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Carmi et al.

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(54) **MEDITERRANEAN MANDARIN TREE
NAMED ‘ODEM’**

(50) Latin Name: *Citrus deliciosa* Ten (ex *C. reticulata*
Blanco)
Varietal Denomination: **ODEM**

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patent is extended or adjusted under 35
U.S.C. 154(b) by 94 days.

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(51) **Int. Cl.**
A01H 5/00 (2006.01)

(52) **U.S. Cl.**
USPC **Plt./202**; Plt./156; Plt./201

(58) **Field of Classification Search**
USPC Plt./156, 201, 202
See application file for complete search history.

(56) **References Cited**

PUBLICATIONS

Israel Plant Breeders’ Rights application No. 3670/04 filed Aug. 5,
2004 for Mediterranean Mandarin named ‘ODEM’ (5 pgs.).

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(57) **ABSTRACT**

A new and distinct mandarin variety of *Citrus deliciosa* Ten.
named ‘ODEM’, particularly characterized by easy-peeling,
mid-season ripening, high quality flavor, flattened-rounded
fruit shape at stalk end, medium size fruit and dark orange-red
skin color.

7 Drawing Sheets

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Botanical name of the genus and species of the plant
claimed: *Citrus deliciosa* Ten (ex *C. reticulata* Blanco).

Variety denomination: ‘ODEM’.

BACKGROUND OF THE INVENTION

The present invention relates to a new and distinct variety
of a mandarin tree, botanically known as *Citrus deliciosa*
Ten., of the Rutaceae Family, and hereinafter referred to by
the variety denomination ‘ODEM’.

The new *Citrus deliciosa* Ten. variety is a product of a
planned breeding program conducted by the inventors, Nir
Carmi, Hanna Neuman-Leshem, Ahuva Frydman-Shani, Pin-
chas Spiegel-Roy, Aliza Vardi, Avraham Elhanati, Yosef
Yaniv, Kanonich Yeoshua, and Ahuva Daos, in the Volcani
Center, Bet Dagan, Israel. The objective of the breeding pro-
gram was to develop a new easy peeling, mid-season ripening
mandarin variety, with high quality flavor.

The new *Citrus deliciosa* Ten. variety originated from a
mutation induced by irradiation, in 1996, of a seedling which
resulted from a cross made by the inventors in 1985 in the
Volcani Center. The female or seed parent is the *Citrus deli-
ciosa* Ten. designated ‘ORAH’ (unpatented). The male or
pollen parent is the *Citrus deliciosa* Ten. designated ‘SHANI’
(patented, U.S. Plant Pat. No. 13,634). The new *Citrus deli-
ciosa* Ten. ‘ODEM’, after irradiation, was observed and fur-
ther selected, by the inventors, in a controlled environment in
2005 in The Volcani Center.

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Asexual propagation of the new *Citrus deliciosa* Ten. vari-
ety ‘ODEM’ by grafting onto ‘Troyer’ citrange—*Citrus sin-
ensis* (L.) Osb.×*Poncirus trifoliata* L. (unpatented) was first
performed in April 1996 in the Volcani Center, and has dem-
onstrated that the combination of characteristics as herein
disclosed for the new variety are firmly fixed and retained
through successive generations of asexual propagation. The
new variety propagates true-to-type.

BRIEF DESCRIPTION OF THE INVENTION

The following traits have been repeatedly observed and are
determined to be characteristics of ‘ODEM’, which in com-
bination, distinguish this mandarin plant as a new, unique and
distinct variety:

1. Easy-peeling;
2. Mid-season ripening;
3. High quality flavor;
4. Fruit shape at stalk end flattened-rounded;
5. Medium size fruit; and
6. Dark orange-red skin color.

In comparison to the parental varieties, ‘ORAH’ (unpat-
ented) and ‘SHANI’ (patented, U.S. Plant Pat. No. 13,634),
‘ODEM’ differs primarily in the traits listed in Table 1.

