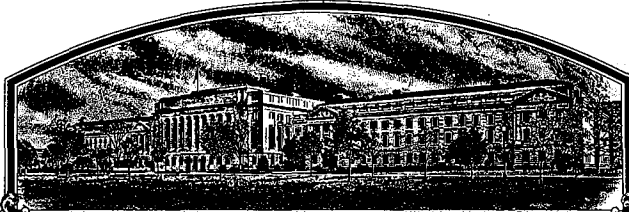


No.

910092



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

'PHJ89'

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 28th day of February 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 Madigan
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. 2421). 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 PHJ89
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) Plant Breeding Division Department of Corn Breeding P. O. Box 85 Johnston, Iowa 50131-0085		5. PHONE (include area code) (515) 270-3300	FOR OFFICIAL USE ONLY VPVO NUMBER 9100092 F I L I N G Date February 7, 1991 Time <input type="checkbox"/> A.M. <input type="checkbox"/> P.M. F E E S Filing and Examination Fee: \$ 2150.- Date Feb. 7, 1991 R E C E I V E D Certificate Fee: \$ 250.00 Date Jan. 17, 1992
6. GENUS AND SPECIES NAME Zea mays	7. FAMILY NAME (Botanical) Gramineae	8. CROP KIND NAME (Common Name) Corn	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			
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, Iowa 50131-0085
 PHONE (include area code): (515) 270-3546

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. Exhibit A, Origin and Breeding History of the Variety.
- b. Exhibit B, Novelty Statement.
- c. Exhibit C, Objective Description of Variety.
- d. Exhibit D, Additional Description of Variety.
- e. Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 2-1-91
- g. 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.)
 YES (If "YES," answer items 16 and 17 below) NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
 YES NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
 FOUNDATION REGISTERED CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
 YES (If "YES," through Plant Variety Protection Act Patent Act Give date _____)
 NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
 YES (If "YES," give names of countries and dates)
 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)) <i>Bruce D. McBratney</i>	Technical Support Coordinator	1/31/91

14A. Exhibit A.
Origin and Breeding History

Pedigree: PHT77/PHG47)X6K1134K113X

Pioneer Line PHJ89, Zea mays L., a yellow corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross PHT77 x PHG47 using the pedigree method of breeding. The progenitors of PHJ89 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection were practiced within the above F1 cross for four generations in the development of PHJ89 at Mankato, Minnesota. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Mankato, Minnesota, 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.

PHJ89 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 PHJ89.

DEVELOPMENTAL HISTORY FOR PHJ89

SEASON/YEAR	INBREEDING LEVEL
Winter 1983	F0 (Cross made)
Summer 1983	F1
Summer 1984	F2
Winter 1985	F3
Summer 1985	F4
Summer 1986	F5*
Summer 1987	F6
Winter 1988	F7
Summer 1988	F8
Summer 1989	F9
Summer 1990	F10**

* PHJ89 was selfed and selected through F5 generation.

** PHJ89 was selfed and ear-rowed from F6 through F10 generations.

14B. Exhibit B. Novelty Statement

PHJ89 is most similar to the Pioneer Hi-Bred International, Inc. proprietary inbred line PHT77 (PVP Certificate No. 8800038). PHJ89 silks approximately 40 (1390 versus 1430) growing degree units earlier than PHT77. PHJ89 has a greater (30-60 degrees versus <30 degrees) leaf angle from the stalk, more (few versus none) marginal waves, and more (few versus absent) longitudinal creases than PHT77. PHJ89 has light green fresh husk color whereas PHT77 has dark green fresh husk color. Cob color of PHJ89 is white, PHT77 has red cob color.

PHJ89 has slightly higher yield and grain harvest moisture than PHT77. PHJ89 is shorter with lower ear placement compared to PHT77. PHJ89 has better stay green than PHT77.

