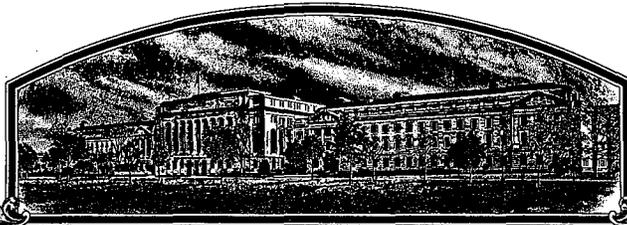


No.

920088



# 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

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED 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 *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED 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 USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHPR5'

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 30th day of June in the year of our Lord one thousand nine hundred and ninety-two.

Attest:

*Kenneth H. Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Edward Madison*  
Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

**APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE**  
(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 242). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate)  Pioneer Hi-Bred International, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.	3. VARIETY NAME  PHPR5
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP)  Plant Breeding Division North America Department of Corn Breeding P.O. Box 85 Johnston, IA 50131-0085		5. PHONE (include area code)  515/270-3300	<b>FOR OFFICIAL USE ONLY</b> PVPO NUMBER  9200088
6. GENUS AND SPECIES NAME  Zea mays	7. FAMILY NAME (Botanical)  Gramineae		F I L I N G Date Jan. 31, 1992 Title <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.
8. CROP KIND NAME (Common Name)  Corn	9. DATE OF DETERMINATION  February 1989		F E E S Filing and Examination Fee. \$ 2150. Date Jan. 31, 1992
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)  Corporation			R E C E I V E D Certificate Fee. \$ 250. Date June 15, 1992
11. IF INCORPORATED, GIVE STATE OF INCORPORATION  Iowa	12. DATE OF INCORPORATION  May 6, 1926		
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Dr. Bruce D. McBratney Plant Breeding Division Pioneer Hi-Bred International, Inc. P.O. Box 85 Johnston, IA 50131-0085			PHONE (include area code): 515/270-3546
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)			
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety. b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement. c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety. d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety. e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership. f. <input checked="" type="checkbox"/> Seed Sample (2,500 viable untreated seeds) Date Seed Sample mailed to Plant Variety Protection Office <u>1-29-92</u> g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."			
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.) <input type="checkbox"/> YES (If "YES," answer items 16 and 17 below) <input checked="" type="checkbox"/> NO (If "NO," skip to item 18 below)			
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO		17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> YES (If "YES," through <input type="checkbox"/> Plant Variety Protection Act <input type="checkbox"/> Patent Act Give date: _____ ) <input checked="" type="checkbox"/> NO			
19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> YES (If "YES," give names of countries and dates) <input checked="" type="checkbox"/> NO			
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.  The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT (Owner(s))  Pioneer Hi-Bred International, Inc.		CAPACITY OR TITLE	DATE
SIGNATURE OF APPLICANT (Owner(s))  		Technical Support Coordinator	1-28-92

## 14A. Exhibit A. Origin and Breeding History

Pedigree: PHK76/PHW52)XA6333K252

Pioneer Line PHPR5 Zea mays L., a yellow corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross PHK76 x PHW52 using the pedigree method of breeding. The progenitors of PHPR5 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection were practiced within the above F1 cross for 4 generations in the development of PHPR5 at Algona, Iowa. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Algona, Iowa, as well as other Pioneer research stations. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations made for uniformity.

JMS  
6/15/92

PHPR5 has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PHPR5.

## DEVELOPMENTAL HISTORY FOR PHPR5

SEASON/YEAR	INBREEDING LEVEL
Summer 1984	F0 (Cross Made)
Winter 1985	F1
Summer 1985	F2
Summer 1986	F3
Summer 1987	F4
Summer 1988	F5*
Winter 1989	F6
Summer 1989	F7
Summer 1990	F8
Summer 1991	F9**

\* PHPR5 was selfed and selected through F5 generation.

\*\*PHPR5 was selfed and ear-rowed from F6 through F9 generations.

## 14B. Exhibit B. Novelty Statement

PHPR5 is most similar to the Pioneer Hi-Bred International, Inc. proprietary inbred line PHW52 (PVP Certification No. 8800215). PHPR5 silks approximately 90 (1440 versus 1530) growing degree units earlier than PHW52. PHPR5 has darker (dark versus light) green leaves and fewer (light versus medium) leaf sheath pubescence than PHW52. PHPR5 has yellow anthers and pink silk whereas PHW52 has purple anthers and green silk. PHPR5 has a white cob, PHW52 red.

PHPR5 has higher grain yield and lower grain harvest moisture than PHW52. PHPR5 has fewer barren plants and is taller with higher ear placement compared to PHW52. PHPR5 has better seedling vigor and higher early stand count than PHW52. PHPR5 has better stalk lodging resistance but is more susceptible to root lodging and has more brittle stalks than PHW52.



