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Wirthensohn et al.

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(54) **ALMOND VARIETY NAMED 'CARINA'**

(50) Latin Name: ***Prunus dulcis***
Varietal Denomination: **CARINA**

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See application file for complete search history.

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(57) **ABSTRACT**

A new and distinct almond variety of *Prunus dulcis* named 'CARINA', particularly characterized by self-fertility and very high production. Other desirable characteristics include very early to early harvest time, well-sealed semi-hard shells, and high quality, sweet kernels with high oil content.

3 Drawing Sheets

1

Latin name of the genus and species of the plant claimed: *Prunus dulcis*.

Variety denomination: 'CARINA'.

BACKGROUND OF THE INVENTION

The present invention relates to a new and distinct cultivar of almond varieties, botanically known as *Prunus dulcis*, and hereinafter referred to by the name 'CARINA'.

The disclosure provides a new and distinct variety of almond tree, botanically known as *Prunus dulcis*, synonymous with *Prunus amygdalus* Batsch., *Amygdalus communis* L., and *Amygdalus dulcis* Mill., which belongs to the Rosaceae family, and is hereinafter referred to by the variety denomination 'CARINA'.

The new *Prunus dulcis* variety is a product of a controlled breeding program conducted by the inventors Michelle Wirthensohn and Andrew Granger in Adelaide, Australia. The objective of the breeding program was to develop new almond varieties with high production, self-fertility and good kernel characteristics.

The new *Prunus dulcis* 'CARINA' originated from a cross in 1998 in Adelaide, Australia. The female or seed parent is *Prunus dulcis* variety designated 'Nonpareil' (unpatented) and the male or pollen parent is the French self-fertile *Prunus dulcis* variety designated 'Lauranne' (unpatented). The new *Prunus dulcis* 'CARINA' was selected by the inventors from the progeny of the stated cross in field trials in 2009 in Lindsay Point, Australia. First observations occurred in 2003.

Asexual propagation of the new *Prunus dulcis* 'CARINA' by grafting onto *Prunus persica* (L.) Batsch rootstock designated 'Nemaguard' (unpatented) was first performed in 2005 in the orchard located in Lindsay Point, Australia.

2

Asexual propagation of the new *Prunus dulcis* 'CARINA' has confirmed that the characteristics as herein disclosed for the new variety are stable and retained through successive generations of asexual propagation. The new variety propagates true-to-type.

Asexual reproduction of the new almond tree has shown that the unique features of this new almond tree are stable and reproduced true to type in successive generations of asexual reproduction.

SUMMARY OF THE INVENTION

The 'CARINA' variety of almond is of medium size, low to medium vigor with open growth and demonstrates very high and regular production of semi-hard nuts with kernels having an excellent flavour similar to 'Nonpareil' (unpatented). The harvest maturity is similar to 'Nonpareil' (unpatented) and the nuts release from the hulls readily. The percentage of doubles is low, usually less than 1% under growing conditions in the Riverland area of South Australia. The tree is self-fertile and, therefore, is able to produce almonds without the use of pollinators.

The following traits have been repeatedly observed and are determined to be the unique characteristics which make the new variety 'CARINA' clearly distinguishable from its parents and the variety most similar of common knowledge which is 'Peerless' (unpatented):

1. self-fertility;
2. high productivity; and
3. ease of harvest.

The following characteristics listed in Table 1 have been repeatedly observed in combination and distinguish 'CARINA' as a new and distinct almond variety:

TABLE 1

Trait	New variety 'CARINA'	Female parent 'Nonpareil' (unpatented)	Male parent 'Lauranne' (unpatented)	Most similar variety of common knowledge 'Peerless' (unpatented)
Shell type	Semi-hard	Paper	Hard	Semi-hard
Tree habit	Open	Slightly open	Spreading-drooping	Open-spreading
Self-fertility	Present	Absent	Present	Absent
Flowering time	Early	Early-medium	Late-very late	Early
Fruit size	Medium	Medium	Small	Medium-large
Time of maturity	Very early-early	Early	Early-medium	Early-medium

Distinguishing characteristics of 'CARINA' are set out in Table 1. Plants of the new 'CARINA' almond tree have not been observed under all possible environmental conditions and cultural practices. The phenotype may vary somewhat with variations in environment, such as temperature, day length and light intensity, without, however, any variance in genotype.

