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Fear et al.

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[54] RASPBERRY PLANT NAMED 'TOLA'

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[58] Field of Search Plt./204

[56] References Cited

U.S. PATENT DOCUMENTS

P.P. 7,436 2/1991 Ackerman Plt./204

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[57] ABSTRACT

The present invention relates to a new and distinct cultivar of red raspberry plant named 'Tola', botanically identified as *Rubus idaeus* L. The new cultivar is distinguished from other red fruited raspberry cultivars by its fruit of excellent flavor and color, its high yielding capacity (especially on the primocane crop), and its consistency in production of uniform size and shape of fruit. The new cultivar also has greater firmness than most other red fruited cultivars.

2 Drawing Sheets

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BACKGROUND OF THE INVENTION

The new cultivar of raspberry plant was developed from the hybridization of the selection 'H374-2' (an unpatented variety) as the seed parent with the selection 'K589-1' (an unpatented variety) as the pollen parent. The parents were crossed in the Fall of 1991, whereafter fruit and seed were collected to produce seedlings for field planting in Watsonville Calif. in 1991. The new cultivar was selected from these seedlings in September 1992 for its excellent fruit firmness, fruit structure, and disease resistance. The new cultivar has been asexually propagated by in vitro shoot tip culture, root sucker division and root cuttings at the Cassin Ranch in Santa Cruz County, Calif. and has been shown to maintain the desired and distinguishing characteristics after propagation over several generations.

SUMMARY OF THE INVENTION

The present invention provides a new and distinct cultivar of red raspberry plant named 'Tola'. The cultivar is botanically identified as *Rubus idaeus* L. The 'Tola' red raspberry plant produces a primocane crop which begins in mid to late July and continues until late October. The florican crop begins in mid to late May and continues until mid July. Both the primocane and florican yields are high relative to other comparable varieties. The fruit of 'Tola' is notably quite firm and very consistent with regard to its size and shape throughout its harvest period. The fruit of 'Tola' separates easily from its receptacle.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying photographs show typical specimens of the primocane fruit, leaves and shoot of the new cultivar, in color as nearly true as it is reasonably possible to make in color illustrations of these characteristics.

FIG. 1 is a photograph of a 'Tola' primocane mature leaf and fruit.

FIG. 2 is a photograph of a 'Tola' primocane shoot and leaf.

DETAILED BOTANICAL DESCRIPTION

The following detailed description of the new raspberry cultivar, 'Tola', is based upon observations taken of plants

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and fruit grown in Watsonville, Calif. between 1994 and 1997, and is believed to apply to plants of the 'Tola' cultivar grown in similar conditions of soil and climate elsewhere.

Throughout this specification, color names beginning with a small letter signify that the name of the color, as used in common speech, is aptly descriptive. Color data beginning with a capital letter and followed by an alphanumeric code designating the color according to the The R.H.S. Colour Chart published by The Royal Horticultural Society of London, England. Color designations, color descriptions, and other phenotypical descriptions may deviate from the stated values and descriptions depending upon variation in environmental, seasonal, climatic and cultural conditions.

Tables 1 and 2 provide information on the plant and fruit characteristics of the new cultivar 'Tola' compared with characteristics of the unpatented raspberry cultivars 'Heritage', 'Summit' and 'Amity'. The cultivars closest to the new 'Tola' cultivar are 'Amity' for fruit size and 'Summit' for its fruiting cycles. Observations of the cultivars were taken under similar conditions.

The new variety is particularly characterized and distinguished from other cultivars by its fruit firmness, fruit structure, yield, and disease resistance.

The fruit color of 'Tola' is a medium red at harvest but darkens after harvest to a deeper color. Fruit of 'Tola' separates easily from the receptacle and is of excellent firmness at harvest. The fruit of 'Tola' is very consistent in size and shape throughout the harvest period.

The primocane and florican yields of 'Tola' are high relative to the varieties 'Amity' and 'Heritage'.

'Tola' is distinguishable from its pollen parent, selection 'H374-2', by producing a higher yield of fruit and having shinier, brighter fruit. The new cultivar is distinguished from its seed parent, selection 'K589-1', by having smaller and firmer fruit.

