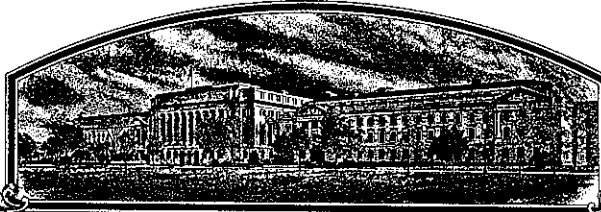


No.

8500200



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Michigan State University

**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. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS SEEDS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS PERMITTED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Hillsdale'

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 31st day of October in the year of our Lord one thousand nine hundred and eighty-eight.



Attest.

Rexsett W. Keane
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

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) Michigan State University		2. TEMPORARY DESIGNATION M0295	3. VARIETY NAME Hillsdale
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) Vice President for Research Michigan State University E. Lansing, MI 48824		5. PHONE (Include area code) (517) 355-0306	FOR OFFICIAL USE ONLY PVPO NUMBER 8500200
6. GENUS AND SPECIES NAME Triticum aestivum	7. FAMILY NAME (Botanical) Gramineae		FILING DATE Aug. 16, 1985 TIME 10:00 <input checked="" type="checkbox"/> A.M. <input type="checkbox"/> P.M.
8. KIND NAME Soft White ^{RED} Winter Wheat	9. DATE OF DETERMINATION 3/15/83		FEES RECEIVED AMOUNT FOR FILING \$1,800 DATE 8/16/85 AMOUNT FOR CERTIFICATE \$200.00 DATE March 28, 1988
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) State University			12. DATE OF INCORPORATION
11. IF INCORPORATED, GIVE STATE OF INCORPORATION			

on per letter dated 8/2/87

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. E. H. Everson, Professor Department of Crop and Soil Sciences, Michigan State University, E. Lansing, MI, 48824
PHONE (Include area code): (517) 355-2231

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

- a. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
- b. Exhibit B, Novelty Statement.
- c. Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)
- d. Exhibit D, Additional Description of Variety.
- e. Exhibit E, Statement of the Basis of Applicant's Ownership.

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

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," give date) No

19. HAS THE VARIETY BEEN RELEASED, 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 Director, AES <i>Robert J. Galt</i>	DATE Aug 8, 1985
SIGNATURE OF APPLICANT HOWARD G. GRIDER Director, Contract & Grant Administration <i>Howard G. Grider</i>	DATE Aug 8, 1985 1

Exhibit A

Hillsdale (P.I.498686) is an F_5 selection made in 1976 from the cross Asosan/Genesee⁴//VA66-54-10. The parentage of VA66-54-10 is Purdue F4126A9-32-2/5/Valart/Frondosa//Vahart/CI12658/3/Asosan/4/Norin 10/Brevor. The parentage of Purdue F4126A9-22-2 is (Kawvale x (39173F₁ = B36162A 13-12-1 x Wabash) x D3932A3-1. B36162A13-12-1 equals 29408A1-16-1-1-2X Ill. No. 1, Sel W38-1; 29408A1-16-1-1-2 equals Fultz-1-1-2 (brown chaff) X Hungarian, CI4830-1; D3932A3-1 equals Trumbull³ X (Hope-Hussar F₂). Selections were made for plant type, powdery mildew, plant height, winterhardiness, post harvest dormancy, milling and baking quality. After each cross, selections with acceptable plant characteristics were tested for yield and quality performance at a number of locations. Only superior lines with high stable performance were used in subsequent crosses.

Concerning Exhibit A, the following information should clarify the selection procedures for all generations of the final cross Asosan/Genesee⁵//VA66-54-10:

- F₁ - Bulk harvest from original crosses
- F₂ - Planted in 12-18 ft. rows and 400 individual plants were selected from a population exhibition winterhardiness on basis of plant type and powdery mildew.
- F₃ - Planted in 400 three ft. headrows and individual headrows selected on basis of plant type, mildew and height characteristics
- F₄ - Seed of selected individual F₃ headrows were planted in four 18 ft. rows at 1/3 the commercial planting rate. Twenty-five heads were harvested from individual plots and selected on basis of winterhardiness, post harvest dormancy and test weight.