TABLE 1

Comparison of 'ODEM' with parent varieties.			
Trait	New Variety 'ODEM'	Female Parent 'ORAH' (unpatented)	Male Parent 'SHANI' (patented, U.S. Plant Pat. No. 13,634)
Color of rind	dark orange red	orange	orange red
Surface	Smooth to medium rough	smooth	smooth
Thickness of rind	medium	medium	thin
Adherence of rind to flesh	weak	weak	weak

Of the many commercial varieties known to the present inventors, the most similar in comparison to the new *Citrus deliciosa* Ten. 'ODEM' is *Citrus deliciosa* Ten. 'MURCOTT', in the following characteristics described in Table 2:

TABLE 2

Comparison of 'ODEM' with commercial variety.		
Characteristic	New Variety 'ODEM'	Comparison Variety 'MURCOTT' (unpatented)
Color of rind	dark orange red	orange
Surface	Smooth to medium rough	rough
Thickness of rind	medium	thin
Adherence of rind to flesh	weak	medium

BRIEF DESCRIPTION OF THE PHOTOGRAPHS

The accompanying photographs illustrate the overall appearance of the new *Citrus deliciosa* Ten. variety 'ODEM' showing the colors as true as is reasonably possible with colored reproductions of this type. Colors in the photographs may differ slightly from the color values cited in the detailed morphological description, which accurately describe the color of 'ODEM'.

- FIG. 1 shows an adult tree of 'ODEM'.
- FIG. 2 shows a fruit-bearing tree of 'ODEM'.
- FIG. 3 shows a typical leaf of 'ODEM'
- FIG. 4 shows a typical mature fruit of 'ODEM', viewed at base and apex.
- FIG. 5 shows a mature fruit of 'ODEM' in cross section.
- FIG. 6 shows a close-up view of skin oil glands of a mature fruit of 'ODEM'.
- FIG. 7 shows the albedo on the inside peel of a mature fruit of 'ODEM'.

DETAILED MORPHOLOGICAL DESCRIPTION

The new *Citrus deliciosa* Ten. 'ODEM' has not been observed under all possible environmental conditions. The phenotype of the new variety may vary with variations in environment such as temperature, light intensity, day length, soil or pruning, without any change in the genotype of the mandarin plant.

The aforementioned photographs, together with the following observations, measurements and values describe plants of 'ODEM' as grown in the orchard in The Volcani Center, under conditions which closely approximate those generally used in commercial practice. "Pardes" the Hebrew

word for citrus orchard is derived from the Persian "pairida ēza" which means surrounded by a wall. From the same word the word "paradise" was deducted.

The described trees were grafted on 'Troyer' citrange—*Citrus sinensis* (L.) Osb.×*Poncirus trifoliata* L. (unpatented) and planted at a distance of 1.5×5 m in sandy red loam soil at an elevation of about 30 meters above sea level with Irrigation of 100 m³ per hectare during summer, and addition of 1 liter of fertilizers (7:3:7+micro-elements (trace elements)) per 1 m³ of water. Average annual rainfall is about 550 mm, with an average 350 mm of rainfall in winter (December to February). Mean diurnal minimum temperature in January is 7.2° C., and mean diurnal maximum temperature in July is 30.8° C.

Unless otherwise stated, the detailed morphological description includes observations, measurements and values taken from 2009 to 2011 and based on thirteen-year-old 'ODEM' trees, grafted in 1996 and grown in the orchard in the Volcani Center. Quantified measurements are expressed as an average or a range of measurements taken from a number of plants of 'ODEM'. The measurements of any individual plant, or any group of plants, of the new variety may vary from the stated average or range.

Color references are made to The Royal Horticultural Society Colour Chart (R.H.S.), (1986 edition), except where general colors of ordinary significance are used. Color values were taken under daylight conditions in full sunlight in The Volcani Center, Bet Dagan, Israel.

All of the plants of 'ODEM', insofar as they have been observed, have been consistent in all the characteristics described below.

Classification:

Botanical.—*Citrus deliciosa* Ten.

Parentage:

Female or seed parent.—*Citrus deliciosa* Ten. 'ORAH' (unpatented).

Male or pollen parent.—*Citrus deliciosa* Ten. 'SHANI' (patented U.S. Plant Pat. No. 13,634).

Propagation: Grafting onto 'Troyer' citrange—*Citrus sinensis* (L.) Osb.×*Poncirus trifoliata* L. (unpatented).

