



(12) **United States Plant Patent**
Janse van Rensburg

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(54) **MANDARIN NAMED ‘AFRICAN SUNSET’**

(50) Latin Name: *Citrus L.*
Varietal Denomination: **African Sunset**

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patent is extended or adjusted under 35
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(51) **Int. Cl.**
A01H 5/00 (2006.01)

(52) **U.S. Cl.** **Plt./202**

(58) **Field of Classification Search** Plt./202
See application file for complete search history.

(56) **References Cited**

PUBLICATIONS

UPOV-ROM GTITM Plant Variety Database Jan. 2008,
GTI Jouve Retrieval Software citation for ‘African Sunset’.*
“Certificate of grant of a Plant Breeder’s Right,” issued Nov.
7, 2004 in respect of plant *Citrus L.* (Mandarin), of variety
African Sunset. Department of Agriculture, Republic of
South Africa. (1 page).

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(57) **ABSTRACT**

A new variety of mandarin (*Citrus L.*) designated ‘African
Sunset’ is described. The fruit matures earlier than compa-
rable varieties. In addition, the fruit includes a more pebbled
rind, a lower acid content, and is almost seedless.

6 Drawing Sheets

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Botanical/commercial classification: (*Citrus L.*), new
mandarin variety.

Variety denomination: ‘African Sunset’.

BACKGROUND OF THE INVENTION

African Sunset is a hybrid of an unpatented *Citrus reticu-*
lata variety Ellendale (the pollen parent) and an unpatented
mandarin hybrid variety Robin (the seed parent). In 1980,
pollen from ‘Robin’ (unpatented) was applied by hand to the
stigmas of ‘Ellendale’ (unpatented). The resulting fruits
were collected in June 1981 where after seeds from each
fruit were extracted and irradiated and thereafter planted in
1982. The resulting 73 seedlings were transplanted to a
breeding orchard situated at Addo, in the Eastern Cape prov-
ince of the Republic of South Africa (global positioning sat-
ellite co-ordinates 25°42'E; 33°34'S). These seedlings were
not grafted and were grown on their own roots. Due to the
so-called juvenility phenomenon in citrus trees as is known
in the art, trees resulting from these transplanted seedlings
only bore fruit in 1992. These trees were then evaluated for
fruit quality traits. Based on the results of this evaluation, six
of the aforementioned trees were selected for further
evaluation, of which one of these selections resulted in the
present ‘African Sunset’ variety. Thereafter ‘African Sunset’
was made subject of a South African Plant Breeders’ Rights
application in January 2000. This application was granted in
2004 under number ZA 20043212.

Some fruit splitting of the variety does occur in March/
April. Trees are alternate-bearing and fruit size may be unac-
ceptably large without manipulation. Additionally, fruit from
young trees (3 to 4 years) are normally coarse and prone to
granulation.

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‘African Sunset’ was first asexually propagated in Addo,
South Africa in 1995 when buds were collected from a
hybrid seedling designated X83-2505/3, and then budded
onto ‘Carizzo citrange’ rootstocks. Ten trees of ‘African
Sunset’ were planted in the field in September 1996 for
description purposes. All characteristics of the original tree
and its fruit as determined and described appear to be trans-
mitted through succeeding asexual propagations. While
‘African Sunset’ has been propagated and grown on ‘Carizzo
citrange’ rootstock, no incompatibility or other rootstock
related problems have been observed. The mother tree is
growing on its own roots and is currently (2008) 24 years
old. Although the tree condition is beginning to decline, the
fruit quality is and always has been good.

‘African Sunset’ has been cleansed of all viruses and
viroids by shoot-tip grafting (STG), followed by immunisa-
tion with *Citrus tristeza* virus LMS6. This was done through
a regulated process, which involves taking vegetative buds
from the mother tree and introducing same into the South
African Citrus Improvement Scheme. In this process, plant
material is shoot-tip grafted to provide a virus-free source of
bud wood material. Material so obtained is then pre-
immunized with a mild strain of the aforementioned *Citrus*
tristeza virus, followed by a certification by the Citrus Foun-
dation Block.

The applicant is aware of U.S. Plant Pat. No. 16,289
(‘289). The present variety is distinguishable over ‘289 in
that, inter alia, not only is the present variety diploid whereas
‘289 is triploid, but also the respective rind colors differ.