9100092

VARIETY DESCRIPTION INFORMATION

INBRED = PHJ89

Type: Dent

Region Best Adapted: NorthCentral

A. Maturity: Average across maturity zones. Zone : 0

Heat Unit Shed: 1360
 Heat Unit Silk: 1390
 No. Reps: 48

HEAT UNITS = $\frac{[\text{Max. Temp. } (<86^{\circ}\text{F.}) + \text{Min. Temp } (>50^{\circ}\text{F.})]*}{2}$ - 50

* If maximum is greater than 86 degrees fahrenheit, then 86 is used and if minimum is less than 50, then 50 is used. Heat units accumulated daily and can not be less than 0.

B. Plant Characteristics:

Plant height (to tassel tip): 202 cm
 Length of top ear internode: 12 cm
 Number of ears per stalk: Single
 Ear height (to base of top ear): 52 cm
 Number of tillers: None
 Cytoplasm type: Normal

C. Leaf:

Color: Dark Green (B14)
 Angle from Stalk: 30-60 degrees
 Marginal Waves: Few (WF9)
 Number of Leaves (mature plants): 16
 Sheath Pubescence: Light (W22)
 Longitudinal Creases: Few (OH56A)
 Length (Ear node leaf): 71 cm
 Width (widest point, ear node leaf): 9 cm

D. Tassel:

Number lateral branches: 4
Branch Angle from central spike: > 45 degrees
Pollen Shed: Heavy based on Pollen Yield Test
(141 % of experiment means)
Peduncle Length (top leaf to basal branches): 24 cm
Anther Color: Yellow
Glume Color: Green

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

Length: 14 cm
Weight: 97 gm
Mid-point Diameter: 38 mm
Silk Color: Green
Husk Extension (Harvest stage): Short (Ears exposed)
Husk Leaf: Short (< 8 cm)
Taper of Ear: Slight
Position of Shank (dry husks): Upright
Kernel Rows: Straight, Distinct Number = 14
Husk Color (fresh): Light Green
Husk Color (dry): Buff
Shank Length: 8 cm
Shank (No. of internodes): 7

F. Kernel (Dried):

Size (from ear mid-point)
Length: 11 mm
Width: 7 mm
Thick: 4 mm
Shape Grade (% rounds): 20-40 (32 % 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): 21 gm

G. Cob:

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

H. Diseases:

Corn Lethal Necrosis (MCMV=Maize Chlorotic Mottle Virus and
MDMV=Maize Dwarf Mosaic Virus): Resistant
N. Leaf Blight (E. turcicum): Intermediate
Common Rust (P. sorghi): Intermediate
Eye Spot (K. zeae): Intermediate
Gray Leaf Spot (C. zeae): Intermediate
Stewart's Wilt (E. stewartii): Susceptible
Goss's Wilt (C. nebraskense): Highly Resistant
Fusarium Ear Mold (F. moniliforme): Resistant

I. Insects:

European Corn Borer-1 Leaf Damage (Pre-flowering): Intermediate
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	PHT77
Usage	PHT77

PHT77 (PVP Certificate No. 8800038) 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 two reps from Johnston, Iowa grown in 1990, plus description information from the maintaining station.

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 or hybrids grown in the same tests in the adapted growing area of PHJ89.

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 HT = 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 HT = 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).

14D. EXHIBIT D. ADDITIONAL DESCRIPTION OF PHJ89. INBRED PER SE YIELD TEST COMPARISON OF PHJ89 AND PHT77 EVALUATED OVER THREE YEARS.