## E. Ear (Husked Ear Data Except When Stated Otherwise):

Length: 17 cm  
 Weight: 136 gm  
 Mid-point Diameter: 40 mm  
 Silk Color: Pink  
 Husk Extension (Harvest stage): Medium (Barely Covering Ear)  
 Husk Leaf: Long (> 15 cm)  
 Taper of Ear: Average  
 Position of Shank (dry husks): Upright  
 Kernel Rows: Straight, Distinct  
 Husk Color (fresh): Light Green  
 Husk Color (dry): Buff  
 Shank Length: 11 cm  
 Shank (No. of internodes): 7

Number = 14

## F. Kernel (Dried):

Size (from ear mid-point)  
     Length: 12 mm  
     Width: 8 mm  
     Thick: 5 mm  
 Shape Grade (% rounds): 40-60 (49% medium round based on Parent Test Data)  
 Pericarp Color: Colorless  
 Aleurone Color: Homozygous Yellow  
 Endosperm Color: Yellow  
 Endosperm Type: Normal Starch  
 Gm Wt/100 Seeds (unsized): 31 gm

## G. Cob:

Diameter at mid-point: 21 mm  
 Strength: Weak  
 Color: White

## H. Diseases:

Corn Lethal Necrosis (MCMV=Maize Chlorotic Mottle Virus and MDMV=Maize Dwarf Mosaic Virus): Resistant  
 Anthracnose Stalk Rot (graminicola): Susceptible  
 N. Leaf Blight (turcicum): Intermediate  
 Common Rust (sorghii): Intermediate  
 Southern Rust (polysora): Intermediate  
 Gray Leaf Spot (zeae): Susceptible  
 Stewart's Wilt (stewartii): Susceptible  
 Goss's Wilt (nebraskense): Resistant  
 Fusarium Ear Mold (moniliforme): Resistant

## I. Insects:

European Corn Borer-1 Leaf Damage (Pre-flowering): Susceptible  
 European Corn Borer-2 (Post-flowering): Susceptible

The above descriptions are based on a scale of 1-9, 1 being highly susceptible, 9 being highly resistant.

S (Susceptible): Would generally represent a score of 1-3.

I (Intermediate): Would generally represent a score of 4-5.

R (Resistant): Would generally represent a score of 6-7.

H (Highly Resistant): Would generally represent a score of 8-9. Highly resistant does not imply the inbred is immune.

## J. Variety Most Closely Resembling:

Character	Inbred
Maturity	PHW52
Usage	PHW52

PHW52 (PVP Certificate No. 8800215) is a Pioneer Hi-Bred International, Inc. proprietary inbred.

Data for Items B, C, D, E, F, and G is based primarily on a maximum of four reps from Johnston, Iowa grown in 1990 and 1991, plus description information from the maintaining station.

14D. EXHIBIT D. ADDITIONAL DESCRIPTION OF PHR5.  
 INBRED PER SE YIELD TEST COMPARISON OF PHR5 AND PHW52 EVALUATED OVER THREE YEARS.

VARIETY #1 - PHR5  
 VARIETY #2 - PHW52

\* = 10% SIG + = 5% SIG # = 1% SIG

YEAR	VAR #	BU ACR	BU ACR	BU MST	BAR	PLT	EAR	SDG	EST	DRP	GDU	GDU	GRN	STA	STK	RT	BRT
		ABS	%MN	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS
89	1			91.3	186.7	61.0	5.9	25.8	1376	1385	7.0	7.0					100.0
	2			100.0	185.4	64.8	4.9	25.3	1408	1441	7.0	7.0					100.0
	LOCS			1	4	4	9	9	15	15	2	2					1
	REPS			1	4	4	9	9	15	15	2	2					1
	PROB			.824	.565	.206	.669	.019+	.001#		1.00						
90	1			12.5	97.9	187.4	67.7	4.9	26.5	1478	1482	6.5	6.5				87.5
	2			12.5	93.7	174.2	54.0	3.1	23.4	1535	1564	5.8	5.8				94.1
	LOCS			3	15	6	6	15	24	21	19	6	6				1
	REPS			3	15	13	13	15	54	29	27	6	6				1
	PROB			1.00	.064*	.034+	.052*	.000#	.000#	.000#	.000#	.175					
91	1	85.6	140	19.6	95.1	195.8	75.6	6.3	42.7	98.6	1441	1450	6.9	6.1	93.5	48.1	
	2	73.7	116	20.4	88.9	181.0	64.8	4.7	42.2	99.9	1501	1552	6.4	6.0	89.9	87.8	
	LOCS	25	25	27	38	30	30	25	48	7	36	33	10	21	20	12	
	REPS	62	62	64	64	53	54	42	99	14	45	40	20	38	42	28	
	PROB	.001#	.000#	.002#	.003#	.000#	.001#	.000#	.469	.145	.000#	.000#	.213	.553	.066*	.003#	
TOTAL SUM	1	85.6	140	18.9	95.8	193.6	72.9	5.8	36.0	98.6	1438	1444	6.9	6.2	93.5	48.1	93.8
	2	73.7	116	19.6	90.5	180.4	63.1	4.2	34.8	99.9	1492	1531	6.4	6.0	89.9	87.8	97.1
	LOCS	25	25	30	54	40	40	49	81	7	72	67	10	29	20	12	2
	REPS	62	62	67	80	70	71	66	162	14	89	82	20	46	42	28	2
	DIFF	11.9	24	0.7	5.3	13.2	9.8	1.6	1.2	1.3	53	86	0.5	0.2	3.6	39.7	3.3
	PROB	.001#	.000#	.002#	.001#	.000#	.000#	.000#	.009#	.145	.000#	.000#	.213	.195	.066*	.003#	.500

