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THE UNIVERD STAVIES OF AMERICA

TO ALL TO WHOM THESE: PRESENTS: SHALL COME;;

Northrup, King and Jompany

Wilhereas, 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 APPLI-CANT(S) FOR THE TERM OF Seventeen 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 EX-CLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, R IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT RETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT AT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)



ORCHARDGRASS 'Orbit'

In Lestimony Watercol, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 7th day of December in the year of our Lord one thousand nine

hundred and seventy-seven

(1.76) ONE BASECUT VAL WARET NO SERVICE ONE NO. 40-877 (1.76) PLANT VARIETY PROTECTION OFFICE MELTRULLE WARETY PROTECTION CERTIFICATE ONE NO. 40-877 APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE SPRUCTIONS: See Reverse. FOR OFFICIAL USE ONLY ISTRUCTIONS: See Reverse. Orbit PV NUMBER FOR OFFICIAL USE ONLY Orchardgrass Dactylis glomerata (L.) PV NUMBER TIME 4/100 P. FAMILY NAME (BOTANICAL) S. DATE OF DETERMINATION PLIND OATE PLIND OATE Gramineae Dactylis glomerata (L.) PLIND OATE TIME 4/100 P. NAME OF APPLICANT(S) T. ADDRESS (Streat and No. or R.F.D. No., City, State, and Str. TI PLETENDATE, See Reverse. Northrup, King & Co. P. O. Box 959 Minneapolis, MN 55440 612-781-801 Northrup, King & Co. P. O. Box 959 Minneapolis, MN 55440 10. of INCORPORATE and PORATION ORGANIZATION (Cooporation Minne Sota 1896 1896 * Name and mailing address of applicant representative(s), if any, to serve in this application and receive all pape Allenby L. White Northrup, King & Co. P. O. Box 952 Minneapolis, NN 55440 S. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED: 13. Exhibit A,	ORM GR-470				
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Northrup, King & Co. P. O. Box 959 Minneapolis, MN 55440 A CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED: 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.) 13B. Exhibit B, Novelty Statement. 13C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.) 13D. Exhibit D, Additional Description of the Variety. A 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). (If "Yes," answer 14B and 14C below.) B. Does the applicant(s) specify that this variety be 14C. If "Yes," to 14B, how many generations of production beyon breeder seed? 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. If "Yes," to 14B, how many generations of production beyon 14C. Begister and will be replenished periodically 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 'variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of S tion 42 of the Plant Variety Act. Applican		1	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		* -
P. O. Box 959 Minneapolis, MN 55440 S. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED: X 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.) X 13B. Exhibit B, Novelty Statement. X 13C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.) X 13D. Exhibit D, Additional Description of the Variety. Management of the section of the Variety (Request form from Plant Variety Protection Office.) X 13D. Exhibit D, Additional Description of the Variety. M. 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). (If "Yes," answer 14B and 14C below.) B. Does the applicant(s) specify that seed of this variety be limited as to number of generations? YES NO FOUNDATION REGISTERED CERTIFIED 5. Does the applicant(s) agree to the publication of his/her (their) name(s) and address in the Official Journal? XYES NO 6. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be deposited upon request before issuance a certificate and will be replenished periodically 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 provisions of S tion 42 of the Plant Variety Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties. X YMA (DAYE) 1976 M. MANDER OF APPLICANTI					
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 I3A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.) I3B. Exhibit B, Novelty Statement. I3C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.) I3D. Exhibit D, Additional Description of the Variety. 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). (If "Yes," answer 14B and 14C below.) IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how many generations of production beyon breeder seed? IAC. If "Yes," to 14B, how ma		Northr P. O.	rup, King & Co Box 959		
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	 3. CHECK BOX BELOW FOR EACH ATTI I 13A. Exhibit A, Origin and Ba I 13B. Exhibit B, Novelty State I 13C. Exhibit C, Objective De I 13D. Exhibit D, Additional D 4A. Does the applicant(s) specify that (See Section 83(a). (If "Yes," and 4B. Does the applicant(s) specify that limited as to number of generation 15. Does the applicant(s) agree to the accrificate and will be replenish. The undersigned applicant(s) is variety is distinct, uniform, and tion 42 of the Plant Variety Act. 	Northr P. O. Minnea ACHMENT SUBMITTED: reeding History of the Va- ement. scription of the Variety (Description of the Variety (D	rup, King & Co Box 959 apolis, MN 55 ariety (See Section 5 (Request form from y. c. If "Yes," to 14B, breeder seed? FOUNDATION (their) name(s) and a seed of this variety w dance with such reguns is sexually reproduce ection 41, and is ent	5440 2 of the Plant Variety F Plant Variety Protectio only as a class of certifi YES NO how many generations REGISTERED ddress in the Official Jo ill be deposited upon re lations as may be applic red novel plant variety, itled to protection under protection and result in	n Office.) ed seed? of production beyon CERTIFIED ournal? X YES quest before issuance able. and believe(s) that er the provisions of the penalties.



