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**United States Patent** [19]  
**Yaneshita et al.**

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[54] **'MIYAKO' ZOYSIAGRASS**  
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[51] **Int. Cl.<sup>6</sup>** ..... **A01H 5/00**  
[52] **U.S. Cl.** ..... **Plt./90**  
[58] **Field of Search** ..... **Plt./90**

[56] **References Cited**  
**PUBLICATIONS**  
Anon. (GTITM UPOVROM listing) "Miyako" proposed  
May 13, 1992.  
*Primary Examiner*—James H. Feyrer  
*Attorney, Agent, or Firm*—M. C. Engelke

[57] **ABSTRACT**  
A new and distinct cultivar of an asexually reproduced  
zoysiagrass, *Zoysia japonica*, with a unique combination of  
characters including fall color retention, tolerance to  
Rhizoctonia large patch, having aggressive spread by sto-  
lons with long internodes and a distinct DNA fingerprint.

**4 Drawing Sheets**

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**BACKGROUND OF THE INVENTION**

**Filed of the Invention**

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

**BRIEF SUMMARY OF INVENTION**

This invention relates to a new and distinct perennial  
zoysiagrass plant, tested as 'Miyako', that was discovered  
by the inventors in a mowed, cultivated turf areas in the  
Southwestern islands of Japan. It was identified as a clone  
superior in rate of spread to the surrounding zoysiagrasses.  
'Miyako' is an aggressively spreading cultivar, with adap-  
tion to sports fields, turf racetracks, industrial parks, and  
highway rights a ways, wherever zoysiagrass is adapted.

For purpose of registration under the "International Con-  
vention 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  
Patent Examining Procedure, it is proposed that the new  
variety of zoysiagrass of the present invention be named  
'Miyako' Zoysiagrass.

**BRIEF DESCRIPTIONS OF THE  
ILLUSTRATIONS**

FIG. 1 is a photograph of the leaf blade and ligule of  
Miyako.

FIG. 2 is a photograph of the inflorescence of 'Miyako.'

FIGS. 3 and 4 are DNA fingerprints of 'Miyako' produced  
by RFLP.

**DETAILED DESCRIPTION OF THE PLANT**

'Miyako' was characterized in greenhouse and field con-  
ditions. 'Miyako' is a unique variety of zoysiagrass (*Zoysia*  
*japonica* Steud.). 'Miyako' was discovered under cultivated  
conditions described above in Japan and tested in field plots  
for three years at the same location. 'Miyako' was identified  
as more rapid in spread than the surrounding zoysiagrass and  
had a longer period of fall color retention than the surround-  
ing zoysiagrasses. Based on DNA fingerprinting, 'Miyako'  
appears to be an interspecific hybrid between *Z. japonica*  
and *Z. matrella*. 'Miyako' was propagated by cutting of  
stolons, rooting them in soil, and planting of the rooted  
stolons to provide planting stock for studying performance  
and for comparison with commercial varieties. 'Miyako'

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remained stable in both performance and morphological  
characters after propagation. 'Miyako' has been propagated  
by sod, plugs, and stolons. Seed reproduction with self-  
fertility is not common in the *Zoysia* sp. No seedling  
establishment from 'Miyako' has been noticed in either  
greenhouse or field studies.

'Miyako' is distinguished from other varieties of zoysia-  
grass by the combination of characters of tolerance to  
Japanese strains of Rhizoctonia large patch, aggressive  
spread and fall color retention. 'Miyako' is closest in appear-  
ance and performance to 'El Toro' zoysiagrass.

'Miyako' has both rhizome and stolon growth. The sto-  
lons of 'Miyako' are aggressive in their spreading ability  
(Table 1), as illustrated by the internode length. The inter-  
node diameter is slender compared to 'El Toro' and 'Meyer'  
(Table 1). The stolons of 'Miyako' 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 gen-  
eral growth of the plant affect color notations.

Leaf blades of 'Miyako' are rolled in the bud, are flat and  
stiff. The leaf blade length of 'Miyako' varies by growth  
conditions, but the third youngest leaf is 3.5 mm wide and  
103.9 mm long, longer than both 'El Toro' and 'Meyer'  
when held under a 14 hour day length in growth chamber  
studies. There are hairs on the adaxial leaf surface of  
'Miyako'. Measured under growth chamber conditions in  
October 1995, the genetic, adaxial leaf color of 'Miyako' is  
2.5GY ¼, with 'El Toro' having a leaf color of 2.5GY ½,  
and 'Meyer' having a color of 2.5G ¾. The internode color  
of 'Miyako' is 5R ¾.

