THE
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

AND

UTAH AGRICULTURAL EXPERIMENT STATION
UTAH STATE UNIVERSITY
LOGAN, UTAH

AND

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

ANNOUNCE THE RELEASE OF

VAVILOV SIBERIAN CRESTED WHEATGRASS

VAVILOV Siberian crested wheatgrass [*Agropyron fragile* (Roth) Candargy] was named to acknowledge the contribution of the N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russia (VIR) to the germplasm resources of the USDA-ARS range grass breeding program. This institute is celebrating its 100th anniversary in 1994. The parental germplasm for cultivar VAVILOV was derived from accessions originally received from VIR; Stavropol Botanical Garden, Stavropol, Russia; Eskisehir Plant Breeding Station, Eskisehir, Turkey; and selections from the cultivar P-27. The parental accessions were originally selected on the basis of green-color retention and vegetative vigor during the late summer under extreme drought conditions on a range site in Box Elder County, Utah. During the development of the cultivar, the breeding population was screened for three cycles for vegetative vigor; response to drought, diseases and insects; seedling vigor; seed yield; and plant type. Open-pollinated progenies from 14 selected clonal lines in the third breeding cycle were bulked to form Breeder seed.

Seedling vigor of VAVILOV, as indicated by establishment in field trials and seedling emergence from deep seedings, is comparable to the cultivar Hycrest and is consistently better than the check cultivar P-27. It has produced significantly more forage dry matter than P-27 in most evaluation trials. Limited data indicate slightly lower digestibility (IVDMD) than P-27; however, levels of Mg, Ca, and K in the forage indicate that it is less likely to cause grass tetany in grazing animals than P-27. The cultivar produced 450 kilograms of seed per hectare (400 pounds/acre) when grown in rows 1 meter apart on a dryland site that received 35 centimeters (14 inches) of annual precipitation. Supplemental irrigation would increase seed yields about 50 percent. At 100 percent purity, there are approximately 330,000 seeds per kilogram (150,000 seeds per pound).

VAVILOV is a tetraploid (2n=28) and is fully interfertile with cultivars of Standard crested wheatgrass [*Agropyron desertorum* (Fisch. ex Link) Schultes] as well as the cultivar Hycrest. Cytological studies show that Siberian crested wheatgrass shares the same genome ('P') with other diploid (2n=14), tetraploid, and hexaploid (2n=42) forms of the crested wheatgrass complex. Siberian wheatgrass is a perennial bunch grass characterized by linear, narrow, and relatively long spikes. Genetic introgression occurs between the Siberian and Standard forms in nature, and a gradation between the long-narrow

spike of Siberian and the shorter and wider spike of Standard is evident in the VAVILOV breeding population.

In its native habitat, the Siberian form of crested wheatgrass is more drought-resistant than either Standard or Fairway [*Agropyron cristatum* (L.) Gaertner s. lat.] and is better adapted to sandy soils than other crested wheatgrass types. The cultivar VAVILOV is recommended for semiarid range sites receiving from 20 to 45 centimeters (8 to 18 inches) of precipitation annually at altitudes up to 2,100 meters (7,000 feet). When drilled under dryland range conditions, a seeding rate of 8 kilograms per hectare (7 pounds per acre) is recommended.

Breeder, Foundation, and Certified seed classes will be recognized. Breeder seed will be maintained by the USDA-ARS Forage and Range Research Laboratory at Logan, UT. Foundation seed will be produced by the USDA-ARS at Logan and distributed to seed growers by the Utah Crop Improvement Association. Protection has been applied for under the Plant Variety Protection Act of 1970. Conditions of this license specify that seed of the cultivar VAVILOV can be marketed only as a class of certified seed. For information regarding supplies of foundation seed, contact:

Stanford Young
Utah Crop Improvement Association
Plants, Soils, and Biometeorology Department
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Release date for publicity purposes shall be effective on the date of the final signature on the release notice.

