

No.

202200416



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE
Administrator of the Agricultural Marketing Service

An application requesting a certificate of protection for an alleged novel variety of sexually reproduced, asexually reproduced, or tuber propagated plant, the name and description of which are contained in the application and exhibits, a copy of which is hereunto annexed and made a part hereof, and the various requirements of law in such cases made and provided have been complied with, and the title thereto is, from the records of the PLANT VARIETY PROTECTION OFFICE, in the applicant(s) indicated in the said copy, and whereas, upon due examination made, the said applicant(s) is (are) adjudged to be entitled to a certificate of plant variety protection under the law.

Now, therefore, this certificate of plant variety protection is to grant unto the said applicant(s) and the successors, heirs or assigns of the said applicant(s) for the term of TWENTY years from the date of this grant, subject to the payment of the required fees and periodic replenishment of viable germplasm material of the variety in a public repository as provided by law, the right to exclude others from selling the variety, or offering it for sale, or reproducing it, or importing it, or exporting it, or conditioning it for propagation, or stocking it for any of the above purposes, or using it in producing a hybrid or different variety there from, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)



CORN, FIELD

'PH47K2'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the **City of Washington, D.C.** this **fifteenth** day of **December**, in the year **two thousand twenty three**.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Administrator
Agricultural Marketing Service

Inari Exhibit 1009
Inari v. Pioneer



U.S. Department of Agriculture
Agricultural Marketing Service, Science & Technology Program
Plant Variety Protection Office

US Plant Variety Protection Report Corn Variety 'PH47K2' PV Number: 202200416

Owner / Applicant / Organization

Pioneer Hi-Bred International, Inc.
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United States
Tel:
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Email:

Owner Representative / Agent

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Experimental Name: PH47K2
Variety Name: PH47K2
Crop Kind: Corn
Filing Date : 06/30/2022

Application Status: Application Pending and Examiner Received
Application Status Code: AP

ST470 Main

1. Genus and Species name of crop

Zea mays L.

2. Family name (Botanical)

Gramineae

3. Is the variety a first generation hybrid?

No

4. Does the variety contain any Transgenes?

No

5. Does the owner specify that seed of this variety be sold only as a class of certified seed? (see section 83(a) of the plant variety protection act)

No

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6. Has the variety (including any harvested material) or a hybrid produced from this variety been sold, disposed of, transferred, or used in the U.S. or other countries?

Yes

Date of first sale, disposition, transfer, or use for each country and the circumstances:

A hybrid produced from this inbred variety has not been offered for sale prior to November 1, 2021.

7. Is the variety or any component of the variety protected by intellectual property right? (plant breeder's right or patent)

Yes

Country, date of filing or issuance and assigned reference number:

U.S. Patent Application date: June 14th, 2019 - Serial No. 16/441152

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Exhibit A - Origin and Breeding History

1. Genealogy (back to and including public and commercial varieties, lines, or clones used) and the breeding method(s).

PH47K2 is an elite corn inbred line originated from a cross between inbred line PH1D84 (PVP Certificate No. 201200313) and inbred line PH12K5 (PVP Certificate No. 200900475). The cross took place in New Holland, Pennsylvania in 2009. From this cross, ears were selected based on genetic analysis predicting disease, insect, and agronomic performance. Varieties PH1D84 and PH12K5 are proprietary inbred lines of Pioneer Hi-Bred International, Inc.

2. Give the details of subsequent stages of selection and multiplication.

PH47K2 was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations. Final developmental selections were made approximately the 5th generation in 2014 when the inbred line was determined to be uniform and stable.

3. Is the variety uniform?

Yes

How did you test for uniformity?

Field trials were grown and observed for uniformity and stability over a minimum of 5 generations, with one or more environments in each generation. Genetic purity testing was used in the purification process.

4. Is the variety stable?

Yes

How did you test for stability? Over how many generations?

Field trials were grown and observed for uniformity and stability over a minimum of 5 generations, with one or more environments in each generation. Genetic purity testing was used in the purification process.