The ligule of 'Miyako' is a ring of hairs, with the longest  
hairs approximately 4.3 mm in length. 'Miyako' has purple  
anthers and white stigmas, undistinguished in color from  
other plants of the species. The inflorescence of 'Miyako' is  
a terminal spike-like raceme, with spikelets on short  
pedicels. When grown in Japan in field trails in May 1994,  
'Miyako' had a mean culm length of 9.0 cm, a floral region  
of 5.4 cm, with a mean of 46 florets per raceme, 2.8 mm in  
length. In trails in Japan, 'Miyako' showed a rating of 7  
raceme number per unit area, with Korean Common having  
a rating of 5, when rated on a scale of 1-9 with 9=most  
racemes per unit area.

The chromosome number of 'Miyako' is 40.

In trials in Japan, 'Miyako' has shown turf quality data  
that includes color (rated on a scale of 1-9, where 9=darkest  
green) where Miyako had a rating of 5 where seeded Korean  
common had a rating of 7. In fall growth ratings, 'Miyako'



had a rating of 8 where Korean common had a rating of 5, on a scale of 1–9 where 9=high growth rate. In spring greenup, ‘Miyako’ had a rating of 3 where Korean common had a rating of 6 when rated on a scale of 1 to 9, where 1=earliest spring greenup. In winter dormancy ratings, ‘Miyako’ had a rating of 8 with Korean Common rating 5, on a scale of 1–9, with 9=late dormancy.

Compared to other *Z. japonicas*, CM 15 has leaf blades longer and wider than ‘El Toro’ (U.S. Plant Pat. No. 5845) and ‘Meyer’. CM 15 has white stigmas and purple anthers, in contrast to the pale yellow green stigma and anthers of ZT-26 (U.S. Plant Pat. No. 6,345) and the pale yellow colored anthers of ZT-4 (U.S. Plant Pat. No. 6,516): ZT-11 (U.S. Plant Pat. No. 7,074) reports few seed heads per unit area, whereas CM 15 reports a production rating of 7, when rated on a scale of 1–9, with 9=most.

‘Miyako’ has a distinctly different DNA fingerprint from (FIGS. 3 and 4) ‘El Toro,’ ‘Meyer,’ ‘DALZ8512,’ ‘DALZ8514,’ Common seeded *Z. japonica*, and ‘Emerald.’

In comparison to ‘Meyer’ zoysiagrass, ‘Miyako’ is more aggressive in rate of spread and general growth, and has a more open and prostrate growth habit. ‘Miyako’ develops less thatch than ‘Meyer’ and retains green color longer in the fall. ‘Miyako’ has a smaller diameter node than either ‘Meyer’ or ‘El Toro’ but has longer internode than ‘El Toro’ and ‘Meyer’. ‘Miyako’ has a wider and longer leaf than either ‘Meyer’ or ‘El Toro’ zoysiagrass. ‘Miyako’s’ leaf length is four times longer and twice as wide as ‘Emerald’s,’ and twice as long but similar in width as ‘Meyer’s’ leaf. ‘Miyako’s’ shade tolerance is less than ‘Meyer’ or ‘Emerald’ but has superior drought tolerance to either.

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-hour daylength, March 1995.			
Genotype	Internode length mm	Internode diameter mm	Node diameter mm
‘Miyako’	43.3a*	0.71bc	1.03bc
‘El Toro’	39.8ab	0.94ab	1.45abc
‘Meyer’	24.1bc	1.03a	1.99a

\*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 zoysiagrasses. Plants were growing in a growth chamber with a 14-hour daylength, March 1995.		
Genotype	Blade width mm	Blade length mm
‘Miyako’	3.52a*	119.2a
‘El Toro’	3.26abc	68.3b
‘Meyer’	2.59c	74.3b

\*Analysis of variance by General Linear Models, with means followed by the same letternot significantly different using Tukey’s Studentized Range (HSD), alpha = 0.05. Only selected means presented.