9200088

8

DEFINITIONS

In the description and examples, a number of terms are used herein. In order to provide a clear and consistent understanding of the specification and claims, including the scope to be given such terms, the following definitions are provided:

BAR PLT = BARREN PLANTS. This is the percent of plants per plot that were not barren (lack ears).

BRT STK = BRITTLE STALKS. This is a measure of the stalk breakage near the time of pollination, and is an indication of whether a hybrid or inbred would snap or break near the time of flowering under severe winds. Data are presented as percentage of plants that did not snap.

BU ACR = YIELD (BUSHEL/ACRE). Actual yield of the grain at harvest adjusted to 15.5% moisture. ABS is in absolute terms and % MN is percent of the mean for the experiments in which the hybrid or inbred was grown.

DRP EAR = DROPPED EARS. This is a measure of the number of dropped ears per plot and represents the percentage of plants that did not drop ears prior to harvest.

EAR HCM = EAR HEIGHT. The ear height is a measure from the ground to the top developed ear node attachment and is measured in centimeters.

EST CNT = EARLY STAND COUNT. This is a measure of the stand establishment in the spring and represents the number of plants that emerge on a per plot basis for the hybrid or inbred.

GDU SHD = GDU TO SHED. The number of growing degree units (GDUs) or heat units required for an inbred line or hybrid to have approximately 50 percent of the plants shedding pollen and is measured from the time of planting. Growing degree units are calculated by the Barger Method, where the heat units for a 24-hour period are:

$$\text{GDU} = \frac{(\text{Max. temp.} + \text{Min. temp.})}{2} - 50$$

The highest maximum temperature used is 86°F and the lowest minimum temperature used is 50°F. For each inbred or hybrid it takes a certain number of GDUs to reach various stages of plant development.

GDU SLK = GDU TO SILK. The number of growing degree units required for an inbred line or hybrid to have approximately 50 percent of the plants with silk emergence from time of planting. Growing degree units are calculated by the Barger Method as given in GDU SHD definition.

GRN APP. = GRAIN APPEARANCE. This is a 1 to 9 rating for the general quality of the shelled grain as it is harvested based on such factors as the color of the harvested grain, any mold on the grain, and any cracked grain. High scores indicate good grain quality and low scores indicate poor grain quality.

MST = HARVEST MOISTURE. The moisture is the actual percentage moisture of the grain at harvest.

PLT HCM = PLANT HEIGHT. This is a measure of the height of the plant from the ground to the tip of the tassel in centimeters.

RT LDG = ROOT LODGING. Root lodging is the percentage of plants that do not root lodge; plants that lean from the vertical axis at an approximately 30° angle or greater would be counted as root lodged.

SDG VGR = SEEDLING VIGOR. This is the visual rating (1 to 9) of the amount of vegetative growth after emergence at the seedling stage (approximately five leaves). A higher score indicates better vigor and a low score indicates poorer vigor.

STA GRN = STAY GREEN. Stay green is the measure of plant health near the time of black layer formation (physiological maturity). A high score indicates better late-season plant health.

STK LDG = STALK LODGING. This is the percentage of plants that did not stalk lodge (stalk breakage) as measured by either natural lodging or pushing the stalks and determining the percentage of plants that break below the ear.

TST WT = TEST WEIGHT UNADJUSTED. The measure of weight of the grain in pounds for a given volume (bushel).

## CLARIFICATION OF DATA IN EXHIBITS C AND D

Please note the data presented in Exhibit C, "Objective Description of Variety," is data collected primarily at Johnston, Iowa plus description information from the maintaining station. The data in Exhibit D, "Additional Description of Variety," is data from comparisons of inbreds grown in the same tests in the adapted growing area of PPHR5.

## 14E. EXHIBIT E. Statement of the Basis of Applicant's Ownership

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the development and evaluation of PHPR5. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHPR5.