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[54] **ZOYSIAGRASS PLANT NAMED 'CROWNE'**

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[51] **Int. Cl.**[7] **A01H 5/00**

[52] **U.S. Cl.** **Plt./390**

[58] **Field of Search** Plt./390, 388

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[57] **ABSTRACT**

An asexually reproduced variety of perennial *Zoysia japonica* with a unique combination of characters including white stigmas, anthers which are 5.0 RP ¾, and a distinct DNA fingerprint.

2 Drawing Sheets

1

BRIEF SUMMARY OF THE INVENTION

The present invention relates to a new and distinct asexually reproduced variety of perennial zoysiagrass (*Zoysia japonica*).

2

BACKGROUND OF THE INVENTION

This invention relates to a new and distinct perennial zoysiagrass cultivar identified as 'Crowne' zoysiagrass (herein referred to as 'Crowne'), that was tested asDALZ8512. 'Crowne', a *Zoysia japonica*, is a chance hybrid of the maternal close 'Z20' (unpatented), obtained from Beltsville, MD in 1981, with an unknown pollen source from a zoysiagrass germplasm field nursery at TAES—Dallas. 'Crowne' has been vegetatively propagated by stolons and rhizomes in Dallas, Tex., and is uniform in growth expression through successive generations.

For purposes of registration under the "International Convention for the Protection of New Varieties of Plants" (generally known by its French acronym as the UPOV Convention) and noting Section 1612 of the Manual of Plant Examination Procedures, the new variety of zoysiagrass of the present invention is named 'Crowne'.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a photograph of the leaf blade and ligule of 'Crowne'.

FIG. **2** is a DNA fingerprint of 'Crowne' in contrast to 'Meyer' (unpatented) zoysiagrass.

DETAILED DESCRIPTION OF THE PLANT

'Crowne' was characterized in greenhouse and field conditions. 'Crowne' is a unique variety of zoysiagrass developed as described above. 'Crowne' was identified as being unique and desirable and was then propagated by cutting of stolons and rhizomes, rooting them in soil, and planting of the rooted material to provide planting stock for studying performance and for comparison of morphological characters after propagation. 'Crowne' has been propagated by sod, plugs, sprigs, stolons and rhizomes in greenhouse and field studies by hand and mechanical propagation in Dallas, Tex. All distinguishing and defining characteristics are reliably reproduced in stable and firmly fixed form by such means through succeeding generations. Seed reproduction with self-fertility is not common in the Zoysia sp. No seedling establishment from 'Crowne' has been noticed in either greenhouse or field studies.

'Crowne' spreads by stolons and rhizomes. It has an intermediate to rapid establishment rate and has low water use requirements. When sprig (stolons) or plug plantings are made in early May, the area should achieve 50–60% average in Dallas, Tex. in 90–120 days, with complete coverage in 190–210 days, in comparison to 'Meyer' zoysiagrass which will require 360–400 days for full coverage. The stolons of 'Crowne' have a mean internode length of 17.7 mm between the second and third nodes, with a mean internode width of 0.9 mm and node diameter of 1.1; internode length between the fourth to fifth internode was 12.0 mm with a stolon width of 1.8 mm (Tables 1,2). This creates a proportionally short-thick internode unique to 'Crowne'. The stolons of 'Crowne' root adventitiously at the nodes. Color notations of plant tissues were based on the Munsell *Color Charts for Plant Tissues*, Munsell Color, Baltimore, Md., 1977. Light quality, photoperiod, and general growth of the plants affect color notations. The internode stolon color of 'Crowne' stolons exposed to full sun is 10R 3/2.

Leaf blades of 'Crowne' are rolled in the bud and are flat and stiff. The leaf blade length of 'Crowne' is from 72.7 to 126.6 mm and 2.96 to 3.23 mm in width (Tables 3,4). The leaf sheath of 'Crowne' is distinct from 'Meyer' (Table 5). The hairs on the abaxial leaf surface of 'Crowne' are sparse in number and are approximately 0.9 mm long. Measured under greenhouse conditions in January 1996, the genetic, adaxial leaf color of 'Crowne' is 2.5G 4/4 with 'El Toro' (U.S. Plant Pat. No. 5,845) having a leaf color of 2.5GY 5/2, and 'Meyer' having a color of 2.5G 3/4. The ligule of 'Crowne' is a fringe of silky hairs, approximately 2.5 mm in length for the longest hairs.