5. Are genetic variants observed or expected during reproduction and multiplication?

No

Exhibit A Attached Files List

File Name

Last Modified On

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Exhibit B - Statement of Distinctness

1. Based on overall morphology. Applicant's new variety PH47K2

is most similar to Comparison Variety PH1D84 , ,

2. Application Variety Traits

Variety PH47K2 differs from comparison variety PH1D84 (PVP application no. 201200313) where variety PH47K2 has a pale yellow anther color, light red silk color and a slight ear taper, whereas PH1D84 has a pink anther color, light green silk color and a average ear taper.

3. Comparison Variety1 Additional Comments?

4. Comparison Variety2 Additional Comments?

5. Comparison Variety3 Additional Comments

Exhibit B Attached Files List

File Name

Last Modified On

Exhibit C

Corn

A . Type

1 . *Type*

Dent

B . Region Where Developed

1 . *Region Where Developed*

C . Maturity

1 . *From Emergence to 50% of Plants in Silk*

Days from Emergence to 50% of Plants in Silk

51

Heat Units from Emergence to 50% of Plants in Silk

1299

2 . *From Emergence to 50% of Plants in Pollen*

Days from Emergence to 50% of Plants in Pollen

52

Heat Units from Emergence to 50% of Plants in Pollen

1325

3 . *From 10% to 90% Pollen Shed*

Days from 10% to 90% Pollen Shed

3

Heat Units from 10% to 90% Pollen Shed

102.5

4 . *From 50% Silk to Optimum Edible Quality*

Days From 50% Silk to Optimum Edible Quality

Heat Units From 50% Silk to Optimum Edible Quality

5 . *From 50% Silk to Harvest at 25% Moisture*

Days From 50% Silk to Harvest at 25% Moisture

Heat Units From 50% Silk to Harvest at 25% Moisture

D . Plant

1 . *Plant Height (cm)*

207

2 . *Ear Height (cm)*

75.1

3 . *Length of Top Ear Internode (cm)*

16.7

4 . *Average Number of Tillers*

0

5 . *Average Number of Ears Per Stalk*

6 . *Anthocyanin of Brace Roots*

Faint

E . Leaf

1 . *Width of Ear Node Leaf*

Width of Ear Node Leaf (cm)

9.3

2 . *Length of Ear Node Leaf*

Length of Ear Node Leaf

83.9

3 . *Number of Leaves Above Top Ear*

Number of Leaves Above Top Ear

5.9

4 . *Leaf Color*

4.a. *Leaf Color*

Very Dark Green

4.b. *Leaf Munsell Code*

5GY3/4

5 . *Leaf Sheath Pubescence Rated on Scale from 1 = None to 9 = Like Peach Fuzz*

4

6 . *Marginal Waves Rated on Scale from 1 = None to 9 = Many*

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7 . Longitudinal Creases Rated on Scale from 1 = None to 9 = Many

F . Tassel

1 . Number of Primary Lateral Branches

Number of Primary Lateral Branches

1.5

2 . Branch Angle from Central Spike

Branch Angle from Central Spike

38.9

3 . Tassel Length From Top Leaf Collar to Tassel Tip

Tassel Length from Top Leaf Collar to Tassel Tip (cm)

56.5

4 . Tassel Peduncle Length (cm)

21.3

5 . Tassel Central Spike Length (cm)

30.9

6 . Branch Attitude from Central Spike

7 . Pollen Shed (Rate on Scale From 0 = Male Sterile to 9 = Heavy Shed)

7

8 . Anther Color

8.a. Anther Color

Other

8.b. Anther Color Munsell Code

10YR7/6

9 . Glume Color

9.a. Glume Color

Other

9.b. Glume Color Munsell Code

2.5R4/8

10 . Bar Glumes (Glume Bands)

Absent

11 . Bar Glume Anthocyanin Color

11.a. Bar Glume Anthocyanin Color

11.b. Bar Glume Anthocyanin Color Munsell Code

G . Ear (Unhusked)

