

[54] BLUEGRASS PLANT
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[58] Field of Search Plt./88

Primary Examiner—Robert E. Bagwill

[57] ABSTRACT
A Kentucky bluegrass plant which exhibits an attractive dark green color, rather narrow leaves and low rhizomatous growth habit and high density of shoots. It has a very large seed size and shows good resistance to Helminthosporium leaf spot, Mildew and Stripe smut diseases.

3 Drawing Figures

1

BACKGROUND OF THE INVENTION

This invention relates to a new and distinct variety of bluegrass plant, the novel characteristics of which reside particularly in its very attractive dark green color, which is maintained well throughout the growing season, a rather narrow leaf blade, large seed size and good resistance to common turf diseases, particularly leaf spot, stripe smut and mildew.

This new variety was discovered in plant material collected at the Lidingo Golf Course, Sweden. Selections within the plant material have been made towards a plant with dark green color, rather narrow leaves and good resistance to Helminthosporium. This plant was reproduced asexually by vegetative reproduction. After growth in a greenhouse, the vegetatively reproduced plants were transferred to field nurseries for increase and subsequent turf evaluation. Progeny tests were conducted and showed that the plant could be reproduced asexually by means of disseminules. The plant was thereafter identified as WK 411 bluegrass.

WK 411 exhibits a unique combination of characteristics which distinguishes it from all other varieties of which applicant is aware. Of special moment is its attractive dark green color in combination with narrow leaves and excellent resistance to stripe smut disease caused by the fungus *Ustilago striiformis*. The new variety exhibits good to excellent resistance to powdery mildew disease caused by the fungus *Erysiphe graminis* and to leaf spot caused by the fungus *Helminthosporium vagans*. WK 411 Kentucky bluegrass greens up early in the spring and maintains an attractive dark green color throughout the growing season. The variety is highly apomictic and has a turf-type growth habit tolerant to moderately close mowing.

A primary object of the invention is to provide a new and distinct bluegrass plant having the desirable characteristics referred to above and to be described in detail below.

Other objects and advantages of the invention will become more fully apparent from the following detailed description when taken in conjunction with the accompanying illustrations in which:

FIG. 1 shows a plant of the new variety approximately 4 weeks before the flowering stage.

FIG. 2 shows a plant of the new variety about 2 weeks after the completion of the flowering stage.

2

FIG. 3 shows a panicle of the new variety about 2 weeks after completion of the flowering stage.

PLANT DESCRIPTION

WK 411 bluegrass (*Poa pratensis*) is a perennial with creeping rhizomes, forming a dense, moderately low-growing compact turf. The variety possesses the following unique combination of characteristics:

1. Very good resistance to the stripe smut disease caused by the fungus *Ustilago striiformis*.
2. Good resistance to the leaf spot disease caused by the fungus *Helminthosporium vagans*.
3. Good resistance to powdery mildew caused by the fungus *Erysiphe graminis*.
4. Very good cold tolerance and winter survival.
5. An attractive dark green color during the entire growing season from early spring to late fall.
6. A narrow leaf blade, which makes WK 411 compatible with fine-leaved grasses, e.g., red fescue in mixtures.
7. Good rhizome and tiller development, forming a turf of superior density and good spreading ability.
8. Prostrate growth habit allowing close mowing.
9. Very good turf performance.
10. Very large seed, thousand kernel weight 0.45 g.

Morphological Description

The plants of the new variety described below were grown in South Sweden, lat. 56° N.

Roots: Rhizomes of medium length, average 52 mm., see Table 1, below:

Table 1

Variety	Rhizome Development in 3-month Old Kentucky Bluegrass Plants (South Sweden)		
	No. of rhizomes Average per plant	Total length in mm. of rhizomes Average per plant	Length in average per rhizome, mm.
Merion	2.4	79	33
WK 411	2.9	151	52
Sydsport	2.7	168	62

Leaves: Flag leaf is relatively short, dark green with blades 4–5 mm. wide and 47–67 mm. long. WK 411 has weak anthocyanin coloring of the leaf sheath in the young stage. Leaf sheath base is keeled, glabrous and glaucous. The ligule is of medium size, slightly pointed and is hairy.

Straw: Of medium length, plant height 65–70 cm.