Thatch development is a function of age of stand, types of soils and other environmental and cultural conditions. Thatch development was determined in 3 year old field plantings comparing eight commercially available cultivars. 'Emerald', 'Miyako' (U.S. Plant Pat. No. 10,187) and 'Zeon' (unpatented) produced the greatest depth of thatch (26.3 mm); 'Crowne', 'Palisades' and 'De Anza' produced an intermediate amount of thatch (25, 23 and 23 mm, respectively), and 'Cavalier' (U.S. Plant Pat. No. 10,778) and 'Meyer' produced the least amount of thatch (20 and 19 mm, respectively).

'Crowne' has 5.0 RP 3/4 colored anthers and white colored stigmas, undistinguished in shade of color. The inflorescence of 'Crowne' is a terminal spike-like raceme, with spikelets on short pedicels. 'Crowne' has a mean length floral region of 23.1 mm with a mean of 25.3 florets per raceme.

The chromosome number of 'Crowne' is 40.

When 'Crowne' was compared with 59 other zoysiagrasses for salinity tolerance, it ranked number 33 in performance and was superior to 'Meyer' (Table 6). When compared to other commercial varieties for root growth, 'Crowne' was not different from 'El Toro' or 'Meyer' in average root depth, root weight, or clipping weights (Table 7).

'Crowne' was entered in the National Turfgrass Evaluation Program (NTEP). 'Crowne' in the National Turfgrass Evaluation Program Zoysiagrass Trial for the years 1992, 1993, and 1994 had mean quality ratings of 5.8, 5.8, and 5.5 for overall quality (Table 8).

'Crowne' shows intermediate resistance to the zoysiagrass mite (Table 9). The varieties 'Meyer', 'Belair' (unpatented), and most experimental zoysiagrasses are very susceptible to the mite. This mite has been found in Maryland, Texas, Florida, and all extensive zones of use for zoysiagrasses.

'Crowne' is distinguished from other zoysiagrass by its coarse texture, thick stolons, and intermediate to good stolon and rhizome production. It has moderate to good shade tolerance and low water use needs and is highly competitive under natural environmental conditions typical of north central Texas. 'Crowne' is intermediate to superior in its average growth rate and has good to excellent winter hardiness and will persist in regions north to Kansas, Missouri and Illinois.

TABLE 1

Internode length as measured between the second and third nodes, internode diameter of the third internode, and node diameter of the third node measured on zoysiagrass plants. Plants were growing in a growth chamber with a 14-hr daylength, March 1995.

Genotype	Internode length mm	Internode diameter mm	Node diameter mm
'Crowne'	17.7 a*	0.9 abc	1.1 bc
'Cavalier'	18.4 a	1.4 abc	1.4 abc
'Meyer'	24.1 a	2.0 a	2.0 a
'Palisades' (United	29.9 a	1.0 a	1.7 ab

TABLE 1-continued

Internode length as measured between the second and third nodes, internode diameter of the third internode, and node diameter of the third node measured on zoysiagrass plants. Plants were growing in a growth chamber with a 14-hr daylength, March 1995.

Genotype	Internode length mm	Internode diameter mm	Node diameter mm
States Plant Patent Application Serial Number 09/078,184)			
'El Toro'	39.8 a	1.4 abc	1.4 abc-

*Analysis of variance by General Linear Models, with means followed by the same letter not significantly different using Tukey's Studentized Range (HSD), alpha = 0.05. Only selected means presented.

TABLE 2

Zoysiagrass internode lengths and stolon width measurements from the fourth to the fifth nodes taken February 1988 on greenhouse grown plants.

Genotype	Internode length mm	Stolon width mm
'Emerald' (unpatented)	6.2 e*	1.0 ghi
'Crowne'	12.0 b–e	1.8 a
'Palisades'	12.3 b–e	1.6 b
'Meyer'	16.5 bc	1.5 b
'Cavalier'	16.7 bc	1.1 efg

*Means followed by the same letter are not significantly different using the Waller-Duncan k ratio test (k ratio = 100). Only selected means presented.