Growing conditions:

Light intensities.—Full sunlight.

	January	February	March	April
Mean maximum air temperature (° C.)	17.8	18.1	20.1	24.5
Mean minimum air temperature (° C.)	7.2	7.1	8.8	11.5
Mean rainfall (mm)	140.5	96.9	66.1	17.5
	May	June	July	August
Mean maximum air temperature (° C.)	27	29.2	30.8	31.2
Mean minimum air temperature (° C.)	14.6	17.9	20.6	21.2
Mean rainfall (mm)	2.2	—	—	—
	September	October	November	December
Mean maximum air temperature (° C.)	30.4	28.3	24.1	19.7
Mean minimum air temperature (° C.)	19.4	16	11.8	8.6
Mean rainfall (mm)	0.4	20.4	76.2	130.3

Fertilization.—A balanced fertilizer with level of 7:3:7 (N:P:K)+micro-elements.

Pollination requirements.—None; variety is parthenocarpic.

Growth regulators.—None used.

Pruning.—Manual pruning is applied. The size and overall shape of mandarin trees essentially depend on pruning and spacing. ‘ODEM’ was pruned, creating a tree which is conical to spherical in shape with 4 or 5 main branches. When the trees are freely grown, the size and the shape assumed by the trees are typical of *Citrus deliciosa* Ten.

BOTANICAL CHARACTERISTICS

Age: Observed trees were 13-years-old.

Fruit:

Type.—Mandarin.

Tree:

Vigor.—Strong.

Height.—About 2.5 m.

Diameter of crown.—About 2.5 m.

Overall shape.—Triangular to rounded.

Density of canopy.—Dense.

No of main brunches.—5.

Diameter of trunk.—About 15 cm.

Color of bark.—Very dark gray closest to RHS 201 A.

Surface of bark.—Nearly smooth.

Lenticels.—Not visible.

Main branches:

Attitude.—Semi-upright.

Angle relative to trunk.—About 45°.

Length.—About 2 m.

Thickness.—5-10 cm.

Color of bark.—Very dark gray closest to RHS 201 A.

Surface of bark.—Nearly smooth.

Lenticels.—Not visible.

Young leaf:

Anthocyanin coloration.—Absent.

Upper side green color.—Between RHS 146 A and 146 B.

Lower side green color.—RHS 146 D.

Surface.—Smooth.

Glossiness.—Weak.

Pubescence.—Absent.

Fully developed leaf-blade:

Length.—60-70 mm.

Width.—28-32 cm.

Shape in cross section.—Concave.

Twisting.—Absent.

Blistering.—Medium.

Upper side green color.—RHS 146 A.

Lower side green color.—RHS 146 D.

Pubescence on upper side.—Absent.

Pubescence on lower side.—Absent.

Firmness.—Weak.

Undulation of margin.—Medium.

Incisions of margin.—Crenate.

Depth of incisions of margin.—Shallow.

Shape of apex.—Acute with obtuse to rounded occasional emarginate tip.

Shape of base.—Obtuse.

Glossiness.—Weak.

Petiole:

Length.—12-15 mm.

Width of wing.—1-2 mm.

Width of wing relative to leaf blade.—Very narrow.

Shape in cross section.—Concave.

Upper side green color.—RHS 146 A.

Lower side green color.—RHS 146 D.

Pubescence.—Absent.

Surface.—Smooth.

Petiole wing:

Upper side green color.—RHS 146 A.

Lower side green color.—RHS 146 D.

Surface.—Smooth.

Flower bud:

Anthocyanin coloration.—Absent.

Shape.—Spherical.

Color.—Yellowish white RHS 150 D.

Length.—5-8 mm.

Diameter.—About 5 mm.

Vegetative bud:

Anthocyanin coloration.—Absent.

Shape.—Spherical.

Color.—Very light green RHS 150 A.

Length.—1-2 mm.

Diameter.—1-2 mm.

Flower:

No. of petals.—5.

Shape.—Star-like.

Diameter of corolla.—16-20 mm.

Scent.—Typical for citrus.

Pedicel:

Length.—4-5 mm.

Shape in cross section.—Circular.

Color.—Light green RHS 144 C.

Thickness.—About 1 mm.