The primary difference between the new variety and the female parent 'Nonpareil' (unpatented) is the new variety is self-fertile, whereas 'Nonpareil' (unpatented) is self-sterile and requires a pollinator tree planted near to fertilize the flowers and, thus, produce almonds. In comparison to its male parent 'Lauranne' (unpatented), the new variety blooms earlier by about 7-10 days, has larger fruit, and has an open tree habit.

The primary difference between the new variety and the most similar variety of common knowledge 'Peerless' (unpatented) is the new variety is self-fertile, whereas 'Peerless' (unpatented) is self-sterile and requires a pollinator tree planted near to fertilize the flowers and, thus, produce almonds.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying photographs (drawings) illustrate the overall appearance of the new *Prunus dulcis* 'CARINA' showing the colors, as true as is reasonably possible with digital reproduction. Colors in the photographs may differ slightly from the color values cited in the detailed botanical description, which accurately describe the color of 'CARINA'. The trees were grown on Nemaguard rootstock.

FIG. **1** shows typical flowers of 'CARINA', dissected (FIG. **1**A) and in situ (FIG. **1**B).

FIG. **2** shows various images of fruit of 'CARINA', including a one year-old shoot, showing green immature fruit (FIG. **2**A), mature fruit in situ (FIG. **2**B), and kernel and dry fruit shape (FIG. **2**C).

FIG. **3** shows a typical four year-old tree of 'CARINA' on 15 Sep. 2010.

DETAILED BOTANICAL DESCRIPTION

Plants used in the aforementioned photographs and in the following description were grown outside under natural season conditions and cultural practices which approximate those generally used in commercial almond production. During the production of the plants, day temperatures ranged from about 14.5° C. to 48.2° C., night ranged from about −5.7° C. to 14° C. and light levels ranged from about 126,905 to 564,729 foot-candles. Measurements and numerical values represent averages for typical flowering plants.

The following is a detailed description of the new 'CARINA' variety when observed during the growing seasons from 2010 to 2015 at Lindsay Point, Victoria, Australia. During 2015, the 'CARINA' trees were nine years of age. Quantified measurements are expressed as an average of measurements taken from a number of trees of 'CARINA'. The measurements of any individual tree (or any group of trees) of 'CARINA' may vary from the stated average.

Color references are made to The Royal Horticultural Society Colour Chart (R.H.S.)., sixth edition, (2015). Color values were taken under conditions of natural light.

All of the trees of 'CARINA', insofar as they have been observed, have been consistent in the characteristics described below.

Classification:

Botanical.—*Prunus dulcis.*

Parentage:

Female, or seed parent.—*Prunus dulcis* variety designated 'Nonpareil', unpatented.

Male, or pollen parent.—French self-fertile *Prunus dulcis* variety designated 'Lauranne', unpatented.

Propagation:

Type.—Budding onto rootstock.

Time to initiate roots.—NA.

Time to produce young plant.—Eight months.

Root description.—'Nemaguard' (unpatented) rootstock.

Plant description:

Tree:

Size.—Slightly smaller than Nonpareil. At 11 years of age, tree height is approximately 4 meters with a spread of approximately 4.5 meters.

Vigor.—Low to medium.

Density.—Medium to high.

Habit.—Open with some limbs hanging over slightly.

Trunk:

Diameter.—At 4 years of age, about 15 cm wide and about 49.6 cm high.

Texture.—Rough with some cracking.

Color of bark.—RHS N200 B, brownish grey.

Lenticels length.—About 2.3 mm.

Lenticels width.—About 1.2 mm.

Lenticels density.—About 10 per cm^2 on nine year-old wood.

Lenticels shape.—Narrow elliptic.

Lenticels color.—RHS 165A, moderate brown.

Current season shoot:

Shape in cross section.—Round.

Color.—RHS 143B, strong yellow green.

Texture.—Smooth and glabrous.

One year-old shoot:

Length.—Up to about 90 cm.

Texture.—Smooth to slightly rough.

Internode length.—About 20-24 mm.

Thickness.—Thin to medium, about 2.5-3.8 mm.

Shape in cross section.—Round.

Color.—RHS N199D, strong yellowish brown.

Anthocyanin coloration.—Strong coloration on sunny side; Lower surface: RHS 143A; Upper surface: RHS 178A.

Intensity of anthocyanin coloration.—Strong.

Feathering.—Very slight to slight.

