneys of record, all future communications from the Office will be directed to the first named inventor or assignee that has properly made itself of record pursuant to 37 CFR 3.71(for applications filed before September 16, 2012) or the applicant (for applications filed on or after September 16, 2012), with correspondence address:

Name	PIONEER HI-BRED INTERNATIONAL, INC.
Name2	
Address 1	7100 NW 62nd Avenue
Address 2	P.O. Box 1014
City	Johnston
State	IA
Postal Code	50131-1014
Country	US

As a reminder, requester is required to inform the first named inventor or assignee that has properly made itself of record pursuant to 37 CFR 3.71 (for applications filed before September 16, 2012) or the applicant (for applications filed on or after September 16, 2012)of the electronically processed petition.

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions

Electronic Acknowledgement Receipt

EFS ID:	16729629
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	29122
Filer:	David Michael Saravitz/Evelyn Casey
Filer Authorized By:	David Michael Saravitz
Attorney Docket Number:	035718/384482
Receipt Date:	03-SEP-2013
Filing Date:	12-NOV-2007
Time Stamp:	10:44:34
Application Type:	Utility under 35 USC 111(a)

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	Petition automatically granted by EFS	petition-request.pdf	34678 c8b81977c3110c667e3a8be645d61ae9a20f5c40	no	2

Warnings:	
Information:	

Total Files Size (in bytes):	34678

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.

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
11/938,483	11/12/2007	James Wayne Bing	035718/384482

CONFIRMATION NO. 4077

POWER OF ATTORNEY NOTICE

29122
ALSTON & BIRD LLP
PIONEER HI-BRED INTERNATIONAL, INC.
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

OC000000063555517

Date Mailed: 09/04/2013

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/03/2013.

- The withdrawal as attorney in this application has been accepted. Future correspondence will be mailed to the new address of record. 37 CFR 1.33.

/eefswuser/

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
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

7590 10/04/2013

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62nd Avenue
P.O. Box 1014
Johnston, IA 50131-1014

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

MAIL DATE	DELIVERY MODE
10/04/2013	PAPER

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.

Office Action Summary	Application No. 11/938,483	Applicant(s) BING ET AL.	
	Examiner ANNE KUBELIK	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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 _____.

☐ 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) 1-7 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) 7 is/are rejected.

8)☒ Claim(s) 1-6 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 11/12/2007 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/08) Paper No(s)/Mail Date _____.

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

4) ☐ Other: _____.

DETAILED ACTION

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

2. 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 28 February 2011 has been entered.

3. Claims 1-7 are pending.

4. The claims contain sequences drawn to an invention nonelected without traverse in the response filed 30 March 2010.

5. The rejection of claims 2-5 under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for maize plants comprising event DAS-59122-7, does not reasonably provide enablement for other plants comprising SEQ ID NIO:32 or 34 is withdrawn in light of Applicant's amendment to the claims.

Claim Rejections - 35 USC § 112

6. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The rejection is repeated for the reasons of record as set forth in the Office action mailed 29 November 2010. Applicant's arguments filed 28 February 2011 have been fully considered but they are not persuasive.

The claim is drawn to a nucleic acid that comprises 11 base pairs of SEQ ID NO:32 or 34 and that uniquely identifies event DAS-59122-7 under stringent hybridization.

The specification describes no 11 base pair long nucleic acids that uniquely identifies event DAS-59122-7 under stringent hybridization.

The structural features that distinguish 11 base pair long fragments of SEQ ID NO:32 that comprise the junction site and that uniquely identify event DAS-59122-7 under stringent hybridization from other 11 base pair long fragments of SEQ ID NO:32 that comprise the junction site are not described in the specification.

One of skill in the art would not recognize that Applicant was in possession of the necessary common attributes or features of the genus in view of the lack of a disclosed species."

Hence, Applicant has not, in fact, described the claimed nucleic acids, and the specification fails to provide an adequate written description of the claimed invention.

Therefore, given the lack of written description in the specification with regard to the structural and functional characteristics of the claimed compositions, Applicant does not appear to have been in possession of the claimed genus at the time this application was filed.

Response to Arguments

Applicant urges that one of skill in the art would be able to identify 11 bp fragments of SEQ ID NO:32 and 34 that comprise junction sequences (response pg 6).

This is not found persuasive. While one of skill in the art would be able to identify 11 bp fragments of SEQ ID NO:32 and 34 that comprise junction sequences, one of skill in the art would not be able to identify such 11 bp fragments that hybridize to DAS-59122-7 DNA and not DNA of other plants.

Applicant urges that one of skill in the art would recognize the common structural attributes of the claimed probes (response pg 7).

This is not found persuasive because the stringent hybridization conditions are not specified, one would not.

Applicant urges that the claim has been amended to specify that the probe does not hybridize to DNA from a corn plant that lacks event DAS-59122-7 (response pg).

This is not found persuasive because this does not fix the lack of description of 11 bp fragments that have the claimed function.

7. Claims 1-6 are objected to for containing nonelected sequences. If these sequences were deleted from the claims, they would be allowable.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is

(866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

/Anne R Kubelik/
Primary Examiner, Art Unit 1638

Substitute for form 1449/PTO (Revised 07/2007) **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(Use as many sheets as necessary)*				**Complete if Known**	
				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1638
				Examiner Name	Kubelik, Anne R.
Sheet	1	of	1	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document Country Code - Number Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	English Language Translation Attached

OTHER 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, page(s) , volume-issue number(s), publisher, city and/or country where published.	English Language Translation Attached
	38	HAMMACK, L., *et al.*, "Larval Sampling and Instar Determination in Field Populations of Northern and Western Corn Rootworm (Coleoptera: Chrysomelidae)," *Journal of Economic Entomology*, 2003, Vol. 96(4), pp. 1153-1159.	

Examiner Signature	/Anne Kubelik/	Date Considered	09/17/2013

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.K./

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11938483	BING ET AL.
	Examiner	Art Unit
	ANNE KUBELIK	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
SEQ ID NO:32	7/25/09	ark
SEQ ID NO:34	4/19/10	ark
Inventor search in PALM	9/17/13	ark

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

Substitute for form 1449/PTO (Revised 07/2007)				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	11/938,483
				Filing Date	November 12, 2007
				First Named Inventor	James Wayne Bing
				Art Unit	1638
				Examiner Name	Kubelik, Anne R.
Sheet	1	of	1	Attorney Docket Number	035718/384482

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document Country Code - Number Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	English Language Translation Attached

OTHER 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, page(s) , volume-issue number(s), publisher, city and/or country where published.	English Language Translation Attached
	37	ELLIS, R. Tracy, *et al.*, "Novel *Bacillus thuringiensis* Binary Insecticidal Crystal Proteins Active on Western Corn Rootworm, *Diabrotica virgifera virgifera* LeConte," *Applied And Environmental Microbiology*, 2002, Vol. 68(3), pp. 1137-1145.	

Examiner Signature	/Anne Kubelik/	Date Considered	09/17/2013

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.K./

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

7590 04/29/2014

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62nd Avenue
P.O. Box 1014
Johnston, IA 50131-1014

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

MAIL DATE	DELIVERY MODE
04/29/2014	PAPER

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 Abandonment	Application No.	Applicant(s)
	11/938,483	BING ET AL.
	Examiner	Art Unit
	Anne Kubelik	1638

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

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on *04 October 2013*.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection.
   (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
   (d) ☒ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $_____ is insufficient. A balance of $_____ is due.
   The issue fee required by 37 CFR 1.18 is $_____. The publication fee, if required by 37 CFR 1.18(d), is $_____.
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33(b). See 37 CFR 1.138(b).

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.

6. ☐ The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☐ The reason(s) below:

/Anne Kubelik/
Primary Examiner, Art Unit 1638

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

Doc Code: PET.OP
Document Description: Petition for Review by the Office of Petitions

PTO/SB/64 (12-13)
Approved for use through 07/31/2016. 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 REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(a)

Docket Number (Optional)
36446.0047U2

First named inventor: James Wayne Bing

Application No.: 11/938,483 Art Unit: 1638

Filed: November 12, 2007 Examiner: Anne R. Kubelik

Title: Corn Event DAS-59122-7 and Methods of Detection Thereof

Attention: Office of Petitions
Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
FAX (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

The above-identified application became abandoned for failure to file a timely and proper reply to a notice or action by the United States Patent and Trademark Office. The date of abandonment is the day after the expiration date of the period set for reply in the Office notice or action plus any extensions of time actually obtained.

APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION.

NOTE: A grantable petition requires the following items:

(1) Petition fee;
(2) Reply and/or issue fee;
(3) Terminal disclaimer with disclaimer fee – required for all utility and plant applications filed before June 8, 1995, and for all design applications; and
(4) Statement that the entire delay was unintentional.

1. **Petition fee**

☐ Small entity fee $ _____ (37 CFR 1.17(m)). Applicant asserts small entity status. See 37 CFR 1.27.

☑ Undiscounted fee $ 1,700.00 (37.CFR.1.17(m)).

2. **Reply and/or fee**

A The reply and/or fee to the above-noted Office notice or action in the form of

Response to Non-Final Office Action (identify the type of reply):

☐ has been filed previously on _____.

☑ is enclosed herewith.

B The issue fee and publication fee (if applicable) of $ _____

☐ has been paid previously on _____.

☐ is enclosed herewith.

This collection of information is required by 37 CFR 1.137(a). 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, 1.14 and 41.6. 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: Mail Stop Petition, 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.

Doc Code: PET.OP
Document Description: Petition for Review by the Office of Petitions

PTO/SB/64 (12-13)
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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PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(a)

3. **Terminal disclaimer with disclaimer fee**

☑ Since this utility/plant application was filed on or after June 8, 1995, no terminal disclaimer is required.

☐ A terminal disclaimer (and disclaimer fee (37 CFR 1.20(d)) of $ _____) disclaiming the required period of time is enclosed herewith (see PTO/SB/63).

4. **STATEMENT:** The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(a) was unintentional. [NOTE: The United States Patent and Trademark Office may require additional information if there is a question as to whether either the abandonment or the delay in filing a petition under 37 CFR 1.137(a) was unintentional (MPEP 711.03(c), subsections (III)(C) and (D)).]

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

/Sima Singadia Kulkarni/
Signature

May 12, 2014
Date

Sima Singadia Kulkarni
Typed or Printed Name

43,732
Registration Number, if applicable

Ballard Spahr LLP; 1735 Market Street,
Address

215.864.8616
Telephone Number

51st Floor, Philadelphia, PA 19103-7599
Address

Enclosures:

☑ Fee Payment
☑ Reply
☐ Terminal Disclaimer Form
☐ Additional sheet(s) containing statements establishing unintentional delay
☐ Other: _____

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR 1.8(a)]

I hereby certify that this correspondence is being:

☐ Deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Petition, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450.

☑ Transmitted by EFS-Web or facsimile on the date shown below to the United States Patent and Trademark Office at (571) 273-8300.

May 12, 2014
Date

/Sima Singadia Kulkarni/
Signature

Sima Singadia Kulkarni
Typed or printed name of person signing certificate

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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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:	11938483
Filing Date:	12-Nov-2007
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	Sima Singadia Kulkarni/Valerie Martin
Attorney Docket Number:	035718/384482

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Pet. Revive Abandon App, Delay Pymt-Resp	1453	1	1700	1700
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 $0 paid	1253	1	1400	1400
Miscellaneous:				
		Total in USD ($)		**3100**

Electronic Acknowledgement Receipt	
EFS ID:	19007258
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Correspondence Address:	PIONEER HI-BRED INTERNATIONAL, INC. - 7100 NW 62nd Avenue P.O. Box 1014 Johnston IA 50131-1014 US - -
Filer:	Sima Singadia Kulkarni/Valerie Martin
Filer Authorized By:	Sima Singadia Kulkarni
Attorney Docket Number:	035718/384482
Receipt Date:	12-MAY-2014
Filing Date:	12-NOV-2007
Time Stamp:	16:41:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3100

RAM confirmation Number	5381
Deposit Account	140629
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		36446-0047U2_Response.pdf	162062 525e7ff6bee619479fa74816fcd9afd2acdaad3f	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	6

Warnings:

Information:

2	Petition for review by the Office of Petitions.	36446-0047U2-Petittion.pdf	216128 a0724b0defa12294f781daa132fbb52dccf8153a	no	3

Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	32346 48c8d1c1b7a5dd00132495b164f0a0244bc48cb6	no	2

Warnings:

Information:

Total Files Size (in bytes):	410536

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Bing et al.	)	Art Unit: **1638**
	)	
Application No.: **11/938,483**	)	Examiner: **Anne R. Kubelik**
	)	
Filing Date: **November 12, 2007**	)	Confirmation No.: **4077**
	)	
For: **CORN EVENT** DAS-59122-7 **AND METHODS OF DETECTION THEREOF**	)	

RESPONSE TO NON-FINAL OFFICE ACTION

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

Ballard Spahr LLP

Customer No. 118610

Dear Commissioner:

In Response to the Non-Final Office Action mailed October 4, 2013, please amend the application as follows:

The **Listing of Claims** begins on page 2 of this response.

Remarks begin on page 4 of this response.

In Response to the Notice of Abandonment issued on April 29, 2014, Applicants submit herewith a Petition to Revive pursuant to the provisions of 37 C.F.R. §1.137(b) along with the requisite fee under 37 C.F.R. §1.17(m).

In accordance with 37 C.F.R. § 1.8, I certify that this correspondence is being transmitted to the Commissioner for Patents, **Mail Stop Amendment**, P.O. Box 1450, Alexandria, VA 22313-1450 via the USPTO's EFS-Web Electronic Filing System on **May 12, 2014.**
/SimaSingadiaKulkarni, Reg.No.43,732/
Sima Singadia Kulkarni – Registration No.43,732

The listing of claims set forth below will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently amended) An isolated DNA molecule comprising a junction sequence comprising a sequence ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof.

2. (Currently amended) An insect resistant corn plant, or parts thereof, wherein DNA having at least one nucleotide sequence ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof, forms part of the plant's genome, wherein said plant or said parts thereof comprise corn event DAS-59122-7.

3. (Currently amended) A descent plant of the insect resistant corn plant of claim 2, wherein DNA having at least one nucleotide sequence ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof, forms part of the descent plant's genome, wherein said descent plant comprises said corn event DAS-59122-7.

4. (Currently amended) A seed of the plant of claim 2 or 3, wherein DNA having at least one nucleotide sequence ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof, forms part of the seed's genome, wherein said seed comprises said corn event DAS-59122-7.

5. (Currently amended) A method of producing an insect resistant corn plant, said method comprising breeding with the plant of claim 2 or 3, and selecting progeny by analyzing for at least one nucleotide sequence ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof, wherein said progeny comprises said corn event DAS-59122-7.