Panicle: Pyramidal with main axis erect and top slightly drooping. Side axis at the bottom are horizontal. Panicle length 120-130 mm. Panicle slightly anthocyan colored. Lemmas are glabrous with indistinct intermediate nerves and scant basal webbing. The keel and lateral nerves are slightly pubescent. For further floret characteristics, see Table 2, below:

Table 2

Floret Characteristics of WK 411 Bluegrass (Oregon Grown)		
Character	Description	
1. Intermediate nerves on lemma	Indistinct	
2. Lemma color	Light straw color to uniform brown, lighter seeds often with dark spot near base.	
3. Lemma margins and apex	Apex semi-flared from sharp keel-tapered to medium point in side view. Wide hyaline margins especially in basal florets. Margins tend to enclose palea in middle and terminal florets.	
4. Lemma texture	Finely granular	
5. In lateral plane - floret shape plus thickness or plumpness	Lemma evenly arched. Mass of seed greatest about middle.	
6. Palea	Finely granular, coarse teeth extending to near apex.	
7. Length	2.4 to 3.5 mm. (average 2.9 mm.).	
8. Width	0.6 to 0.8 mm. (average 0.7 mm.).	

Seed: Very large seeded, average length 3.0 mm. and width 0.7 mm., see Table 3, below. WK 411 contains about 1,008,000 seeds per pound (0.450 grams per 1000 seeds) compared with Merion bluegrass, which is said to contain 2,100,000 seeds per pound.

Table 3

Seed Measurements South Sweden 1971-73		
Variety	Seed Length, mm.	Seed Width, mm.
WK 411	3.03	0.72
Fylking	2.80	0.73
Merion	2.31	0.74
Windsor	2.20	0.59
Nugget	3.33	0.77

For morphological comparisons see Table 4, below:

Table 4.

Planted 1971	Plant height, mm		Flag leaf length, mm		Flag leaf width, mm		Panicle length, mm
Variety	12 . 6 . 73		4 . 6 . 73		4 . 6 . 73		12 . 6 . 73
WK 411	695		66.5		5.2		130.7
Baron	619		36.5		5.0		82.8
Fylking	720		65.8		4.8		123.9
Newport	868		80.3		4.7		129.7
Nugget	500		49.5		4.7		71.8
Merion	828		87.8		5.5		120.3
Primo	841		55.8		4.6		119.9
Planted 1973	Ear emergence		Flowering		Plant height, mm		Panicle length, mm
Variety	1974	1975	1974	1975	1-7-74	3-7-75	3-7-75
WK411	15.5	23.5	4.6	10.6	654	714	131.6
Belturf	15.5	20.5	8.6	13.6	688	770	118.8
Adelphi	13.5	20.5	5.6	13.6	548	833	114.5

Turf Performance

Turf performance and spring color ratings for WK 411 and other Kentucky bluegrasses for the years 1969-1973 at New Brunswick, New Jersey, are presented in Table 5, below:

Table 5.

Variety	Turf Quality Ratings 9 = Best					Spring Color 9 = Best
	1969	1970	1971	1972	1973	April 10, 1972
5 Majestic	7.9	7.9	6.8	6.5	6.8	8.0
WK-411	6.8	6.8	6.3	6.1	6.6	5.7
Fylking	7.3	7.2	6.7	6.9	6.5	5.0
Belturf	6.8	7.1	6.3	5.3	6.3	5.0
Pennstar	7.2	7.0	6.5	6.8	6.2	5.0
Nugget	8.1	6.9	6.5	4.9	5.2	1.0
Windsor	4.5	4.5	4.7	4.2	4.8	4.7
10 Merion	6.6	6.9	4.7	3.2	3.34	3.3
Primo	5.6	4.3	3.8	2.9	2.9	2.7
Park	4.7	3.9	3.6	2.9	2.3	5.3
Delta	2.9	2.5	2.5	2.1	1.7	4.0
S. Dak. Cert.	3.4	2.7	2.4	1.9	1.6	3.0

Turf quality ratings for WK 411 and other Kentucky bluegrasses for the years 1969-1971 at Rhode Island are presented in Table 6, below:

Table 6.

NE-57 Regional Project Location: Area I — Sec.B. South KENTUCKY BLUEGRASS VARIETY EVALUATION University of Rhode Island Mowing Height 3/4" Low					
TURF QUALITY 9= Ideal Turf 1= Bare Ground					
NO.		1969	1970	1971	AVERAGE
52	Baron	7.8	7.2	7.1	7.37 abc
16	Merion	7.7	7.1	7.1	7.30 a-e
20	WK 411	7.4	7.0	7.2	7.23 a-e
7	Nugget	7.2	6.6	7.6	7.13 a-f
26	Belturf	7.9	6.5	6.5	6.97 a-g
10	Pennstar	7.7	6.5	6.5	6.90 a-g
15	Fylking	7.8	6.3	6.5	6.87 a-g
24	Primo	7.3	5.6	5.6	6.17 e-i
3	Windsor	5.9	5.8	6.4	6.03 f-i
12	Park	5.9	3.3	4.7	4.63 k-l
17	Delta	5.7	3.2	4.6	4.50 l

Values followed by the same letter are not significantly different at the 5% level using Duncan's multiple range test.