VARIETY #1 - PHJ89
VARIETY #2 - PHT77

		* = 10% SIG										+ = 5% SIG										# = 1% SIG									
YEAR	VAR #	BU ACR	BU ACR %MN	BU MST	BAR PLT	BAR ABS	PLT HT	PLT ABS	EAR HT	EAR ABS	SDG VGR	SDG ABS	EST CNT	EST ABS	DRP EAR	DRP ABS	GDU SHD	GDU ABS	SILK APP	SILK ABS	GRN APP	GRN ABS	STA LDG	STA ABS	STK LDG	STK ABS	BRT STK	BRT ABS			
88	1	72.9	106	20.7	91.6	191	53	5.2	39.4	100.0	1358	1385	6.7	3.3	78.8	100.0	98.2	1	11.0	93.2	171	74	5.5	36.9	1372	1395	4.7	80.9			
	2	70.4	102	20.4	99.3	200	67	5.2	38.9	100.0	1384	1437	6.9	2.1	76.0	100.0	97.9		11.0	79.4	184	66	5.4	35.8	1407	1481	3.7	100.0			
	LOCS	12	12	12	5	13	13	16	28	9	18	14	10	10	13	4	2		1	6	2	2	8	14	11	12	3	1			
	PROB	.581	.471	.395	.047+	.030+	.000#	.000#	.564	1.00	.010+	.000#	.625	.002#	.291	1.00	.884		.259	.705	.859	.836	.246	.005#	.000#	.423					
89	1	72.9	106	20.7	91.6	191	53	5.2	39.4	100.0	1358	1385	6.7	3.3	78.8	100.0	98.2		11.0	93.2	171	74	5.5	36.9	1372	1395	4.7	80.9			
	2	70.4	102	20.4	99.3	200	67	5.2	38.9	100.0	1384	1437	6.9	2.1	76.0	100.0	97.9		11.0	79.4	184	66	5.4	35.8	1407	1481	3.7	100.0			
	LOCS	12	12	12	5	13	13	16	28	9	18	14	10	10	13	4	2		1	6	2	2	8	14	11	12	3	1			
	PROB	.581	.471	.395	.047+	.030+	.000#	.000#	.564	1.00	.010+	.000#	.625	.002#	.291	1.00	.884		.259	.705	.859	.836	.246	.005#	.000#	.423					
90	1	72.9	106	20.7	91.6	191	53	5.2	39.4	100.0	1358	1385	6.7	3.3	78.8	100.0	98.2		11.0	93.2	171	74	5.5	36.9	1372	1395	4.7	80.9			
	2	70.4	102	20.4	99.3	200	67	5.2	38.9	100.0	1384	1437	6.9	2.1	76.0	100.0	97.9		11.0	79.4	184	66	5.4	35.8	1407	1481	3.7	100.0			
	LOCS	12	12	12	5	13	13	16	28	9	18	14	10	10	13	4	2		1	6	2	2	8	14	11	12	3	1			
	PROB	.581	.471	.395	.047+	.030+	.000#	.000#	.564	1.00	.010+	.000#	.625	.002#	.291	1.00	.884		.259	.705	.859	.836	.246	.005#	.000#	.423					
TOTAL SUM	1	72.9	106	20.0	92.4	187	57	5.4	35.7	100.0	1356	1374	6.7	3.5	78.8	97.3	98.2		11.0	93.2	171	74	5.5	36.9	1372	1395	4.7	80.9			
	2	70.4	102	19.7	88.4	197	69	5.1	35.5	100.0	1378	1433	6.9	2.4	76.0	95.0	97.9		11.0	79.4	184	66	5.4	35.8	1407	1481	3.7	100.0			
	LOCS	12	12	13	11	18	18	33	53	9	41	37	10	14	13	7	2		1	6	2	2	8	14	11	12	3	1			
	DIFF	2.5	4	0.3	4.0	10	12	0.3	0.3	0.0	22	59	0.2	1.1	2.8	2.3	0.3		.259	.705	.859	.836	.246	.005#	.000#	.423					
	PROB	.581	.471	.393	.562	.010+	.008#	.294	.617	1.00	.000#	.000#	.625	.002#	.291	.721	.884		.259	.705	.859	.836	.246	.005#	.000#	.423					

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**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 PHJ89. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHJ89.