6. (Previously presented) A method of detecting event DAS-59122-7 in corn tissue comprising:

(a) contacting a sample of said corn tissue with a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA sequences ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof;

(b) subjecting said sample and probe to stringent hybridization conditions; and

(c) analyzing for hybridization of the probe.

7. (Currently amended) A DNA detection kit comprising a polynucleotide probe capable of uniquely identifying event DAS-59122-7, ~~wherein said probe comprises a sequence of at least eleven contiguous nucleotides~~, wherein said probe hybridizes under stringent hybridization conditions with one or more DNA sequences ~~selected from the group consisting~~ of SEQ ID NO: 32, ~~33,~~ 34, ~~35, and~~ or complements thereof, but does not hybridize under said stringent conditions with DNA from a corn plant that lacks event DAS-59122-7.

REMARKS

Claims 1-7 are pending in this application. Claims 1-7 have been amended. Support for the amended claims can be found at least in the original claims, and throughout the specification. No new matter has been added.

CLAIM REJECTIONS UNDER 35 U.S.C. § 112 (Pre-AIA)

In the October 4, 2013 Office Action, Claim 7 was 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, Claim 7 contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s) at the time the application was filed, had possession of the claimed invention.

The Examiner stated that while "one of skill in the art would be able to identify 11 bp fragments of SEQ ID NO:32 and 34 that comprise junction sequences, one of skill in the art would not be able to identify such 11 bp fragments that hybridize to DAS-59122-7 DNA and not DNA of other plants". In an effort to facilitate prosecution, Applicants have herein amended the claims to specifically recite SEQ ID NO: 32 and 34. In an additional effort to facilitate prosecution Applicants have herein amended Claim 7 to remove reference to the requirement for 11 nucleotides (or more) for a specific probe and respectfully submit that given the high level of skill in the art, and given that as primers specific for the junction sequences are known, development of probes for the specific sequences are within the scope of those skilled in the art. In light of the amendments and remarks herein, reconsideration and withdrawal of the claims is respectfully requested.

Claims 1-6 were objected to for containing nonelected sequences and the Examiner noted that if the non-elected sequences were deleted from the claims, they would be allowable. Reference to the non-elected sequences has now been deleted and Applicants respectfully request that the claims be allowed.

NOTICE OF ABANDONMENT

A Notice of Abandonment was issued for present application on April 29, 2014 for failure to timely file a proper reply to an Office Action mailed on October 4, 2013. Applicants respectfully submit that the delay in responding to the Office Action was unintentional, and in an effort to revive the present application, Applicants submit herewith a Petition to Revive pursuant to the provisions of 37 C.F.R. §1.137(b):

(1) *Reply*: The present paper constitutes the reply required to the outstanding Office Action mailed on October 4, 2013.

(2) *Fee*: The petition fee set forth under 37 C.F.R. §1.17(m) is submitted herewith.

(3) *Statement*: The entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to 37 C.F.R. §1.137(b) was unintentional.

EXTENSION OF TIME

Applicants are also transmitting payment of $1,400.00 for the Extension of Time fees.

CONCLUSION

The foregoing is a complete Response to the Non-Final Office Action mailed October 4, 2013. Applicants respectfully submit that at least Claims 1-7 are patentable. Early and favorable consideration is solicited. A Petition to Revive the present application and the requisite fee is provided herewith.

No additional fees are believed due; however, the Commissioner is hereby authorized to charge any extra fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

If the Examiner believes there are other issues that can be resolved by a telephone interview, or that there are any informalities that remain in the application which may be corrected by the Examiner's amendment, a telephone call to the undersigned attorney at (678) 420-9428 is respectfully solicited.

Respectfully submitted,
BALLARD SPAHR LLP

/SimaSingadiaKulkarni, Reg. No. 43,732/
Sima Singadia Kulkarni
Registration No. 43,732

BALLARD SPAHR LLP
Customer Number 118610
(678) 420-9300 Phone
(678) 420-9301 Fax

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 06/30/2014

CKHLOK ADJ #00000004 Mailroom Dt: 05/12/2014
Seq No: 5381 Sales Acctg Dt: 05/13/2014 140629 11938483
02 FC : 1253 1400.00 CR

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 11/938,483	Filing Date 11/12/2007	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		
FOR	NUMBER FILED	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

		(Column 1)		(Column 2)	(Column 3)		
	05/12/2014	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 9	Minus	** 9	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $420 =	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**

		(Column 1)		(Column 2)	(Column 3)		
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	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.

SLIE
/KENDALL JONES/

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

PIONEER HI-BRED
INTERNATIONAL, INC.
7100 NW 62nd Avenue
P.O. Box 1014
Johnston IA 50131-1014

MAILED
JUN 30 2014
OFFICE OF PETITIONS

In re Application of

Bing, et al. :

Application No. 11/938,483 : DECISION ON PETITION

Filed: November 12, 2007 :

Attorney Docket No. 035718/384482

This is a decision on the petition under 37 CFR 1.137(a) [1], filed May 12, 2014, to revive the above-identified application.

The petition is **GRANTED**.

---

[1] 37 CFR 1.137(a) states: If the delay in reply by applicant or patent owner was unintentional, a petition may be filed pursuant to this paragraph to revive an abandoned application, a reexamination prosecution terminated under §§ 1.550(d) or 1.957(b) or limited under § 1.957(c).

(b) Petition Requirements. A grantable petition pursuant to this paragraph must be accompanied by:
(1) The reply required to the outstanding Office action or notice, unless previously filed;
(2) The petition fee as set forth in § 1.17(m);
(3) Any terminal disclaimer (and fee as set forth in § 1.20(d)) required pursuant to paragraph (d) of this section.
(3) A statement that the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to this paragraph was unintentional. The Director may require additional information where there is a question whether the delay was unintentional;

(c) Reply. In an application abandoned under 1.57(a), the reply must include a copy of the specification and any drawings of the previously filed application. In an application or patent abandoned for failure to pay the issue fee or any portion thereof, the required reply must include payment of the issue fee or any outstanding balance. In an application abandoned or failure to pay the publication fee, the required reply must include payment of the publication fee. In a nonprovisional application abandoned for failure to prosecute, the required reply may be met by the filing of a continuing application. In a nonprovisional utility or plant application filed on or after June 8, 1995, abandoned after the close of prosecution as define in 1.114(b), the required reply may also be met by the filing of a request for continued examination in compliance with 1.114.

In re Application No. 11/938,483

The above-cited application became abandoned for failure to reply in a timely and proper manner to the non-final Office action mailed October 4, 2013, which set a shortened statutory period for reply of three (3) months from its mailing date. Accordingly, the application became abandoned on January 5, 2014. A Notice of Abandonment was mailed April 29, 2014.

The amendment filed May 12, 2014, is noted.

It is not apparent whether the person signing the statement of unintentional delay was in a position to have firsthand or direct knowledge of the facts and circumstances of the delay at issue. Nevertheless, such statement is being treated as having been made as the result of a reasonable inquiry into the facts and circumstances of such delay. See 37 CFR 10.18(b) and Changes to Patent Practice and Procedure; Final Rule Notice, 62 Fed. Reg. 53131, 53178 (October 10, 1997), 1203 Off. Gaz. Pat. Office 63, 103 (October 21, 1997). In the event that such an inquiry has not been made, petitioner must make such an inquiry. If such inquiry results in the discovery that it is not correct that the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to 37 CFR 1.137(b) was unintentional, petitioner must notify the Office.

There is no indication that the person signing the instant petition was ever given a power of attorney or authorization of agent to prosecute the above-identified application. If the person signing the instant petition desires to receive future correspondence regarding this application, the appropriate power of attorney or authorization of agent must be submitted. While a courtesy copy of this decision is being mailed to the person signing the instant petition, all future correspondence will be directed to the address of currently of record until such time as appropriate instructions are received to the contrary.

The request for the extension of time within the third month filed May 12, 2014, is noted but cannot be granted as the request was made outside the maximum statutory period for reply to the non-final Office action. The amount of $1,400.00 will be refunded, in due course.

The application is being forwarded to Technology Center GAU 1771 for further processing

Telephone inquiries concerning this decision should be directed to the undersigned at (571) 272-3222.

/Kenya A. McLaughlin/

Kenya A. McLaughlin
Attorney Advisor
Office of Petitions

Cc:

Sima Singadia Kulkami
Ballard Spahr LLP
1735 Market Street
51st Floor
Philadelphia, PA 19103-7599

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

7590 07/18/2014

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62nd Avenue
P.O. Box 1014
Johnston, IA 50131-1014

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

MAIL DATE	DELIVERY MODE
07/18/2014	PAPER

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.

Office Action Summary	Application No. 11/938,483	Applicant(s) BING ET AL.	
	Examiner Anne Kubelik	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 *05/12/2014*.

☐ 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) *1-7* is/are pending in the application.

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

6)☒ Claim(s) *1-6* is/are allowed.

7)☒ Claim(s) *7* 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: _____.

DETAILED ACTION

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

2. Claims 1-7 are pending.

Claim Rejections - 35 USC § 112

3. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Due to Applicant's amendment of the claims, the rejection is modified from the rejection set forth in the Office action mailed 4 October 2013. Applicant's arguments filed 12 May 2014 have been fully considered but they are not persuasive.

The claim is drawn to a nucleic acids that hybridize to SEQ ID NO:32 or 34 under stringent hybridization conditions and that uniquely identifies event DAS-59122-7.

The specification describes nucleic acids that that hybridize to SEQ ID NO:32 or 34 under stringent hybridization conditions and that uniquely identifies event DAS-59122-7 other than SEQ ID NO:32 or 34.

The structural features that distinguish nucleic acids that hybridize to SEQ ID NO:32 or 34 under stringent hybridization conditions and that uniquely identifies event DAS-59122-7 from other nucleic acids that hybridize to SEQ ID NO:32 or 34 under stringent hybridization conditions are not described in the specification.

One of skill in the art would not recognize that Applicant was in possession of the necessary common attributes or features of the genus in view of the lack of a disclosed species."

Hence, Applicant has not, in fact, described the claimed nucleic acids, and the specification fails to provide an adequate written description of the claimed invention.

Therefore, given the lack of written description in the specification with regard to the structural and functional characteristics of the claimed compositions, Applicant does not appear to have been in possession of the claimed genus at the time this application was filed.

Response to Arguments

Applicant is under the belief that this was an enablement rejection (response pg 4).

This is not found persuasive because the rejection is for lack of written description.

Applicant urges that the claims have been amended to specify SEQ ID NO:32 and 34 and removed reference to 11 nucleotide long probes (response pg 4).

This is not found persuasive because the specification does not describe the structural features of nucleic acids that hybridize to SEQ ID NO:32 or 34 under stringent hybridization conditions and that uniquely identifies event DAS-59122-7. Amending the claim to specify that probe is SEQ ID NO:32 or 34 would overcome the rejection.

Applicant urges that given the high level of skill in the art, development of probes are within the skill of those in the art (response pg 4).

This is not found persuasive because this is a written description rejection, not an enablement rejection. The specification does not describe the structural features of nucleic acids that hybridize to SEQ ID NO:32 or 34 under stringent hybridization conditions and that uniquely identifies event DAS-59122-7.

4. Claims 1-6 are allowed.

Conclusion

5. Applicant's amendment necessitated the modified 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.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 9:00 am - 5:30 pm.

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 central fax number for official correspondence 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.

/Anne Kubelik/
Primary Examiner, Art Unit 1638

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Bing et al.	)	Art Unit: **1638**
	)	
Application No.: **11/938,483**	)	Examiner: **Anne R. Kubelik**
	)	
Filing Date: **November 12, 2007**	)	Confirmation No.: **4077**
	)	
For: **CORN EVENT** DAS-59122-7 **AND METHODS OF DETECTION THEREOF**	)	

RESPONSE TO FINAL OFFICE ACTION

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

Ballard Spahr LLP

Customer No. 23859

Dear Commissioner:

In Response to the Final Office Action mailed July 18, 2014, please amend the application as follows:

The **Listing of Claims** begins on page 2 of this response.

Remarks begin on page 4 of this response.

In accordance with 37 C.F.R. § 1.8, I certify that this correspondence is being transmitted to the Commissioner for Patents, **Mail Stop Amendment**, P.O. Box 1450, Alexandria, VA 22313-1450 via the USPTO's EFS-Web Electronic Filing System on **September 18, 2014.**
/SimaSingadiaKulkarni, Reg.No.43,732/
Sima Singadia Kulkarni – Registration No.43,732

The listing of claims set forth below will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Previously Presented) An isolated DNA molecule comprising a junction sequence comprising a sequence of SEQ ID NO: 32, 34, or complements thereof.

2. (Previously Presented) An insect resistant corn plant, or parts thereof, wherein DNA having at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, forms part of the plant's genome, wherein said plant or said parts thereof comprise corn event DAS-59122-7.

3. (Previously Presented) A descent plant of the insect resistant corn plant of claim 2, wherein DNA having at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, forms part of the descent plant's genome, wherein said descent plant comprises said corn event DAS-59122-7.

4. (Previously Presented) A seed of the plant of claim 2 or 3, wherein DNA having at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, forms part of the seed's genome, wherein said seed comprises said corn event DAS-59122-7.

5. (Previously Presented) A method of producing an insect resistant corn plant, said method comprising breeding with the plant of claim 2 or 3, and selecting progeny by analyzing for at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, wherein said progeny comprises said corn event DAS-59122-7.

6. (Previously Presented) A method of detecting event DAS-59122-7 in corn tissue comprising:

(a) contacting a sample of said corn tissue with a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA sequences of SEQ ID NO: 32, 34, or complements thereof;

(b) subjecting said sample and probe to stringent hybridization conditions; and

(c) analyzing for hybridization of the probe.

7. (Currently Amended) A DNA detection kit comprising a polynucleotide probe capable of uniquely identifying event DAS-59122-7, wherein said probe ~~hybridizes under stringent hybridization conditions with one or more DNA sequences of~~ is SEQ ID NO: 32, 34, or complements thereof[,] ~~but does not hybridize under said stringent conditions with DNA from a corn plant that lacks event DAS-59122-7~~.

REMARKS

Claims 1-7 are pending in this application. Claims 1-6 have been allowed, and Claim 7 is amended herein. Support for the amended claim can be found at least in the original claims, and throughout the specification. No new matter has been added.

CLAIM REJECTIONS UNDER 35 U.S.C. §112 (Pre-AIA)

In the July 18, 2014 Office Action, Claim 7 was 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, Claim 7 contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s) at the time the application was filed, had possession of the claimed invention.