Detailed Summary of DNA Fingerprinting Analysis

Mr. Yaneshita of Japan Turfgrass, Inc. performed the DNA fingerprint analysis. The zoysiagrass fingerprints were of ‘Miyako,’ a seeded variety of common *Z. japonica*, ‘Meyer,’ ‘Emerald,’ ‘El Toro,’ DALZ8512, and DALZ8514. The RFLP hybridization patterns are with the ZG7 clone. Total DNA’s extracted from mature leaves of materials were digest with HindIII. Restriction fragments were transferred onto a nylon-membrane after Southern blotting. Labeling ZG7 clone and detection of hybridization were conducted by ECL system produced from Amersham Ltd. ‘Miyako’ is identified by a unique fragment of 6.0 kbp from other varieties (FIG. 3).

‘Miyako’ identified by a unique fragment of 3.5kbp from a seeded variety of common *Z. japonica*, ‘Meyer,’ ‘Emerald,’ ‘El Toro,’ DALZ8512, and DALZ8514 (FIG. 4).

I claim:

- 1. A new and distinct cultivar of an asexually reproduced zoysiagrass, *Zoysia japonica* plant, as described and illustrated herein, having a unique combination of characters including fall color retention, tolerance to Rhizoctonia large patch, having aggressive spread by stolons with long internodes, and a distinct DNA fingerprint.