BRIEF SUMMARY OF THE INVENTION

In this specification, all major color code designations are
made with reference to the R.H.S. Color Chart (1986) as
provided by the Royal Horticultural Society of Great Britain.

This invention relates to a new and distinct variety of mandarin (*Citrus reticulata*), presently named 'African Sunset', the novel characteristics of which, under the local evaluation conditions, reside particularly in the early onset of maturity of the fruit (mid-late June) as opposed to July/August when compared to 'Ellendale' (unpatented). In addition to the above, a further novel and distinctive feature of 'African Sunset', as compared to 'Ellendale' (unpatented), include a more pebbled rind and a lower acid content, and is almost seedless, even in mixed blocks.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1: is a photograph showing an entire tree;

FIG. 2(a): is a photograph showing a first perspective of the stem;

FIG. 2(b): is a photograph showing a second perspective of the stem;

FIG. 3: is a photograph showing details of the fruit: viewed from the side, apex, base and including a cross section through the fruit, illustrating the obloid shape of the fruit as well as its size and color of the rind;

FIG. 4: is a close-up photograph showing several leaves of 'African Sunset', illustrating the sizes and shapes of the leaves, including the venation thereof;

FIG. 5: is a photograph showing inflorescence; and

FIG. 6: is a schematic illustration of the pedigree of 'African Sunset'.

DETAILED BOTANICAL DESCRIPTION

The below detailed botanical description of 'African Sunset' is based on 4 to 6, and 11 year old trees, unless otherwise specifically stated to the contrary.

Tree: 'African Sunset' trees are moderately spreading and thornless. Tree vigor and density is medium. Rootstock compatibility with 'Carizzo citrange' is median as observed and indicated by stem measurements. Trunk color is greyish-brown (RHS 197A) and the trunk has a smooth surface texture.

Shape.—Spheroid in shape.

Size.—In eleven year-old trees, the average tree height is 3.0 meters, while the average width is 2.94 meters. Average trunk circumference of an eleven-year old tree is 454 millimeters at the bud union, and an average of 399 millimeters and 475 millimeters at heights of 150 millimeters above and below the bud union, respectively. The average height of the bud union is 200 millimeters above soil level. Branches are on average 120 millimeters in circumference. There are on average 3 main branches per tree, with an average crotch angle of 75°. Branch texture is smooth and has a greyish-brown color (RHS 197A).

Flower: 'African Sunset' trees flower from September to October in South Africa. Being a normal diploid mandarin, 'African Sunset' produces abundant pollen and has, depending on the climate, 30.9% pollen viability (determined using the carmine-red stain method).

Size.—The flower of 'African Sunset' is typically hermaphroditic. Flower buds are obovoid in shape and have an average calyx diameter of 5.6 millimeters and is an average 10 millimeters in length. Each flower has between 4 and 5 petals. Petals are elliptic in shape and each have a length of 11.4 millimeters and a width of 5.0 millimeters. The petal tip is acute

in shape, while the base is truncate. The petal margin is entire. There are also 3 observed flowers per cluster and flowers have a typical citrus flower fragrance.

Color.—The petals are yellow-white (RHS 158B) on the inside and yellow-white (RHS 158B) with small, yellow speckles (RHS 8C) on the outside. Further, light yellow (RHS 8C) anthers are present.

Reproductive organs.—The stigma with style is an average 6.4 millimeters in length, while the stamen is 7.8 millimeters in length. One style and one stigma are present with an average of 16.8 stamens.

Young shoot.—Anthocyanin coloration of the tip is absent. **Leaves:** Leaf descriptions hereunder were taken as the first leaf after new flush growth.

Shape and size.—Leaves are simple, sessile, broad and are elliptically-shaped with entire blade margins. The leaves also have typically pinnate venation and the leaf apex is acuminate in shape, while the base is rounded. Blade length is 85 millimeters, while blade width is 38 millimeters. Accordingly, blade length to width ratio is 2.24:1. Emargination of the blade is present at the tip, however, incisions of the blade margin is absent. In cross-section, the shape of the leaf is slightly concave and generally flattened. It also warrants mentioning that 'African Sunset' leaves are totally without thorns. In fact, even young trees in the nursery do not have thorns.

Color.—Generally, the upper (adaxial) leaf surface is darker than the lower (abaxial) leaf surface. Adaxial color is green (RHS 137A), while abaxial color is yellow-green (RHS 146B). Furthermore, leaves have a smooth adaxial surface, while the abaxial surface has prominent veins.