The Examiner stated that the structural features that distinguish nucleic acids that hybridize to SEQ ID NO: 32 and 34 under stringent hybridization conditions and that uniquely identify event DAS-59122-7 from other nucleic acids that hybridize to SEQ ID NO: 32 and 34 under stringent hybridization conditions are not described in the specification (Office Action page 2). The Examiner suggested that amending Claim 7 "to specify that [the] probe is SEQ ID NO: 32 or 34" would overcome the rejection (Office Action page 3). In an effort to facilitate prosecution, Applicants have herein amended Claim 7 pursuant to the Examiner's recommendation. Accordingly, in light of the amendment, reconsideration and withdrawal of Claim 7 is respectfully requested.

CONCLUSION

The foregoing is a complete Response to the Final Office Action mailed July 18, 2014. Claims 1-6 have already been allowed, and Applicants respectfully submit that Claims 7 should also be allowed. Early and favorable consideration is solicited. No additional fees are believed due; however, the Commissioner is hereby authorized to charge any extra fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

If the Examiner believes there are other issues that can be resolved by a telephone interview, or that there are any informalities that remain in the application which may be corrected by the Examiner's amendment, a telephone call to the undersigned attorney at (215) 864-8616 is respectfully solicited.

Respectfully submitted,
BALLARD SPAHR LLP

/SimaSingadiaKulkarni, Reg. No. 43,732/
Sima Singadia Kulkarni
Registration No. 43,732

BALLARD SPAHR LLP
Customer Number 118610
(215) 864-8616 Phone
(215) 864-8999 Fax

Electronic Acknowledgement Receipt	
EFS ID:	20178806
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Correspondence Address:	PIONEER HI-BRED INTERNATIONAL, INC. - 7100 NW 62nd Avenue P.O. Box 1014 Johnston IA 50131-1014 US - -
Filer:	Sima Singadia Kulkarni/Valerie Martin
Filer Authorized By:	Sima Singadia Kulkarni
Attorney Docket Number:	035718/384482
Receipt Date:	18-SEP-2014
Filing Date:	12-NOV-2007
Time Stamp:	15:28:57
Application Type:	Utility under 35 USC 111(a)

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		36446-0047U2_Reply.pdf	91488 517facc83bd47915c4c96622ff49e85c2f41b4d5	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	5

Warnings:	
Information:	
Total Files Size (in bytes):	91488

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.

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 11/938,483	Filing Date 11/12/2007	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		
FOR	NUMBER FILED	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	09/18/2014	(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))	* 7	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $420 =	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
/DORIS BURNS/

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 09/25/2014

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62ND AVENUE
P.O. BOX 1014
JOHNSTON, IA 50131-1014

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 09/25/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

TITLE OF INVENTION: Corn Event DAS-59122-7 and Methods for Detection Thereof

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	12/26/2014

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 09/25/2014

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62ND AVENUE
P.O. BOX 1014
JOHNSTON, IA 50131-1014

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

TITLE OF INVENTION: Corn Event DAS-59122-7 and Methods for Detection Thereof

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	12/26/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
KUBELIK, ANNE R	1638	800-302000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

7590 09/25/2014

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62ND AVENUE
P.O. BOX 1014
JOHNSTON, IA 50131-1014

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 09/25/2014

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. 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.

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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

Notice of Allowability	Application No. 11/938,483	Applicant(s) BING ET AL.	
	Examiner Anne Kubelik	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--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *resposne and amendment filed 09/18/2014*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ 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.
3. ☒ The allowed claim(s) is/are *1-7*. As a result of the allowed claim(s), 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 .
4. ☐ 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)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☒ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☒ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/Anne Kubelik/
Primary Examiner, Art Unit 1638

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

REQUIREMENT OF ALLOWANCE UNDER 37 CFR §§ 1.801-1.809

1. The Deposit Statement filed 21 September 2010 is deemed in accordance with 37 CFR §§ 1.801-1.809. Therefore, no 35 USC § 112, first paragraph rejection has been maintained even though it is apparent that corn event DAS-59122-7 seed is essential to the claimed invention and that the deposit is necessary for an adequate written description and enablement for the claimed invention.

Since the application is otherwise in condition for allowance except for the needed deposit of corn event DAS-59122-7 seed and since the Office has received written assurance that an acceptable deposit will be made on or before payment of the issue fee, the Office is authorized to mail Applicant a Notice of Allowance and Issue Fee Due together with a requirement that the needed deposit be made within THREE (3) MONTHS of the mail date of this letter (see 37 CFR § 1.809(c)).

Under 37 CFR 1.809(c)-(d) an applicant is required to make a deposit of seeds within three months after the mailing date of the Notice Of Allowance and Issue Fee Due. The time period for making a biological deposit, and an amendment to add the depository information to the specification and claims, is no longer extendable. See 37 CFR 1.136(c) and 1.809(c), revised in Changes to the Time Period for Making any Necessary Deposit of Biological Material, 66 Fed. Reg. 21090 (April 27, 2001), 1246 Off. Gaz. Pat. Office 104 (May 22, 2001), effective for Notices of Allowability mailed on or after May 29, 2001. Amendments are no longer permitted to be filed after the payment of the issue fee. See 37 CFR 1.312, revised in Changes to Application Examination and Provisional Application Practice, 65 Fed. Reg. 14865, 14869 and

14873 (March 20, 2000), 1233 Off. Gaz. Pat. Office 47, 50 and 54 (April 11, 2000), effective on May 29, 2000. Failure to make the needed deposit of seeds of the claimed line will result in **ABANDONMENT** of the application for failure to prosecute. The deposit statement in the specification and all claims that refer to the instant seeds by name must be amended to include the deposit accession numbers, if they are not already present. These amendments should be submitted before the payment of the issue fee as an Amendment After Allowance under 37 CFR 1.312. The statement of deposit in the specification shall contain:

(1) The accession number for the deposit(s);

(2) The date of the deposit(s);

(3) A description of the deposited biological material sufficient to specifically identify and to permit examination; and

(4) The name and address of the depository (see 37 CFR § 1.809(d)).

Applicant is reminded to update the specification and claims as necessary to include the deposit information.

Conclusion

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, Ph.D., whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

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 central fax number for official correspondence 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.

/Anne Kubelik/
Primary Examiner, Art Unit 1638

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11938483	BING ET AL.
	Examiner	Art Unit
	ANNE KUBELIK	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
SEQ ID NO:32	7/25/09	ark
SEQ ID NO:34	4/19/10	ark
Inventor search in PALM	9/17/13	ark

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	SEQ ID NO:32 and 34	7/16/14	ark

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11938483	BING ET AL.
	Examiner	**Art Unit**
	ANNE KUBELIK	1638

CPC						
Symbol					**Type**	**Version**
C07K		14	/	415	F	2013-01-01
C12N		15	/	8277	I	2013-01-01
C12N		15	/	8286	I	2013-01-01
C12Q		1	/	6895	I	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	7	
/ANNE KUBELIK/ Primary Examiner.Art Unit 1638	09/23/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	none

U.S. Patent and Trademark Office — Part of Paper No. 20140923

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11938483	BING ET AL.
	Examiner	**Art Unit**
	ANNE KUBELIK	1638

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
800	302

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
536	24.3				
800	320.1				

INTERNATIONAL CLASSIFICATION					
CLAIMED					**NON-CLAIMED**
C	1	2	N	15 / 82 (2006.0)	
C	1	2	N	15 / 11 (2006.01.01)	

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	7	
/ANNE KUBELIK/ Primary Examiner.Art Unit 1638	09/23/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	none

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11938483	BING ET AL.
	Examiner	**Art Unit**
	ANNE KUBELIK	1638

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 7	
/ANNE KUBELIK/ Primary Examiner.Art Unit 1638 (Primary Examiner)	09/23/2014 (Date)	O.G. Print Claim(s) 2	O.G. Print Figure none

U.S. Patent and Trademark Office Part of Paper No. 20140923

OK TO ENTER: /A.K./

09/24/2014

ATTORNEY DOCKET NO. 36446.0047U2
VIA EFS-WEB
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Bing et al.	)	Art Unit: **1638**
	)	
Application No.: **11/938,483**	)	Examiner: **Anne R. Kubelik**
	)	
Filing Date: **November 12, 2007**	)	Confirmation No.: **4077**
	)	
For: **CORN EVENT** DAS-59122-7 **AND METHODS OF DETECTION THEREOF**	)	

RESPONSE TO FINAL OFFICE ACTION

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

Ballard Spahr LLP

Customer No. 23859

Dear Commissioner:

In Response to the Final Office Action mailed July 18, 2014, please amend the application as follows:

The **Listing of Claims** begins on page 2 of this response.

Remarks begin on page 4 of this response.

In accordance with 37 C.F.R. § 1.8, I certify that this correspondence is being transmitted to the Commissioner for Patents, **Mail Stop Amendment**, P.O. Box 1450, Alexandria, VA 22313-1450 via the USPTO's EFS-Web Electronic Filing System on **September 18, 2014.**
/SimaSingadiaKulkarni, Reg.No.43,732/
Sima Singadia Kulkarni – Registration No.43,732

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

BIB DATA SHEET

CONFIRMATION NO. 4077

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/938,483	11/12/2007 RULE	800	1638	035718/384482

APPLICANTS

INVENTORS

James Wayne Bing, Ankeny, IA;
Robert F. Cressman JR., Wilmington, DE;
Manju Gupta, Carmel, IN;
Salim M. Hakimi, Sacramento, CA;
David Hondred, Altoona, IA;
Todd L. Krone, Johnston, IA;
Mary E. Hartnett Locke, Mickleton, NJ;
Abigail K. Luckring, West Chester, PA;
Sandra E. Meyer, Des Moines, IA;
Daniel Moellenbeck, Granger, IA;
Kenneth Edwin Narva, Zionsville, IN;
Paul D. Olson, Kalaheo, HI;
Craig D. Sanders, Bear, DE;
Jimei Wang, Johnston, IA;
Jian Zhang, Urbandale, IA;
Gan-Yuan Zhong, Urbandale, IA;

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

This application is a DIV of 11/237,222 09/28/2005 PAT 7323556
which claims benefit of 60/614,225 09/29/2004

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

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

03/04/2008

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged /ANNE R KUBELIK/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		IA	7	7	4

ADDRESS

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62nd Avenue
P.O. Box 1014
Johnston, IA 50131-1014
UNITED STATES

TITLE

Corn Event DAS-59122-7 and Methods for Detection Thereof

FILING FEE	FEES: Authority has been given in Paper	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time)

BIB (Rev. 05/07).

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
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.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 118610

OR

☐ Practitioner(s) named below (If more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 118610

OR

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

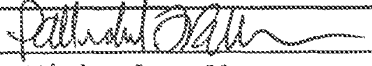
Assignee Name and Address:

E. I. DU PONT DE NEMOURS AND COMPANY
1007 Market Street
Wilmington, Delaware 19898

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	10/15/2013
Name	P. Michael Walker	Telephone	302-999-6090
Title	VP Assistant General Counsel, Chief Intellectual Property Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

PTO/SB/96 (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 displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: James Wayne Bing et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: November 12,2007

Titled: CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

E. I. DuPont de Nemours and Company , a Company
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ 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. ☐ the 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. ☒ 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 016658, Frame 0251, or for which a copy therefore 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: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

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

☐ 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.

/MaryAnthonyMerchant, Reg. No. 39,771/ — Signature
September 25, 2014 — Date
Mary Anthony Merchant, J.D., Ph.D. — Printed or Typed Name
Attorney — Title

This collection of information is required by 37 CFR 3.73(b). 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

PTO/AIA/80 (07-12)
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 118610

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 118610

OR

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

Assignee Name and Address: Dow Agrosciences LLC
9330 Zionsville Road
Indianapolis, IN 46268

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	April 8, 2014
Name	Andrea T. Borucki	Telephone	317-337-4846
Title	General Patent Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: James Wayne Bing et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: November 12,2007

Titled: CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

Dow Agrosciences LLC , a Limited Liability Company
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ 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. ☐ the 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. ☒ 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 016658, Frame 0251, or for which a copy therefore 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: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

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

☐ 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.

/MaryAnthonyMerchant, Reg. No. 39,771/ — Signature
September 25, 2014 — Date
Mary Anthony Merchant, J.D., Ph.D. — Printed or Typed Name
Attorney — Title

This collection of information is required by 37 CFR 3.73(b). 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	035748/38448238446.0047U2
	Application Number	11/938,463
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

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.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	Wayne	Bing	

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

City	Ankeny	State/Province	IA	Country of Residence	US

Mailing Address of Inventor:

Address 1	275 NE 54th Street		
Address 2			
City	Ankeny	State/Province	IA
Postal Code	50021	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robert	F.	Cressman	Jr.

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

City	Wilmington	State/Province	DE	Country of Residence	US

Mailing Address of Inventor:

Address 1	2502 Turnstone Drive		
Address 2			
City	Wilmington	State/Province	DE
Postal Code	19380	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Manju		Gupta	

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~035718/38448236446.0047U2~~
	Application Number	11/938,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

City	Carmel	State/Province	IN	Country of Residence	US

Mailing Address of Inventor:

Address 1	13463 Winamac Court		
Address 2			
City	Carmel	State/Province	IN
Postal Code	46032	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Salim	M.	Hakimi	

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

City	Sacramento	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	171 Vista Creek Circle		
Address 2			
City	Sacramento	State/Province	CA
Postal Code	95835	Country	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	David		Hondred	

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

City	Altoona	State/Province	IA	Country of Residence	US

Mailing Address of Inventor:

Address 1	9313 NE Reynolds Way		
Address 2			
City	Altoona	State/Province	IA
Postal Code	50009	Country	US

Inventor 6 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Todd	L.	Krone	

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

City	Johnston	State/Province	IA	Country of Residence	US

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~035718/304402364460047U2~~
	Application Number	11/939,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Mailing Address of Inventor:

Address 1	9104 Telford Circle		
Address 2			
City	Johnston	State/Province	IA
Postal Code	50131	Country i	US

Inventor 7 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Mary	E.	Hartnett Locke	

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

City	Mickleton	State/Province	NJ	Country of Residence i	US

Mailing Address of Inventor:

Address 1	31 Millwood Drive		
Address 2			
City	Mickleton	State/Province	NJ
Postal Code	08056	Country i	US

Inventor 8 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Abigail	K.	Luckring	

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

City	West Chester	State/Province	PA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	306 West Marshall Street		
Address 2			
City	West Chester	State/Province	PA
Postal Code	19380	Country i	US

Inventor 9 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Sandra	E.	Meyer	

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

City	Des Moines	State/Province	IA	Country of Residence i	US

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~035710/3644823644G.0047U2~~
	Application Number	11/936,463
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Mailing Address of Inventor:

Address 1	1311 - 46th Street		
Address 2			
City	Des Moines	State/Province	IA
Postal Code	50311	Country i	US

Inventor 10 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Daniel		Moellenbeck	

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

City	Granger	State/Province	IA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	11566 NW 107th Court		
Address 2			
City	Granger	State/Province	IA
Postal Code	50229	Country i	US