INSTRUCTIONS

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GENERAL: Send an original copy of the application, exhibits and \$250.00 fee to U.S. Dept. of Agriculture, Agricultural Marketing Service, Grain Division, National Agricultural Library, Beltsville, Maryland 20705. (See Section 180.175 of the regulations and rules of practice.) Retain one copy for your files. All items on the face of the form are selfexplanatory unless noted below.

ITEM

- 5 Give the date the applicant determined that he had a new variety based on (1) the definition in Section 41(a) of the Act and (2) the date a decision was made to increase the seed.
- 13a Give (1), the genealogy, including public and commerical varieties, lines, or clones used, and the breeding method. (2), the details of subsequent stages of selection and multiplication. (3), the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4), evidence of stability.
- 13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties; (1) identify these varieties and state all differences objectively; (2) Attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.
- 13c Fill in the Exhibit C, Objective Description form for all characteristics, for which you have adequate data.
- 13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe; such as; plant habit, plant color, disease resistance, etc.

14A If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may <u>NOT</u> reverse his affirmative decision after the variety has either been sold and so labeled or published or the certificate has been issued. However, if the applicant specifies "NO", he may change his choice. (See Section 180.15 of the Regulations and Rules of Practice.)



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EXHIBIT A

Origin and Breeding History of Orbit Orchardgrass

- 1. Development of Orbit orchardgrass began in 1957 with the establishment of a space-planted nursery containing large numbers of plants of diverse origin. Following a severe winter kill, surviving clones from PI 230116 I were allowed to intercross with other surviving clones within the nursery.
- 2. Seed from these crosses was used to establish a second nursery from which 12 clones were phenotypically selected on the basis of winter hardiness, vigor, maturity and disease reaction. These 12 clones were placed in a polycross nursery in 1966. On the basis of replicated polycross progeny performance (primarily for forage yield) 5 of these clones were eliminated. Polycross seed was produced on the remaining 7 clones, was bulked, and was used to establish a breeder's field.
- 3. Plants in the breeder's field were quite uniform with respect to plant type. Sufficient breeders seed has been produced from this field to last the expected life of the variety. Commercial Orbit seed will be produced the next generation beyond breeder's seed.
- 4. Spaced plantings of breeders and basic seed reveal few variants between these two generations.



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EXHIBIT B

Novelty Statement

Orbit is a medium late maturing variety which is most similar to Sterling orchardgrass but differs from that variety in having shorter, lighter seed, by being about six days later in maturity, by being more winter hardy and by having leaves which are more narrow and upright.

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ADDENDUM

EXHIBIT B

LEAF WIDTH

Variety	Leaf Width (mm)
Orbit	6.2
Boone	8.2
Sterling	7.2
Nordstern	7.1

L.S.D. (05) .09% Disper letter of 11/16 77 C.V. 2.38% & 12/177 Note: Data taken in June, 1977

SEED LENGTH

Variety	Seed Length (mm)
Orbit	4.51
Sterling	6.06
Potomac	5.37
Pennlate	5.07
Latar	5.06
Masshardy	5.08

L.S.D. (05) .15% $\mathcal{O}_{11/21/77}^{4.80\%}$ $\mathcal{O}_{11/21/77}^{4.80\%}$

4

SEED WEIGHT

No statistically significant data available because original samples were not replicated.