APPROVAL SIGNATURES:

JUL 01 1994
Date

Howard J. Bode
Administrator
for Agricultural Research Service,
U. S. Department of Agriculture

May 24, 1994
Date

Director
Utah Agricultural Experiment Station

June 22, 1994
Date

Chief
Soil Conservation Service
U. S. Department of Agriculture

Table 1. Stand establishment, forage yield, moisture content, and forage quality of 25 grasses evaluated at Curlew Grasslands site near Stone, Idaho at 25-30 centimeters (10-12 inches) of annual precipitation.

	Stand				Dry Matter Yield		
	1990	1991	1992	1993	1992	1993	Mean
Entry	Rating				Kilograms/plot		
BBWG Goldar	2.5	1.8	1.0	0.8	0.00	0.00	0.00
Vavilov	7.5	8.0	8.5	8.3	0.30	1.19	0.74
CWG P-27	2.3	2.5	2.5	5.5	0.16	0.88	0.52
CWG Broadleaf X Reg	5.5	6.0	5.5	5.5	0.13	0.69	0.41
CWG Broadleaf	5.3	6.3	5.5	5.5	0.19	0.88	0.53
CWG Ephraim	3.3	4.0	4.3	7.0	0.13	1.01	0.57
CWG Fairway	5.8	6.5	6.8	7.8	0.16	0.88	0.52
CWG Hycrest R89	6.5	7.8	7.8	8.3	0.31	1.07	0.69
CWG Hycrest NLF	7.8	8.0	8.0	9.0	0.33	1.30	0.82
CWG New Hybrid	7.0	7.5	7.0	8.5	0.26	1.15	0.71
CWG Nordan	6.0	7.0	6.8	5.0	0.22	1.05	0.58
CWG R (Iran Turf)	5.5	6.5	6.0	7.3	0.10	1.14	0.62
LC Hybrid	2.0	1.5	1.0	1.0	0.01	0.00	0.01
P. libanotica	2.0	0.5	1.0	0.8	0.00	0.00	0.00
P. nodosum	1.5	1.0	1.0	0.5	0.00	0.00	0.00
Pseudopyron	1.0	0.0	0.3	0.3	0.00	0.00	0.00
RWR Bozoisky	3.8	5.3	4.8	7.0	0.13	0.50	0.31
RWR Cabree	3.3	4.3	4.0	5.0	0.12	0.47	0.29
RWR Syn A	4.8	5.3	5.0	6.0	0.13	0.42	0.28
RWR Vinall	4.5	3.8	3.8	4.8	0.09	0.31	0.20
SL Hybrid	1.8	1.3	1.0	1.0	0.01	0.00	0.01
SRWG Secar	1.3	1.0	1.0	1.0	0.01	0.00	0.01
TSWG T-21076	3.0	2.5	1.0	1.0	0.02	0.00	0.02
WWG Rosana	1.0	0.5	1.0	1.0	0.01	0.00	0.01
WWG Syn	1.3	0.8	1.0	0.8	0.00	0.00	0.00
Mean	3.8	4.0	3.8	4.3	0.11	0.86	0.39
LSD (0.05)	1.4	1.2	1.1	1.5	0.04	0.28	0.14

Table 2. Stand and dry matter yield of 34 grasses at Utah State University Blue Creek Experiment Station (average annual precipitation 36.6 centimeters, 14.4 inches).