- F₅ - Twenty-five, 3 ft. headrows were planted from each of the selected F₄ populations and individual headrows selected on basis of uniformity of plant type, powdery mildew resistance, kernel color and post harvest dormancy. This was the final within line selection.
- F₆ - Single five row, 4 ft. x 18 ft. plots were planted at rate of 120 pound/acre at single location. Lines retained on basis of winterhardiness, uniformity of plant type, kernel color, powdery mildew resistance, test weight, micro milling and baking quality. Interplot selection only.
- F₇ - Preliminary replicated performance trial locations - tested for yield, micro milling and baking quality - interplot selection only.
- F₈ - Advanced replicated yield trials at 8 locations.
- macro-milling and baking quality tests.
- F₉ - Advanced yield trials at 8 locations.
- macro-milling and baking quality tests.
- F₁₀ - Advanced yield trials at 8 locations
- macro-milling and baking quality tests.
- 1000 single headrows planted and 700 were selected as near identical in plant type, powdery mildew resistance, glume and kernel color.
- F₁₁ - 700 phenotypically similar headrows were increased individually in 5.3 sq. m. plots, rechecked for plant type, height, glume color, maturity, kernel color and 650 were harvested and bulked for breeder's seed.

Hillsdale is uniform and stable for the characteristics described and within the limits of the acceptable variants as follow:

1. White seed variant up to .1%
2. Plants contain up to .05% white chaff variant
Plants contain up to .05% brown bearded variant

Exhibit B - Novelty Statement

Hillsdale is a beardless, soft red winter wheat with a tendency to have awnlets on the apical spikelets. It has brown colored glumes at maturity and a medium-large head (14 mm x 11 cm), tapering slightly towards the apex. The soft wheat variety closest in appearance is Frankenmuth which has white seed. The distinguishing characteristics of Hillsdale is its red seed coat, post harvest dormancy and its excellent resistance to powdery mildew, Erysiphe graminis D.C. form sp. tritici E. Marchal. Hillsdale has no Hessian fly resistance whereas Frankenmuth has.

4

REGISTRATION OF HILLSDALE WHEAT

'Hillsdale', (P.I. 498686) a soft red winter wheat (Triticum aestivum L.) (Reg. No. _____) developed at the Michigan State University Agricultural Experiment Station in cooperation with ARS-USDA, was released in 1983. It was tested in Michigan and regionally as B6310 and M0295. It was named for the city of Hillsdale the site of one of the early grist mills in Michigan and a milling center since 1837. Hillsdale was released because of its excellent powdery mildew resistance caused by Erysiphe graminis DC. f.sp. tritici E. Marchal, broad adaptation, excellent agronomic performance, milling and baking quality.

Hillsdale was a F₅ selection made in 1976 from the cross 'Asosan'/'Genesee^{*4}'//VA66-54-10. Dr. T. M. Starling reported that the parentage of VA 66-54-10 is Purdue F4126A9-32-2/5/'Valart'/'Froncosa'/'Vahart/C112658/3/Asosan/4/'Norin 10'/'Brevor'.

Pedigree selections for powdery mildew, height and plant type were made from F₃ and F₅ headrows; winter hardiness and pre-harvest dormancy were evaluated in the F₄ and subsequent generations; selection for milling and baking quality was made from F₅ headrows.

Seed from approximately 700 individual head rows, which were phenotypically similar, were increased in 5.3 sq. m² plots, rechecked for plant type, height, glume color, maturity, kernel color and bulked for breeder's seed.