\* \* \* \* \*



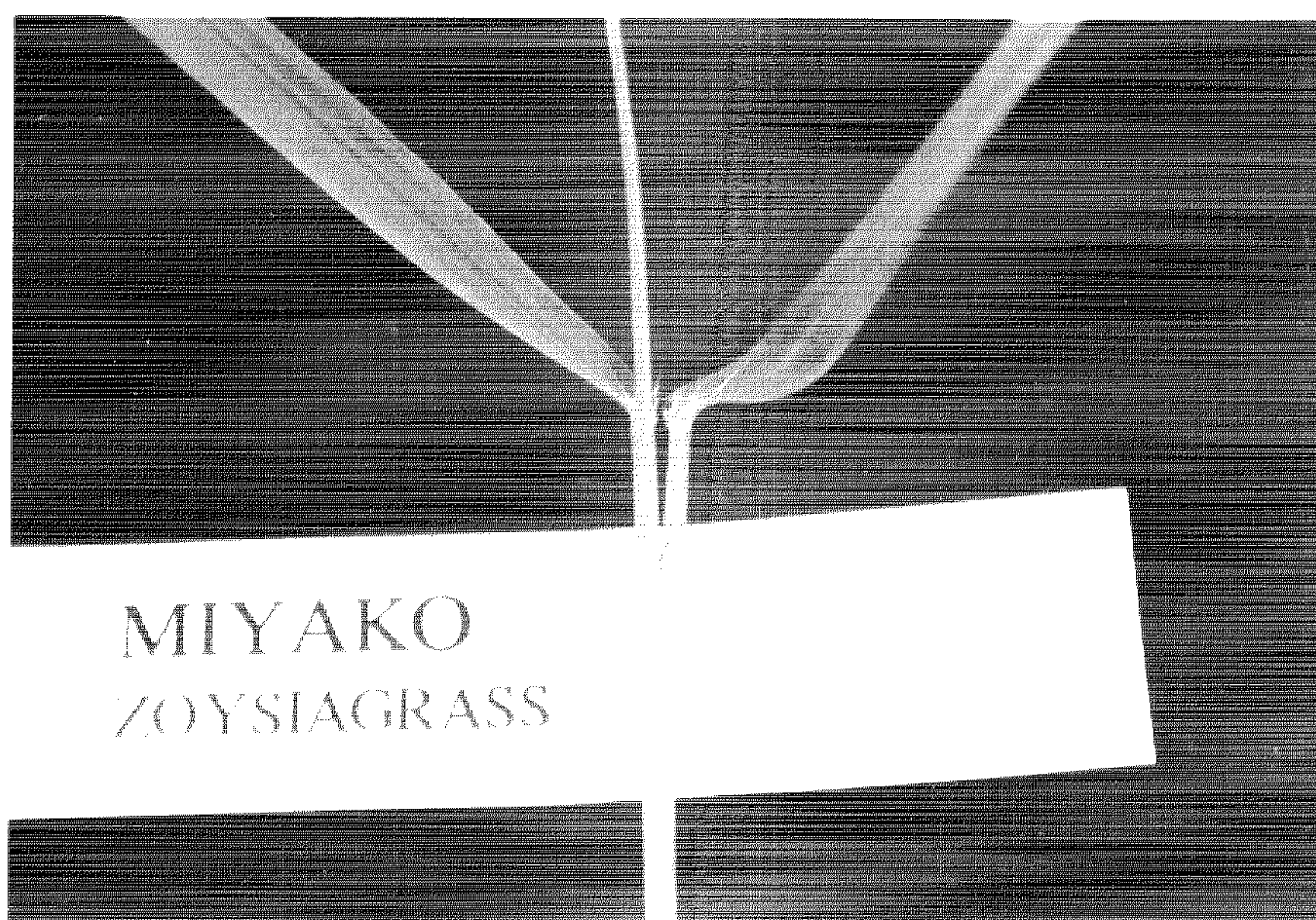


FIGURE 1