TABLE 3

Leaf blade width and length measured on the third youngest leaf of zoysiagrass. Plants were growing in a growth chamber with a 14-hr daylength, March 1995.

Genotype	Blade width mm	Blade length mm
'Cavalier'	1.3 d*	60.7 cd
'Meyer'	2.6 c	74.3 bc
'Crowne'	3.0 abc	72.7 bc
'El Toro'	3.3 abc	68.3 bcd
'Palisades'	3.4 ab	75.6 bc

*Analysis of variance by General Linear Models, with means followed by the same letter not significantly different using Tukey's Studentized Range (HSD), alpha = 0.05. Only selected means presented.

TABLE 4

Zoysiagrass leaf measurements taken February 1988 on the fourth youngest leaf from greenhouse grown plants.

Genotype	Blade width mm	Blade length mm
'Cavalier'	1.8 ij*	58.9 e
'Emerald'	2.0 fgh	30.6 f
'Crowne'	3.2 b	126.6 b
'Palisades'	3.4 b	101.1 c
'Meyer'	3.3 b	82.3 d

*Means followed by the same letter are not significantly different using the Waller-Duncan k ratio test (k ratio = 100). Only selected means presented.

TABLE 5

Zoysiagrass leaf sheath length measurements taken February 1988 on the fourth youngest leaf from greenhouse grown plants.

Genotype	Sheath length mm
'Emerald'	16.3 ij
'Cavalier'	28.9 ef
'Meyer'	30.7 cd
'Crowne'	42.9 b*
'Palisades'	51.25 a

*Means followed by the same letter are not significantly different using the Waller-Duncan k ratio test (k ratio = 100). Only selected means presented.

TABLE 6*

Average percent shoot salt injury (average of 20 rating dates) on zoysiagrass entries in the 1991 NTEP† Trials.

Entry	Source	Species‡	% Injury
'Diamond' (U.S. Plant Patent No. 10,636)	NTEP 20	matrella	33 ab£
'El Toro'	NTEP 13	japonica	38 a–e
'Emerald'	NTEP 10	jap x tenu	42 a–h
'Cavalier'	NTEP 17	matrella	42 a–h
'Crowne'	NTEP	japonica	46 e–k
'Palisades'	NTEP	japonica	46 e–k
'Belair'	NTEP 11	japonica	50 f–k
'Meyer'	NTEP 09	japonica	58 lmn
'Korean Common' (unpatented)	NTEP 07^	japonica	76 pq

*Selected data set; complete data set includes 59 varieties and cultivars.
†NTEP = National Turfgrass Evaluation Program.
‡Species identity.
£Means followed by the same letter are not significantly different, based on the Waller-Duncan k-ratio t-test (k-ratio = 100)

In Marcum, K. B., M. C. Engelke, S. J. Morton and C. Dayton. 1994. Salinity tolerances of selected bermudagrass and zoysiagrass genotypes. TX Turfgrass Res.—1993, Consolidated Prog. Rep. PR 5140: 105–107.

TABLE 7

Average mean root depth of zoysiagrass grown in flexible tubes in greenhouse studies, Dallas, TX.

Variety	Average Mean Root Depth mm	Total Root Weight mm	Clippinge Weights mm
'Cavalier'	255	278	243
'Belair'	296	330	286
'Palisades'	318	457	452
'Emerald'	330	461	241
'Meyer'	333	411	466
'Crowne'	355	497	406
'El Toro'	356	473	391
MSD	79	161	267

*MSD = minimum significant difference for comparison of means within columns based on the Waller-Duncan k-ratio test where k = 100.

In Marcum, K.B., M.C. Engelke, S.J. Morton, and R.H. White. 1995. Rooting characteristics and associated drought resistance of zoysiagrasses. Agron.

J. 87:534–538.

TABLE 8

Mean Turfgrass quality ratings of vegetative zoysiagrass cultivars grown in the National Turfgrass Evaluation Program at 23 locations in the US for 1992, 1993, 1994, and 1995.