1 Hillsdale was evaluated in advanced nurseries from 1978 to 1983
2 and in the uniform Eastern Soft Red Winter Wheat Performance Nursery
3 in 1982 and 1983. In 41 nurseries at eight locations in Michigan,
4 Hillsdale exceeded 'Arthur' in yield by 21% and was about the same
5 yield level as 'Augusta' and 'Frankenmuth'. Milling and baking
6 qualities were evaluated from 1978 through 1983. This cultivar has
7 good seed size with kernel test weight similar to the cultivars
8 'Genesee' and Frankenmuth. Hillsdale has good soft wheat milling
9 and baking quality. One of its unique features is strong
10 pre-harvest seed dormancy.

11 Hillsdale is a soft red winter wheat cultivar with apical awns,
12 brown glumes at maturity and a rather large head which tapers
13 slightly. Hillsdale heads at the same time as Augusta and
14 Frankenmuth and 6 days later than Arthur. Hillsdale has averaged
15 1.04 m in height. The cultivar closest in appearance is Frankenmuth
16 which has white seed and is resistant to biotype A and C of Hessian
17 fly.

18 Hillsdale has two genes for resistance to powdery mildew,
19 Erysiphe graminis DC. f.sp. tritici E. Marchal. Hillsdale has no
20 Hessian fly Mayetiola destructor (Say) resistance.

21 Variety protection has been applied for under the Plant Variety
22 Protection Act, Public Law 91-577 in accordance with the certified
23 seed option, which specifies that Hillsdale may be sold only by
24 cultivar name as a class of certified seed. Only two generations

1 from Breeder Seed is permitted. Breeder seed is maintained by the
2 Michigan State University Agricultural Exp. Stn., East Lansing, MI
3 48824.

4
5 R.D. Freed, E.H. Everson, P.K. Zwer, L.W. Morrison, D.J. Glenn, B.L.
6 Marchetti, D.W. Fulbright, J.L. Clayton, and R.L. Clements
7 (2)

8
9 REFERENCES AND NOTES

- 10 1. Starling, T. M. Personal communications with Dr. T. M.
11 Starling, V.P.I., Blacksburg, VA. 24061.
- 12 2. Associate Professor, Professor, Former Research Associate,
13 Field Research Technician, Field Research Technician, Research
14 Technician (USDA), Dept. of Crop and Soil Science; Associate
15 Professor, Research Assistant, Dept. of Botany and Plant
16 Pathology, Michigan State University, East Lansing, MI;
17 Research Chemist, Soft Wheat Quality Lab; ARC-USDA, OARDC,
18 Wooster, OH. We gratefully acknowledge the expert technical
19 assistance of the technical staff of the Soft Wheat Quality
20 Laboratory, ARC-USDA, OARDC, Wooster, Ohio. Registered by the
21 Crop Sci. Soc. Am. Cooperative Investigations of the Michigan
22 State Univ. Agric. Exp. Sta. and ARS-USDA. Paper No. 11236.
23 Mich. Agric. Exp. Sta. Accepted _____.
- 24

11. HEAD:

Density: 1 = LAX 2 = DENSE Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE
4 = OTHER (Specify) _____

Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED
5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

CM. LENGTH MM. WIDTH

12. GLUMES AT MATURITY:

Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.) Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.)
3 = WIDE (CA. 4 mm.)

Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL Cheek: 1 = ROUNDED 2 = ANGULAR

Brush: 1 = SHORT 2 = MEDIUM 3 = LONG Brush: 1 = NOT COLLARED 2 = COLLARED

Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN
4 = BROWN 5 = BLACK

Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

MM. LENGTH MM. WIDTH GM. PER 1000 SEEDS

17. SEED CREASE:

Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'
2 = 80% OR LESS OF KERNEL 'CHRIS'
3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'
2 = 35% OR LESS OF KERNEL 'CHRIS'
3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

STEM RUST (Races) LEAF RUST (Races) STRIPE RUST (Races) LOOSE SMUT

POWDERY MILDEW BUNT OTHER (Specify) _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