FORM GR-470-40 U.S. DEPARTMUNT OF AC (6-77) AGRICULTURAL MARKET GRAIN AND SEED D	TING SERVICE	APPROVED: OMB NO. 40-R371
BELTSVILLE, MARYLA OBJECTIVE DESCRIPTION 'ORCHARDGRA	I OF VARIETY	
NAME OF APPLICANT(S)		
NORTHRUP KING COMPANY	O R B I T	MPORARY DESIGNATION
ADDRESS (Street and No., or R.T.D. No., Gty, State, and ZIP Code)		
P. O. Box 959	PVPO NUMBER	
Minneapolis, MN 55440	760007	0
Place the appropriate number that describes the varietal character of this (e.g. $0 99$ when number is 99). In comparisons to Potomac (standard not apply [e.g. (shorter) (longer)); the value $0 0$ should only be used to decimal point. Characteristics described, including numerical measurement deasured data should be for SPACED PLANTS. Any recognized color freemine plant colors; designate system used: Ranges of values are valuable and may be uncluded with additional description.	i variety) be sure to strike out the b indicate that the varieties are eq- ts, should represent those which an, e.g. Royal Horticultural Colo Give location of test area	e comparative term which does ual. The symbol & indicates a are TYPICAL for the variety, our Chart, may be used to de-
NOTE: FOR SINGLE PLANT DATA A MINIMUM OF 100 PLANTS IS SUGGESTE	ED.	
1. PLOIDY:		······
2 1 = DIPLOID (2N = 14) 2 = TETRAPLOID (2N = 28)	3 = OTHER (Specify)	
2. ADAPTATION (for forage or pasture):		
4 5 - SOUTH CENTRAL 6 - PACIFIC NW.	3 - SOUTHEAST 7 - SOUTHWEST	4 - NORTH CENTRAL 8 - OTHER (Specify)
3. WINTER HARDINESS:		
7 3- TENDER (HALLMARK) 5- INTERMEDIATE (PENNLATE)	7 - HARDY (CHINOOK)	
	ARLY (STERLING) 3-MIL ERY LATE (MASSHARDY) 8 DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER	
4 - LATE (PENNLATE) 5 - VE	BAY LATE (MASSHARDY))
4 LATE (PENNLATE) FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC BEGINNING OF SPRING GROWTH COMPARED TO POTOMAC 5. PLANT HEIGHT (From soil level to top of panicle): 0 9 0 CM. TALL; COMPARED TO POTOMAC 11/2://77 35 P.C letter 11/6/77	ERY LATE (MASSHARDY) B DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER))
4 LATE (PENNLATE) 2 - EA 4 - LATE (PENNLATE) 8 - VE FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC BEGINNING OF SPRING GROWTH COMPARED TO POTOMAC 5. PLANT HEIGHT (From soil level to top of panicle): 0 9 0 CM. TALL: COMPARED TO POTOMAC 11/2/177 as pcc letter 11/6/77 B. PLANT GROWTH TYPE (at maturity):	ERY LATE (MASSHARDY) 8 DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER) 'E (PENNMEAD) 3 - EREC))) CT (BOONE)
4 4-LATE (PENNLATE) 2-EA 4-LATE (PENNLATE) 8-VE FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC 8-VE 8EGINNING OF SPRING GROWTH COMPARED TO POTOMAC 8 5. PLANT HEIGHT (From soil level to top of panicle): 1 0 9 0 CM. TALL; COMPARED TO POTOMAC 1 12:177 as p://letter/life/77 8. PLANT GROWTH TYPE (at maturity): 2 2 TYPE: 1-PROSTRATE (S-143) 2 INTERMEDIAT PLANT WIDTH: DIAMETER ACROSS 2ND YEAR PLANT (TO TIPS OF OP	ERY LATE (MASSHARDY) 8 DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER) 'E (PENNMEAD) 3 - EREC)) CT (BOONE) R COMPARABLE PLANTS AS
4 4-LATE (PENNLATE) 2-EA 4-LATE (PENNLATE) 8-VE FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC 8-VE 8EGINNING OF SPRING GROWTH COMPARED TO POTOMAC 8 5. PLANT HEIGHT (From soil level to top of panicle): 9 0 9 0 CM. TALL: COMPARED TO POTOMAC 11/2:1/77 as p:r letter 11/6/77 8. PLANT GROWTH TYPE (at maturity): 2 1 PROSTRATE (S-143) 2- INTERMEDIAT PLANT WIDTH: DIAMETER ACROSS 2ND YEAR PLANT (TO TIPS OF OP FOR PLANT HEIGHT.	ERY LATE (MASSHARDY) 8 DAYS (EBBELEN) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER))) CT (BOONE) A COMPARABLE PLANTS AS
4 4-LATE (PENNLATE) 2-EA 4-LATE (PENNLATE) 8-VE FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC 8-VE 8EGINNING OF SPRING GROWTH COMPARED TO POTOMAC 8 5. PLANT HEIGHT (From soil level to top of panicle): 9 0 9 6 M. TALL; COMPARED TO POTOMAC 11/2/177 8. PLANT HEIGHT (From soil level to top of panicle): 11/2/177 8. PLANT GROWTH TYPE (at maturity): 2 1 1-PROSTRATE (S-143) 2-INTERMEDIAT PLANT WIDTH: DIAMETER ACROSS 2ND YEAR PLANT (TO TIPS OF OP FOR PLANT HEIGHT. CM. PLANT WIDTH; COMPARED TO POTOMAC 1 EARLY LEAFINESS: 1	ERY LATE (MASSHARDY) 8 DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER) 'E (PENNMEAD) 3 - EREC POSITE PANICLES). USE SAME O CM. (NARROWER) (WIDER)) CT (BOONE) A COMPARABLE PLANTS AS
4 A-LATE (PENNLATE) 2 - EA 4 - LATE (PENNLATE) 8 - VE FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC 8 8EGINNING OF SPRING GROWTH COMPARED TO POTOMAC 9 5. PLANT HEIGHT (From soil level to top of penicle): 9 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 0 9 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ERY LATE (MASSHARDY) 8 DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER) 'E (PENNMEAD) 3 - EREC POSITE PANICLES). USE SAME O CM. (NARROWER) (WIDER)) CT (BOONE) A COMPARABLE PLANTS AS
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4 A = LATE (PENNLATE) 2 = EA FLOWERING DATE (50% BLOOM) COMPARED TO POTOMAC B = VE BEGINNING OF SPRING GROWTH COMPARED TO POTOMAC BEGINNING OF SPRING GROWTH COMPARED TO POTOMAC B PLANT HEIGHT (From soil level to top of panicle): D CM. TALL; COMPARED TO POTOMAC 2 TYPE: 1 = PROSTRATE (S-143) 2 = INTERMEDIAT PLANT WIDTH: DIAMETER ACROSS 2ND YEAR PLANT (TO TIPS OF OP FOR PLANT HEIGHT. CM. PLANT WIDTH; COMPARED TO POTOMAC 2 EARLY LEAFINESS: 1 = PANICLE TILLERS EXSERTED BEFORE BARREN TILLERS NO. PANICLE TILLERS AT MATURITY NO. BARREN TILLERS AT MATURITY	ERY LATE (MASSHARDY) 8 DAYS (EBBERT) (LATER DAYS (EARLIER) (LATER DAYS (EARLIER) (LATER CM. (SHORTER) (TALLER) CM. (NARROWER) (WIDER CM. (NARROWER) (WIDER) 2 - PANICLE AND BARREN THE OTH (HARACTERS))) T (BOONE) A COMPARABLE PLANTS AS) LLERS EXSERTED TOGETHER