Variety	1992 mm	1993 mm	1994	1995	Overall 4-Yr Avg. mm
'Cavalier'	6.0	6.2	5.9	6.0	5.9
TC 2033	5.8	6.1	6.1	6.0	5.9
'Sunburst' (unpatented)	5.8	5.9	5.8	5.9	5.8
TC 5018	5.8	5.8	5.9	5.7	5.8
'Emerald'	5.7	6.2	6.0	5.7	5.8
'Omni' (unpatented)	5.6	6.1	6.1	6.0	5.7
QT 2004	5.6	6.0	5.9	5.6	5.6
DALZ8508	5.6	6.1	5.7	5.6	5.6
'Palisades'	5.8	5.8	5.5	5.4	5.6
DALZ9006	5.6	6.0	5.6	5.5	5.6
'Crowne'	5.8	5.8	5.5	5.4	5.6
'El Toro'	5.8	5.6	5.3	5.4	5.5
CD 259-13	5.3	5.5	5.7	5.5	5.4
'Meyer'	5.3	5.7	5.8	5.5	5.4
QT 2047	5.4	5.4	5.3	5.2	5.3
'Belair'	5.0	5.6	5.6	5.0	5.2
DALZ8516	4.7	5.4	5.0	5.0	4.9
'Diamond'	4.4	5.0	4.6	4.4	4.4
DALZ8501	4.9	4.3	4.0	4.0	4.3
DALZ8701	4.2	4.1	3.7	3.6	3.8
LSD VALUE	0.2	0.2	0.2	0.2	0.2

To determine statistical differences among entries, subtract one entry's mean from another entry's mean. Statistical difference occurs when this value is larger than the corresponding LSD value (LSD 0.05).

In National Zoysiagrass Test—1991. Final Report 1992–95, NTEP No. 96-15; (Table 4); United States Department of Agriculture, Agricultural Research Service, Beltsville Agricultural Research Center, Beltsville, Md. 20705.

TABLE 9

Mean number of mite-damaged leaves per zoysiagrass plant (n = 18).

Cultivar	Leaf Texture Class	3April92	24April92	Combined Dates
DALZ9006	31	0.2a*	0.2 a	0.2 a
DALZ8508	2	0.7 b	0.6 ab	0.6 b
DALZ8516	2	1.8 d	0.3 ab	1.0 b

TABLE 9-continued

Mean number of mite-damaged leaves per zoysiagrass plant (n = 18).

Cultivar	Leaf Texture Class	3April92	24April92	Combined Dates
'Emerald'	3	1.3 bc	0.9 b	1.1 b
DALZ8501	1	1.4 cd	2.6 c	2.0 c
'Crowne'	4	5.4 ef	2.3 c	3.9 d
'El Toro'	4	5.6 ef	2.8 c	4.2 d
TC2033	2	4.4 e	4.3 d	4.4 d
'Palisades'	4	7.5 fg	4.0 cd	5.8 e
CD2031	2	7.6 gh	7.9 e	7.8 f
'Diamond'	1	7.8 gh	9.4 ef	8.6 g
DALZ8701	1	9.3 h	9.4 ef	9.4 g
'Cavalier'	3	9.1 h	9.8 ef	9.5 g
'Meyer'	2	9.9 h	9.9 ef	9.9 g
'Belair'	2	10.0 h	9.9 f	9.9 g
JZ-1	4	10.0 h	9.9 f	10.0 g

*Data transformed using log (X + 0.5) for analysis. Means in a column followed by the same letter are not significantly different by Waller-Duncan k-ratio test (k = 100) (P = 0.05).
1 Textural class of zoysiagrass where 1 = short, narrow leaves; 2 = short, wide leaves; 3 = long, narrow leave; and 4 = long, wide leaves.

Reinert, J.A., M.C. Engelke, and S.J. Morton. 1993. Zoysiagrass resistance to the zoysiagrass mite, *Eriphyes zoysiae* (Acari: Eriophyidae). In R.N. Carrow, N.E. Christians, and R.C. Sherman (Eds.). International Turfgrass Society Research Journal 7. Intertec Publishing Corp., Overland Park, Kans. pp. 349–352.

DETAILED SUMMARY OF DNA FINGERPRINT ANALYSIS

Drs. Bassam and Caetano-Anolles of the University of Tennessee performed the DNA analysis. The zoysiagrass amplification profiles were obtained using primer of sequence 5'-GCCCGCCC-3', and are compared to the standard 'Meyer'. Complex banding patterns and amplification fragment length polymorphism's were obtained in all cases. Results indicate bands fall into two categories, those that are common to the species, and those that in combination are characteristic of the cultivar (some identified by dots).