Inventor 11 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Kenneth	Edwin	Narva	

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

City	Zionsville	State/Province	IN	Country of Residence i	US

Mailing Address of Inventor:

Address 1	4372 Creekside Pass		
Address 2			
City	Zionsville	State/Province	IN
Postal Code	46077	Country i	US

Inventor 12 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Paul	D.	Olson	

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

City	Kalaheo	State/Province	HI	Country of Residence i	US

Mailing Address of Inventor:

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~036718/38448236446.0047U2~~
	Application Number	11/938,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Address 1	4351 Puu Kulana Place		
Address 2			
City	Kalaheo	State/Province	HI
Postal Code	96741	Country i	US

Inventor 13 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Craig	D.	Sanders	

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

City	Bear	State/Province	DE	Country of Residence	US

Mailing Address of Inventor:

Address 1	15 Penny Lane		
Address 2			
City	Bear	State/Province	DE
Postal Code	19701	Country i	US

Inventor 14 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jimei		Wang	

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

City	Johnston	State/Province	IA	Country of Residence	US

Mailing Address of Inventor:

Address 1	5611 Kensington Circle		
Address 2			
City	Johnston	State/Province	IA
Postal Code	50131	Country i	US

Inventor 15 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jian		Zhang	

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

City	Urbandale	State/Province	IA	Country of Residence	US

Mailing Address of Inventor:

Address 1	6824 Mill Pond Drive

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~036718/38448~~36446.0047U2
	Application Number	11/938,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Address 2			
City	Urbandale	**State/Province**	IA
Postal Code	50322	**Country** i	US

Inventor 16 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Gan-Yuan		Zhong	

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

City	Urbandale	**State/Province**	IA	**Country of Residence** i	US

Mailing Address of Inventor:

Address 1	4612 - 93rd Street		
Address 2			
City	Urbandale	**State/Province**	IA
Postal Code	50322	**Country** i	US

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	~~29122~~ 118610		
Email Address	USpatentmail@ballardspahr.com	Add Email	Remove Email

Application Information:

Title of the Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof		
Attorney Docket Number	~~036718/38448~~36446.0047U2	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	7	**Suggested Figure for Publication (if any)**	2

Filing By Reference :

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~036718/384482~~36446.0047U2
	Application Number	11/938,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

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).
Either enter 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	~~29122~~ 118610		

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.
When referring to the current application, please leave the application number blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Division of	11/237222	2005-09-28
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Claims benefit of provisional	60/614225	2004-09-29

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	036718/38448236446.0047U2
	Application Number	11/938,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. 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(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[1]	Filing Date (YYYY-MM-DD)	Access Code[1] (if applicable)

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

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

PTO/SB/14 (12-13)
Approved 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	036718/38448236446.0047U2
	Application Number	11/938,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

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

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	E. I. DuPont de Nemours and Company		
Mailing Address Information For Applicant:			
Address 1	1007 Market Street		
Address 2			
City	Wilmington	**State/Province**	DE
Country	US	Postal Code	19898
Phone Number		Fax Number	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	035718/3844823644G.0047U2
	Application Number	11/983,483
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Email Address	

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

Applicant 2

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :	
If the Applicant is an Organization check here.	☒
Organization Name	Pioneer Hi-Bred International, Inc.

Mailing Address Information For Applicant:

Address 1	7100 N.W. 62nd Avenue		
Address 2	P.O. Box 1014		
City	Johnston	**State/Province**	IA
Country	US	Postal Code	50131-1014
Phone Number		Fax Number	
Email Address			

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

Applicant 3

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

PTO/AIA/14 (12-13)
Approved 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	035718/38448236446.0047U2
	Application Number	
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	Dow Agrosciences LLC

Mailing Address Information For Applicant:

Address 1	9330 Zionsville Road		
Address 2			
City	Indianapolis	**State/Province**	IN
Country	US	Postal Code	46268
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

PTO/AIA/14 (12-13)
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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	~~035718/38448236446.0047U2~~
	Application Number	
Title of Invention	Corn Event DAS-59122-7 and Methods for Detection Thereof	

Mailing Address Information For Assignee Including Non-Applicant Assignee:			
Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.			

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.					
Signature	/MaryAnthonyMerchant, Reg. No. 39,771/			Date (YYYY-MM-DD)	2014-09-25
First Name	Mary	Last Name	Merchant	Registration Number	39771
Additional Signature may be generated within this form by selecting the Add button.					

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:	20249786
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Correspondence Address:	PIONEER HI-BRED INTERNATIONAL, INC. - 7100 NW 62ND AVENUE P.O. BOX 1014 JOHNSTON IA 50131-1014 US - -
Filer:	Mary Anthony Merchant.
Filer Authorized By:	
Attorney Docket Number:	035718/384482
Receipt Date:	25-SEP-2014
Filing Date:	12-NOV-2007
Time Stamp:	19:09:54
Application Type:	Utility under 35 USC 111(a)

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		36446_0047U2_2014_09_25_POA_as_Filed.pdf	1637138 be44cd8d73cc71be4559dd9e1adbfce8244c9ba3	yes	18

	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
	Power of Attorney	3	3
	Assignee showing of ownership per 37 CFR 3.73.	4	4
	Power of Attorney	5	5
	Assignee showing of ownership per 37 CFR 3.73.	6	6
	Application Data Sheet	7	18

Warnings:	
Information:	
Total Files Size (in bytes):	1637138

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

PTO/SB/80 (11-08)
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 118610

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 118610

OR

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

Assignee Name and Address:

PIONEER HI-BRED INTERNATIONAL, INC.
7100 N.W. 62nd Avenue
Johnston, Iowa 50131-1014

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	11/08/2013
Name	Cornel B. Fuerer	Telephone	515/535-8083
Title	VP-DuPont Pioneer Legal / Associate General Counsel - DuPont		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: James Wayne Bing et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: November 12,2007

Titled: CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

Pioneer Hi-Bred International, Inc. , a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ 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. ☐ the 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. ☒ 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 016658, Frame 0251, or for which a copy therefore 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: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

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

☐ 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.

/MaryAnthonyMerchant, Reg. No. 39,771/	September 25, 2014
Signature	Date
Mary Anthony Merchant, J.D., Ph.D.	Attorney
Printed or Typed Name	Title

This collection of information is required by 37 CFR 3.73(b). 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. 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.

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
11/938,483	11/12/2007	James Wayne Bing	035718/384482

CONFIRMATION NO. 4077

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62ND AVENUE
P.O. BOX 1014
JOHNSTON, IA 50131-1014

MISCELLANEOUS NOTICE



Date Mailed: 09/30/2014

A communication which cannot be delivered in electronic form has been mailed to the applicant.

Doc Code: N572

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 DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/938,483	11/12/2007	James Wayne Bing	035718/384482

CONFIRMATION NO. 4077

OC000000071054576

PIONEER HI-BRED INTERNATIONAL, INC.
7100 NW 62ND AVENUE
P.O. BOX 1014
JOHNSTON, IA 50131-1014

Cc:- DUPONT PIONEER
C/O BALLARD SPAHR LLP
999 PEACHTREE STREET, SUITE 1000
ATLANTA, GA 30309

Date Mailed: 09/30/2014

DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney 09/25/2014 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☑ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☐ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(c) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) _____ a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.
- ☐ Only one Customer Number can be designated for the Power of Attorney in an application. The Customer Number that was captured is the first Customer Number provided on the Power of Attorney document.
- ☐ A request under 37 CFR 1.48 to add an inventor was granted in this application, however, no power of attorney consistent with the power of attorney granted by the originally named inventive entity has been received. Thus, the addition of the inventor has resulted in the loss of power of attorney in the application. See 37 CFR 1.32(e).

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

- ☐ The power of attorney has not been accepted because the party who is giving power of attorney has not been identified. Power of attorney may only be signed by the applicant for patent (37 CFR 1.42) or the patent owner. A patent owner who was not the applicant must appoint any power of attorney in compliance with 37 CFR 3.71 and 3.73. See 37 CFR 1.32(b)(4).

- ☐ The power of attorney from the inventors has not been accepted because it is a copy from a prior national application for which benefit is claimed and the continuing application names an inventor who was not named as an inventor in the prior application.

- ☐ The power of attorney from the inventors has not been accepted because the power of attorney must be signed by the applicant for patent. See 37 CFR 1.32(b)(4).

- ☐ Any request to correct or update the name of the applicant must include an application data sheet (ADS) in compliance with 37 CFR 1.76 specifying the correct or updated name of the applicant in the applicant information section. Any request to change the applicant after an original applicant has been specified under 37 CFR 1.46(b) must include a new ADS in compliance with 37 CFR 1.76 specifying the applicant in the applicant information section and comply with 37 CFR 3.71 and 3.73. See 37 CFR 1.46(c).

Any inquiries regarding this notice should be directed to the Application Assistance Unit at 571-272-4200.

Application Assistance Unit
571-272-4200

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: James Wayne Bing et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: November 12, 2007

Titled: CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

E. I. DU PONT DE NEMOURS AND COMPANY , a COMPANY

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☐ 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. ☒ the 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. ☒ 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 016658, Frame 0251, or for which a copy therefore 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: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

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

☐ 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.

/MaryAnthonyMerchant, Reg. No. 39,771/ October 2, 2014

Signature Date

Mary Anthony Merchant, J.D., Ph.D. Attorney

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). 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. 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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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: James Wayne Bing et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: November 12, 2007

Titled: CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

PIONEER HI-BRED INTERNATIONAL, INC. , a CORPORATION

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☐ 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. ☒ the 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. ☒ 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 016658, Frame 0251, or for which a copy therefore 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: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

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

☐ 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.

/MaryAnthonyMerchant, Reg. No. 39,771/ October 2, 2014

Signature Date

Mary Anthony Merchant, J.D., Ph.D. Attorney

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). 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. 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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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: James Wayne Bing et al.

Application No./Patent No.: 11/938,483 Filed/Issue Date: November 12, 2007

Titled: CORN EVENT DAS-59122-7 AND METHODS FOR DETECTION THEREOF

DOW AGROSCIENCES LLC , a LIMITED LIABILITY COMPANY

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☐ 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. ☒ the 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. ☒ 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 016876, Frame 0849, or for which a copy therefore 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: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

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

☐ 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.

/MaryAnthonyMerchant, Reg. No. 39,771/ October 2, 2014

Signature Date

Mary Anthony Merchant, J.D., Ph.D. Attorney

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). 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. 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.

Electronic Acknowledgement Receipt	
EFS ID:	20313623
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Correspondence Address:	PIONEER HI-BRED INTERNATIONAL, INC. - 7100 NW 62ND AVENUE P.O. BOX 1014 JOHNSTON IA 50131-1014 US - -
Filer:	Mary Anthony Merchant.
Filer Authorized By:	
Attorney Docket Number:	035718/384482
Receipt Date:	02-OCT-2014
Filing Date:	12-NOV-2007
Time Stamp:	19:15:22
Application Type:	Utility under 35 USC 111(a)

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	Assignee showing of ownership per 37 CFR 3.73.	36446_0047U2_2014_10_02_Corrected_3_73_Statements_as_Filed.PDF	96994 86a73a6c63e67062ed67a55b078a9973786b2244	no	3

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):	96994

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.

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
11/938,483	11/12/2007	James Wayne Bing	035718/384482

CONFIRMATION NO. 4077

118610
DuPont Pioneer
c/o Ballard Spahr LLP
999 Peachtree Street, Suite 1000
Atlanta, GA 30309

POA ACCEPTANCE LETTER

OC000000071534434

Date Mailed: 10/27/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/02/2014.

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.

/tlulu/

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
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Address: COMMISSIONER FOR PATENTS
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

118610 7590 11/03/2014

DuPont Pioneer
c/o Ballard Spahr LLP
999 Peachtree Street, Suite 1000
Atlanta, GA 30309

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1662	

NOTIFICATION DATE	DELIVERY MODE
11/03/2014	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):

uspatentmail@ballardspahr.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 11938483
Applicant : Bing
Filing Date : 11/12/2007
Date Mailed : 11/03/2014

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Kam Sin/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 11938483 **Drawings filed: 11/12/2007**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [X] Figure numbers are duplicated or missing. FIG(s) 1-3 are missing
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [ ] The character of the lines, numbers, and letters is poor. FIG(s)
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [ ] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s)
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains amended drawings that are not labeled as "Amended" as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

Application No. 11938483 **Drawings filed: 11/12/2007**

DRAWINGS AND BRIEF DESCRIPTION OF DRAWINGS IN NON-COMPLIANCE WITH 37 CFR 1.84(u)(1)

37 CFR 1.84(u)(1) states, "The different views must be numbered in consecutive Arabic numerals, starting with 1 … Partial views intended to form one complete view, on one or several sheets, must be identified by the same number followed by a capital letter. View numbers must be preceded by the abbreviation 'FIG.' "

Other methods of identification are improper, including Roman numerals (FIG. I, FIG, II, etc.) and alphabetic characters (FIG. A, FIG. B, etc.). Abbreviations and words other than "FIG." ("Illustration, 1" "Diagram 2," "Photo 3," etc.) are improper.

[X] Applicant must submit drawings that number the views using consecutive Arabic numerals.

[ ] Applicant must amend the brief description of the drawings on Page(s) of the specification to show consecutive Arabic numerals.

NOTE: Applicant is advised that the detailed description may voluntarily be amended to identify the drawings by Arabic numerals.

[X] The drawing is continued onto a second page (or more) without proper labeling under 37 CFR 1.84(u)(1). FIG(s) 1

[ ] Applicant must submit drawings on which the view numbers are preceded by the abbreviation "FIG."

[ ] Applicant must amend the brief description of the drawings on Page(s) of the specification to show view numbers preceded by the abbreviation "FIG."

NOTE: Applicant is advised that the detailed description may voluntarily be amended to show view numbers preceded by the abbreviation "FIG."

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Bing et al.	)	Art Unit: **1638**
	)	
Application No.: **11/938,483**	)	Examiner: **Anne R. Kubelik**
	)	
Filing Date: **November 12, 2007**	)	Confirmation No.: **4077**
	)	
For: **CORN EVENT** DAS-59122-7 **AND METHODS OF DETECTION THEREOF**	)	

AMENDMENT AFTER ALLOWANCE UNDER 37 C.F.R. § 1.312

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Ballard Spahr LLP

Customer No. 118610

Dear Commissioner:

A Notice of Allowance issued on September 25, 2014 in connection with the above-referenced patent application. Applicants respectfully request that the Examiner consider the following remarks and the accompanying Viability Statement submitted pursuant to 37 CFR 1.807(c). In addition, Applicants submit herewith Replacement Drawings in Response to "Notice to File Corrected Application Papers" mailed November 3, 2014.

Amendments to the Specification begin on page 2 of this paper.