	Stand				Dry Matter Yield		
	1990	1991	1992	1993	1991	1993	Mean
	Rating [1/]				Kilograms/Plot		
BBWG Goldar	6.8	4.3	4.0	3.5	1.12	0.54	0.93
CWG P-27	6.3	5.8	6.5	7.0	1.91	1.84	1.87
Vavilov	7.0	7.3	7.5	8.0	1.87	1.86	1.86
CWG 6X-BLR	5.8	5.5	6.0	6.8	1.30	1.67	1.49
CWG 6X-BL	5.8	6.5	6.3	6.5	1.50	1.68	1.59
CWG Ephraim	7.0	8.3	8.3	8.0	1.95	1.75	1.85
CWG Fairway	6.0	8.0	7.5	7.8	2.07	1.61	1.84
CWG Hycrest R89	8.8	9.0	9.0	8.8	2.81	1.89	2.35
CWG Hycrest NLF	8.5	8.8	8.3	8.8	2.61	2.12	2.36
CWG New Hybrid	7.8	8.5	8.0	8.5	2.24	1.82	2.03
CWG Nordan	5.5	7.3	7.3	8.5	2.36	2.00	2.18
CWG R (Iran Turf)	6.8	6.5	6.8	8.0	1.88	1.81	1.84
L. ang. Prairieland	3.5	5.3	4.0	4.0	0.70	1.01	0.86
L. angustus Hybrid	1.8	1.8	1.3	2.0	0.12	0.67	0.39
L. karelinii	3.0	4.5	3.0	2.0	0.56	0.58	0.57
LC Hybrid	6.8	7.0	5.5	4.3	1.56	0.51	1.04
P. nodosum	6.3	6.8	6.3	5.3	1.53	0.62	1.07
RS-1 Hybrid	7.3	5.3	4.8	5.0	1.48	0.88	1.18
RS-Hoffman	6.8	5.8	5.5	6.3	1.75	1.14	1.45
RS-Miles City	7.8	6.3	5.8	7.3	2.05	1.36	1.71
RS-Spic Type	4.5	4.8	3.8	5.3	1.68	1.30	1.49
RS-T Hybrid	7.3	5.0	5.0	7.0	1.74	1.47	1.61
RWR Bozoisky	6.3	7.8	7.8	8.3	1.20	1.05	1.12
RWR Cabree	6.8	7.5	7.0	7.5	0.96	0.80	0.88
RWR Syn-A (2)	6.8	7.3	7.5	8.0	1.24	0.91	1.07
RWR Syn-A (F)	6.3	7.8	7.8	8.3	1.31	0.81	1.06
RWR Tetracan	5.8	7.0	7.0	7.5	0.95	0.92	0.93
RWR Vinall	5.3	6.5	6.5	8.0	0.89	0.78	0.83
SL Hybrid	7.0	6.5	6.5	6.5	1.61	0.78	1.20
SRWG Secar	3.8	3.0	4.3	4.3	0.99	0.60	0.80
TSWG Critana	5.0	6.8	6.0	5.3	1.88	0.75	1.32
TSWG T-21076	5.8	6.8	6.5	6.3	1.78	1.22	1.50
WWG Rosana	3.3	6.5	7.5	8.5	1.37	1.64	1.50
WWG Syn	3.0	5.8	6.8	8.0	1.18	1.49	1.33
MEAN	5.9	6.4	6.2	6.6	1.53	1.25	1.39
LSD (0.05)	1.0	1.0	1.3	1.2	0.41	0.32	0.29

[1/] 1 = worst, 9 = best

Table 3. Stand and dry matter yield of 30 grasses evaluated on semiarid site near Logan, Utah (Deerpens).