I claim:

1. A new and distinct cultivar of *Zoysia japonica* plant as herein shown and described.

* * * * *

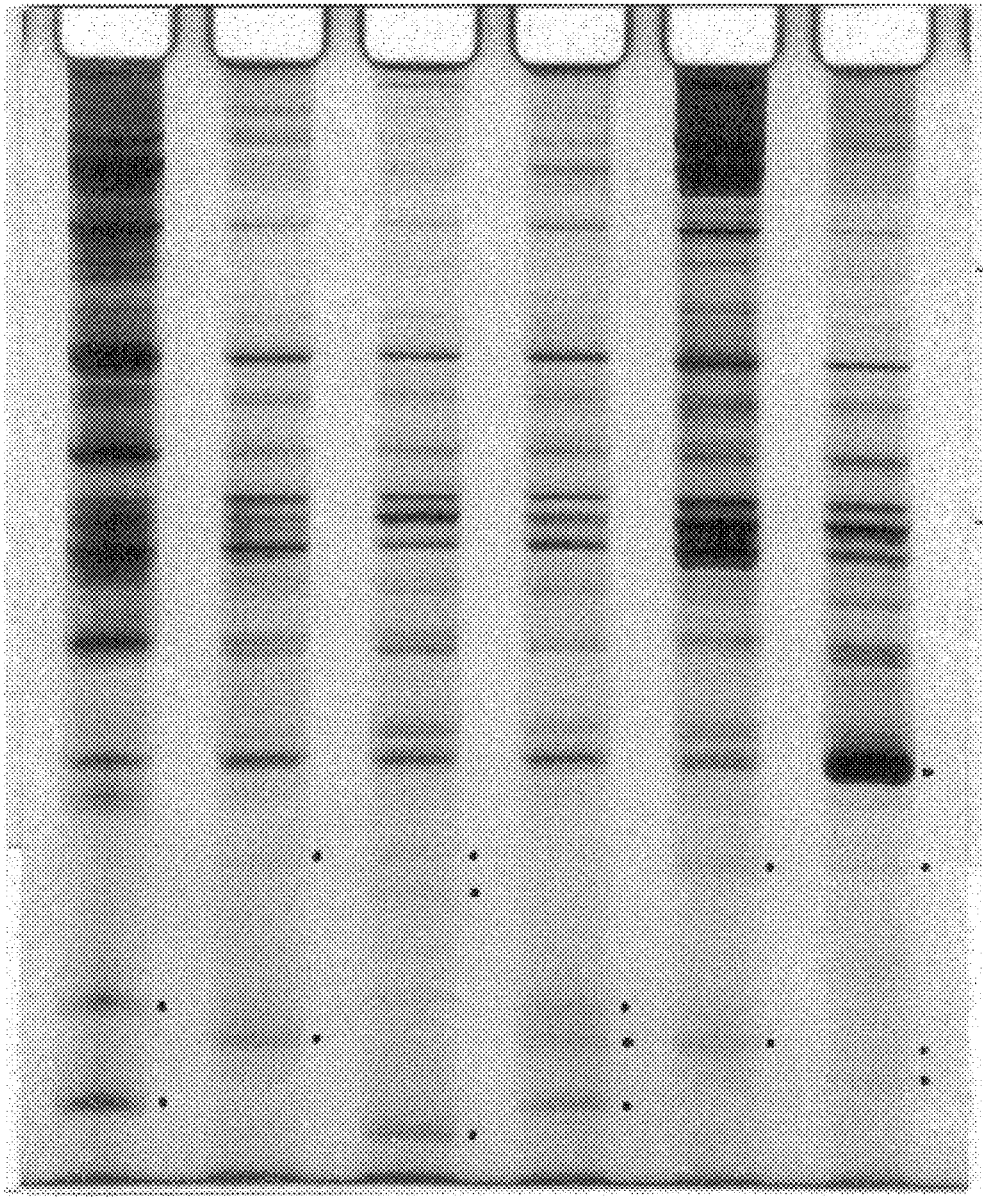

FIGURE 2