Color ratings for WK 411 and other Kentucky bluegrasses for the years 1969-1973 at the University of Maryland are shown in Table 7, below:

Table 7.

1973 Kentucky Bluegrass Data University of Maryland Hopkins Research Farm 1.5" Mowing Height Color Ratings (0-9) 9= Dark Green 0= Bleach Tan						
Variety	1969	1970	1971	1972	1973	Color Average
Windsor	6.26	4.58	5.80	6.21	5.99	5.76
Nugget	6.92	4.20	6.09	5.92	6.83	5.89
Pennstar	7.14	4.54	5.92	6.59	6.77	6.19

Table 7.-continued

1973 Kentucky Bluegrass Data University of Maryland Hopkins Research Farm 1.5" Mowing Height Color Ratings (0-9) 9= Dark Green 0= Bleach Tan						
Variety	1969	1970	1971	1972	1973	Color Average
Park	6.26	4.58	5.05	5.83	5.72	5.48
Fylking	7.14	4.95	6.40	6.63	6.88	6.40
Merion	6.54	4.45	6.44	6.58	6.83	6.17
Delta	5.88	4.46	5.09	5.75	6.85	5.60
WK-411	7.06	4.87	6.74	6.39	7.16	6.44
Primo	6.34	4.25	5.65	6.88	6.44	5.91
Belturf	6.74	4.54	6.09	6.29	6.16	5.96

Density ratings for WK 411 and other Kentucky bluegrasses for the years 1969-1973 are shown in Table 8, below:

Table 8.

1973 Kentucky Bluegrass Data University of Maryland 1968 Hopkins Farm 1.5% Mowing Height Turf Density (0-9) 9= Maximum Density 0= Bare Ground						
Variety	1969	1970	1971	1972/1973	Density Average	
Windsor	7.18	7.58	6.35	6.25	6.26	6.72
Nugget	6.70	6.45	4.59	5.83	5.86	5.88
Pennstar	6.95	7.37	6.28	6.37	6.39	6.67
Park	7.24	7.04	6.14	5.08	5.39	6.17
Fylking	7.32	7.58	6.46	6.38	6.26	6.80
Merion	7.24	7.58	6.77	7.13	7.13	7.11
Delta	6.18	5.66	4.16	5.17	5.19	5.27
WK-411	6.95	7.50	7.00	7.21	7.33	7.19
Primo	6.57	7.33	6.82	6.46	6.06	6.64
Belturf	7.14	7.66	6.40	5.71	5.73	6.53

As can be seen in Tables 5 and 6, WK 411 has shown consistently high turf performance. Table 7 shows that WK 411 has a very attractive dark green color, and the variety stays green from early spring (Table 5) to late fall. Table 8 indicates that WK 411 forms a very dense and good turf.

Disease Resistance

Disease resistance ratings for WK 411 and other Kentucky bluegrasses at New Brunswick, N.J. in 1972 are demonstrated in Table 9, below:

Table 9.

Regional Bluegrass Variety Test Established September 1968, at Rutgers University, New Brunswick, New Jersey.			
Variety	Leaf Spot Percent Disease		Stripe Smut Infected Tillers/ft. ²
	Apr. 10 1972	June 5 1972	May 10 1972
Majestic	7	7	30
WK-411	23	12	2
Fylking	8	7	20
Belturf	27	33	26
Pennstar	10	8	14
Nugget	3	2	4
Windsor	33	72	273
Merion	68	33	433
Primo	88	83	213
Park	65	95	11
Delta	85	89	69
S. Dak. Cert.	92	95	4

The figures indicate that WK 411 has a very good resistance to leaf spot caused by the fungus *Helminthosporium vagans* and to stripe smut caused by the fungus *Ustilago striiformis*.

Reproduction and Propagation

Asexual reproduction of the new variety by disseminules (modified caryopses produced by agamospermy) has consistently produced progeny indistinguishable from the mother plant.

What is claimed is:

1. A new and distinct variety of Kentucky bluegrass plant, substantially as described and illustrated, characterized particularly by very good turf performance, very attractive dark green color, good rhizome and tiller development, very large seed and good resistance to leaf spot and stripe smut.