ISOZYME ANALYSIS

In addition to the morphological description above, the new cultivar 'Tola' has been analyzed to obtain an indication of its genetic makeup to provide further means for identifying the new variety and distinguishing it from some other somewhat similar and/or related raspberry varieties. Specifically, leaf samples of 'Tola', and the unpatented

varieties 'Summit' and 'Heritage' were analyzed by electrophoresis for isozyme patterns of the enzymes phosphoglucosomerase (PGI), malate dehydrogenase (MDH) and phosphoglucosomutase (PGM) according to the procedure described by J.C. Cousineau and D.J. Donnelly, "Use of isozyme analysis to characterize raspberry cultivars and detect cultivar mislabeling", *Hort Science* 27:1023-1025 (1992). Isozyme characterization of the cultivar 'Tola' is presented in Table 3, with the letters representing the banding patterns for each enzyme as designated in the above-identified article.

DISEASE AND STRESS RESISTANCE

The cultivar has very high resistance to late leaf rust. Resistance is unknown to powdery mildew and root rots. Cold tolerance of the new cultivar has not been established. Post harvest fruit rot resistance is good in comparison over many selections and varieties.

TABLE 1

PLANT CHARACTERISTICS OF 'TOLA'				
	Tola	Heritage	Summit	Amity
<u>General</u>				
Plant size	large	large	small-medium	medium
Growth habit	erect	erect	semi-erect	erect
Productivity	very high	medium	high	low-medium
Self-fruitfulness	self-fruitful	self-fruitful	self-fruitful	self-fruitful
<u>Primocane fruiting</u>				
percent of cane length flowering as primocane	~40-50	~5-20	~40-50	~20-35
percent of total yield	~50-60	~40-60	~50-70	~40-50
Number of young shoots	many	medium	few	many
<u>Primocanes</u>				
number fruiting laterals/cane	9-22 (mean 16)	2-14 (mean 8)	9-15 (mean 12)	6-14 (mean 10)
number of canes/crown	1-5 (mean 3)	3-5 (mean 4)	2-7 (mean 3)	1-6 (mean 3)
young shoot pigmentation	medium intensity red	medium intensity red	medium intensity red	medium intensity red
length (cm)	162-243 (mean 193)	182-230 (mean 208)	137-212 (mean 164)	135-208 (mean 168)
<u>diameter (end of 1st year)</u>				
cane base (cm)	1.0-1.8 (mean 1.4)	0.9-1.4 (mean 1.2)	0.8-1.3 (mean 1.1)	0.8-1.5 (mean 1.1)
central 1/3 of cane (cm)	0.7-1.3 (mean 1.1)	0.8-1.1 (mean 1.0)	0.7-1.0 (mean 0.8)	0.6-1.0 (mean 0.8)
time of shoot emergence	medium	very late	late	medium
<u>prickles</u>				
pigmentation	green-	green-	brownish	purple

TABLE 1-continued

PLANT CHARACTERISTICS OF 'TOLA'				
	Tola	Heritage	Summit	Amity
density on young shoots	brownish green medium	brownish green dense	purple sparse	purple sparse
attitude of tip	downward	downward	downward	horizontal
size	small	medium	medium	small
texture	soft	rigid	heavy	heavy
presence and distribution on petioles	regularly distributed	regularly distributed	regularly distributed	regularly distributed
pubescence on canes	strong	absent or very weak	medium	medium
<u>internodal distance (cm)</u>				
(at central 1/3 of cane)	3.5-6.5 (mean 5.2)	3.0-6.0 (mean 4.7)	3.2-7.5 (mean 4.8)	3.0-6.5 (mean 5.0)
lenticels	not visible	not visible	not visible	not visible
<u>Floricanes</u>				
number nodes/lateral branch	12-20	10-14	10-15	12-19
number of flowers/node	2-4	1-4	2-6	1-2
<u>Leaves</u>				
Arrangement	compound	compound	compound	compound
Relief between veins	weak	very weak	medium	medium
Cross section	concave	concave	flat	concave-flat
Leaflet number	usually 5	3-5	usually 5	usually 3
<u>Terminal leaflet</u>				
length (cm)	11.6	14.6	12.4	13.7
width (cm)	7.5	7.8	7.2	12.1
shape	ovate	ovate	ovate	lobed
tip	acuminate	acuminate	acuminate	acuminate
base	cordate-round	acute	rounded	cordate
margin	doubly serrate	doubly serrate	doubly serrate	doubly serrate
<u>Lateral leaflets (basal pair)</u>				
overlap	touching	free	overlapping	overlapping
orientation	opposite	opposite	opposite	opposite
shape	oblique	oblique	ovate-lobed	ovate-lobed
tip	acuminate	acuminate	acuminate	acuminate
base	oblique	oblique	oblique-rounded	oblique
margin	doubly serrate	doubly serrate	doubly serrate	doubly serrate
length (cm)	11.9	14.7	11.6	11.7
width (cm)	7.6	8.6	7.7	8.2
Rachis length	1.0-1.8	0.8-2.2	0.5-1.8	2.4-3.9