1 . *Silk Color Three Days After Emergence*

1.a. *Silk Color Three days after Emergence*

Other

1.b. *Munsell Code for Silk Color*

10RP5/8

2 . *Fresh Husk Color (25 Days after 50% Silking)*

2.a. *Fresh Husk Color 25 Days after 50% Silking*

Light Green

2.b. *Munsell Code for Fresh Husk Color*

5GY7/6

3 . *Dry Husk Color (65 Days after 50% Silking)*

3.a. *Dry Husk Color (65 Days after 50% Silking)*

Tan

3.b. *Munsell Code for Dry Husk Color*

10YR8/4

4 . *Position of Ear at Dry Husk Stage*

Upright

5 . *Husk Tightness Rated on Scale from 1 = Very Loose to 9 = Very Tight*

7

6 . *Husk Extension at Harvest*

Medium (<8 cm)

H . Ear (Husked)

1 . *Ear Length (cm)*

Ear Length (cm)

17

2 . *Ear Diameter at Mid-Point (mm)*

Ear Diameter at Mid-Point (mm)

36.1

3 . *Ear Weight (g)*

Ear Weight (g)

107.8

4 . *Ear Shape*

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5 . *Number of Kernel Rows*

Number of Kernel Rows

14

6 . *Number of Kernels per Row*

25.4

7 . *Kernel Rows*

Distinct

8 . *Row Alignment*

Straight

9 . *Shank Length (cm)*

8.9

10 . *Ear Taper*

Slight

I . Kernel (Dried)

1 . *Kernel Length*

Kernel Length (mm)

2 . *Kernel Width*

Kernel Width (mm)

3 . *Kernel Thickness*

Kernel Thickness (mm)

4 . *Aleurone Color Uniformity*

4.a. *Aleurone Color Uniformity*

Homozygous

4.b. *Aleurone Color Pattern Description*

5 . *Aleurone Color*

Clear

Aleurone Color Munsell Code

6 . *Hard Endosperm Color*

Yellow Orange

Hard Endosperm Color Munsell Code

7.5YR7/14

7 . *Endosperm Type*

Normal Starch

J . Cob

1 . *Cob Diameter at Mid-Point (mm)*

20.3

2 . *Cob Color*

White

Cob Color Munsell Code

5Y9/1

K . Disease Resistance

I. Leaf Blights, Wilts, and Local Infection Diseases

1 . *Anthracnose Leaf Blight (Colletotrichum graminicola)*

2 . *Common Rust (Puccinia sorghi)*

3 . *Common Smut (Ustilago maydis)*

4 . *Eyespot (Kabatiella zeae)*

5 . *Goss's Wilt (Clavibacter michiganense spp. nebraskense)*

Race

6 . *Gray Leaf Spot (Cercospora zeae-maydis)*

Race

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7 . *Helminthosporium Leaf Spot (Bipolaris zeicola)*

Race

8 . *Northern Leaf Blight (Exserohilum turcicum)*

Race

9 . *Southern Leaf Blight (Bipolaris maydis)*

Race

10 . *Southern Rust (Puccinia polysora)*

11 . *Stewart's Wilt (Erwinia stewartii)*

12 . *Other Blights*

Specify

II. Systemic Diseases

1 . *Lethal Necrosis (MCMV and MDMV)*

2 . *Head Smut (Sphacelotheca reiliana)*

3 . *Maize Chlorotic Dwarf Virus (MCDV)*

4 . *Maize Chlorotic Mottle Virus (MCMV)*

5 . *Maize Dwarf Mosaic Virus (MDMV)*

Strain

6 . *Sorghum Downy Mildew of Corn (Peronosclerospora sorghi)*

7 . *Other Systemic Diseases*

Other Systemic Diseases - Specify

III. Stalk Rots

1 . *Anthrachnose Stalk Rot (Colletotrichum graminicola)*

2 . *Diplodia Stalk Rot (Stenocarpella maydis)*

3 . *Fusarium Stalk Rot (Fusarium moniliforme)*

4 . *Gibberella Stalk Rot (Gibberella zeae)*

5 . *Other Stalk Rot Diseases*

Other Stalk Rots - Specify

IV. Ear and Kernel Rots

1 . *Aspergillus Ear and Kernel Rot (Aspergillus flavus)*

2 . *Diplodia Ear Rot (Stenocarpella maydis)*

3 . *Fusarium Ear and Kernel Rot (Fusarium moniliforme)*

4 . *Gibberella Ear Rot (Gibberella zeae)*

5 . *Other Ear and Kernel Rot Diseases*

Other Ear and Kernel Rots - Specify

L . Insect Resistance

1 . *Banks Grass Mite (Oligonychus pratensis)*

I. Corn Earworm (*Helicoverpa zea*)

1 . *Leaf Feeding*

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2 . Silk Feeding

2.a. Silk Feeding Larval Weight

2.b. Silk Feeding Standard Deviation

2.c. Silk Feeding Sample Size

2.d. Silk Feeding Larval Weight (mg)