Calyx:

Diameter.—About 4 mm.

Color.—Very light green between RHS 145 C and 145 D.

Shape.—Flattened.

Shape of apex of lobe.—Acute.

Size.—Miniscule.

Petal:

Shape.—Elongated.

Length.—10-12 mm.

Width.—5-6 mm.

Color of upper side.—White RHS 155 A.

Color of lower side.—White RHS 155 A.

Stamina:

Number.—About 17.

Anther:

Length.—Less than 1 mm.

Color.—Yellow RHS 13 C.

Shape.—Elongated.

Filament:

Length.—5-7 mm.

Thickness.—Less than 1 mm.

Color.—White RHS 155 A.

Pollen:

Color.—Yellow RHS 13 C.

Viability.—Low.

Style:

Length.—5-6 mm.

Diameter.—1-2 mm.

Color.—Green RHS 144 D.

Stigma:

Shape.—Rounded.*Color*.—Yellow RHS 13 C.

Fruit:

Length.—50-58 mm.*Diameter*.—66-78 mm.*Ratio length/diameter*.—Shorter than broad.*Position of maximum diameter*.—In the middle.*Shape in cross section*.—Rounded scalloped.*Shape at stalk end*.—Flattened-rounded.*Depression at stalk end*.—Absent.*Neck*.—Absent.*Radial grooves at stalk end*.—Absent.*Floral disc below calyx*.—Absent.*Abscission layer between calyx and fruit*.—Absent.*Shape at distal end*.—Flattened-rounded.*Depression at distal end*.—Present.*Depth of depression at distal end*.—Very shallow less than 1 mm.*Diameter of depression relative to fruit*.—Small.*Areola*.—Present, complete.*Conspicuousness of areola*.—Medium.*Type of areola*.—Smooth.*Diameter of areola relative to diameter of fruit*.—Large.*Stylar scar*.—Typical.*Persistence of style*.—Absent.*Navel opening*.—Present.*Diameter of navel opening*.—5-10 mm.*Protrusion of navel*.—Absent.*Radial grooves at distal end*.—Absent.*Main color of surface*.—Dark orange red RHS 32 A.*Pubescence of surface*.—Absent.*Glossiness*.—Medium.*Roughness of surface*.—Smooth to medium rough.*Evenness of size of oil glands*.—Uneven small and large ones.*Size of larger oil glands*.—About 1 mm.*Conspicuousness of larger oil glands*.—Strong.*Pebbles on oil glands*.—Medium dense.*Color of oil glands*.—Light orange RHS 23B.*Firmness*.—Medium.*Thickness of rind*.—Medium 2-3 mm.*Adherence of rind to flesh*.—Weak.*Strength of rind*.—Strong.*Oiliness of rind*.—Medium.*Oil glands on inner side*.—Inconspicuous.*Color of albedo*.—Light orange RHS 27 B.*Density of albedo*.—Medium.*Adherence of albedo to flesh*.—Medium.*Amount of fibers in albedo*.—Few.*Differently colored spots in flesh*.—None.*Bicolored segments*.—None.*Color of flesh*.—Light orange RHS 25 B.*Filling of core*.—Half filled.*Diameter of core relative to fruit*.—Medium 10-14 mm.*Number of non-developed segments*.—Non or very few.*Number of developed segments*.—Many 11 or 12.*Number of open segments*.—None.*Adherence of segments*.—Weak.*Strength of segment wall*.—Weak.*Length of juice vesicle*.—4-7 mm.*Thickness of juice vesicle*.—About 4 mm.*Conspicuousness of vesicle wall*.—Inconspicuous.*Adherence of juice vesicles*.—Strong.*Presence of navel viewed internally*.—Present.*Length of internal navel*.—Short 6-13 mm.*Ratio length/diameter of internal navel*.—Small.*Juice content*.—Medium.*Total soluble solids*.—15.*Acidity of juice*.—0.96.*Strength of fiber*.—Medium.*Number of seeds*.—None or few, up to 4.*Poly-embryonic seed*.—Absent.