TABLE 1-continued

PLANT CHARACTERISTICS OF 'TOLA'				
	Tola	Heritage	Summit	Amity
between terminal leaflet and adjacent lateral leaflets (cm)	(mean 1.4)	(mean 1.5)	(mean 1.2)	(mean 3.0)
Glossiness	medium	medium	medium	dull
<u>Color</u>				
face	medium 137A	medium 137A, 139A	medium 137A	medium 147A
underside	138B	148C, 191B	191B	191A
<u>Petiole</u>				
length (cm)	4.0-10.0 (mean 7.1)	6.6-8.5 (mean 7.6)	5.8-8.9 (mean 7.4)	4.0-8.2 (mean 6.0)
pigmentation of upper surface	unpigmented	lightly	lightly	lightly
pigmentation of underside	unpigmented	unpigmented	lightly	unpigmented
Petiolule length	short	very short	short	very short
Stipule orientation	erect	erect	erect-clasping	erect-clasping
<u>Flowers</u>				
Flower color	white	white	white	white
<u>Flowering period</u>				
primocane	mid June-late September	mid June-early October	early June-mid September	early June-early October
floricane	early April-early June	early April-early June	early April-early June	early to mid March-early June
Flower size	small	small	medium	large
<u>Petal</u>				
length (cm)	0.6-0.8	0.7-0.8	0.7-0.9	0.7-1.0
width (cm)	0.3-0.4	0.3	0.3-0.4	0.3-0.5
<u>Pedicel</u>				
coloration	absent or very weak intensity, red	present, strong intensity, red	present, strong intensity, red	present, strong intensity, red
length	short	medium	medium	long
<u>Productivity</u>				
Primocane	~9.2 t/acre	~5.1 t/acre	~7.3 t/acre	~6.4 t/acre
Floricanes	~4.1 t/acre	~4.1 t/acre	~2.9 t/acre	~5.1 t/acre

TABLE 2

FRUIT CHARACTERISTICS OF 'TOLA'				
	Tola	Heritage	Summit	Amity
<u>Fruit</u>				
<u>Harvest season</u>				
primocane	mid to late	late July-	mid July-	mid July-

TABLE 2-continued

FRUIT CHARACTERISTICS OF 'TOLA'				
	Tola	Heritage	Summit	Amity
	July-late	mid	late	mid
	October	November	October	November
floricane	mid to late	mid May-	mid May-	late April
	May - mid July	mid July	mid July	-mid July
<u>Color</u>	Medium Red	Medium Red	Medium Red	Medium Red
immature	44B	53A	46A	46A
maturing	45A-47A	45A, 46D	45A	47A
mature	46A, 46B	44C	42B	42B
Glossiness	medium	medium	medium	medium
<u>Dimensions</u>				
<u>weight (g/fruit)</u>				
primocane	2.9-3.6 (mean 3.3)	2.7-2.9 (mean 2.8)	2.5-3.3 (mean 2.8)	2.7-3.7 (mean 3.2)
floricane	2.8-3.5 (mean 3.1)	2.3-2.7 (mean 2.6)	2.5-2.8 (mean 2.6)	3.0-3.4 (mean 3.2)
length (primocane) (mm)	15.9-25.4 (mean 22.4)	—	17.5-25.4 (mean 20.2)	17.5-22.2 (mean 20.1)
width (primocane) (mm)	17.5-23.8 (mean 20.9)	—	18.3-23.0 (mean 20.4)	15.9-23.0 (mean 20.2)
Soluble solids (%)	9.2	—	9.4	9.7
<u>Titrate acidity</u>				
(% as citric acid)	11.8	—	14.5	11.2
<u>Seeds</u>				
weight (mg)	1.5	—	1.8	1.5
Number	93-154 (mean 127)	45-102 (mean 72)	73-119 (mean 98)	62-108 (mean 88)
Firmness	firm	firm	firm	firm
Yield	high	medium	high	medium