08M GR-470 40 (PAGE 2)			16-10)
7. (£AF:)				
1 CUI M LEAF ATTITUDE	(AT EARLY BOOT):	- ERECT (ORBIT)	- DROGING (POTOMAC)	
	ELLOW GREEN (LATAR) LUE GREEN (SUMAS)	2 + GREEN (STERLING)	3 - DARK GREEN (POTO	MAC)
LEAF HAIMINESS (% PLANTS V	WITH EACH SURFACE).		r 	
% GLABROUS	1 0	0 % SLIGHTLY PUBESCE	NT	% PUBESCENT
4. 4 MM. WIDTH GARSE		LEAF); COMPARED TO PO	томас	MM. (NARROWER (WIDER)
	/23/77 (RID9725AF\$2AD58520	WHELAG LEAF); COMPARE		MM. (SHORTER) (LONGER)
PANICLE: (from lowest panicle			······································	· · _ · · · ·
	TH; COMPARED TO POTO	MAC	СМ.	(SHOATER) (LONGER)
3. 1 NO. PRIMARY BRAI	7 3	j · · · ·	ST GLOMERULE (SPIKEL	ET CLUSTER)
4 CAST (SECONDARY CO	LOR) OF PANICLE: 1-	YELLOWISH 2- BROW		OTHER (Specify) rown & Purple
				· · · · · · · · · · · · · · · · · · ·
PANICLE TYPE IN THE TAE BY THE ANGLES FROM THE V				LE TYPE IS DETERMINED
		(A) ANGL	E OF RACHIS TIP (FROM	VERTICAL)
		0 (ERECT)	< 45 [°]	> 45°
	(< 30°)	5 %		
(B) ANGLE OF LOWEST BRANCH (FROM VERTICAL)	(30 [°] - 90)	60 %	10 %	
(, , , , , , , , , , , , , , , , , , ,	(> 90°)	10 %	10 %	5 %
	······································		10 %	<u> </u>
LEMMA (first spikalet of lowes				
LEMMA HAIRINESS (% PLANT				
% GLABROUS	1 0	0 % PUBESCENT		
LEMMA KEEL HAIRINESS (% P	E TOTS WITH EACH SUR	NCE):		
% GLABBOU;;	1 0	0 % CILIATE		
0 7 5 % PLANTS WI	TH NOTCHED LEMMA APE	·		
		^	.0,2 5	MM. DEPTH APICAL NOTCH
1 0 0 % PLANTS WI	TH LEMMA AWNS		1.03	MM, TYPICAL AWN LENGTH
SEED:	· · · · · · · · · · · · · · · · · · ·	·····	······································	
0 .9 3 MM, WIDTH;	COMPARED TO POTOMAC	· · · · · · · · · ·	0 5 MM.	(包容言言会凶遽善)(WIDER)
4 .5 7 MM. LENGTH	; COMPARED TO POTOMA	NC	T 1	(SHORTER) 在主王王王主
8 4 0 MG. PER 1,00	OPURE SEED; COMPARED	TO POTOMAC	And the second s	
DISEASE AND INSECT RESI	STANCE (rate resistance 0-	9, Where 0 = not tested, 1 =	·	O% resistant):
			·,	SMUT (USTILAGO
				TRILEORMIS)
O ANTHRACNOSE (<u>COLI</u> OTHER (Specify)	ETOTRICHUM GRAMINIC	<u>() (()</u>	-	
L	<u></u>		₽°.	6