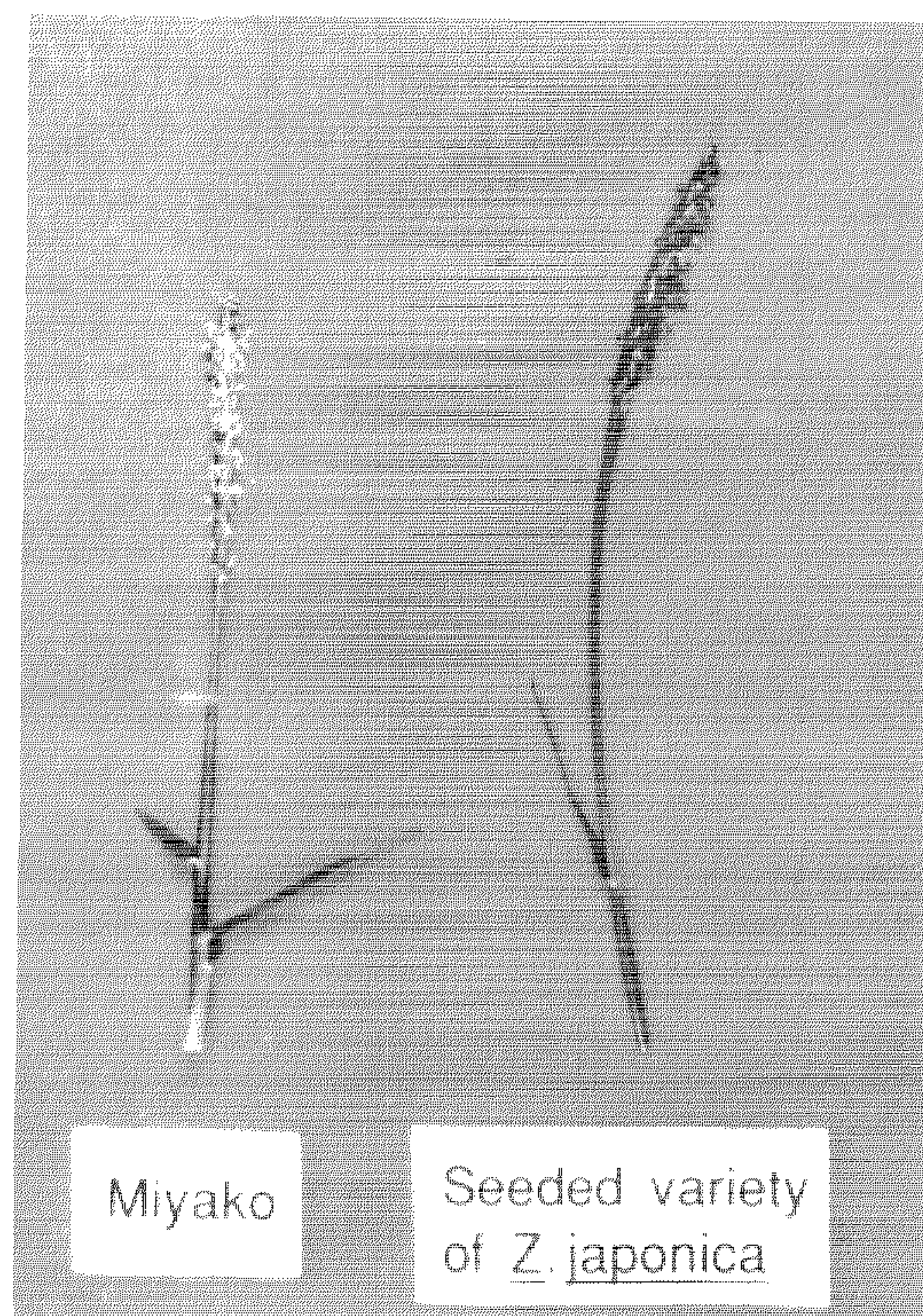


FIGURE 2

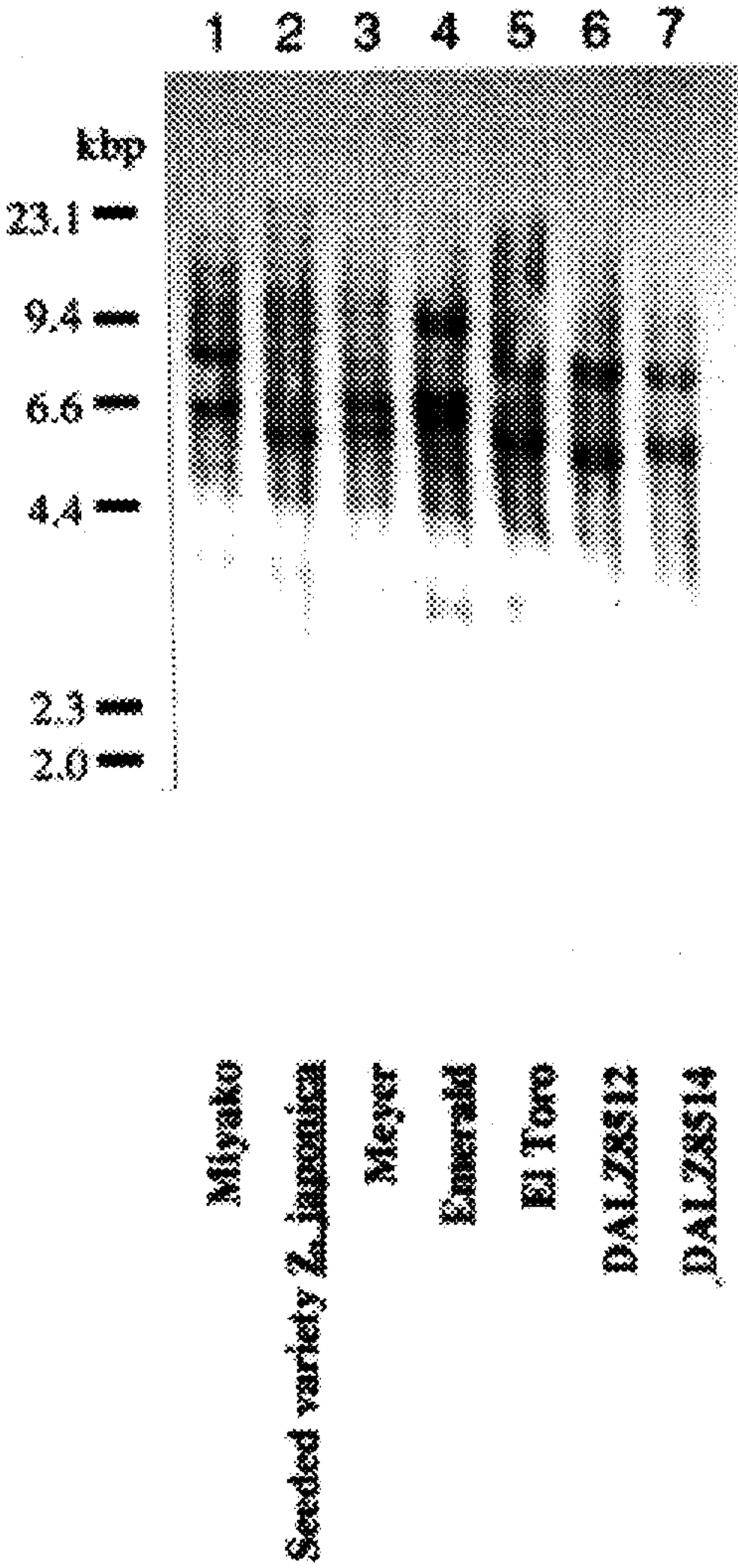