A listing of the claims begins on page 4 of this paper.

Remarks begin on page 6 of this paper.

In accordance with 37 C.F.R. § 1.8, I certify that this correspondence is being transmitted to the Commissioner for Patents, **Mail Stop Issue Fee**, P.O. Box 1450, Alexandria, VA 22313-1450 via the USPTO's EFS-Web Electronic Filing System on **December 12, 2014.**
/SimaSingadiaKulkarni, Reg.No.43,732/
Sima Singadia Kulkarni – Registration No.43,732

AMENDMENT TO THE SPECIFICATION

Please amend the specification as shown below.

1. Cross-Reference To Related Applications

Please replace the first paragraph that appears on page 1, which appears immediately after the section heading "CROSS REFERENCE TO RELATED APPLICATIONS" with the paragraph below.

Below is shown the amended paragraph with markings showing where the amendments are made.

This application is a divisional of U.S. Ser. No. 11/237,222 filed Sep. 28, 2005, now U.S. Pat. No. 7,323,556, which claims the benefit of U.S. Provisional Application Ser. No. 60/614,225, filed Sep. 29, 2004, the contents of all of which are herein incorporated by reference in their entirety.

2. Deposit of Biological Specimen

Please insert the following paragraph on page 26 immediately after the paragraph that begins at line 1 and ends at line 9 and immediately before the paragraph that begins at line 10.

Applicants made a deposit of at least 2500 seeds of hybrid com (maize) seed comprising event DAS-59122-7 on October 4, 2010 with the American Type Culture Collection (ATCC), Manassas, VA 20110 USA. The deposit was assigned ATCC Patent Deposit Designation PTA-11384. Access to this deposit will be available during the pendency of the application to the Commissioner of Patents and Trademarks and persons determined by the Commissioner to be entitled thereto upon request. Upon the grant of a patent from the present application, Applicants will make the deposit available to the public pursuant to 37 C.F.R. §1.808. This deposit of hybrid com (maize) seed comprising event DAS-59122-7 will be maintained in the ATCC depository, which is a public depository, for a period of 30 years, or 5 years after the most recent request, or for the enforceable life of the patent, whichever is longer, and will be replaced if it becomes nonviable during that period. Additionally, Applicant has or will satisfy all the requirements of37 C.F.R. §§1.801 - 1.809, including providing an indication of the viability of the sample upon deposit. Applicant has no authority to waive any restrictions imposed by law on the transfer of

biological material or its transportation in commerce. Applicant does not waive any infringement of its rights granted under this patent or under the Plant Variety Protection Act (7 U.S.C *§* 2321 et seq.).

3. Figure Descriptions

On Page 9 at line 16, please amend the description of Figure 1 as shown the paragraph below.

Below is shown the amended paragraph with markings showing where the amendments are made.

FIG. 1A-1E. DNA sequence (SEQ ID NO: 23) showing the transgenic insert PHI17662A, as well as the sequences flanking the transgenic insert. The 5' and 3' border regions, bp 1 to bp2593 and bp 9937 to bp 11922, respectively, are underlined. Two nucleotide differences (bp 6526 and bp 6562) based on comparison to the transforming plasmid PHP17662 are noted in bold and underlined.

The listing of claims set forth below will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Previously Presented) An isolated DNA molecule comprising a junction sequence comprising a sequence of SEQ ID NO: 32, 34, or complements thereof.

2. (Previously Presented) An insect resistant corn plant, or parts thereof, wherein DNA having at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, forms part of the plant's genome, wherein said plant or said parts thereof comprise corn event DAS-59122-7.

3. (Previously Presented) A descent plant of the insect resistant corn plant of claim 2, wherein DNA having at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, forms part of the descent plant's genome, wherein said descent plant comprises said corn event DAS-59122-7.

4. (Previously Presented) A seed of the plant of claim 2 or 3, wherein DNA having at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, forms part of the seed's genome, wherein said seed comprises said corn event DAS-59122-7.

5. (Previously Presented) A method of producing an insect resistant corn plant, said method comprising breeding with the plant of claim 2 or 3, and selecting progeny by analyzing for at least one nucleotide sequence of SEQ ID NO: 32, 34, or complements thereof, wherein said progeny comprises said corn event DAS-59122-7.

6. (Previously Presented) A method of detecting event DAS-59122-7 in corn tissue comprising:

(a) contacting a sample of said corn tissue with a polynucleotide probe that hybridizes under stringent hybridization conditions with one or more DNA sequences of SEQ ID NO: 32, 34, or complements thereof;

(b) subjecting said sample and probe to stringent hybridization conditions; and

(c) analyzing for hybridization of the probe.

7. (Previously Presented) A DNA detection kit comprising a polynucleotide probe capable of uniquely identifying event DAS-59122-7, wherein said probe is SEQ ID NO: 32, 34, or complements thereof.

REMARKS

In the Notice of Allowability mailed on September 25, 2014, Applicants were requested to satisfy the Requirement for Deposit of Biological Material pursuant to MPEP 2409 and 37 C.F.R. of 37 C.F.R. 1.801-1.809.

In response to this Request, Applicants have herein amended the specification to add a paragraph on page 26 that provides required information concerning the biological deposit of hybrid corn (maize) seed comprising event DAS-59122-7 as set forth on page 2 of the Notice of Allowability. Applicants provide herewith in the Appendix a copy of the Certificate of Deposit from the ATCC. The Certificate includes information regarding the viability of the deposit as well as the date of deposit and the accession number for the deposit.

According to the Notice to File Corrected Application Papers mailed November 3, 2014, the drawings filed on November 12, 2007, were not accepted because figure numbers for Figures 1-3 were missing; in response Applicants submit herewith Replacement Drawing Sheets (7 pages). Additionally, Applicants have amended the specification to reflect the numbering of the drawings.

If the Examiner wishes to discuss any aspect of the application, the Examiner is invited to contact the undersigned representative at (215) 864-8616.

No fee is believed due; however, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,
BALLARD SPAHR LLP

/SimaSingadiaKulkarni, Reg. No. 43,732/
Sima Singadia Kulkarni
Registration No. 43,732

BALLARD SPAHR LLP
Customer Number 118610
(215) 864-8616 Phone
(678) 420-9301 Fax
E-mail: USpatentmail@ballardspahr.com

Appendix

BUDAPEST RESTRICTED CERTIFICATE OF DEPOSIT
BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF
THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE
INTERNATIONAL FORM
RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT ISSUED PURSUANT TO RULE 7.3
AND VIABILITY STATEMENT ISSUED PURSUANT TO RULE 10.2

The American Type Culture Collection (ATCC®) has received your deposit of seeds/strain(s)/strain(s) in connection with the filing of an application for patent. The following information is provided to fulfill Patent Office requirements.

Claire L. Moxon
Pioneer Hi-Bred International Inc
7250 N.W. 62nd Avenue
Johnston, IA 50131-0552

Deposited on Behalf of: **Pioneer Hi-Bred International Inc**

Date of Receipt of seeds/strain(s) by the ATCC®: **October 04, 2010**

Identification Reference by Depositor:	ATCC ®Patent Deposit Designation:	Quantity Received:
Hybrid Corn (maize) seed with Event DAS-59122-7	**PTA-11384**	**100 packets/25 seeds in each packet**

The ATCC® understands that:

1. The deposit of these seeds/strain(s) does not grant ATCC® a license, either express or implied, to infringe the patent, and our release of these seeds/strain(s) to others does not grant them a license, either express or implied, to infringe the patent.

2. If the deposit should die or be destroyed during the effective term of the patent, it shall be your responsibility to replace it with viable material. It is also your responsibility to supply a sufficient quantity for distribution for the deposit term. ATCC® will distribute and maintain the material for 30 years or 5 years following the most recent request for the deposit, whichever is longer. The United States and many other countries are signatory to the Budapest Treaty.

Prior to the issuance of a U.S. Patent, the ATCC® agrees in consideration for a one-time service charge, not to distribute these seeds/strain(s) or any information relating thereto or to their deposit except as instructed by the depositor or relevant patent office. After relevant patent issues we are responsible to release the seeds/strain(s) and they will be made available for distribution to the public without any restrictions. We will inform you of requests for the seeds/strain(s) for 30 years from date of deposit.

The deposit was tested **October 18,2010** and on that date, the seeds/strain(s) were viable
International Depository Authority: American Type Culture Collection (ATCC®), Manassas, VA, USA

Signature of person having authority to represent ATCC®:

_____	**October 20, 2010**
ATCC® Patent Depository	Date

cc: David A. Saravitz

Ref: Docket or Case No: 035718/384480 (PHI 1895D4)

Electronic Acknowledgement Receipt

EFS ID:	20948921
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	118610
Filer:	Sima Singadia Kulkarni/Valerie Martin
Filer Authorized By:	Sima Singadia Kulkarni
Attorney Docket Number:	035718/384482
Receipt Date:	12-DEC-2014
Filing Date:	12-NOV-2007
Time Stamp:	15:21:56
Application Type:	Utility under 35 USC 111(a)

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	Drawings-only black and white line drawings	36446-0047U2_Replacement_Drawings.pdf	1121536 3610be891aa2c20e332c9c3b92b16d90c5814bf3	no	7
Warnings:					
Information:					

2		36446-0047U2_Amendment_Viability.pdf	216436 17bff22dce46b26bb7102edd011fa7fad6ad741f	yes	9

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment after Notice of Allowance (Rule 312)	1	1
Specification	2	3
Claims	4	5
Applicant Arguments/Remarks Made in an Amendment	6	9

Warnings:	
Information:	
Total Files Size (in bytes):	1337972

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New Applications Under 35 U.S.C. 111
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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.

Fig. 1A

```
   1  CTGAGCGCAC AACAGCGAGT CGCATGGCAC CGGACGACAT GAGCGAGATT
  51  TAGATCGGAG GGTGCGGACA TGGGGCAACC TGCGCAGCTA ACGCAGGGAT
 101  CCACACGACC ACCAACGAAG CCAAGCCCGG GCACGTCCCC AGGCAGGTTG
 151  GGCCCTGGTT CCACCAGCGG ATGCATGCAG TGAAGCGGGG ACGGAGAGAC
 201  AAGCCGAGGG CGCGGGTGGG AATGGCGTCC GGGAGGACGA GTGGAGGAGA
 251  AGAATCTAGA GGCATCGAGA TTCGAGAAGC CGACGGAGAC AAGATTCGTG
 301  TGGGGGGAGA CAAACCGCGG GGCTGAGCGC CGTTGATATG GGATCAGACG
 351  GTGTGGATAA AAAAAGTGAC GTTGATAGAA CGTCTGGCCA GTGAAAAAAC
 401  AAAACAACTC CAACAAAATA CTTTAAAAGC TCTTATACCC TAAATGTAGG
 451  GGATCAAACA CGTCTCTACA CTATTTAGCA GCGTCCTCTA AATGATCCTC
 501  TAAATTTAGA GAACGCTACT AGATTCTCTA TATATAGTTT CTCTAAACGA
 551  TCTTTTATCC ATTTAAATAC TTTAAATAAC CGGTTTAACA AAACTAAAAT
 601  ATATACAATA CATTTGAGAG TATGACAAAT ACGTATGTAT AAAAATAAAA
 651  AATAAAATAA TGTATTAGTC TACTTTGAAT CTTCTTTTCT TCATAATATA
 701  ATGATGTATA GCTCTCATGT GCGTTGAGAA AAAAGTTAGA GCTAGACGTT
 751  TAATGTGTAG TGACAGTCTT CGACGAAATC TCCCTAATGA GATGAATTAC
 801  TGGAGGTTCC ATCAGAAAGT CCCCTGAAAA GAGGCATTTA TTTAGTTTAG
 851  TCAGCAATTT CTGGGAACAC AAATATTCTT TTGTTATCAC CACTATTAAA
 901  AATCTATGGT TATAACTTAT AATAACATGA AAAAATAATT TAGCATCCCA
 951  TATATATAAA AACTGAAGGA AGCCATATAT ACTAACATAA GTTAGGAGAA
1001  ACTAAGAAGG TTGTGCAAAG CTTGCACTGC TCCAAAATAC TGCAAACAAC
1051  CACTCTCCTC TACCAACCAA AGAAACTCAT GTACTCCCTC CGTTCTTTTT
1101  TATTTGTCGC ATTTTAGTTT AAAAATGAAC TAGCAGTCGA CAAATATTCG
1151  AGAACAGATA TAGTATATAC TAACATAACT TAGGAGATAC TAAGAAAGTT
1201  GCGCAGAGCT TTCACTGTTC CAAATTACTG CAAAGCCTCT CCCCTCTGCC
1251  AGTACATCTA CGAGATGTTT CAGTTAAACA AAGATTCAGA CAAGTGATGA
1301  GCCACTTCTT GTCATAGATT GTGTGGTCAA CCAACCCATT GATGCCACGG
1351  TTTTTGTGCA TCCATGCTTT TGTATTAAAA CATCAGTTAT GTTTACCATG
1401  TCCGATATGC TCTACATAAT GACAATCAAC TTGGTGTTCA TTATATTTAC
1451  AATGTTAGGA ATTTCAATAG CTACGAACAC TTCAATAGAA GTGCCTTTGT
1501  GGGATCACCT TAATGTGTTG TTGATGTAAG GAGAAGAATC TTAATTTACT
1551  CTTGCTAAAT TTGAACTACA CAAAACCACT GCACTGAGGA TTGTCCTAAT
1601  AAATTACTGC TCATACACGT TAGCATCTGT TCAGATACTG AGCTAATCCC
1651  TAGGATTAAA GGATTTGTAA AAGATATGCC CAATCATTCA TTTTAGTTAT
1701  TTATTTCTTA GTTATCCACT TGAAGATTTA CATACATTTG AAATAAATTT
1751  CTTAGAGGTA AAGTGAAAAT CAGTTATTTA AATACATTTT AGTTATTTAT
1801  TTTCTTCTTT TTCCTAATTT TTCCTTGTAT TTGAAGTCTG AAAAGATAAC
1851  TTTGCCCTTA TACATATTTT ATCTTCTACG TACGCATCTG AACAACGTCT
1901  CTTTGTCCCC TGATCGTGCA GCAATTAGTG CTATGAATCG CGTTTAAGCG
1951  CTGCAAAATC ATGGCTGGGG CTTCGTCCTC GAGTCGTCCT GCTGCTCGAT
2001  GTCACCTCGA GTCCCGCACC GACCTCAGTG CTTGTTCTTG TTGGAGCCAC
2051  CTCTCTCGGA CGATCGCCAA AGACGGATAA GGCCGAAGCC GTCACTTCAG
2101  ACCGCGCTCA TGCGCCGTAG CAGACTCCTA CATAGCAGGG CCAGGGTATG
2151  TGGACCTTTG CAAGTTTAGG ATTGGAACCA GCGACCAGAA TCCACAAGAT
2201  TGGAGCAAAC GACCAAAAAT TCACAAGGAT TGGCGGCTGA CATTGCCAGC
2251  GCGGGATCGC ATGCGGCGGC GGCGGCCGGG GCGAGCACGG GAGCAGGCGA
2301  CAGTCGAGCT CCATTGGAAC GTAGAAATAC TTAAGGGCAA GGTCTCCAAA
2351  TACTTGAAAA AATAGGAAAA AGAAGAAAAT ACATGAAATG ATATTGAAAT
2401  CAATTGGAAG ATGTTATGAA TCTTGTTTTT GCAAAGCGAA CGATTCAGAT
2451  GGCAAAACTA TGAATCTTTT TGTTTGAAGT CCCAAATATA AAATTTTCTC
2501  GTACTCACCA ACATTGGTGC GCACCTGTGA TTGGCTCATA AAAATTCTTG
2551  GAGGGACGGA AGAAAGAGTG AAGGGATAAG CAAGTAAAAG CGCTCAAACA
2601  CTGATAGTTT AAACTGAAGG CGGGAAACGA CAATCTGATC ATGAGCGGAG
```