Seed:

Length.—9-13 mm.*Width*.—6-7 mm.*Surface (when fresh)*.—Smooth.*Prominence of veins or wrinkles*.—Not prominent.*External color (when fresh)*.—Greenish white RHS 157 B.*Color of inner seed coat*.—Greenish white RHS 157 B.*Color of cotyledons*.—Greenish RHS 145 C.*External color (when dry)*.—White RHS 155 B.*Flowering habit*.—Once per year.*Fruit ripening*.—January-February.*Parthenocarpy*.—Present.*Time of flowering*.—March.

Market use: Mainly for fresh consumption.

40 Disease resistance: Brown Spot, *Alternaria alternata* pv. *citri* pathotype tangarin Solel.

Pest resistance: No atypical resistance has been noted.

Disease susceptibility: None observed.

Pest susceptibility: None observed.

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We claim:

1. A new and distinct mandarin variety of *Citrus deliciosa* Ten. named 'ODEM', as illustrated and described herein.

* * * * *

FIG. 1



FIG. 2

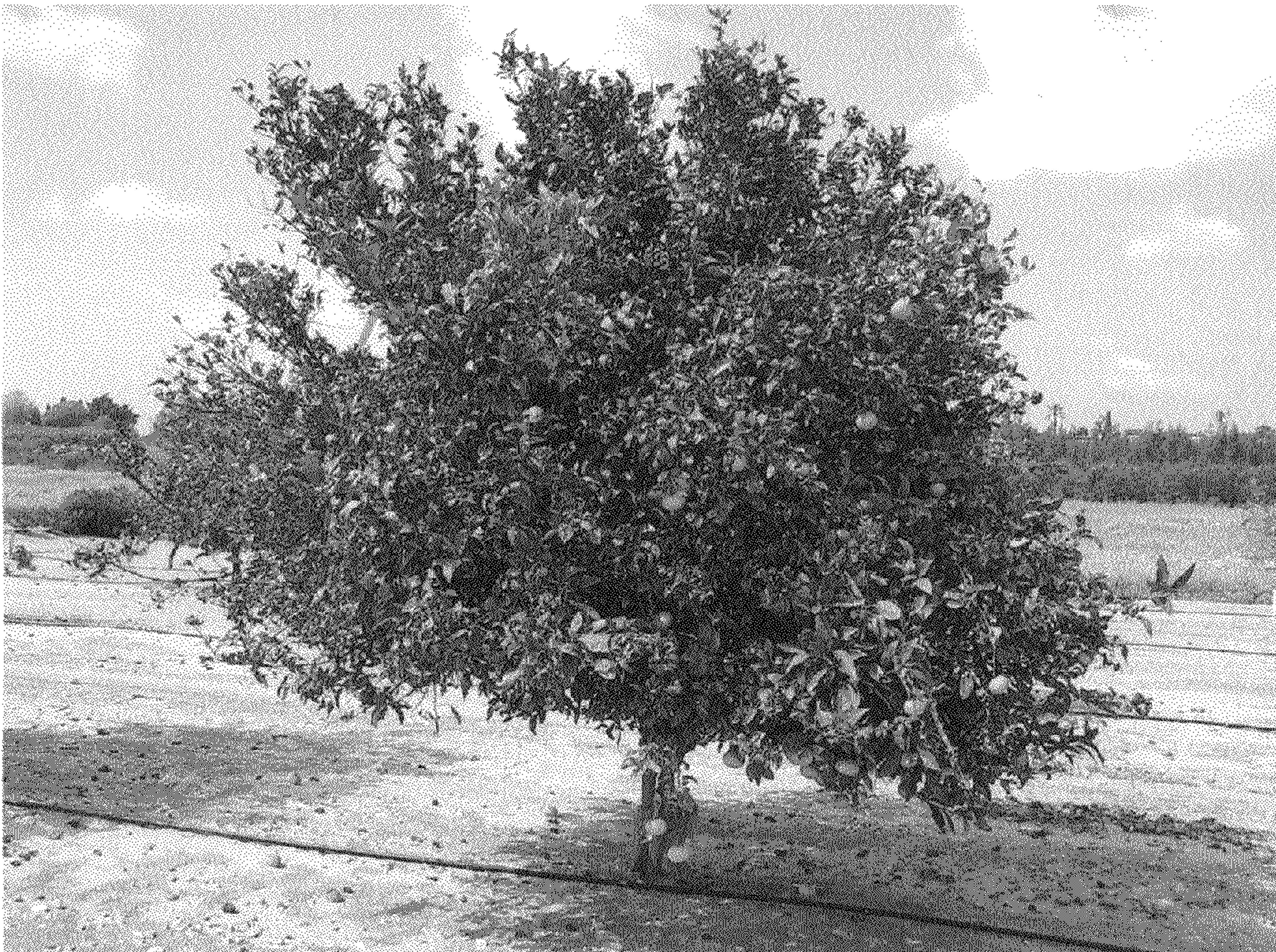


FIG. 3

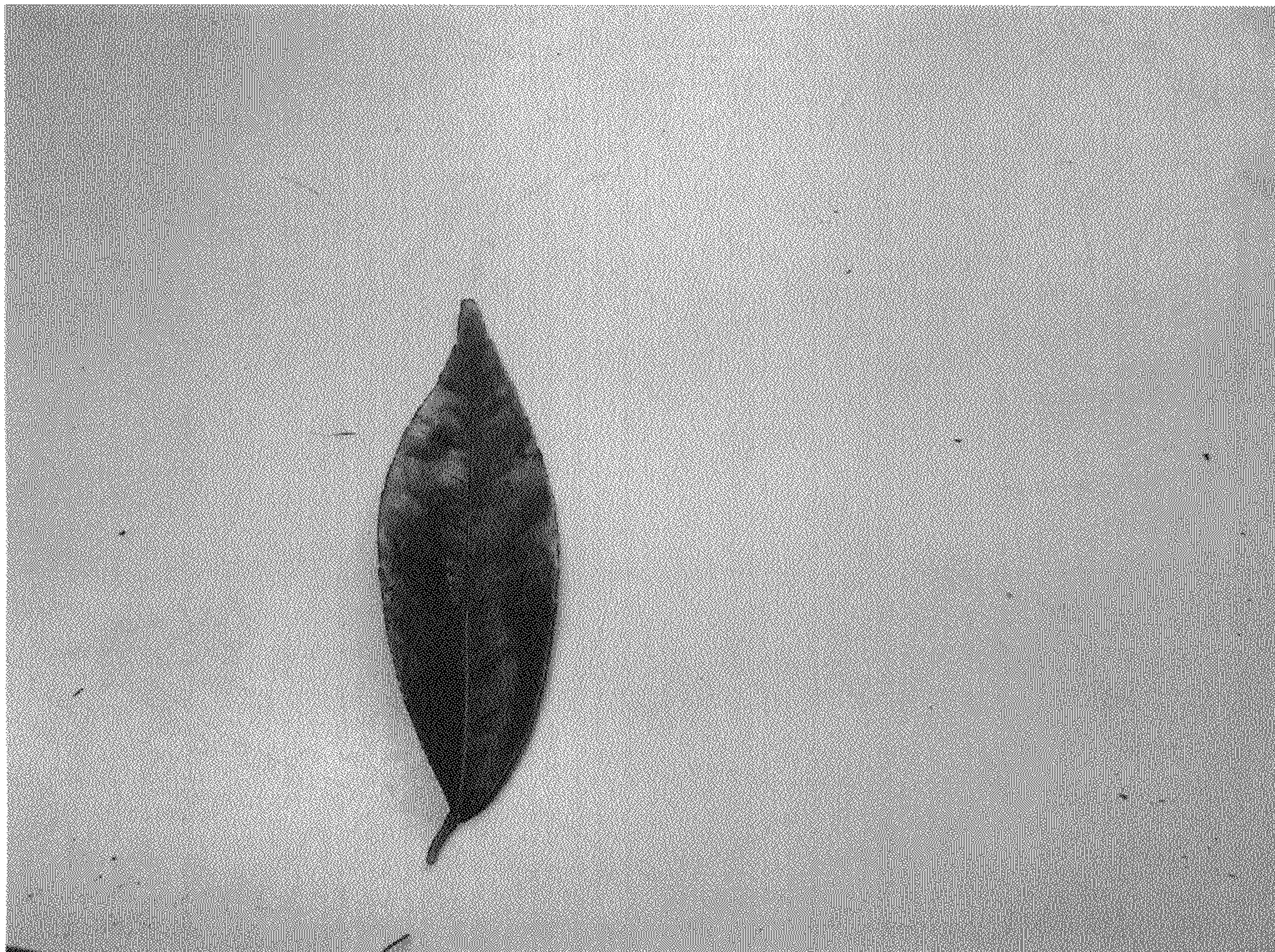


FIG. 4

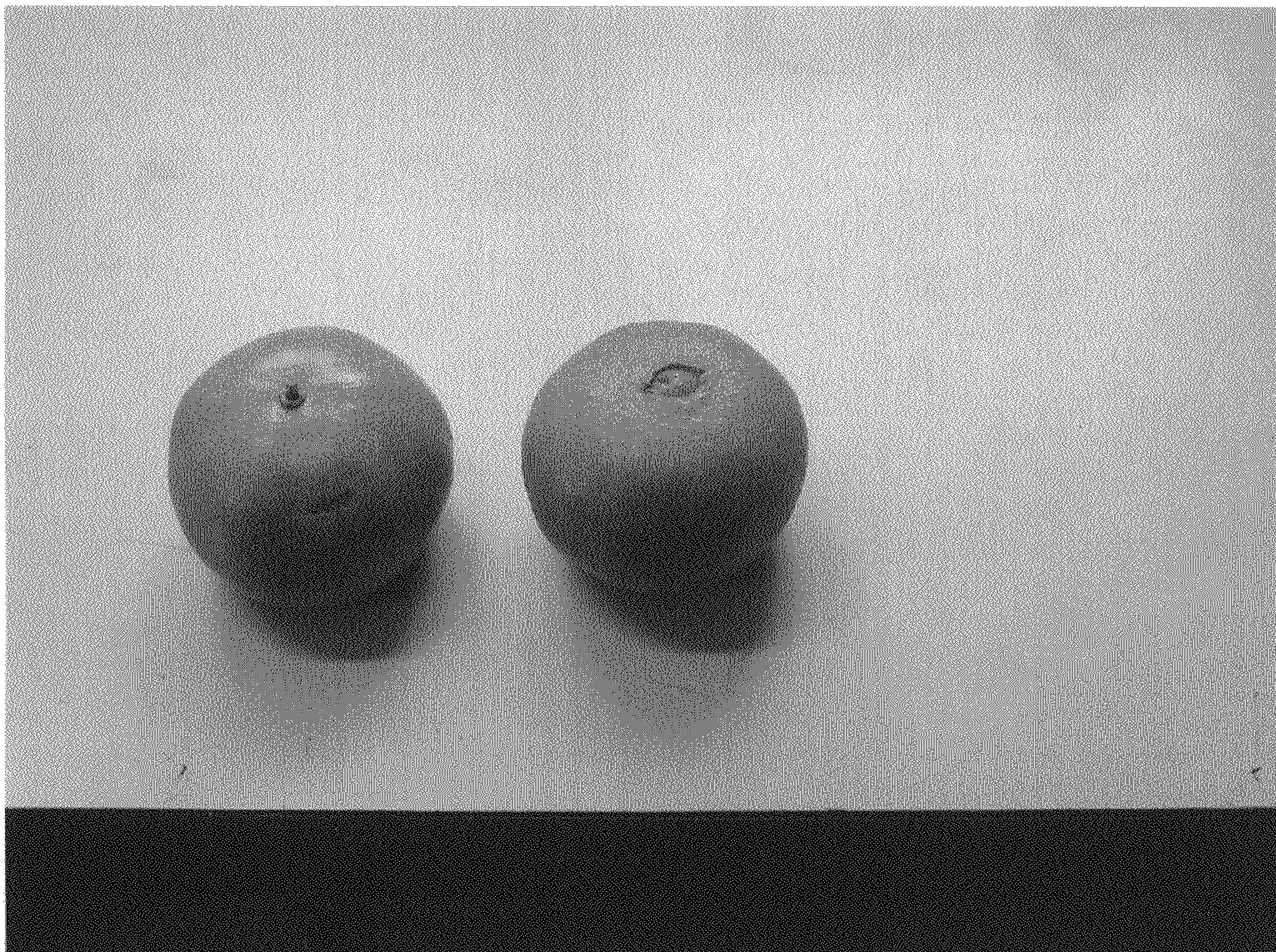


FIG. 5



FIG. 6

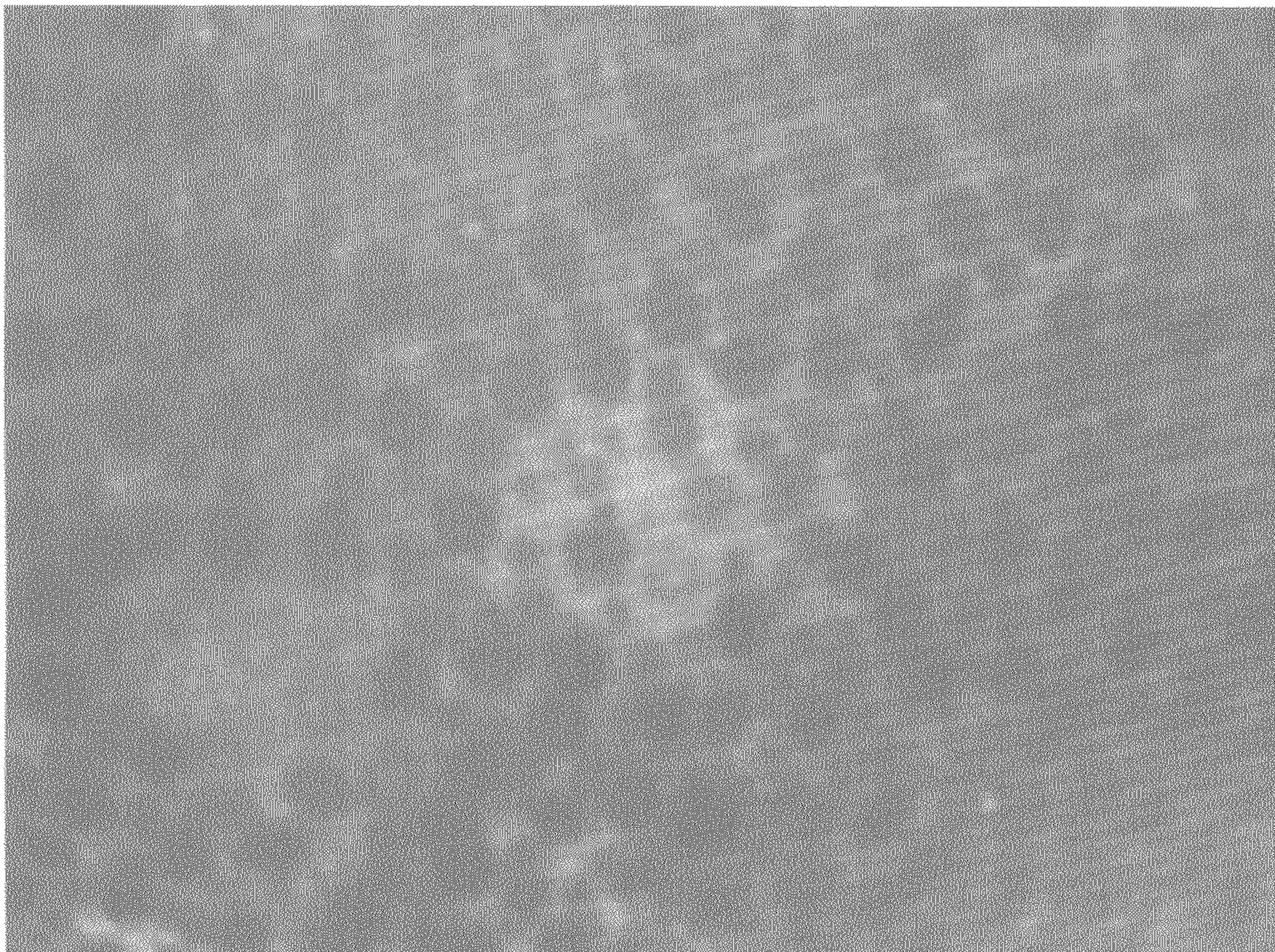


FIG. 7