Entry	Stand			Dry Matter Yield					
	87	88	92	88	89	90	91	92	Mean
	-Percent-			grams/plot					
AI Hybrid (E86)	94	90	70	1339.3	898.3	639.5	434.8	458.8	754.1
IWG Greenar	74	76	80	1940.9	911.8	657.0	590.8	385.3	897.1
Altai wildrye	33	35	40	408.6	384.8	374.8	428.3	254.5	370.2
BBWG Whitmar	2	2	10	0.0	0.0	0.0	0.0	0.0	0.0
Vavilov	85	83	80	1418.8	1065.0	605.8	507.0	437.5	806.8
CWG Siberian (P-27)	21	43	40	851.3	655.8	544.3	416.8	361.3	565.9
CWG Hycrest (NL86-F)	89	90	70	1055.6	785.0	524.3	383.0	320.5	613.7
CWG Hycrest (2, DP86)	81	86	70	1203.1	993.3	531.5	432.8	335.5	699.2
CWG Hycrest (3, DP86)	73	80	60	1384.7	982.8	579.3	446.0	356.5	749.8
CWG Hycrest (E86)	83	86	70	1316.6	914.0	550.5	446.8	305.8	706.7
CWG Hycrest (DP82)	84	88	80	1180.4	921.8	570.3	420.5	332.8	685.1
CWG Nordan	48	59	50	1112.3	810.3	588.8	383.3	357.3	650.4
CWG Siberian Common	59	64	60	1214.5	825.8	530.8	386.0	415.5	674.5
CWG C6BL (DP)	94	91	60	1316.6	867.8	478.0	430.5	284.3	675.4
L. karelinii	39	71	40	238.4	145.8	236.3	275.5	140.8	207.3
Nodosum	54	74	60	1021.5	391.5	379.8	332.8	238.0	472.7
P. libanotica (86)	80	80	60	556.2	511.8	329.8	476.0	324.8	439.7
RS BC-E	65	79	50	839.9	371.0	312.5	373.3	237.5	426.8
RS Hoffman	38	71	40	828.6	420.0	437.0	416.5	240.8	468.6
RS Hybrid (MC Increase)	75	84	40	953.4	517.5	388.0	419.8	345.8	524.9
RS-1 (E86)	51	73	40	590.2	389.3	345.3	303.8	289.8	383.6
RS-1 (Spic Type)	76	85	60	1066.9	564.3	407.8	423.5	324.8	557.4
RST Hybrid (E85)	68	83	50	839.9	483.0	358.8	309.0	233.5	444.8
RWR Bozoisky (DP86)	60	78	60	885.3	269.3	183.5	218.3	104.5	332.2
RWR Syn-A (F86)	50	60	60	578.9	204.8	164.0	206.8	84.0	247.7
RWR Syn-B (D86)	23	48	50	703.7	418.3	266.0	348.0	148.0	376.8
RWR Vinall	48	55	50	533.5	211.8	200.5	249.3	147.0	268.4
SL Hybrid (E86)	80	84	60	919.4	309.3	265.8	298.3	151.0	388.7
TSWG Critana	55	73	70	749.1	261.0	311.8	273.8	84.0	335.9
Mean	62	72	56	927.7	569.8	403.3	365.9	262.8	505.9
LSD (0.05)	14	10	11	426.6	215.3	131.9	117.7	90.1	148.8

Table 4. Stand and dry matter yield of 15 grasses at Soda Lake, Wyoming.

Entry	Stand 92 Rating[1/]	Stand 93 Rating	Dry Weight (93) g/Plot
BBWG Goldar	6.5	7.8	257.0
CWG Siberian Syn	8.5	7.5	373.8
Vavilov	5.2	6.2	321.5
CWG 6X-BL	6.2	6.2	154.5
CWG 6X-BLR	6.0	6.8	193.0
CWG Hycrest R	7.5	8.2	414.2
CWG New Hybrid	5.0	6.8	244.2
CWG Nordan	6.0	7.8	414.0
CWG Turf (R)	8.0	8.2	207.2
RST Hybrid	3.8	5.0	180.8
RWR Bozoisky	5.5	7.0	230.0
RWR Syn-A (E-91)	7.5	7.5	225.2
SL Hybrid	2.8	4.0	179.8
TSWG Critana	4.8	5.0	154.0
TSWG T21076	6.0	7.5	248.0
Mean	6.0	6.8	253.2
LSD (0.05)	1.8	0.9	72.0

[1/] 1 = worst, 9 = best

Table 5. Stand ratings of perennial grasses seeded in replicated trials at Dugway Proving Grounds, Utah (Burn Site).