Lenticels.—Present.
Lenticels density.—About 25-31 per cm^2.
Lenticels shape.—Elliptic.
Lenticels length.—About 0.8-1.6 mm.
Lenticels width.—About 1 mm.
Lenticels color.—RHS 156D.

Buds:
Shape.—Lateral: obtuse; Terminal: acute.
Length.—Lateral: About 5.5-5.9 mm; Terminal: About 5-5.7 mm.
Diameter.—Lateral: About 2.9-3.3 mm; Terminal: About 3.2-3.7 mm.
Color.—Lateral: RHS 166A; Terminal: RHS 200B.

Spurs:
Shape.—Cylindrical.
Length.—About 12.4-35.6 mm.
Diameter.—About 4.4-5.9 mm.
Color.—RHS 174A.
Leaves per spur.—About 13.1.

Mature wood:
Color.—RHS 166B.

Foliage:
Density.—Medium.

Leaf blade:
Length.—About 55-70 mm, average 62 mm.
Width.—About 18-26 mm, average 23 mm.
Length/width ratio.—Low.
Shape.—Elliptic.
Shape of base.—Obtuse.
Shape of apex.—Obtuse.
Color.—Upper surface: RHS NN137B, greyish olive green.
Incisions of margin.—Crenate.
Venation type.—Arcuate to pinnate.

Petiole:
Length.—About 14-28 mm, average 20 mm.
Color.—RHS 144A, strong yellow green.
Shape in cross section.—Concave.

Flower buds:
Distribution.—Intermediate.
Shape.—Conical.
Color of tip of petals.—RHS 62D, pale purplish pink.
Color of sepals.—RHS 183B, dark red.
Hairiness of sepals.—Medium.

Flower:
Diameter of flower.—About 38-45 mm, average 40 mm, medium.
Depth of flower.—About 17.82 mm (average).
Number of flowers.—Single or clusters up to seven.
Color of flower.—Pale pink center when mature.
Scent.—Fragrant.
Length of petals.—About 19.2 mm (average).
Width of petals.—About 15.9 mm (average).
Texture of petals.—Upper surface: Smooth; Lower surface: Very smooth.
Margin.—Indented, retuse, rounded, 2-3 lobes.
Shape of petals.—Elliptic.
Shape of apex.—Retuse, indented.
Shape of base.—Acute.
Number of petals.—Five.
Color of petals.—Upper surface: RHS NN155C with pink blush to RHS N66A; Lower surface: RHS NN155C.
Number of stamens.—About 31.8 (average).
Color of stamens.—White to RHS 63C pink.
Number of pistils.—Always one.
Length of pistils.—About 15.22 mm (average).
Color of pistils.—RHS 145C with some anthoy on lower parts.
Position of stigma as compared with anthers.—Below.

Sepals:
Number.—Five.
Shape.—Broad elliptic.
Length.—About 7.34 mm (average).
Width.—About 4.84 mm (average).
Apex.—Rounded.
Margin.—Very hairy.
Color.—Outer: RHS 138B; Inner: RHS 138C nectary RHS 25B.

Pedicels:
Length.—About 2.71 mm (average).
Color.—RHS 144A.

Stamen:
Anthocyanin coloration of filament.—Present; white to pink RHS 63C.
Filament length.—About 8.28 mm (average).

Stigma:
Size.—Large.

Pollen:
Amount.—Moderate.
Color.—RHS 153D.

Green fruit:
Size.—Large.
Shape.—Ovate.
Average length.—About 37.7 mm.
Average width.—About 30.67 mm.
Average thickness.—About 25.01 mm.
Color.—RHS N148C, moderate yellow green.
Pubescence.—Much.

Dry fruit:
Shape.—Ovate.
Shape of apex.—Pointed.
Length.—About 26-34 mm.
Width.—About 18-25 mm.
Thickness.—About 14-17 mm.
Average weight.—About 2.7 g.
Color.—RHS 164B, moderate orange yellow.
Surface.—Smooth with moderate pitting.
Thickness of endocarp.—About 2-3 mm.
Resistance to cracking.—Medium, semi-hard.
Percentage of kernel to dry fruit.—Approximately 34%.
Keel development.—Weak.
Distribution on tree.—On spurs and one year-old shoots.
Base.—Flat.
Color.—Inner surface: RHS 164B.

Fruit:
Percentage of double kernels.—Very low, less than 1%.
Eating quality.—Excellent. Oil content average is about 57.4%; Oleic acid is about 62.3%, Vitamin E is about 53.8 mg/100 g oil.
Production.—Regular fruit bearer.