Голм. 1R-470-40 (PAGE 3)	76-70
11. DISEASE AND INSECT RESISTANCE (Continued)	
RUST AND LEAF SPOTE SPECIFY AS COMPLETELY AS POSSI RESISTANCE OR SUSCEPTIBILITY IS CLAIMED (FIRST BOX), SUSCEPTIBLE TO 100% RESISTANT, RESPECTIVELY,	BLE INCLUDING SPECIES AND RACES WHERE KNOWN, IF GENERALIZED , INCLUDE OR APPEND EXPLANATION. (0 - NOT TI STED 1-9 - 100%
	COMMENTS
5 STEM RUST (PUCCINIA GRAMINIS)	

2

	0	CROWN RUST (P. CORONATA)	
	0	LEAF RUST (P. RUBIGO VERA)	· · · · · · · · · · · · · · · · · · ·
	0	STRIPE RUST (P. GLUMARUM)	
			COMMENTS
	LE/	AF SPOT	
	0	LEAF STREAK (SCOLECOTRICHUM GRAMINIS)	
·~ •	0	LEAF BLOTCH (STAGONOSPORA ARENARIA).	
	0	PURPLE LEAF SPOT (STAGONOSPORA MACULATA)	
	9	SCALD (RHYNCHOSPORIUM ORTHOSPORIUM)	
	0	LEAF SPOT (<u>ASCOCHYTA GRAMINICOLA</u>)	
,	0	LEAF SPOT (MASTIGOSPORIUM RUBICOSUM)	
	0	LEAF SPOT (HELMINTHOSPORIUM SPP.)	
	0	LEAF SPOT (<u>SEPTORIA</u> SPP.)	
		OTHER	

