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Engelke

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- [54] **ZOYSIA GRASS PLANT NAMED 'PALISADES'**
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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, and anthers are 5.0 RP 3/6.

2 Drawing Sheets

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BRIEF SUMMARY OF THE INVENTION

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

BACKGROUND OF THE INVENTION

This invention relates to an new and distinct perennial zoysiagrass cultivar indentified as ‘Palisades’ zoysiagrass (herein referred to as ‘Palisades’), that was tested as DALZ8514. ‘Palisades’, a *Zoysia japonica*, is a chance hybrid of the maternal clone ‘Z44’, obtained from Beltsville, MD in 1981, with an unknown pollen source from a zoysiagrass germplasm field nursery at TAES—Dallas. ‘Palisades’ has been vegetatively propagated, and is uniform in growth expression.

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 ‘Palisades’ Zoysiagrass.

BRIEF DESCRIPTIONS OF THE ILLUSTRATIONS

FIG. 1 is a photograph of the leaf orientation, blades and ligule of ‘Palisades’.

FIG. 2 is a close-up photograph of the leaf orientation, blades and ligule of ‘Palisades’.

FIG. 3 is a photograph of the in florescence of ‘Palisades’ at anthesis.

DETAILED DESCRIPTION OF THE PLANT

‘Palisades’ was characterized in greenhouse and field conditions. ‘Palisades’ is a unique variety of zoysiagrass developed as described above. ‘Palisades’ 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. ‘Palisades’ has been propagated by sod, plugs, sprigs, stolons and rhizomes in greenhouse and field planting by hand and mechanical propagation in Dallas, Tex. and is uniform in growth expression. Seed reproduction with self-fertility is not common in the *Zoysia* sp. No seedling establishment from ‘Palisades’ has been noticed in either greenhouse or field studies.

‘Palisades’ is asexually propagated by stolons and rhizomes. It has an intermediate to rapid establishment rate. When spring (stolons) or plug plantings are made in early

May, the area should achieve 60–70% coverage in Dallas, Tex. in 90–120 days, with complete coverage in 180–200 days, in comparison to ‘Meyer’ zoysiagrass which will require 360–400 days for full coverage. The stolons of ‘Palisades’ have a mean internode length of 29.9 mm between the second and third nodes, with a mean internode width of 1.0 mm and node diameter of 1.7 mm (Table 1). The stolons of ‘Palisades’ 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 ‘Palisades’ stolons exposed to full sun is 5R 3/4.

Leaf blades of ‘Palisades’ are rolled in the bud, and are flat and stiff. The mean leaf blade length of ‘Palisades’ is 75.6 mm and average width is 3.4 mm (Table 2). The leaf sheath of ‘Palisades’ is distinct from ‘Meyer’(unpatented) and ‘Crowne’(U.S. Plant Patent application Ser. No. 09/076,973 at a length of 51.2 mm (Table 3). The hairs on the abaxial leaf surface of ‘Palisades’ are sparse in number and are approximately 0.9 mm long. Measured under greenhouse conditions in January 1996, the genetic, adaxial leaf color of ‘Palisades’ is 2.5G 5/6 with ‘El Toro’ (U.S. Plant Pat. No. 5845) having a leaf color of 2.5GY 5/2, and ‘Meyer’ having a color of 2.5G 3/4. The ligule of ‘Palisades’ is a fringe of silky hairs, approximately 2.8 mm in length for the longest hairs.

‘Palisades’ has 5RP 3/6 colored anthers and white colored stigmas, undistinguished in shade of color. The inflorescence of ‘Palisades’ is a terminal spike-like raceme, with spikelets on short pedicels. ‘Palisades’ has a mean length floral region of 27.2 mm, with a mean of 27.8 florets per raceme.

Thatch development is a function of age of stand, types of soils and other environments 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 ‘DeAnza’ produced an intermediate amount of thatch (25,23 and 23 mm, respectively), and Cavalier and Meyer produced the least amount of thatch (20 and 19 mm respectively).

The chromosome number of ‘Palisades’ is 40.