3 . Ear Damage

4 . Leaf Aphid (Rhopalosiphum maidis)

5 . Sap Beetle (Carpophilus dimidiatus)

II. European Corn Borer (*Ostrinia nubilalis*)

1 . First Generation Typically Whorl Leaf Feeding

2 . Second Generation Typically Leaf Sheath Collar Feeding

3 . Stalk Tunneling (cm) Tunneled Per Plant

III. Fall Armyworm (*Spodoptera frugiperda*)

1 . Leaf Feeding Fall Armyworm (Spodoptera frugiperda)

2 . Silk Feeding Fall Armyworm (Spodoptera frugiperda)

2.a. Fall Armyworm (Spodoptera frugiperda) Silk Feeding Larval Weight

2.b. Fall Armyworm (Spodoptera frugiperda) Silk Feeding

2.c. Fall Armyworm (Spodoptera frugiperda) Silk Feeding Standard Deviation

2.d. Fall Armyworm (Spodoptera frugiperda) Silk Feeding Sample Size

3 . Maize Weevil (Sitophilus zeamais)

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4 . Northern Rootworm (*Diabrotica barberi*)

5 . Southern Rootworm (*Diabrotica undecimpunctata*)

IV. Southwestern Corn Borer (*Diatraea grandiosella*)

1 . Leaf Feeding

2 . Stalk Tunneling

2.a. Stalk Tunneling Amount Tunneled/Plant (cm)

2.b. Stalk Tunneling Standard Deviation

2.c. Stalk Tunneling Sample Size

3 . Two-Spotted Spider Mite (*Tetranychus urticae*)

4 . Western Rootworm (*Diabrotica virgifera virgifera*)

5 . Other Insects

5.a. Other Insects

5.b. Other Insects (Specify)

M . Agronomic Traits

1 . Stay Green (at 65 days after anthesis)(Rate on a scale of 1 = worst to 9 = excellent)

2 . Percent Dropped Ears (at 65 days after anthesis)

3 . Percent Pre-anthesis Brittle Snapping

4 . Percent Pre-anthesis Root Lodging

5 . Percent Post-anthesis Root Lodging (at 65 days after anthesis)

6 . Kg/ha Yield of Inbred Per Se (at 12-13% Grain Moisture)

N . Molecular Markers

1 . *Isozyme*

2 . *RFLP*

3 . *RAPD*

4 . *SSR*

5 . *SNP*

6 . *Other Molecular Markers*

Other Molecular Markers (Specify)

I. Characteristics of Isozyme Polymorphism

1 . *Acp1*

2 . *Acp4*

3 . *Adh1*

4 . *Dia1*

5 . *Dia2*

6 . *Idh1*

7 . *Idh2*

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8 . *Mdh1*

9 . *Mdh2*

10 . *Mdh3*

11 . *Mmm*

12 . *Mdh4*

13 . *Mdh5*

14 . *Mdh6*

15 . *Pgd1*

16 . *Pgd2*

17 . *Pgi1*

18 . *Pgm1*

19 . *Pgm2*

20 . *Phi1*

O . Comments

1 . *Comments*

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Exhibit D - Additional Descriptive Information

Additional descriptive question / text:

Additional descriptive answer / information in detail:

Exhibit D Attached Files List

File Name

Last Modified On

Exhibit E - Statement of the Basis of Ownership

1. Does the applicant own all rights to the variety?

Yes

2. Is the applicant a U.S. national or a U.S. based entity?

Yes

3. Is the applicant the original owner?

Yes

4. Additional explanation on ownership (Trace ownership from original breeder to current owner):

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.