Petiole.—Petiole length is 10.5 millimeters and there are no wings on the petioles.

Fruit, external characteristics:

Color.—The external fruit color is orange-red (a combination of RHS 28A, 30B and 25A). Fruit are sensitive to wind scarring.

Surface.—Pubescence is absent on the fruit surface. Oil glands are uniform in size and pitting and pebbling are present with pitting medium to dense and a medium to strong degree of dense pebbling.

Shape.—With reference to the Citrus descriptors of the previously named International Plant Genetic Resources Institute (IPGRI), now known as Biodiversity International, the shape of 'African Sunset' is obloid, having its broadest part in the middle of the fruit. The fruit length to diameter ratio is 0.714. The general shape of the proximal part of the fruit is flattened. In comparison, fruit obtained from 'Nour' (unpatented) is generally flatter and larger than fruit obtained from 'African Sunset'.

Size.—Fruit is on average 50 millimeters in length and 70 millimeters in diameter, with an average mass of 155.7 grams (see Table 1 below) when grown on 'Carrizo citrange' rootstock.

Base.—The general shape of the distal part of the fruit is flattened, and depression is shallow to absent. Radial grooves are absent.

Stalk end.—Shallow depression evident with many radial grooves.

Areola.—Has complete areola, which is smooth and complete in appearance, having an average diameter of 2.1 millimeters.

Stylar scar.—Present, but small in size.

Fruit, internal characteristics:

Color.—Flesh color is dark orange (RHS 28A).

Navel.—Occasionally present when viewed internally.

Oil glands.—Oil glands on the inner rind absent.

Glandular layer.—Rag is moderately tough.

Mesocarp (albedo).—The fruit peels moderately easily and has a rind on average 3 millimeters thick. The adherence of albedo to pulp is medium and very few to no albedo strands are left behind after peeling. Albedo color is yellow-range (RHS 23D and 19C).

Axis.—Fruit has an open core with a diameter of 14 millimeters. There appears to be a sparse to no filling in the core.

Segments.—The number of well-developed segments is on average 10.5 per fruit.

Pulp.—Coarser texture with smaller cells. Juice vesicles are short to medium in size. In transverse section, the fruit pulp is scalloped in shape.

Juice.—Fruit have a rich ‘Navel’-like flavor and although the rag is tougher than that of ‘Clementine’ (unpatented), it is still within acceptable standards. Fruit has an average juice percentage of 59.7% and 58.6%, when grown on its own roots and on ‘Carrizo citrange’ rootstock, respectively. Solids: acids ratio indicated that the best time to harvest fruit at Addo, South Africa, is mid-end June.

Seeds.—Seed are ovoid to semi-deltoid in shape with a slightly wrinkled almost smooth surface, a length of 1.2 mm and a width of 0.8 mm and is fairly flat. Seed number is not excessive in mixed blocks and fruit are commercially seedless (no fruit has greater than 3 seeds) when caged. In a highly cross-pollinated scenario 86.9% (Table 1) of the fruit had no seeds and 13.1% had between 1–3 seeds per fruit. Therefore, this selection should be almost seedless in a solid block although it is probably not self-incompatible.

Table 1: ‘African Sunset’ Selections: Average of Internal Quality Tests 2001 to 2006—Addo, South Africa

TABLE 1					
‘African Sunset’ Selections: Average of Internal Quality Tests 2001 to 2006-Addo, South Africa					
Cultivar	Rootstock	Juice %	Brix %	Acid %	Brix:Acid Ratio
‘African Sunset’	‘Carrizo’	58.6	13.1	2.4	11.5
‘African Sunset’	Own roots	59.7	13.0	0.8	15.7

TABLE 1-continued						
‘African Sunset’ Selections: Average of Internal Quality Tests 2001 to 2006-Addo, South Africa						
Cultivar	Percentage fruit with				Avg. Fruit Mass (grams)	
	0	1-3	4-6	7+		
	seed per fruit					
‘African Sunset’	92.2	7.8	0.0	0.0	155.1	
‘African Sunset’	86.9	13.1	0.0	0.0	156.3	

Table 2: Internal Quality Tests (trees planted in 1984):

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Internal Quality Tests (trees planted in 1984):				
Test Date	Juice %	Brix %	T. Acid %	Brix/TA Ratio
28 Jun. 1994	54	11.0	0.90	12.1
11 Jul. 1997	56	12.0	0.82	14.6
25 Jul. 2002	63	14.4	1.08	13.3
14 Jul. 2004	58	12.4	0.85	14.6

Table 3: African Sunset yields 2001 to 2006 at Addo, South Africa.