‘Palisades’ is rated as having low supplemental water needs similar to ‘Crowne’ and ‘El Toro’ to maintain active growing turf (Table 4). When ‘Palisades’ was compared with 59 other zoysiagrasses for salinity tolerance, it ranked number 34 in performance and was superior to ‘Meyer’ (Table 5). When compared to other commercial varieties for root growth, ‘Palisades’ was not different from ‘El Toro’ or

'Meyer' in average root depth, root weight, or clipping weights (Table 6).

'Palisades' was entered in the 1991 National Turfgrass Evaluation Program (NTEP). 'Palisades', in the 1991 National Turfgrass Evaluation Program Zoysiagrass Trial for the years 1992–1995 had mean quality ratings of 5.8, 5.8, 5.5 and 5.4 for overall quality (Table 7).

'Palisades' rated among the best for the broad leaf textural class 4. 'Palisades' shows intermediate resistance to the zoysiagrass mite (Table 8). The varieties 'Meyer', 'Belair' (unpatented), and most experimental zoysiagrasses are very susceptible to the mite. This mite has been found in Maryland, Texas, and Florida, all extensive zones of use for zoysiagrasses.

'Palisades' is distinguished from other zoysiagrasses by its combined unique morphological differences in leaf width, length, and floral characters of sheath and seed head length. It is a medium-coarse textured, thick stolon, and rhizome producing grass with good recuperative ability. It has good shade tolerance and low water use needs. It is moderate in salinity tolerance. 'Palisades' 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'	17.7a*	0.9abc	1.1 bc
'Cavalier' (U.S. Plant Pat. No. 10,778)	18.4a	1.4abc	1.4abc
'Meyer'	24.1a	2.0a	2.0a
'Palisades'	29.9a	1.0a	1.7ab
'El Toro'	39.98a	1.4abc	1.4abc

*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

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'	1.3d*	60.7cd
'Meyer'	2.6 c	74.3 bc
'Crowne'	3.0abc	72.7 bc
'El Toro'	3.3abc	68.3 bcd
'Palisades'	3.4ab	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 3

Zoysiagrass leaf sheath length measurements taken February 1988 on the fourth youngest leaf from greenhouse grown plants	
Genotype	Sheath length mm
'Emerald'(unpatented)	16.3 ij
'Cavalier'	28.9 ef
'Meyer'	30.7 cd
'Crowne'	42.9 b*
'Palisades'	51.25a

*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 4

Supplemental irrigation water requirement for commercial and experimental zoysiagrasses during July 1989 through August 1991 at Dallas, Texas*					
	Textural Class	Irrigation Requirement			Mean
		1989 mm/yr	1990 mm/yr	1991 mm/yr	
'Diamond' (U.S. Plant Pat. No. 10,636)	1	461	435	567	488
DALZ8501	1	449	544	429	474
FC13521	3	482	448	443	457
DALZ8517	3	475	402	487	455
'Emerald'	3	464	343	503	437
DALZ8506	3	458	379	455	431
DALZ8515	3	469	419	394	427
DALZ8508	2	447	379	398	408
DALZ8510	3	449	310	413	390
'Cashmere' U.S. Plant Pat. No. 6,529	1	435	424	311	390
'Cavalier'	3	464	175	441	360
DALZ8504	2	478	363	138	326
DALZ8503	2	441	280	193	305
DALZ8511	2	451	353	200	304
DALZ8516	2	462	377	25	288
'Meyer'	2	450	321	74	276
'Korean Common'(unpatented)	4	470	174	88	244
'El Toro'	4	417	21	6	148
'Palisades'	4	358	26	12	132
'Crowne'	4	256	12	12	93
MSD [†]		129	169	242	155
Rainfall [‡]		1092	1118	1143	1118

[†]MSD, minimum significant difference for comparison of means within columns based on the

Waller-Duncan k-ratio t-test where k = 100.

[‡]Total annual precipitation in mm.

*White et al. 1993.