FIGURE 3



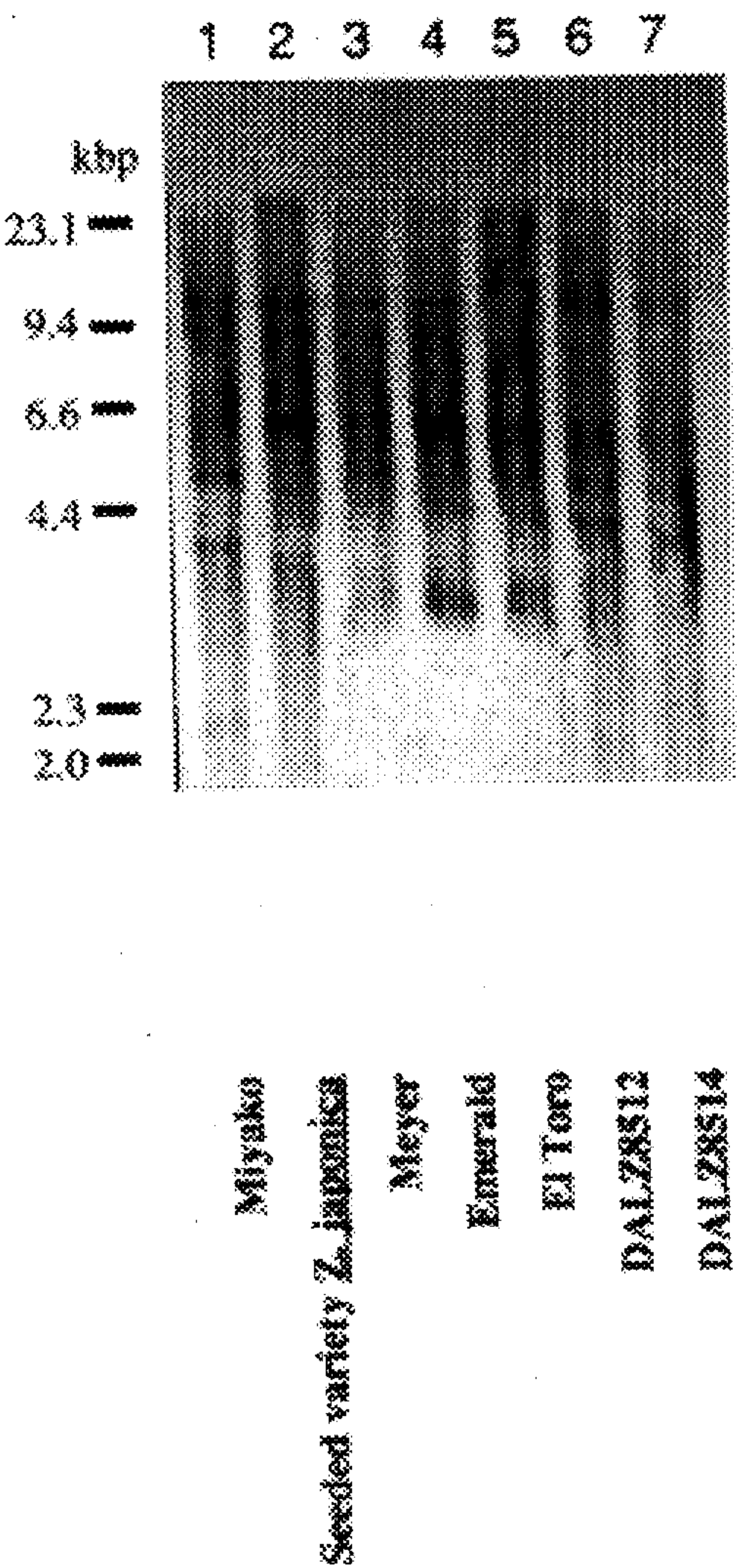


FIGURE 4