Kernel:
Shape.—Broad elliptic.
Size.—Small.
Average weight.—About 1 g.
Length.—About 19-24 mm.
Width.—About 11-15 mm.
Thickness.—About 7-9 mm.

Main color.—RHS 164B, moderate orange yellow.
Intensity of color.—Light.
Rugosity.—Weak.
Taste.—Sweet.
Apex.—Mucronate.
Base.—Rounded.
Yield.—About 5,634 kg/ha at 10 years.

Blooming/flowering timing:

Time of beginning of flowering.—Full bloom four to five days before 'Nonpareil'; Early August to late August (winter — Australia).
Time of leaf budburst in relation to beginning of flowering.—Early August, generally as flowering is occurring.
Flowering period.—Early August to late August (winter — Australia); Up to about 29 days (about 4 weeks) depending on the weather; Full bloom in about middle of August (Australia).
Time of maturity.—Approximately 30 weeks from beginning of flowering (about 7 months from August to March — Australia).

Cultural characteristics:

Susceptibility to disease.—Very good tolerance to bacterial spot.

Storage/shipping:

Storage.—Good storage ability due to high level of oleic acid (about 62%).
Shipping ability.—Good.

Harvest:

Peak.—February (late summer — Australia); Approximately 8 days after Nonpareil.

Pest resistance/susceptibility:

Resistance.—Semi-hard shell is resistant to insect attacks.

We claim:

1. A new and distinct variety of almond tree (*Prunus dulcis*) named 'CARINA', as illustrated and described herein.

* * * * *

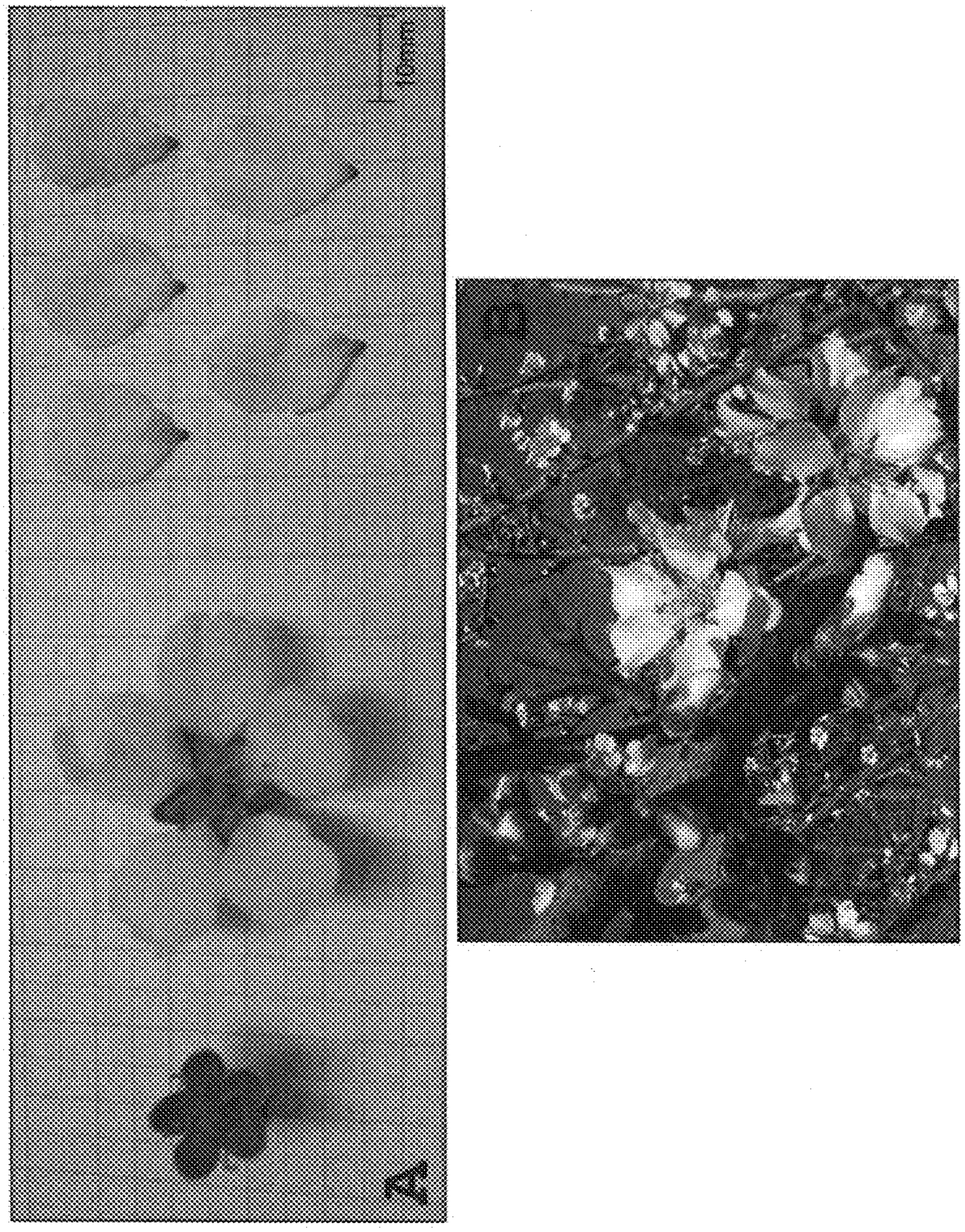

Figure 1

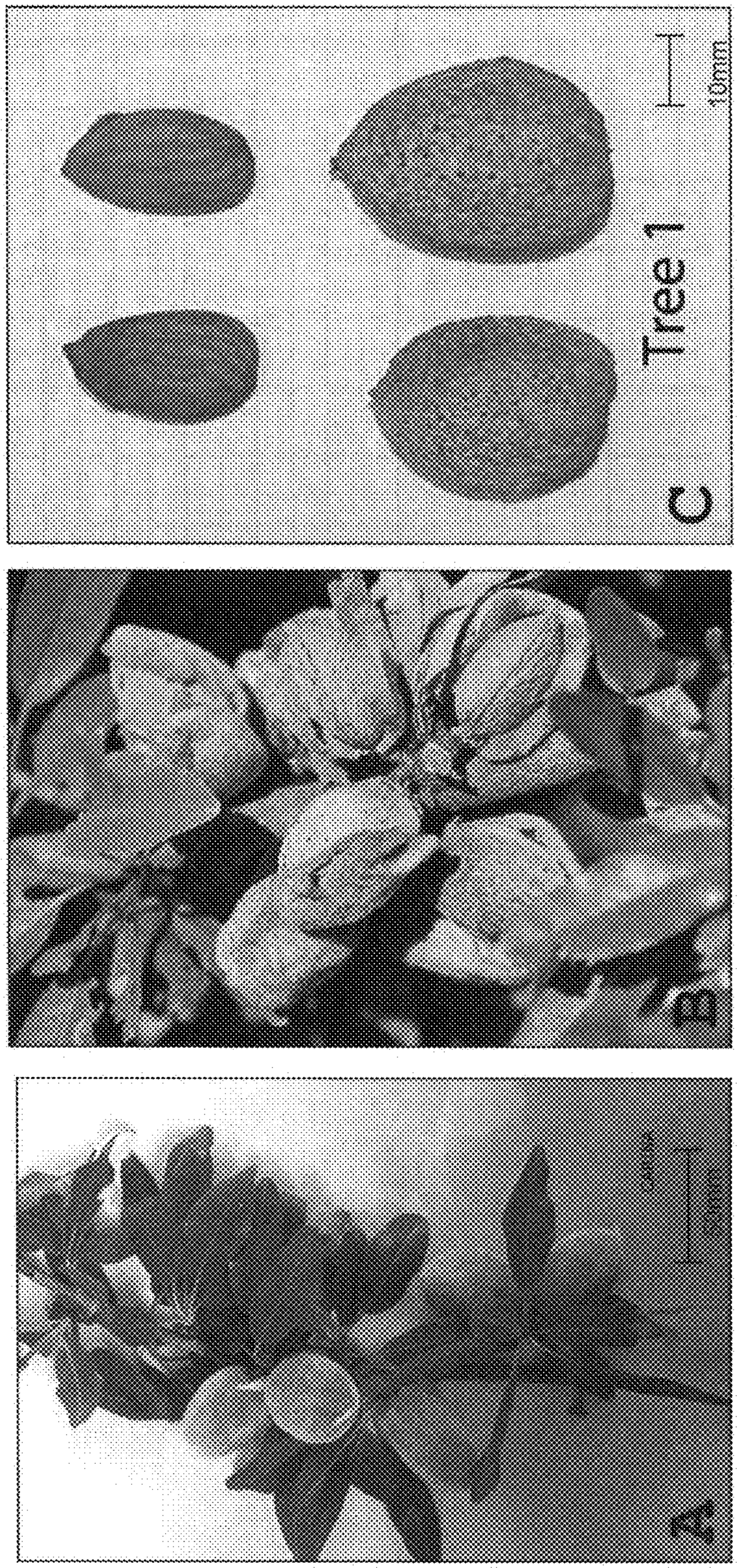

Figure 2

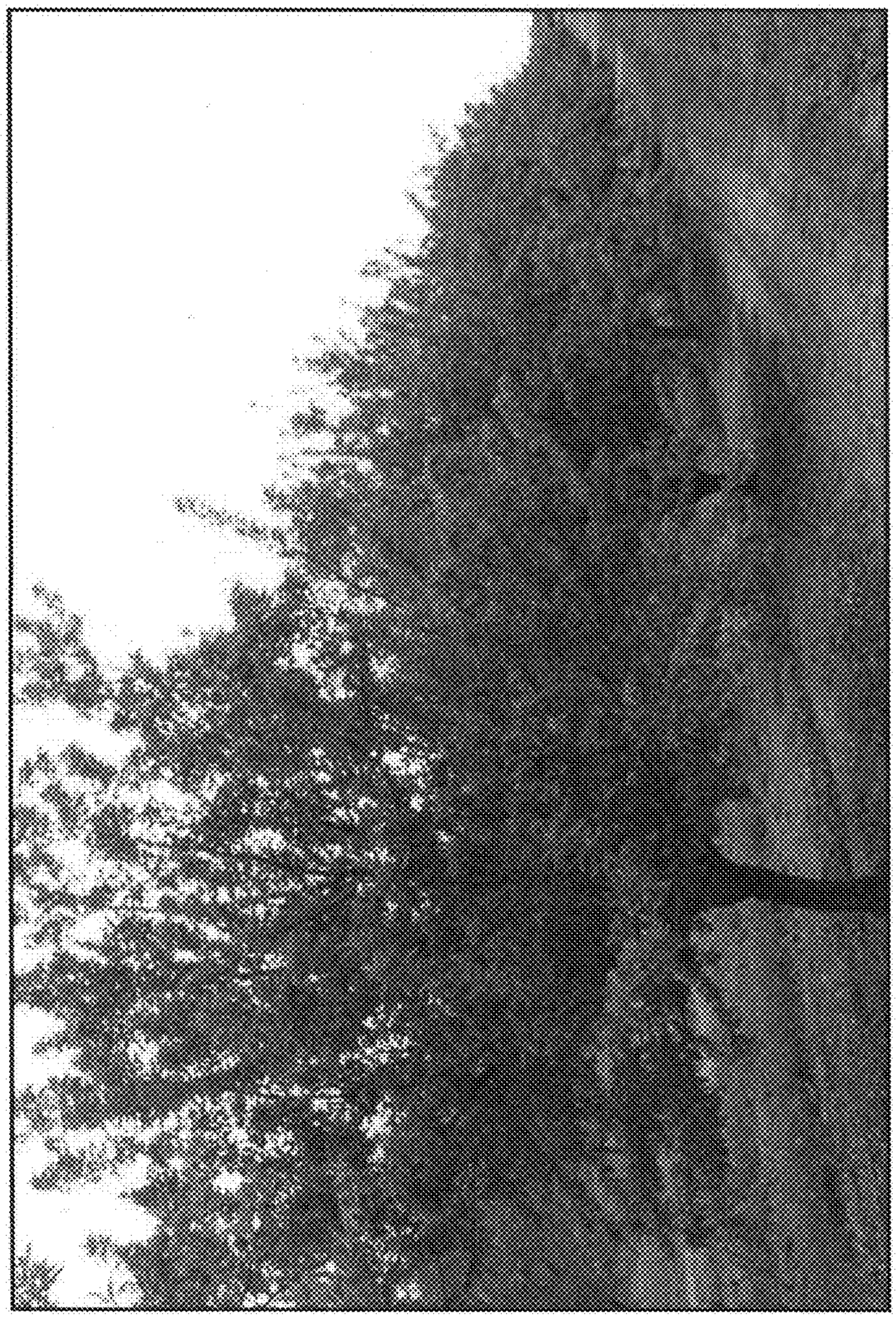

Figure 3