Fig. 1B

```
2651    AATTAAGGGA GTCACGTTAT GACCCCCGCC GATGACGCGG GACAAGCCGT
2701    TTTACGTTTG GAACTGACAG AACCGCAACG TTGAAGGAGC CACTCAGCAA
2751    GCTTACTAGT AGCGCTGTTT AAACGCTCTT CAACTGGAAG AGCGGTTACC
2801    CGGACCGAAG CTTGCATGCC TGCAGTGCAG CGTGACCCGG TCGTGCCCCT
2851    CTCTAGAGAT AATGAGCATT GCATGTCTAA GTTATAAAAA ATTACCACAT
2901    ATTTTTTTTG TCACACTTGT TTGAAGTGCA GTTTATCTAT CTTTATACAT
2951    ATATTTAAAC TTTACTCTAC GAATAATATA ATCTATAGTA CTACAATAAT
3001    ATCAGTGTTT TAGAGAATCA TATAAATGAA CAGTTAGACA TGGTCTAAAG
3051    GACAATTGAG TATTTTGACA ACAGGACTCT ACAGTTTTAT CTTTTTAGTG
3101    TGCATGTGTT CTCCTTTTTT TTTGCAAATA GCTTCACCTA TATAATACTT
3151    CATCCATTTT ATTAGTACAT CCATTTAGGG TTTAGGGTTA ATGGTTTTTA
3201    TAGACTAATT TTTTTAGTAC ATCTATTTTA TTCTATTTTA GCCTCTAAAT
3251    TAAGAAAACT AAAACTCTAT TTTAGTTTTT TTATTTAATA ATTTAGATAT
3301    AAAATAGAAT AAAATAAAGT GACTAAAAAT TAAACAAATA CCCTTTAAGA
3351    AATTAAAAAA ACTAAGGAAA CATTTTTCTT GTTTCGAGTA GATAATGCCA
3401    GCCTGTTAAA CGCCGTCGAC GAGTCTAACG GACACCAACC AGCGAACCAG
3451    CAGCGTCGCG TCGGGCCAAG CGAAGCAGAC GGCACGGCAT CTCTGTCGCT
3501    GCCTCTGGAC CCCTCTCGAG AGTTCCGCTC CACCGTTGGA CTTGCTCCGC
3551    TGTCGGCATC CAGAAATTGC GTGGCGGAGC GGCAGACGTG AGCCGGCACG
3601    GCAGGCGGCC TCCTCCTCCT CTCACGGCAC CGGCAGCTAC GGGGGATTCC
3651    TTTCCCACCG CTCCTTCGCT TTCCCTTCCT CGCCCGCCGT AATAAATAGA
3701    CACCCCCTCC ACACCCTCTT TCCCCAACCT CGTGTTGTTC GGAGCGCACA
3751    CACACACAAC CAGATCTCCC CCAAATCCAC CCGTCGGCAC CTCCGCTTCA
3801    AGGTACGCCG CTCGTCCTCC CCCCCCCCCC CTCTCTACCT TCTCTAGATC
3851    GGCGTTCCGG TCCATGGTTA GGGCCCGGTA GTTCTACTTC TGTTCATGTT
3901    TGTGTTAGAT CCGTGTTTGT GTTAGATCCG TGCTGCTAGC GTTCGTACAC
3951    GGATGCGACC TGTACGTCAG ACACGTTCTG ATTGCTAACT TGCCAGTGTT
4001    TCTCTTTGGG GAATCCTGGG ATGGCTCTAG CCGTTCCGCA GACGGGATCG
4051    ATTTCATGAT TTTTTTTGTT TCGTTGCATA GGGTTTGGTT TGCCCTTTTC
4101    CTTTATTTCA ATATATGCCG TGCACTTGTT TGTCGGGTCA TCTTTTCATG
4151    CTTTTTTTTG TCTTGGTTGT GATGATGTGG TCTGGTTGGG CGGTCGTTCT
4201    AGATCGGAGT AGAATTCTGT TTCAAACTAC CTGGTGGATT TATTAATTTT
4251    GGATCTGTAT GTGTGTGCCA TACATATTCA TAGTTACGAA TTGAAGATGA
4301    TGGATGGAAA TATCGATCTA GGATAGGTAT ACATGTTGAT GCGGGTTTTA
4351    CTGATGCATA TACAGAGATG CTTTTTGTTC GCTTGGTTGT GATGATGTGG
4401    TGTGGTTGGG CGGTCGTTCA TTCGTTCTAG ATCGGAGTAG AATACTGTTT
4451    CAAACTACCT GGTGTATTTA TTAATTTTGG AACTGTATGT GTGTGTCATA
4501    CATCTTCATA GTTACGAGTT TAAGATGGAT GGAAATATCG ATGTAGGATA
4551    GGTATACATG TTGATGTGGG TTTTACTGAT GCATATACAT GATGGCATAT
4601    GCAGCATCTA TTCATATGCT CTAACCTTGA GTACCTATCT ATTATAATAA
4651    ACAAGTATGT TTTATAATTA TTTTGATCTT GATATACTTG GATGATGGCA
4701    TATGCAGCAG CTATATGTGG ATTTTTTTAG CCCTGCCTTC ATACGCTATT
4751    TATTTGCTTG GTACTGTTTC TTTTGTCGAT GCTCACCCTG TTGTTTGGTG
4801    TTACTTCTGC AGGTCGACTC TAGAGGATCC ACACGACACC ATGTCCGCCC
4851    GCGAGGTGCA CATCGACGTG AACAACAAGA CCGGCCACAC CCTCCAGCTG
4901    GAGGACAAGA CCAAGCTCGA CGGCGGCAGG TGGCGCACCT CCCCGACCAA
4951    CGTGGCCAAC GACCAGATCA AGACCTTCGT GGCCGAATCC AACGGCTTCA
5001    TGACCGGCAC CGAGGGCACC ATCTACTACT CAATTAATGG CGAGGCCGAG
5051    ATCAGCCTCT ACTTCGACAA CCCGTTCGCC GGCTCCAACA AATACGACGG
5101    CCACTCCAAC AAGTCCCAGT ACGAGATCAT CACCCAGGGC GGCTCCGGCA
5151    ACCAGTCCCA CGTGACCTAC ACCATCCAGA CCACCTCCTC CCGCTACGGC
5201    CACAAGTCCT GAGTCATGAG TCATGAGTCA GTTAACCTAG ACTTGTCCAT
5251    CTTCTGGATT GGCCAACTTA ATTAATGTAT GAAATAAAAG GATGCACACA
```

Fig. 1C

```
5301    TAGTGACATG CTAATCACTA TAATGTGGGC ATCAAAGTTG TGTGTTATGT
5351    GTAATTACTA GTTATCTGAA TAAAAGAGAA AGAGATCATC CATATTTCTT
5401    ATCCTAAATG AATGTCACGT GTCTTTATAA TTCTTTGATG AACCAGATGC
5451    ATTTCATTAA CCAAATCCAT ATACATATAA ATATTAATCA TATATAATTA
5501    ATATCAATTG GGTTAGCAAA ACAAATCTAG TCTAGGTGTG TTTTGCGAAT
5551    GCGGCCGCGG ACCGAATTGG GGATCTGCAT GAAAGAAACT GTCGCACTGC
5601    TGAACCGCAC CTTGTCACTT TCATCGAACA CGACCTGTGC CCAAGATGAC
5651    GGTGCTGCGG TCTAAGTGAG GCTGAATTGC CTTGGACAGA AGCGGACTCC
5701    CTACAATTAG TTAGGCCAAA CGGTGCATCC ATGTGTAGCT CCGGGCTCGG
5751    GCTGTATCGC CATCTGCAAT AGCATCCATG GAGCTCGTTC CATGTAGTTG
5801    GAGATGAACC AATGATCGGG CGTGTGGACG TATGTTCCTG TGTACTCCGA
5851    TAGTAGAGTA CGTGTTAGCT CTTTCATGGT GCAAGTGAAA TTTGTGTTGG
5901    TTTAATTACC CCTACGTTAG TTGCGGGACA GGAGACACAT CATGAATTTA
5951    AAGGCGATGA TGTCCTCTCC TGTAATGTTA TTCTTTTGAT GTGATGAATC
6001    AAAATGTCAT ATAAAACATT TGTTGCTCTT TAGTTAGGCC TGATCGTAGA
6051    ACGAAATGCT CGTGTAGCGG GGCTACGAGC CTATGACGCA ATAACACTGG
6101    TTTGCCGGCC CGGAGTCGCT TGACAAAAAA AAGCATGTTA AGTTTATTTA
6151    CAATTCAAAA CCTAACATAT TATATTCCCT CAAAGCAGGT TCACGATCAC
6201    ACCTGTACCT AAAAAAAACA TGAAGAATAT ATTACTCCAT TATTATGAGA
6251    TGAACCACTT GGCAAGAGTG GTAAGCTATA TAAAAAAATG AACATTATTA
6301    CGAGATGTTA TATGCCATTA TATTGATTCG AAGATATATG TTTCTTTCTC
6351    CCACGGGCAC CTAACGGATA CATGATAAGG CCAAGGCAGA TCACGGGAAA
6401    TTATTCGAAT ACATGTTACG CCCTATTGCC GGAAAAAAAA TGCAGGGCAG
6451    GTGTTGGCCG TAGCGATTTA AGCACTTAAG CTGGAGGTTG CCACACTTGG
6501    ATGCAAGCGT CTGACCCTTC TAAAACATCG GCGGCTTTGT CCGTATCCGT
6551    ATCCCCTATC CGACATCTAG CTGGCCACAC GACGGGGCTG GGCAGATCGT
6601    GGATGCCGGG TCGACGTCGA TCGTCAGCCA TCATAGACCA ATCGACCATC
6651    TGTTATGGAT GCTTGCTAGC TAGACTAGTC AGACATAAAA TTTGGATACT
6701    TTCTCCCAAC TGGGAGACGG GGACTGATGT GCAGCTGCAC GTGAGCTAAA
6751    TTTTTCCCTA TAAATATGCA TGAAATACTG CATTATCTTG CCACAGCCAC
6801    TGCCACAGCC AGATAACAAG TGCAGCTGGT AGCACGCAAC GCATAGCTCT
6851    GGACTTGTAG CTAGGTAGCC AACCGGATCC ACACGACACC ATGCTCGACA
6901    CCAACAAGGT GTACGAGATC AGCAACCACG CCAACGGCCT CTACGCCGCC
6951    ACCTACCTCT CCCTCGACGA CTCCGGCGTG TCCCTCATGA ACAAGAACGA
7001    CGACGACATC GACGACTACA ACCTCAAGTG GTTCCTCTTC CCGATCGACG
7051    ACGACCAGTA CATCATCACC TCCTACGCCG CCAACAACTG CAAGGTGTGG
7101    AACGTGAACA ACGACAAGAT TAATGTGTCA ACCTACTCCT CCACCAACTC
7151    CATCCAGAAG TGGCAGATCA AGGCCAACGG CTCCTCCTAC GTGATCCAGT
7201    CCGACAACGG CAAGGTGCTC ACCGCCGGCA CCGGCCAGGC CCTCGGCCTC
7251    ATCCGCCTCA CCGACGAGTC CTCCAACAAC CCGAACCAGC AATGGAACCT
7301    GACGTCCGTG CAGACCATCC AGCTCCCGCA GAAGCCGATC ATCGACACCA
7351    AGCTCAAGGA CTACCCGAAG TACTCCCCGA CCGGCAACAT CGACAACGGC
7401    ACCTCCCCGC AGCTCATGGG CTGGACCCTC GTGCCGTGCA TCATGGTGAA
7451    CGACCCGAAC ATCGACAAGA ACACCCAGAT CAAGACCACC CCGTACTACA
7501    TCCTCAAGAA GTACCAGTAC TGGCAGAGGG CCGTGGGCTC CAACGTCGCG
7551    CTCCGCCCGC ACGAGAAGAA GTCCTACACC TACGAGTGGG GCACCGAGAT
7601    CGACCAGAAG ACCACCATCA TCAACACCCT CGGCTTCCAG ATCAACATCG
7651    ACAGCGGCAT GAAGTTCGAC ATCCCGGAGG TGGGCGGCGG TACCGACGAG
7701    ATCAAGACCC AGCTCAACGA GGAGCTCAAG ATCGAGTATT CACATGAGAC
7751    GAAGATCATG GAGAAGTACC AGGAGCAGTC CGAGATCGAC AACCCGACCG
7801    ACCAGTCCAT GAACTCCATC GGCTTCCTCA CCATCACCTC CCTGGAGCTC
7851    TACCGCTACA ACGGCTCCGA GATCCGCATC ATGCAGATCC AGACCTCCGA
7901    CAACGACACC TACAACGTGA CCTCCTACCC GAACCACCAG CAGGCCCTGC
```