* * * * *



FIG. 1

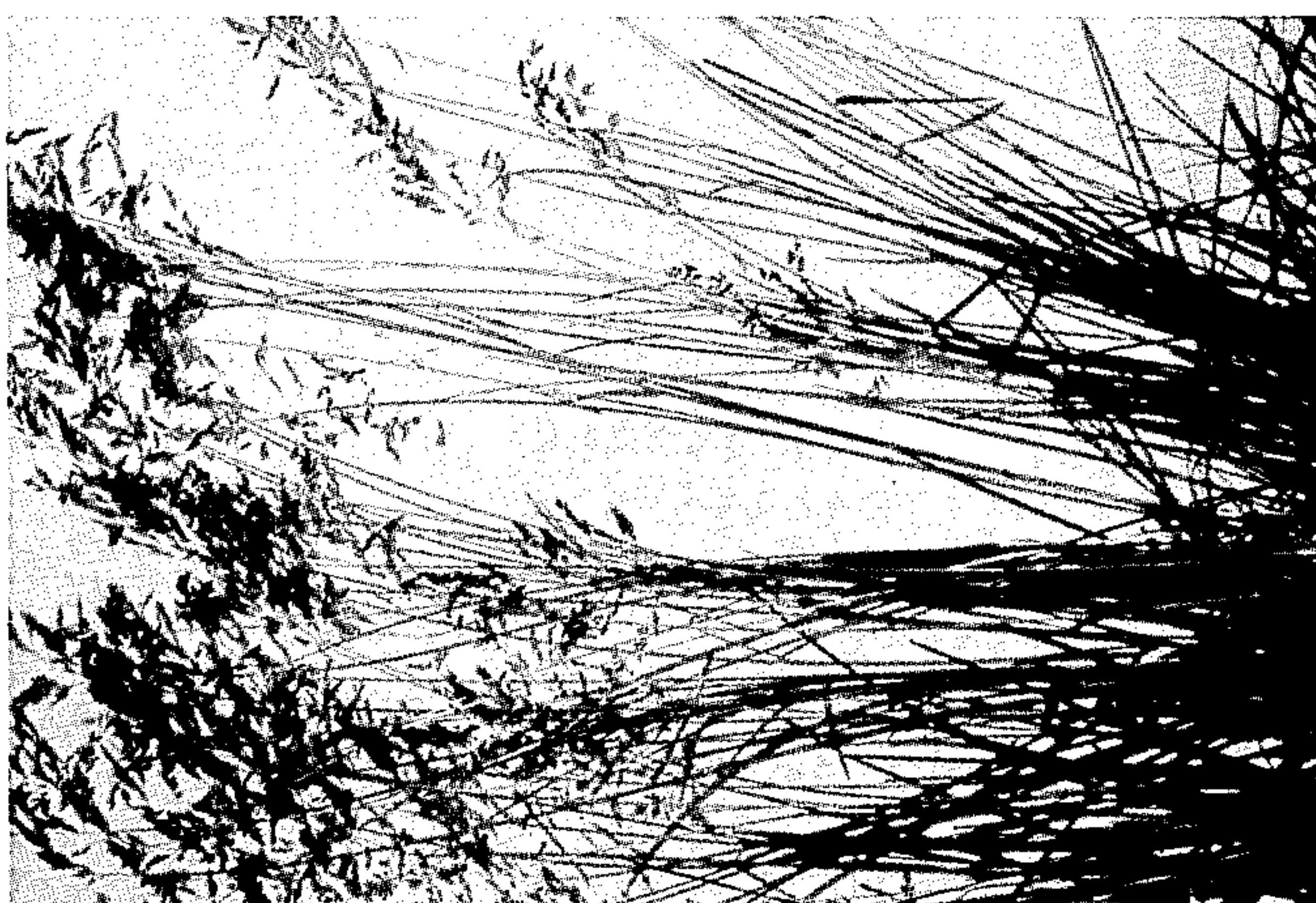


FIG. 2

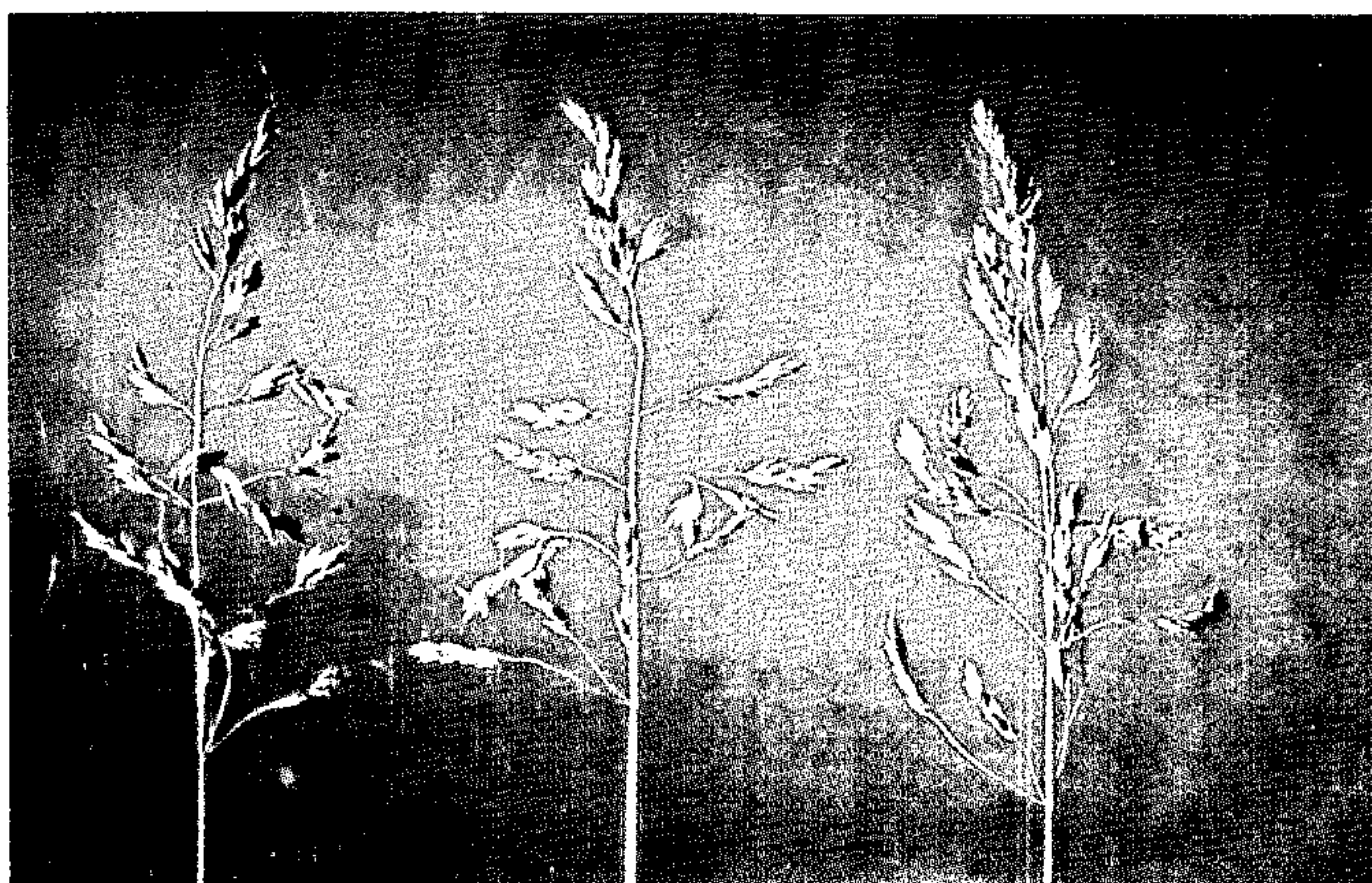


FIG. 3

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : Plant Patent No. 4165
DATED : December 13, 1977
INVENTOR(S) : Bjarne Johan Langvad

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, between lines 45 and 46, insert Table 4 heading as follows:

-- Morphological Comparisons and Observations
in WK 411 and Other Kentucky Bluegrasses
(South Sweden) --.

Column 4, between lines 1 and 2, insert Table 5 heading as follows:

-- Regional Bluegrass Variety Test Established
September 1968 at Rutgers University, New
Brunswick, New Jersey --.

Column 4, line 30, in Table 6 column headings, insert
-- NO. -- as first column heading; in second column
heading, delete "NO." and replace with -- SELECTION --.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : Plant Patent No. 4165
DATED : December 13, 1977
INVENTOR(S) : Bjarne Johan Langvad

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 39, delete "leve" and replace with -- level --.

Column 5, line 32, in Column 5 of Table 8, delete "7.13" and replace with -- 6.87 --.

Column 6, line 17, in Column 4 of Table 9, delete "4" and replace with -- 6 --.

Signed and Sealed this

Sixth Day of June 1978

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

DONALD W. BANNER
Commissioner of Patents and Trademarks