TABLE 3

ISOZYME BANDING PATTERNS OF 'TOLA' COMPARED WITH 'HERITAGE' AND 'SUMMIT'			
Isozyme and Pattern			
Cultivar	PGI	MDH	PGM
Tola	A	C	C
Heritage	A	D	C
Summit	A	C	A

We claim:

1. A new and distinctive cultivar of raspberry plant as illustrated and described herein.

* * * * *

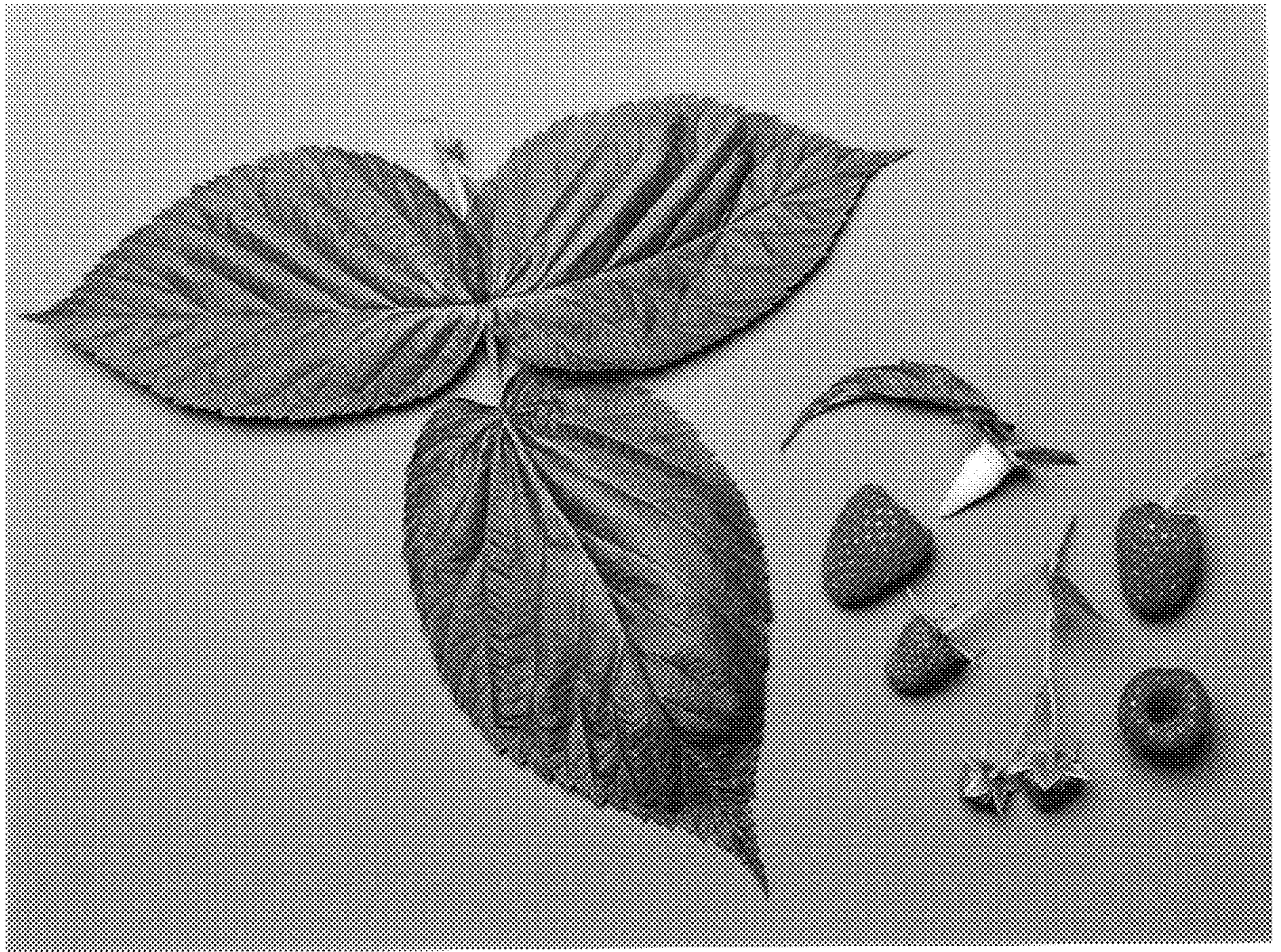


FIG. 1

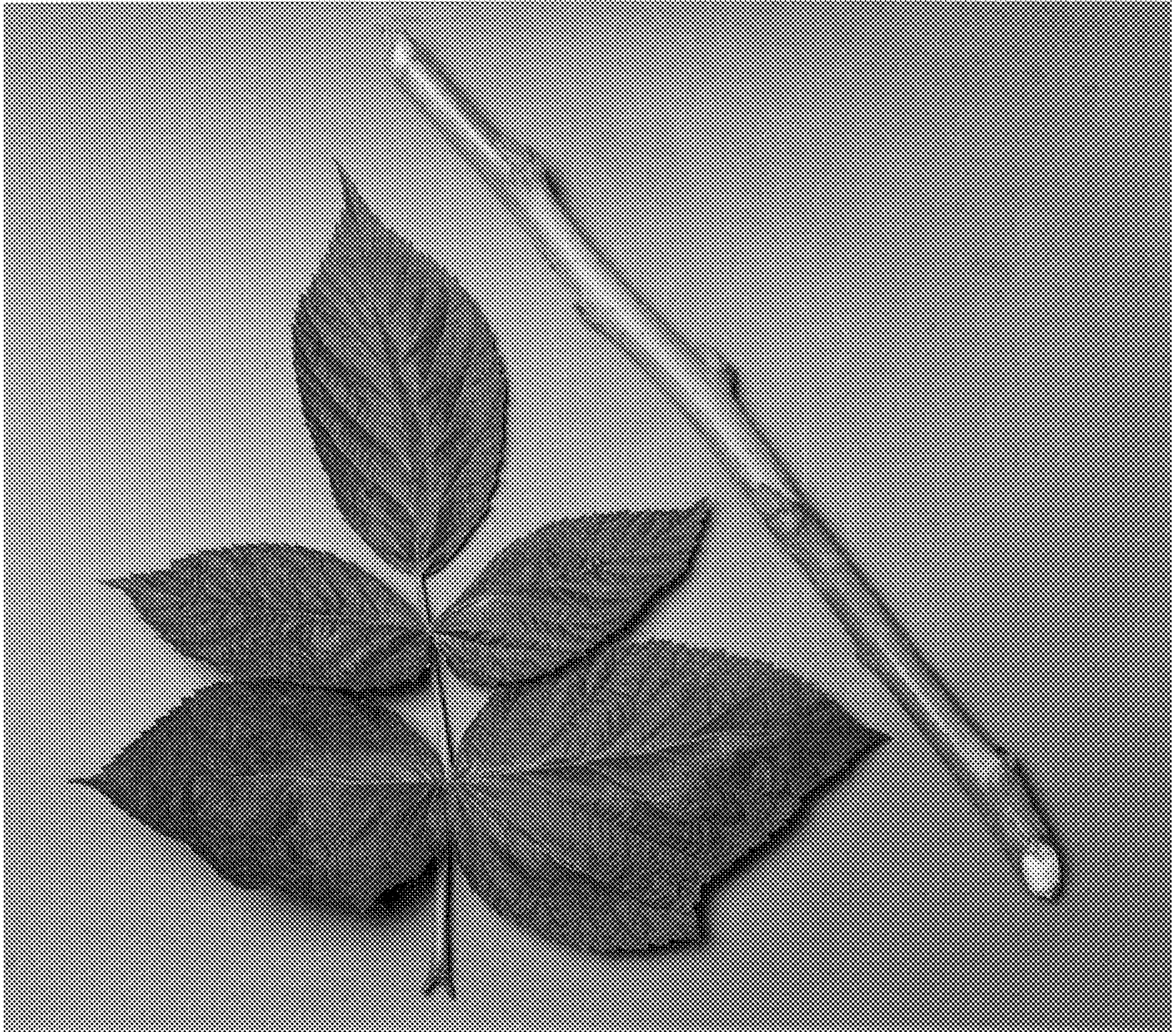


FIG. 2