SAWFLY APHID (Bydv.) GREEN BUG CEREAL LEAF BEETLE

OTHER (Specify) _____ HESSIAN FLY RACES: GP A B C
 D E F G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Frankenmuth	Seed size	Frankenmuth
Leaf size		Seed shape	Frankenmuth
Leaf color		Coleoptile elongation	Frankenmuth
Leaf carriage	✓	Seedling pigmentation	Frankenmuth

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

- (a) L.W. Briggie and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.
- (b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

ADVANCED NURSERY EVALUATION

FOR SOFT WHEAT MILLING AND BAKING QUALITY

1983 CROP

E. LANSING, MICHIGAN Exhibit D
101 NURSERY

STANDARD = 831284, FRANKENMUTH

LAB NO	ENTRY	MILLING QUAL SCORE	BAKING QUAL SCORE	COMB. QUAL SCORE	MILLAB. SCORE	MICRO TEST WT KG/HL	WHEAT PROT %	PSI %	FLOUR YIELD %	ESI EQUIV %	ASH %	FLOUR PROT %	VISC ADJ MACM	MICRO AWRC %	COOKIE DIAM CM	TOP GR
****	STANDARD	100 A	100 A	100 A	104.7	74	8.7	46.2	71.4	10.9	.42	7.3	62	52	18.1	5
****	BENCHMARK	95.6 B	95.1 B	95.1 B	113.6	78.6	9.6 *	39.20	72.6	9.9	.43	8.4 *	56	52.1	18.7	7
1284 5	M0290 (FRANKENMUTH)	100 A	100 A	100 A	104.7	74	8.7	46.2	71.4	10.9	.42	7.3	62	52	18.1	5
1285 6	M0300 (AUGUSTA)	100.8A	105.9A	100.8A	107	71.60	8.4	47.6	71.7	10.7	.44	6.9	64	50.3	18.2	6
1286 17	M0295 (HILLSDALE)	100.2A	106.4A	100.2A	106.2	74.9	9.1	46.5	71.6	10.7	.41	7.6	32	51.2	18.6	6
1287 18	B7101	97.7 B	107.8A	97.7 B	89.2 *	73.2	8.7	53.7	69.3*	12.80	.44	7.2	68	51.4	18.4	7
1288 19	B7480	102 A	105.8A	102 A	101.8	72.7*	8.1	49.6	71	11.3	.42	6.6	90 *	51.7	18.3	7
1289 20	B7321	101.3A	103.5A	101.3A	107	75.6	9.1	46.9	71.7	10.7	.4	7.9 *	65	51.5	18.5	7
1290 24	C0009	88.8 D	86.9 D	86.9 D	111.4	75.8	11.70	39 0	72.3	10.1	.39	10 0	69	52.9	18.6	7
1291 25	C0072	89.6 D	95.2 B	89.6 D	112.2	67.80	11.30	46.5	72.4	10	.45	9.5 0	67	51.8	18.6	7
1292 26	C1037	95.1 B	97.9 B	95.1 B	114.4	72.4*	10.70	44.3	72.7	9.8	.41	8.9 0	67	50.3	18.6	7
1293 27	C1103	90.4 C	90.4 C	90.4 C	112.2	74.1	10.60	35.70	72.4	10	.38	8.9 0	55	52.2	18.5	6
1294 28	C1138	86.3 D	91	86.3 D	110.7	74.3	11.70	36.20	72.2	10.2	.39	9.8 0	45	51.1	18.9	7
1295 29	C1062	86.9 D	96 B	86.9 D	97.3	76.8	11.90	45.4	70.4	11.8*	.38	10.40	61	50.9	18.9	6
1296 30	C1057	91.9 C	92.1 C	91.9 C	114.4	77	11.50	41 *	72.7	9.8	.39	9.9 0	43	52	18.6	7

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Exhibit E.

The applicant, Michigan State University, employs the breeder, Dr. Everett H. Everson, as a professor of Crop Science in the Agricultural Experiment Station and Department of Crop and Soil Science. Michigan State University, Board of Trustees reserves the ownership rights to plant protection certificates.