Fig. 1D

```
 7951    TGCTGCTGAC CAACCACTCC TACGAGGAGG TGGAGGAGAT CACCAACATC
 8001    CCGAAGTCCA CCCTCAAGAA GCTCAAGAAG TACTACTTCT GAGTCATGAG
 8051    TCATGAGTCA GTTAACCTAG ACTTGTCCAT CTTCTGGATT GGCCAACTTA
 8101    ATTAATGTAT GAAATAAAAG GATGCACACA TAGTGACATG CTAATCACTA
 8151    TAATGTGGGC ATCAAAGTTG TGTGTTATGT GTAATTACTA GTTATCTGAA
 8201    TAAAAGAGAA AGAGATCATC CATATTTCTT ATCCTAAATG AATGTCACGT
 8251    GTCTTTATAA TTCTTTGATG AACCAGATGC ATTTCATTAA CCAAATCCAT
 8301    ATACATATAA ATATTAATCA TATATAATTA ATATCAATTG GGTTAGCAAA
 8351    ACAAATCTAG TCTAGGTGTG TTTTGCGAAT TCCCATGGAG TCAAAGATTC
 8401    AAATAGAGGA CCTAACAGAA CTCGCCGTAA AGACTGGCGA ACAGTTCATA
 8451    CAGAGTCTCT TACGACTCAA TGACAAGAAG AAAATCTTCG TCAACATGGT
 8501    GGAGCACGAC ACGCTTGTCT ACTCCAAAAA TATCAAAGAT ACAGTCTCAG
 8551    AAGACCAAAG GGCAATTGAG ACTTTTCAAC AAAGGGTAAT ATCCGGAAAC
 8601    CTCCTCGGAT TCCATTGCCC AGCTATCTGT CACTTTATTG TGAAGATAGT
 8651    GGAAAAGGAA GGTGGCTCCT ACAAATGCCA TCATTGCGAT AAAGGAAAGG
 8701    CCATCGTTGA AGATGCCTCT GCCGACAGTG GTCCCAAAGA TGGACCCCCA
 8751    CCCACGAGGA GCATCGTGGA AAAAGAAGAC GTTCCAACCA CGTCTTCAAA
 8801    GCAAGTGGAT TGATGTGATA TCTCCACTGA CGTAAGGGAT GACGCACAAT
 8851    CCCACTATCC TTCGCAAGAC CCTTCCTCTA TATAAGGAAG TTCATTTCAT
 8901    TTGGAGAGGA CAGGGTACCC GGGGATCCAC CATGTCTCCG GAGAGGAGAC
 8951    CAGTTGAGAT TAGGCCAGCT ACAGCAGCTG ATATGGCCGC GGTTTGTGAT
 9001    ATCGTTAACC ATTACATTGA GACGTCTACA GTGAACTTTA GGACAGAGCC
 9051    ACAAACACCA CAAGAGTGGA TTGATGATCT AGAGAGGTTG CAAGATAGAT
 9101    ACCCTTGGTT GGTTGCTGAG GTTGAGGGTG TTGTGGCTGG TATTGCTTAC
 9151    GCTGGGCCCT GGAAGGCTAG GAACGCTTAC GATTGGACAG TTGAGAGTAC
 9201    TGTTTACGTG TCACATAGGC ATCAAAGGTT GGGCCTAGGA TCCACATTGT
 9251    ACACACATTT GCTTAAGTCT ATGGAGGCGC AAGGTTTTAA GTCTGTGGTT
 9301    GCTGTTATAG GCCTTCCAAA CGATCCATCT GTTAGGTTGC ATGAGGCTTT
 9351    GGGATACACA GCCCGGGGTA CATTGCGCGC AGCTGGATAC AAGCATGGTG
 9401    GATGGCATGA TGTTGGTTTT TGGCAAAGGG ATTTTGAGTT GCCAGCTCCT
 9451    CCAAGGCCAG TTAGGCCAGT TACCCAGATC TGAGTCGACC TGCAGGCATG
 9501    CCCGCTGAAA TCACCAGTCT CTCTCTACAA ATCTATCTCT CTCTATAATA
 9551    ATGTGTGAGT AGTTCCCAGA TAAGGGAATT AGGGTTCTTA TAGGGTTTCG
 9601    CTCATGTGTT GAGCATATAA GAAACCCTTA GTATGTATTT GTATTTGTAA
 9651    AATACTTCTA TCAATAAAAT TTCTAATTCC TAAAACCAAA ATCCAGGGCG
 9701    AGCTCGGTAC CCGGGGATCC TCTAGAGTCG ACCTGCAGGC ATGCCCGCGG
 9751    ATATCGATGG GCCCCGGCCG AAGCTTCGGT CCGGGCCATC GTGGCCTCTT
 9801    GCTCTTCAGG ATGAAGAGCT ATGTTTAAAC GTGCAAGCGC TCAATTCGCC
 9851    CTATAGTGAG TCGTATTACA ATCGTACGCA ATTCAGTACA TTAAAAACGT
 9901    CCGCAATGTG TTATTAAGTT GTCTAAGCGT CAATTTTTCC CTTCTATGGT
 9951    CCCGTTTGTT TATCCTCTAA ATTATATAAT CCAGCTTAAA TAAGTTAAGA
10001    GACAAACAAA CAACACAGAT TATTAAATAG ATTATGTAAT CTAGATACCT
10051    AGATTATGTA ATCCATAAGT AGAATATCAG GTGCTTATAT AATCTATGAG
10101    CTCGATTATA TAATCTTAAA AGAAAACAAA CAGAGCCCCT ATAAAAAGGG
10151    GTCAAGTGGA CACTTGGTCA CTCATTTAAT CCCTCCCTCT CCTCTTTTAT
10201    CCCTCTTTTT GGTGTATTCA CCAATAGTGG TGTGCACCTG TGATTGGCTC
10251    GTAAAAATTC TTGGACGGAT GGAAGAGTGA AGAGATAAGC AAGTCAAAGA
10301    AAAGTAACAA CGAAGCTTCA TCAGCTACAA ATTTTGGCCC AACTGGTTGC
10351    ACCAGCACCA AACTTACGTA TACATGATTA TCTCTGTTTC CCTCATTTCG
10401    AAGAAAAAAA CGGGTTTCAA AACCCACTGC TTTCAGGAGT AAAAAAAGAT
10451    AATAATCTGA AACATTGCTT CCACCTTGGC CCTTATTTGG TTACGTTGCA
10501    ATTCACCCCA ATCCACATGT GGATTGAGAT GGATTGCAGT GTAGCTAGAC
10551    AAACCCTTAG GCCCTGTTTG CATAGGAATA CACCAGGAAT TATTCCAGCT
```