Entry	Stand Rating[1/] 1991	1993
CWG 6X-BL	1.9	1.0
CWG 6X-BLR	2.6	3.3
CWG Ephraim	4.4	5.0
CWG Hycrest	6.1	5.5
CWG P-27	1.3	1.5
Vavilov	5.6	6.3
RWR Tetracan	1.0	1.3
RWR Syn-A	3.0	3.8
SL Hybrid	1.4	1.3
SRWG Secar	1.0	1.8
TSWG Hybrid	1.9	1.5
TSWG T-21076	2.5	2.8
Mean	2.7	2.9
LSD (0.05)	1.0	1.4

1 = worst and 9 = best stand

TABLE.6. Emergence from deep seedings and vigor of seedlings of Vavilov breeding population.

Entry	Emergence Rate	Seedling Ht	Seedling Wt
	Seedling Count	centimeters	grams
62-06	10.50	45.50	0.26
09-07	10.49	46.25	0.27
19-06	10.33	43.75	0.26
13-02	9.87	42.00	0.25
12-19	9.85	44.25	0.25
04-12	9.58	44.25	0.26
22-05	9.55	45.50	0.25
36-08	9.42	49.50	0.21
30-02	9.41	44.50	0.23
58-04	9.29	44.25	0.25
52-14	9.20	41.00	0.22
48-17	9.04	44.75	0.25
30-08	8.37	33.00	0.16
39-08	8.23	45.25	0.21
24-13	8.12	37.00	0.23
04-11	8.09	38.25	0.19
43-04	7.89	38.75	0.18
22-18	7.78	30.00	0.16
14-05	7.71	41.50	0.19
44-15	7.67	34.75	0.17
46-03	7.65	36.50	0.17
59-13	7.58	35.50	0.17
61-05	7.55	41.50	0.20
40-15	7.46	37.00	0.16
51-09	7.45	44.25	0.19
61-16	7.26	35.75	0.15
08-03	7.16	33.50	0.16
20-18	7.03	40.00	0.19
23-11	6.97	35.00	0.13
20-15	6.85	34.00	0.15
06-13	6.73	43.25	0.17
08-11	6.58	34.50	0.18
24-02	6.57	35.00	0.16
32-12	6.40	41.50	0.17
06-15	6.36	25.50	0.08
41-09	6.33	30.25	0.16
48-10	6.28	28.25	0.13
61-01	6.04	27.25	0.13
59-15	6.01	32.50	0.10
05-05	5.88	39.50	0.11
40-04	5.86	27.75	0.10
06-08	5.76	35.00	0.14

16-01	5.75	31.75	0.13
33-18	5.71	31.75	0.14
62-08	5.57	29.50	0.09
04-16	5.57	33.75	0.12
17-17	5.00	33.25	0.10
53-18	4.91	28.50	0.10
09-04	4.90	29.25	0.10
35-05	4.86	25.00	0.10
05-02	4.81	32.75	0.09
29-13	4.71	29.00	0.08
18-03	4.61	37.00	0.07
04-02	4.47	24.00	0.09
04-14	4.45	24.00	0.07
50-11	3.98	25.25	0.08
08-17	3.89	30.25	0.09
52-05	3.67	22.75	0.05
18-19	3.44	29.50	0.08
15-14	3.24	22.25	0.06
22-13	3.23	27.25	0.07
55-11	3.03	19.75	0.05
28-17	2.94	26.25	0.05
56-14	2.76	15.75	0.05
43-10	2.72	19.75	0.04
47-01	2.45	26.50	0.04
14-12	2.37	16.00	0.02
34-10	2.01	14.25	0.03
21-09	1.97	25.00	0.04
29-05	1.92	17.00	0.03
13-16	1.13	20.50	0.03
Hycrest-88	5.17	32.25	0.12
Hycrest-89	9.95	53.25	0.31
Mean	6.21	33.43	0.14
LSD (0.05)	2.20	11.40	0.05