TABLE 5

* Average percent shoot salt injury (average of 20 rating dates) on zoysiagrass entries in the 1991 NTEP [†] Trials			
Entry	Source	Species [‡]	% Injury
'Diamond'	NTEP 20	<i>matrella</i>	33ab [§]
'El Toro'	NTEP 13	<i>japonica</i>	38a-e
'Emerald'	NTEP 10	<i>jap x tenu</i>	42a-h
'Cavalier'	NTEP 17	<i>matrella</i>	42a-h
'Crowne'	NTEP 15	<i>japonica</i>	46 e-k
'Palisades'	NTEP 14	<i>japonica</i>	46 e-k
'Belair'	NTEP 11	<i>japonica</i>	50 f-k

TABLE 5-continued

* Average percent shoot salt injury (average of 20 rating dates) on zoysiagrass entries in the 1991 NTEP [†] Trials			
Entry	Source	Species [‡]	% Injury
'Meyer'	NTEP 09	<i>japonica</i>	58 lmn
'Korean Common'	NTEP 07	<i>japonica</i>	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 6

Average mean root depth of zoysiagrass grown in flexible tubes in greenhouse studies, Dallas, TX			
Variety	Average Mean Root Depth mm	Total Root Weight mg	Clipping Weights mg
'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 7

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

Variety	Leaf Texture Class	Year				Overall 4-Yr Avg.
		1992	1993	1994	1995	
'Cavalier'	3 ¹	6.0	6.2	5.9	6.0	5.9
TC2033	2	5.8	6.1	6.1	6.0	5.9
'Sunburst'(unpatented)	2	5.8	5.9	5.8	5.9	5.8
TC 5018		5.8	5.8	5.9	5.7	5.8
'Emerald'	2	5.7	6.2	6.0	5.7	5.8
'Omni'(unpatented)	2	5.6	6.1	6.1	6.0	5.7
QT 2004		5.6	6.0	5.9	5.6	5.6
DALZ8508	2	5.6	6.1	5.7	5.6	5.6
'Palisades'	4	5.8	5.8	5.5	5.4	5.6
DALZ9006	3	5.6	6.0	5.6	5.5	5.6
'Crowne'	4	5.8	5.8	5.5	5.4	5.6
'El Toro'	4	5.8	5.6	5.3	5.4	5.5
CD 259-13		5.3	5.5	5.7	5.5	5.4
'Meyer'	2	5.3	5.7	5.8	5.5	5.4

TABLE 7-continued

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

Variety	Leaf Texture Class	Year				Overall 4-Yr Avg.
		1992	1993	1994	1995	
QT 2047		5.4	5.4	5.3	5.2	5.3
'Belair'	2	5.0	5.6	5.6	5.0	5.2
DALZ 8516	2	4.7	5.4	5.0	5.0	4.9
'Diamond'	1	4.4	5.0	4.6	4.4	4.4
DALZ8501	1	4.9	4.3	4.0	4.0	4.3
DALZ8701	1	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). ¹Textural class of zoysiagrass where 1 = short, narrow leaves; 2 = short, wide leaves; 3 = long, narrow leaf; and 4 = long, wide leaves.

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 8

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

Cultivar	Date		Combined Dates
	April 3, 1992	April 24, 1992	
DALZ9006	0.2a*	0.2a	0.2a
DALZ8508	0.7b	0.6ab	0.6b
DALZ8516	1.8d	0.3ab	1.0b
'Emerald'	1.3bc	0.9b	1.1b
DALZ8501	1.4cd	2.6c	2.0c
'Crowne'	5.4ef	2.3c	3.9d
'El Toro'	5.6ef	2.8c	4.2d
TC2033	4.4e	4.3d	4.4d
'Palisades'	7.5fg	4.0cd	5.8e
CD2031	7.6gh	7.9e	7.8f
Diamond	7.8gh	9.4ef	8.6g
DALZ8701	9.3h	9.4ef	9.4g
'Cavalier'	9.1h	9.8ef	9.5g
'Meyer'	9.9h	9.9ef	9.9g
'Belair'	10.0h	9.9f	9.9g
JZ-1	10.0h	9.9f	10.0g

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

I claim:

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

* * * * *



FIGURE 1



FIGURE 2

PALISADES

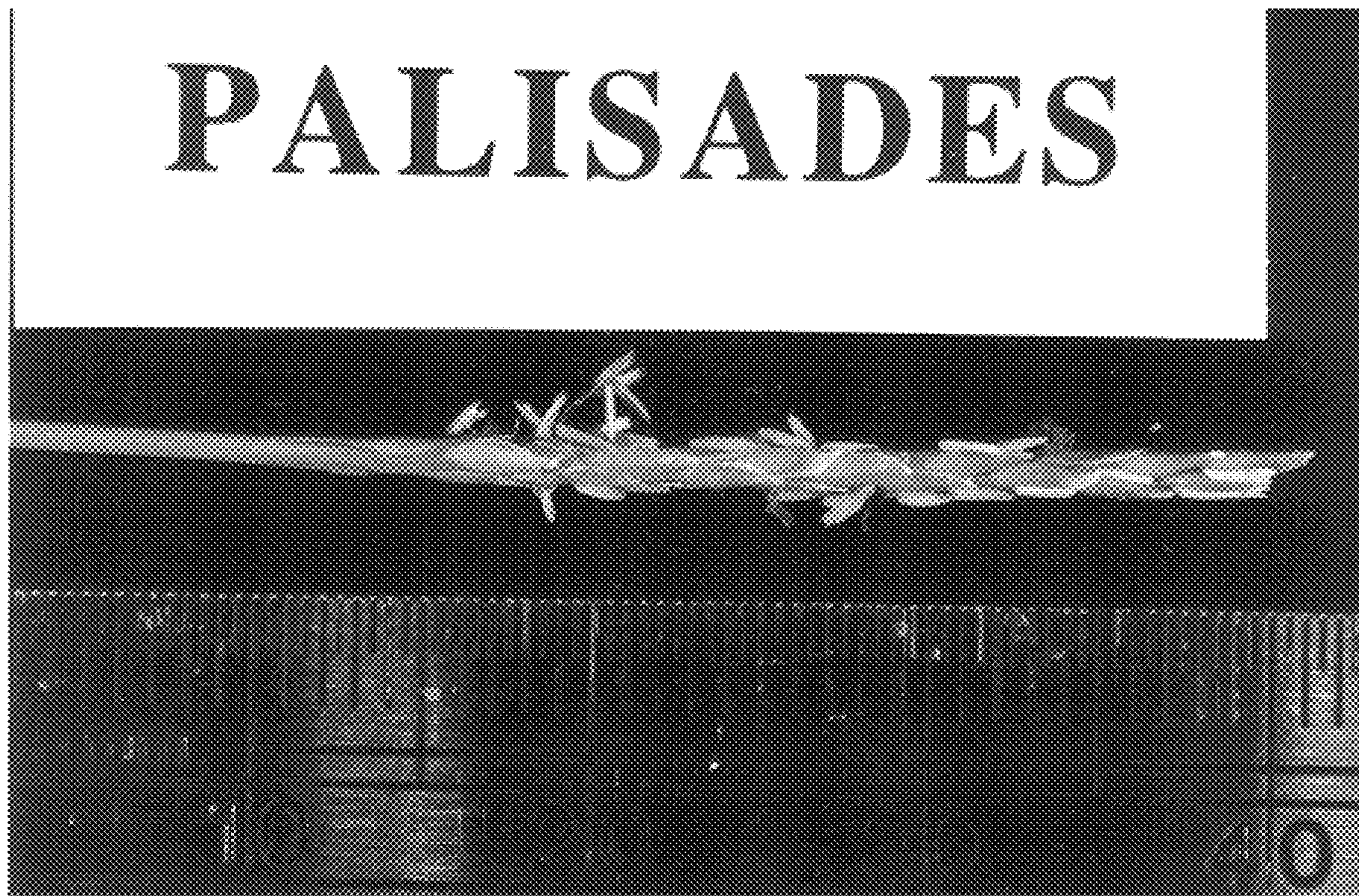


FIGURE 3