Fig. 1E

```
10601    AATCAAAATT TATATAAATG AGAGAAACAA TTCGGATAGG AATTGTTCCA
10651    GGACTTCATT CTGCAGTAAC CGAACGGCCC CTTAATCCAC CCCAATACAC
10701    GTGGATTGGA GTGGATTGAG GTACAGCCAA ACAAGGCCTA AGTGCAGATC
10751    AAATAAATCA CCCGTCATAT TCTTCTACCT ACAAAAACAG CAATAAACAC
10801    CTGAATGAAG TTCTAATTTG CACAGTGTAG GTAGGATGAA AATAGTTACC
10851    TCCTCATGGT CAGTAACTCT TGGCACACAA CTTCACATGT AATCGATGTA
10901    CCACTTGGCT CTTGCCTGAA ACCCAATACA TCTTTAGCAT AAGAATAATA
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11001    TATCACTCCC CAAAACAATT CAAATGAACA GAGATGCATT GCCCCCAATG
11051    AATTCTATTT CAATTAGCCG GAAAATTCTA CTTCATCAGA AGCATCCAAA
11101    TTGCCAGCAT CCCTACTAGA CTGACCATGA CCAGGCTGCC GCAGATGCCT
11151    CTTTTTCTGT CCTCTCCTCT TTGCCTTGAG TTTCTCTTCA AGATCCCTCA
11201    CCCCACGTCT CTTATACATC TTAAAGCTAA CATGTCTCTC CTCCGCCATC
11251    TTCCTAACCT TCTCAGTAAT CTCAGCAGCA ATCTGACGGT TGTACAACTT
11301    CTTCAGCCCC TTCATCAACT TTGCAAATGT GTCAGGCTGT GGCATCAGTC
11351    CTGCCTCTAG CATGTCTAAG CAATACAGGC AGGCCTCCTT GACATGTTTC
11401    TTCGCAAACA GTGCATGAAT CCAGATAGTC CATGCACTCA CATTGAGCTC
11451    ACAGCCTTTG CTCACAATAC ATTTCCAAAC ATCCTTTGCA AGCTCAAGTT
11501    TCTCATCTCT GACCAACGCA TTGAGGAGGT CCTTCAGCAC CCCATATTGC
11551    GGTACCACAA AGAGCCCCCT CCCAACCATG TCTTTAAAAT AACTACATGC
11601    CTCAATCAGC AAACCCTGCC CAACAAGGCC ACTCACCACG ATAGCAAATG
11651    TATCGACCAC AGGACTGAGC CCAGCACTTT CCATCTCATT CCACAATGTC
11701    ATGGCTTGCT TGGTCTCCCC AAGCCTGCAG GCCAACCGAA TCACCACATT
11751    GTATATCTTG AGATCTGGTG GACACCGGCA CTCCCGCATC CTCTCCATCA
11801    GCTCCAAGCA CTCCTCAAGC TGCTCCTTCT TCTCGTGTGC TACAAAGAAA
11851    CCATGGTACA CGGCAGCGTC CACCCGCAGG CCATCCCTCG ACATAGCATC
11901    CAAGAACTCG TACCCCTGGG AT
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Fig. 2

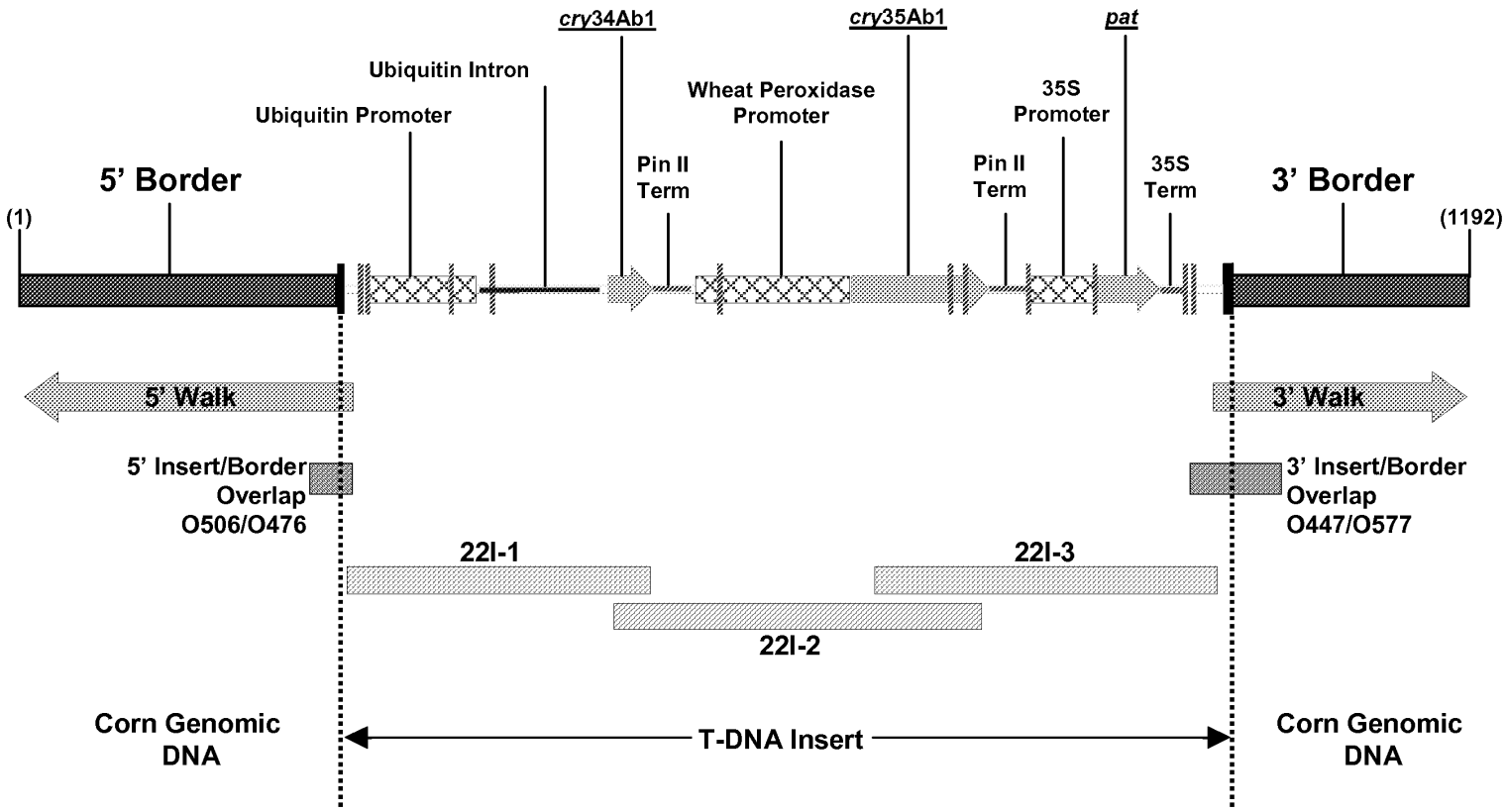
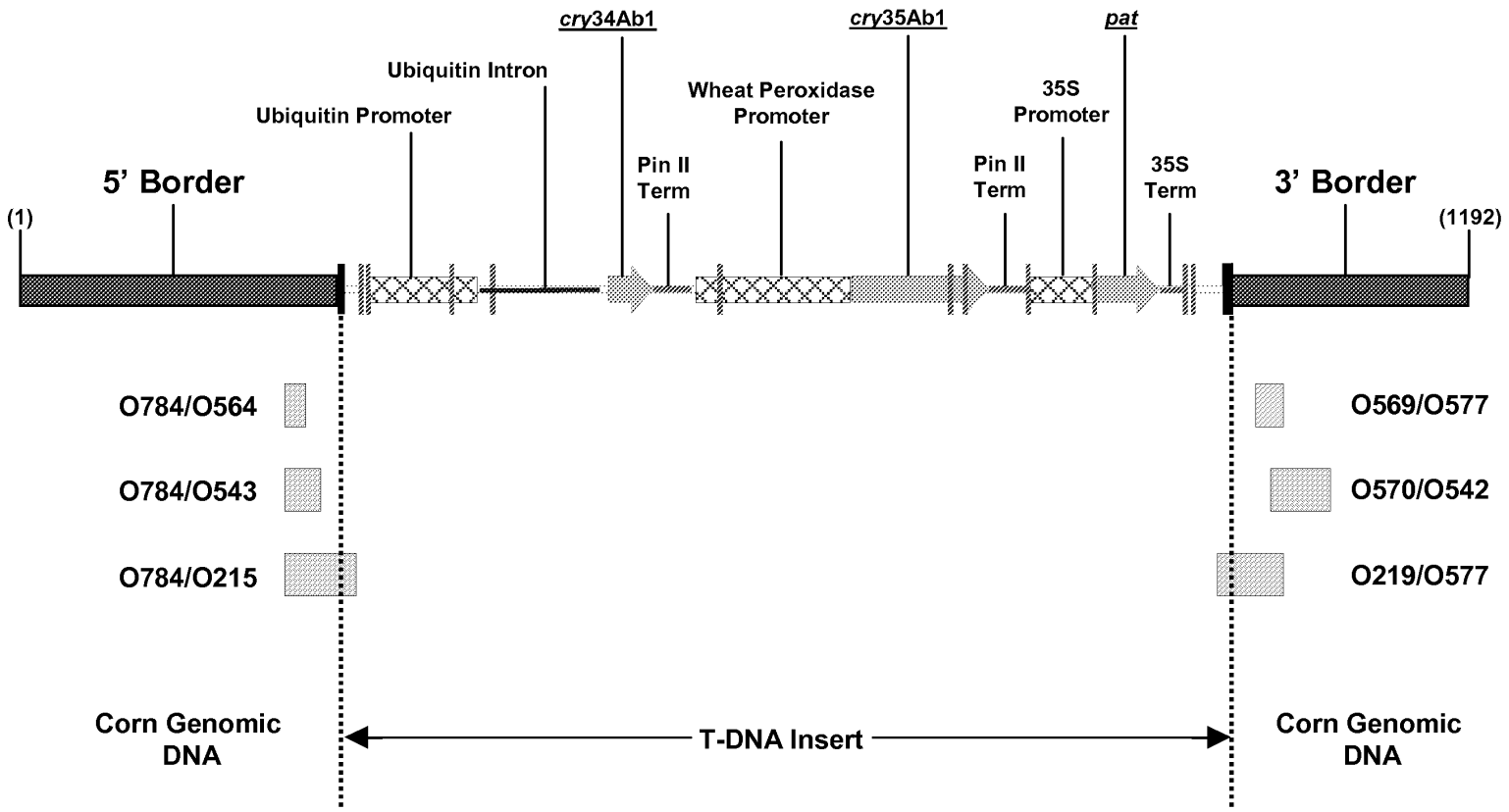

cry34Ab1
cry35Ab1
pat
Ubiquitin Intron
Ubiquitin Promoter
Wheat Peroxidase Promoter
35S Promoter
Pin II Term
Pin II Term
35S Term
5' Border
3' Border
(1)
(1192)
5' Walk
3' Walk
5' Insert/Border Overlap O506/O476
3' Insert/Border Overlap O447/O577
22I-1
22I-3
22I-2
Corn Genomic DNA
T-DNA Insert
Corn Genomic DNA

Fig. 3


cry34Ab1
cry35Ab1
pat
Ubiquitin Intron
Ubiquitin Promoter
Wheat Peroxidase Promoter
35S Promoter
Pin II Term
Pin II Term
35S Term
5' Border
3' Border
(1)
(1192)
O784/O564
O784/O543
O784/O215
O569/O577
O570/O542
O219/O577
Corn Genomic DNA
T-DNA Insert
Corn Genomic DNA

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(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

TITLE OF INVENTION: Corn Event DAS-59122-7 and Methods for Detection Thereof

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	12/26/2014

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Pioneer Hi-Bred International, Inc.	Johnston, IA
Dow Agrosciences LLC	Indianapolis, IN

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☐ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
☐ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
☐ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Sima Singadia Kulkarni/ Date December 22, 2014
Typed or printed name Sima Singadia Kulkarni Registration No. 43,732

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Electronic Patent Application Fee Transmittal

Application Number:	11938483
Filing Date:	12-Nov-2007
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Filer:	Sima Singadia Kulkarni/Valerie Martin
Attorney Docket Number:	035718/384482

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

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:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**960**

Electronic Acknowledgement Receipt	
EFS ID:	21034954
Application Number:	11938483
International Application Number:	
Confirmation Number:	4077
Title of Invention:	Corn Event DAS-59122-7 and Methods for Detection Thereof
First Named Inventor/Applicant Name:	James Wayne Bing
Customer Number:	118610
Filer:	Sima Singadia Kulkarni/Valerie Martin
Filer Authorized By:	Sima Singadia Kulkarni
Attorney Docket Number:	035718/384482
Receipt Date:	22-DEC-2014
Filing Date:	12-NOV-2007
Time Stamp:	14:47:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$960
RAM confirmation Number	1072
Deposit Account	020755
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	364460047U2_Fee_Transmittal.pdf	273473 8c99b9b25b8b48190073f8888ba2d0aa7f20ec4c	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30683 7c1caa6fb601bbe3c3ed691d451119a0b1ba7594	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	304156		

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.

OK TO ENTER: /A.K./

01/05/2015

ATTORNEY DOCKET NO. 36446.0047U2
VIA EFS-WEB
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Bing et al.	)	Art Unit: **1638**
	)	
Application No.: **11/938,483**	)	Examiner: **Anne R. Kubelik**
	)	
Filing Date: **November 12, 2007**	)	Confirmation No.: **4077**
	)	
For: **CORN EVENT** DAS-59122-7 **AND METHODS OF DETECTION THEREOF**	)	

AMENDMENT AFTER ALLOWANCE UNDER 37 C.F.R. § 1.312

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Ballard Spahr LLP

Customer No. 118610

Dear Commissioner:

A Notice of Allowance issued on September 25, 2014 in connection with the above-referenced patent application. Applicants respectfully request that the Examiner consider the following remarks and the accompanying Viability Statement submitted pursuant to 37 CFR 1.807(c). In addition, Applicants submit herewith Replacement Drawings in Response to "Notice to File Corrected Application Papers" mailed November 3, 2014.

Amendments to the Specification begin on page 2 of this paper.

A listing of the claims begins on page 4 of this paper.

Remarks begin on page 6 of this paper.

In accordance with 37 C.F.R. § 1.8, I certify that this correspondence is being transmitted to the Commissioner for Patents, **Mail Stop Issue Fee**, P.O. Box 1450, Alexandria, VA 22313-1450 via the USPTO's EFS-Web Electronic Filing System on **December 12, 2014.**
/SimaSingadiaKulkarni, Reg.No.43,732/
Sima Singadia Kulkarni – Registration No.43,732

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	11/12/2007	James Wayne Bing	035718/384482	4077

118610 7590 01/08/2015

DuPont Pioneer
c/o Ballard Spahr LLP
999 Peachtree Street, Suite 1000
Atlanta, GA 30309

EXAMINER	
KUBELIK, ANNE R	

ART UNIT	PAPER NUMBER
1662	

NOTIFICATION DATE	DELIVERY MODE
01/08/2015	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):

uspatentmail@ballardspahr.com
PTO-Legal.PRC@dupont.com
IPSupport@pioneer.com

Response to Rule 312 Communication	Application No.	Applicant(s)
	11/938,483	BING ET AL.
	Examiner	Art Unit
	Anne Kubelik	1662

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

1. ☒ The amendment filed on _____ under 37 CFR 1.312 has been considered, and has been:

a) ☒ entered.

b) ☐ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

/Anne Kubelik/
Primary Examiner, Art Unit 1662

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 NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/938,483	02/10/2015	8952223	035718/384482\1895USD9E	4077

118610 7590 01/21/2015

DuPont Pioneer
c/o Ballard Spahr LLP
999 Peachtree Street, Suite 1000
Atlanta, GA 30309

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 686 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

James Wayne Bing, Ankeny, IA;
Robert F. Cressman JR., Wilmington, DE;
Manju Gupta, Carmel, IN;
Salim M. Hakimi, Sacramento, CA;
David Hondred, Altoona, IA;
Todd L. Krone, Johnston, IA;
Mary E. Hartnett Locke, Mickleton, NJ;
Abigail K. Luckring, West Chester, PA;
Sandra E. Meyer, Des Moines, IA;
Daniel Moellenbeck, Granger, IA;
Kenneth Edwin Narva, Zionsville, IN;
Paul D. Olson, Kalaheo, HI;
Craig D. Sanders, Bear, DE;

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 USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

BARNES & THORNBURG LLP

11 South Meridian Street
Indianapolis, Indiana 46204
(317) 236-1313

Ex Parte Reexamination

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.:	186233
Group:	3991
Confirmation No.:	4077
Application No.:	90/019,132
Invention:	**Corn Event DAS-59122-7 and Methods for Detection Thereof**
Inventor:	JAMES WAYNE BING et al.
Filed:	November 21, 2022
Attorney Docket:	76751-375942
Examiner	JEAN C WITZ

FILED ELECTRONICALLY:

March 30, 2023

CERTIFICATE OF SERVICE

Pursuant to M.P.E.P. § 2266.03 and 37 C.F.R. § 1.248, the undersigned attorney for the Patent Owner certifies that copies of the following documents were filed in the U.S. Patent and Trademark Office on March 17, 2023:

- A Power of Attorney Document
- Statement under 37 C.F.R. § 3.73(c)

These documents were also served on the Third-Party Requester by first class U.S. mail on March 30, 2023, at the following correspondence address:

Ropes & Gray LLP
IPRM Docketing – Floor 43
Prudential Tower
800 Boylston Street
Boston, MA 02199-36000

Copied from 90019132 on 08/30/2023

Respectfully submitted,

/John P. Breen/

John P. Breen
Registration No. 38,833
Attorney for Applicants

JPB:ajd
(317) 261-7940
Indianapolis, Indiana 46204

Copied from 90019132 on 08/30/2023

PTO/AIA/81B (07-13)
Approved for use through 09/30/2025. OMB 0651-0035
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

REEXAMINATION OR SUPPLEMENTAL EXAMINATION – PATENT OWNER POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS FOR REEXAMINATION OR SUPPLEMENTAL EXAMINATION AND PATENT

Control Number(s)	90/019,132
Filing Date(s)	November 21, 2022
First Named Inventor	JAMES WAYNE BING
Title	Corn Event DAS-59122-7 and Methods for Detection Thereof
Patent Number	8,952,223
Examiner Name	JEAN C WITZ
Attorney Docket No(s)	76751-375942

I. Power of Attorney. This form may be used to change the Power of Attorney in a reexamination or supplemental examination proceeding (or multiple proceedings where merged). This form may also be used to change the Power of Attorney in the patent file; in such a case, a copy of this form will be placed in both the patent file and the reexamination or supplemental examination proceeding.

A. Revocation of Previous Power of Attorney. I hereby revoke all previous patent owner powers of attorney, if any, given:

☒ in the above-identified reexamination or supplemental examination proceeding control number(s) (more than one may be changed only if the proceedings are merged).

☒ in the file of the above-identified patent.

(check BOTH boxes if change in BOTH the patent file and the reexamination or supplemental examination proceeding is requested).

B. Designation of Power of Attorney.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) to prosecute the proceeding(s)/patent identified above and selected in section I(A), and to transact all business in the United States Patent and Trademark Office connected therewith:

186233

OR

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

Practitioner(s) Name	Registration Number

Authorization for the Power of Attorney is provided by the signature on page 2 of this form.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0035. Public burden for this form is estimated to average 15 minutes hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **If filing this completed form by mail, 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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PTO/AIA/81B (07-13)
Approved for use through 09/30/2025. OMB 0651-0035
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II. Change of Correspondence Address

Please recognize or change the correspondence address for the above-identified reexamination or supplemental examination proceeding control number(s) (more than one may be changed **only** if they are merged proceedings) **and for the file of the above-identified patent** to be:

■ The address associated with the above-identified Customer Number.
OR
☐ The address associated with the Customer Number identified in the box at right:
OR

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

NOTE: THE CORRESPONDENCE ADDRESS FOR THE REEXAMINATION OR SUPPLEMENTAL EXAMINATION PROCEEDING CONTROL NUMBER(S) MUST BE THE SAME AS THAT FOR THE PATENT. SEE 37 CFR 1.33.

III. Authorization for Power of Attorney and (if selected) Change of Correspondence Address

I am the:
☐ Inventor, having ownership of the patent being reexamined.
OR
■ Patent owner.
Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on March 17, 2023.

Signature of Inventor or Patent Owner		Date	28-3-2023
Name	KURT VAN THOMME	Telephone	515-535-0039
Title and Company	ASSISTANT SECRETARY, PIONEER HI-BRED INTERNATIONAL, INC.		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted. *If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

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PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. OMB 0651-0031
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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(c)

Applicant/Patent Owner: Corteva AgriScience LLC and Pioneer Hi-Bred International, Inc.

Application No./Patent No.: 8,952,223 Filed/Issue Date: February 10, 2015

Titled: Corn Event DAS-59122-7 and Methods for Detection Thereof

Pioneer Hi-Bred International, Inc., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☐ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☑ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Corteva AgriScience LLC

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☑ 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 060678, Frame 0059, or for which a copy thereof is attached.

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.

This collection of information is required by 37 CFR 3.73(b). 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. 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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STATEMENT UNDER 37 CFR 3.73(c)

3. 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.

4. 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.

5. 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.

6. 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.

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

☐ As required by 37 CFR 3.73(c)(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.

/John P. Breen/	March 30, 2023
Signature	Date
John P. Breen	38833
Printed or Typed Name	Title or Registration Number

Copied from 90019132 on 08/30/2023

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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

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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

BIB DATA SHEET

CONFIRMATION NO. 4077

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/938,483	11/12/2007 RULE	800	1662	035718/384482\1895USD9E

APPLICANTS

INVENTORS

James Wayne Bing, Ankeny, IA;
Robert F. Cressman, Wilmington, DE;
Manju Gupta, Carmel, IN;
Salim M. Hakimi, Sacramento, CA;
David Hondred, Altoona, IA;
Todd L. Krone, Johnston, IA;
Mary E. Hartnett Locke, Mickleton, NJ;
Abigail K. Luckring, West Chester, PA;
Sandra E. Meyer, Des Moines, IA;
Daniel Moellenbeck, Granger, IA;
Kenneth Edwin Narva, Zionsville, IN;
Paul D. Olson, Kalaheo, HI;
Craig D. Sanders, Bear, DE;
Jimei Wang, Johnston, IA;
Jian Zhang, Urbandale, IA;
Gan-Yuan Zhong, Urbandale, IA;

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

This application is a DIV of 11/237,222 09/28/2005 PAT 7323556
which claims benefit of 60/614,225 09/29/2004

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

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

03/04/2008

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
☐ Yes ☑ No	☐ Yes ☐ No	/ANNE R KUBELIK/ Examiner's Signature	☐ Initials	IA	7	7	4

ADDRESS

Barnes & Thornburg LLP (CORTEVA)
11 South Meridian Street
Indianapolis, IN 46204
UNITED STATES

TITLE

Corn Event DAS-59122-7 and Methods for Detection Thereof

FEES: Authority has been given in Paper

☐ All Fees
☐ 1.16 Fees (Filing)

BIB (Rev. 05/07).

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/938,483	11/12/2007	James Wayne Bing	035718/384482\1895USD9E

CONFIRMATION NO. 4077

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POA ACCEPTANCE LETTER

OC000000061292265

Date Mailed: 08/31/2023

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/30/2023.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/rbell/