12. INDICATE THE VARIETY THAT MOST CLOSELY RESEMBLES THE APPLICATION VARIETY FOR THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHAHACTER	VARIETY
LEAFINESS	Penlate	SEEDLING VIGÓR	
WINTER HARDINESS	Nordstern	SEED SIZE	
FROST RESISTANCE	· · ·	% LIGNIN	
SUMMER DORMANCY		PERSISTENCE	
HEAT TOLERANCE	······································	TILLERING	

REFERENCES:

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> R. G. STAPLEDON, COCKS(COT GRASS (DACTYLIS GLOMERATAL.) ECOTYPES IN RELATION TO THE BIOTIC FACTORS, JOURNAL OF ECOLOGY 16:71-104 1928.

> P.F. PARKER, GENETIC VARIATION IN DIPLOID DACTYLIS III PANICLE, SPIKELET AND FLORET CHARACTERS. HEREDITY 24:383-405-1969.

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COMMENTS:

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EXHIBIT D

Additional Description of the Variety

I. Seed.

	Seed Length	Seed Width	Notched Lemma Apex	Wt/1000 Seeds 1/			ent Keel of Plan	
Variety	(mm)	(mm)	Percent	(grams)	None	Light	Medium	Heavy
				0.04	•	7	25	70 2
Orbit	4.57	0.93	75	0.84	0	3		6310/25177
Sterling	6.06	0.99	5	1.04	0	13	24	
Potomac	5.37	0.88	13	1.09	0	23	55	22
Pennlate	5.07	0.92	4	0.94	0	17	53	30
Latar	5.06	0.93	25	0.86	0	12	50	38
Masshardy	5,08	0.96	25	1.02	0	0 :::	55	45

1/ Weight of seed after cleaning with air column under constant setting.

Orbit has a shorter seed, lighter seed weight and a higher percentage of seeds with a notched lemma apex than any check varieties. It also has a greater amount of pubescence on the seed keel.

II. Plant.

Variety	Height of Main Foliage Bulk Foliage Height (cm) 1/
Orbit	90
Potomac	101
Sterling	97
Pennlate	107
Latar	107
Masshardy	103

 <u>1</u>/ Height of main foliage of spaced plants at maturity as described on Page 450 of the 1972 Proceedings of the International Seed Trade Association.
 Orbit can, under either sward or space planted conditions and under

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SR 12/7/77

Orbit can, under either sward or space planted/conditions and under most environments, be easily distinguished from other orchardgrasses by the leaves alone which are narrow and tend to be in a more upright or stiff position as opposed to the more lax position of other varieties.

III. Flowering.

Orbit is a medium-late maturing variety with small panicles, of which 70% have three primary branches. Rarely does Orbit have a plant with less than 2 or more than 4 primary branches.



IV. Agronomic Characteristics.

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A. <u>Yield Data - In % of Check</u>.

Varieties	NK Trials 12 Harvest Yrs.	MinnIowa 7 Harvest Yrs.	Ontario, Canada 19 Harvest Yrs.
Orbit	103	100	103
Frode	100		100
Nordstern	111	100	104

NK trials: Washington, Iowa and Stanton, Minnesota, 1969-1975. Minn.-Iowa: Station Trials 1972-1974. Ontario, Canada: Station Trials - 6 locations - 1972-1974.