TABLE 3							
African Sunset yields 2001 to 2006 at Addo, South Africa.							
	Year						
	2001	2002	2003	2004	2005	2006	2007
Treeage (Yrs)	4	5	6	7	8	9	10
Ton/ha	10	21	35	38	24	42	50
Kg/tree	11	23	38	42	26	46	55

The fruit of ‘African Sunset’ is intended for consumption. Fruit stored and shipped at 4° C. and kept under these conditions, are likely to keep for up to 6 weeks.

The above described new variety of Mandarin displays an early onset of maturity of the fruit (mid-late June) and a more pebbled rind and a lower acid content as compared to known varieties.

What we claim is:

1. A novel and distinct variety of mandarin tree having the characteristics described and illustrated herein.

* * * * *



FIGURE 1



FIGURE 2(a)



FIGURE 2(b)

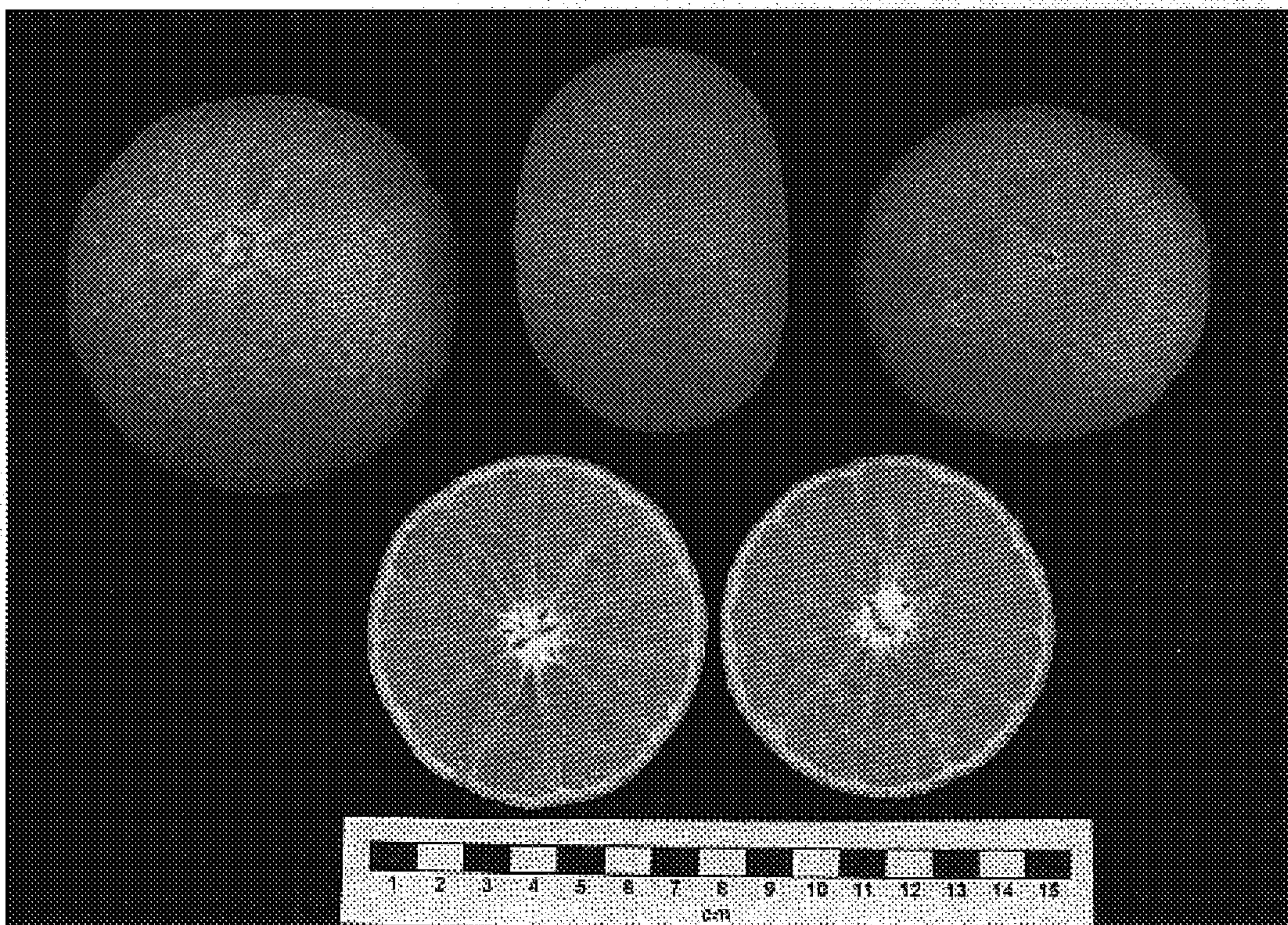


FIGURE 3

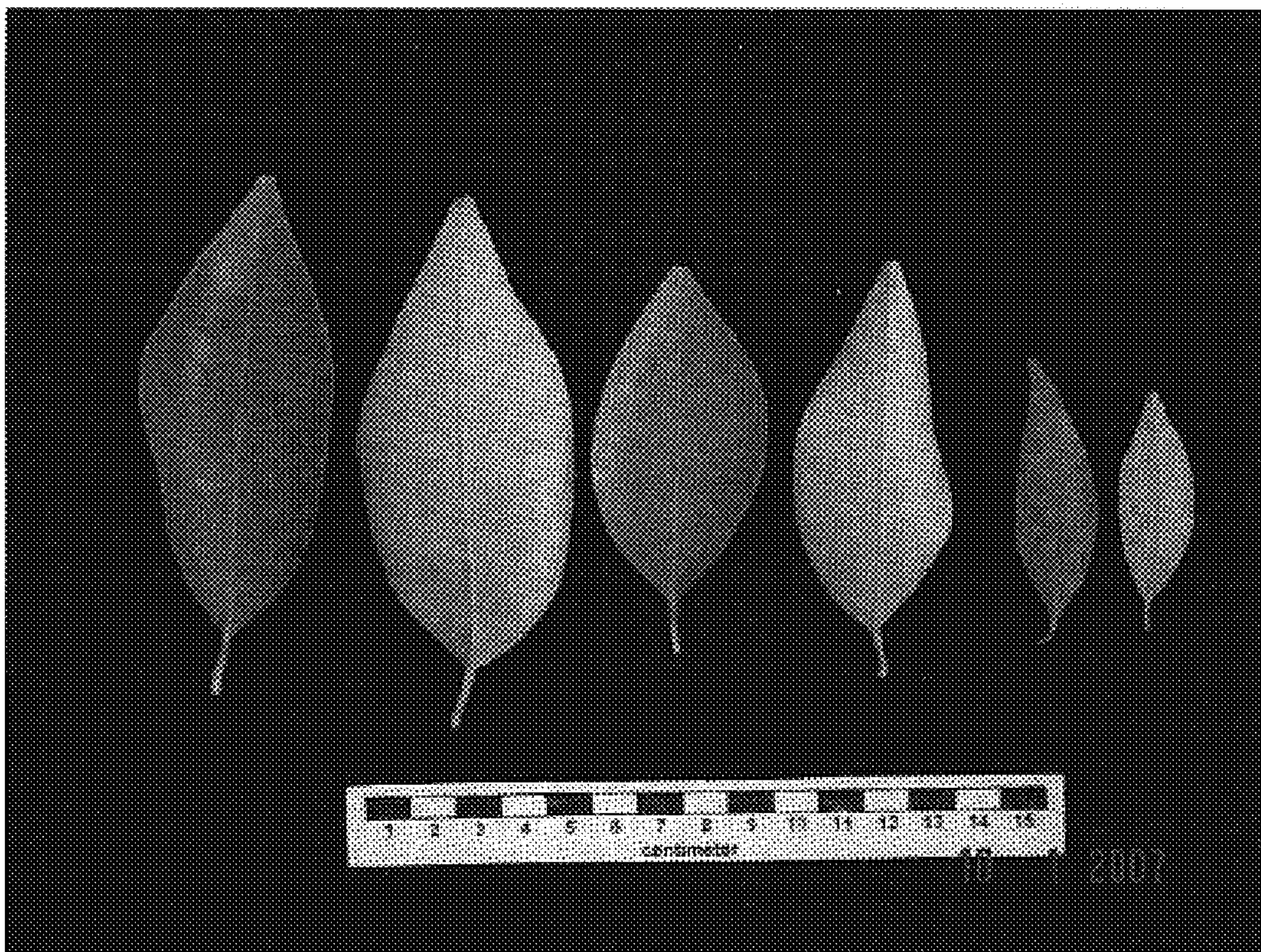


FIGURE 4



FIGURE 5

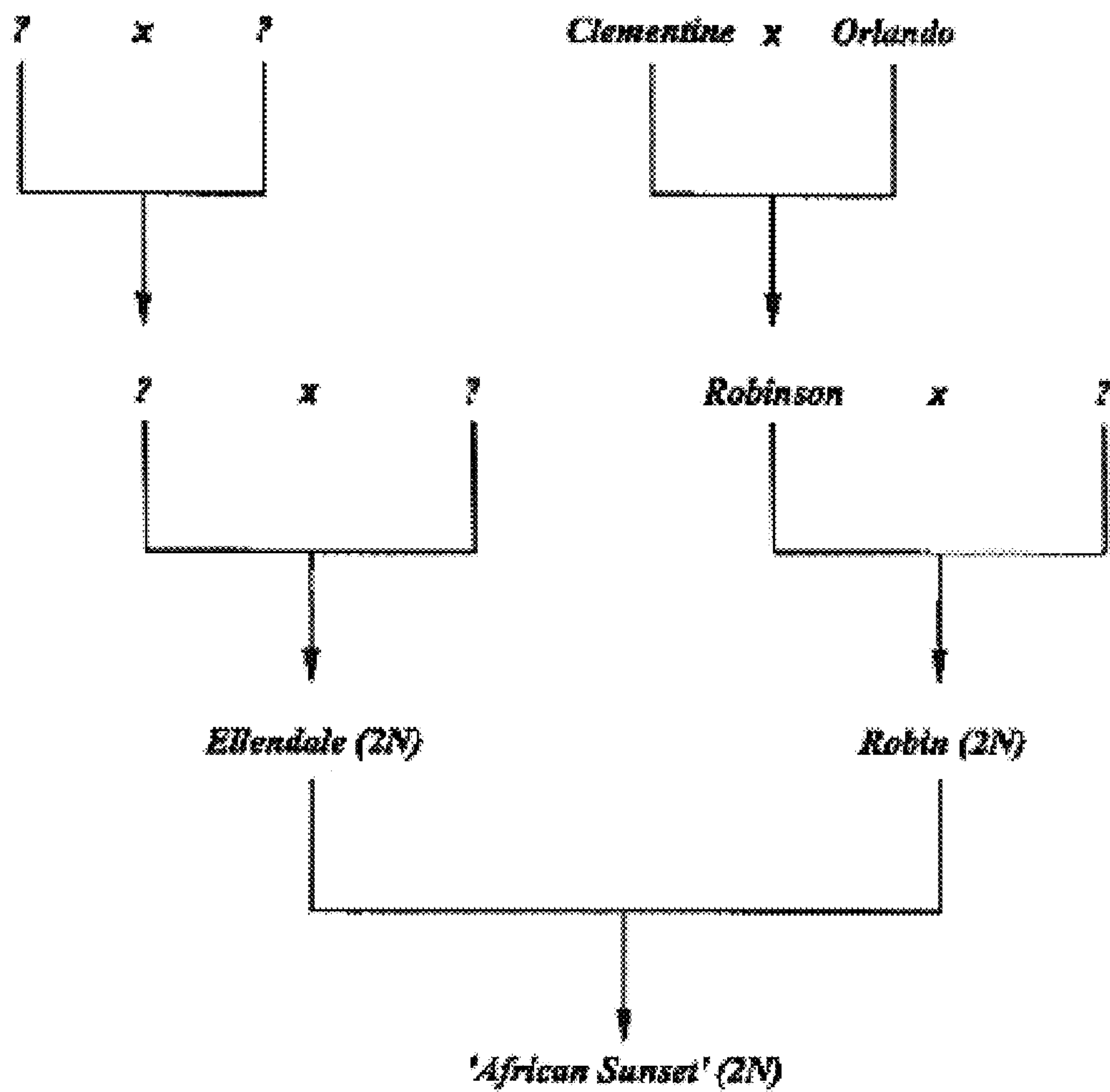


FIG. 6