B. <u>Winter Survival Data</u>.

	State Ex Station			NK Trials
Varieties	N. Dakota <u>1973-74</u>	Iowa 1974	Minn. 1974	Stanton, MN 1972-75 Average
Orbit Sterling	16 4	12	8.5	3.1 5.7
Frode Latar	1 5	41	7.3	4.0
Rideau	5	22	···	· · · · · · · · · · · · · · · · · · ·
	No. of Spaced Plants Surviving Out of 40	Percent Winter Injury	Injury 9 = least 1 = most	Injury 1 = least 9 = most

C. <u>Disease Resistance</u>.

	State Experiment Station Trials		NK Trials		
Varieties	Minn. Rust	Iowa Rust	MN-Iowa Rust	Minn. Scald	Minn. Gen. Leaf Disease
Orbit Sterling	2.3	2.0	3.9 7.1	4.5	2.5 6.5
Frode		4.5	5.2		5.0
Boone Rideau	4.8	3,4	7.0	6.5	5.0
	1 = None 5 = Severe		l = None 9 = Severe		

9 = Severe

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ALLENBY L. WHITE - VICE PRESIDENT RESEARCH & MARKET DEVELOPMENT

TELEX 29-0143 TWX 910-576-3420 PHONE 612-781-8011

September 23, 1977

Mr. Larry W. Dosier Examiner Plant Variety Protection Office Agricultural Marketing Service Grain and Seed Division National Agricultural Library Building Beltsville, Maryland 20705

Subject: Orchardgrass Application No. 7600070, "Orbit"

Dear Mr. Dosier:

This letter is in response to your letters of May 10, July 21 and August 15, 1977.

Objective Description Form

You will find enclosed the completed objective description form for Orbit.

Statistical Verification of Characters

You will find enclosed an addendum to Exhibit B in which the statistical evidence requested in your May 10 letter for the claims for "more narrow leaves" and "shorter, lighter seed" is presented. As indicated on the addendum, we have not provided data on seed weight because we did not replicate our samples when the seed was weighed, so therefore cannot provide a statistical analysis. While we believe that Orbit truly does have smaller and lighter seed than many other orchardgrass varieties, we also find that this character can be environmentally influenced so are inclined to drop this claim for novelty.

Clarification of Terms in Exhibit A

The term "plant type" in Exhibit A was used in the broadest sense to indicate that, in general, overall appearance of the plants were similar in type. In the objective description form, we describe this type as being "intermediate." That is, the plants are not tussocky like those of S.143 or erect, or distinctly "hay types," such as those of Boone. They are, however, uniform "intermediate" types.

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NOTICE: Northrup King Co. warrents that seeds sold have been labeled as required under State and Federal Seed Laws and that they conform to the label description. No liability hereunder shall be asserted unless the buyer or uper reports to the warrentor within a repsonable period after discovery (not to exceed 30 days), any conditions that might leed to a complaint. OUR LIABILITY ON THIS WARRANTY IS LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THE SEEDS. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF.



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We used the term "few variants" in item 4 of Exhibit A to avoid the absolute and to support the phrase, "quite uniform," in item 3. Orbit is, of course, a synthetic variety and, as such, contains a certain range of plant types. We find this range to be very narrow in the case of Orbit, but since we cannot claim that all plants are identical, we felt we should use such adjectives as "few" and "quite" in our application. We do not find "variants" in Orbit if the word "variant" may in this instance be defined as describing plants which are clearly and obviously unlike actual Orbit plants. We can easily see how, in our effort to avoid the absolute, and in our use of the words "few" and "quite" the question of stability would arise, but we hope this commentary on the terms used in Exhibit A provides the necessary assurance.

Pubescence Percentage

Your observation that the figures shown for the keel pubescence for Orbit total only 98 percent is correct. This discrepancy results from the fact that we rounded off the figures. The actual figures were 3.4, 25.8, and 70.8. We should, therefore, have rounded these figures off to 3, 26, and 71, respectively.

Claim for "lax" Leaves

In your letter of August 15, you request more information for the claim for "lax" leaves.

It is true that all orchardgrasses, including Orbit, have lax leaves. However, those of Orbit are less lax than those of Potomac, Pennlate, Latar, Masshardy, Boone, and Nordstern, for example. Sterling, by contrast, is intermediate in this respect. That is, it falls in between the just-named varieties and Orbit in this respect. The lax leaf character of Orbit is most pronounced during the period 10-21 days after cutting. This is a difficult character to analyze statistically, but it is a nonetheless unique characteristic of Orbit.

I believe this answers the questions asked in the earlier-referenced letters, but we shall be happy to provide additional information if needed.

Sincerely,

NORTHRUP KING CO.

Allenby L. White

sam Enclosures

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