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(12) **United States Plant Patent**
Beineke

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(54) **BLACK WALNUT TREE NAMED 'BEINEKE 11'**

(50) Latin Name: *Juglans nigra* L.
Varietal Denomination: **Beineke 11**

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(73) Assignee: **American Forestry Technologies Inc.**, West Point, IN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 108 days.

(21) Appl. No.: **10/887,143**

(22) Filed: **Jul. 8, 2004**

(65) **Prior Publication Data**

US 2006/0015975 P1 Jan. 19, 2006

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

(52) **U.S. Cl.** **Plt./154**

(58) **Field of Classification Search** Plt./154
See application file for complete search history.

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(57) **ABSTRACT**

A new and distinct cultivar of black walnut tree (*Juglans nigra* L.) is distinctly characterized by extremely rapid growth rate and fairly strong central stem tendency, thereby producing good timber qualities. The new variety has low production of nuts. This new variety of black walnut trees was discovered by the applicant near South Raub, Tippecanoe County, Ind. in a black walnut planting from previously selected trees for outstanding timber production potential. This selection has been designated as BW508, a seedling progeny of patented 'Purdue 1' (U.S. Plant Pat. No. 4,543) in records maintained by the applicant on the performance of this selection, and grafts made from the selection and will be known henceforth as 'Beineke 11'.

3 Drawing Sheets

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Latin name of the genus and species: *Juglans nigra* L.
Variety denomination: 'Beineke 11'.

BACKGROUND OF THE INVENTION

This new variety of black walnut tree (*Juglans nigra* L.) was discovered by the applicant near South Raub, Tippecanoe County, Ind., in a black walnut planting of seedling progeny from previously selected trees for outstanding timber producing potential. This selection has been designated as BW508, a seedling progeny of patented 'Purdue 1' (U.S. Plant Pat. No. 4,543) in records maintained by the applicant on the performance of this selection, and grafts made from

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the selection and will be known henceforth as 'Beineke 11'. The male parent is unknown, as is generally the case with black walnut trees. (Beineke, 1989).

SUMMARY OF THE INVENTION

A new and distinct cultivar of black walnut tree (*Juglans nigra* L.) is distinctly characterized by extremely rapid growth rate, strong central stem tendency, and good straightness, thereby producing excellent timber qualities, the trait of commercial interest. 'Beineke 11' was 11 years old when described at a location near South Raub, Ind.

After the original clone was selected, and assigned an identity number of BW508, the aforesaid tree was repro-

duced by collecting scions from it and grafting these onto common black walnut rootstocks at American Forestry Technologies, Inc., West Point, Ind. These asexual reproductions ran true to the originally discovered tree and to each other in all respects.

Color values used were from the Munsell Color Chart for Plant Tissues. However, color is too dependent on weather conditions and fertilization to be consistent or distinctive. For example, leaves can be made a deeper green by applying nitrogen. Walnut tree leaves turn yellow as the season progresses, especially if there is a lack of rainfall. As black walnut meats dry, they become darker. Simply being on the ground for a week causes the outer shell to darken. Bark color involves many shades of gray through brown and black.

'Beineke 11' is hardy in USDA zones 4,5,6,7, and 8.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a photograph showing the timber form of 'Beineke 11'.

FIG. 2 is a photograph showing the leaves of 'Beineke 11'.

FIG. 3 is a photograph showing the nuts of 'Beineke 11'.

BOTANICAL DESCRIPTION OF THE PLANTS

The botanical details of this new and distinct variety of walnut tree are as follows:

Tree:

Size.—Large, 42 ft. at 11 years; crown diameter of 20 ft.

Vigor.—Vigorous.

Growth rate.—Very rapid, 40.8% larger in diameter than the average of parental Purdue 1 (U.S. Plant Pat. No. 4,543) grafts, planted the same year on the same land. Diameter growth rate (at 4½ feet above the ground) at 11 years was 8.8 inches for an average growth rate of 0.80 inches per year.

Form.—Good timber form (form rating) not as good as parental Purdue 1 (form rating 1) (U.S. Plant Pat. No. 4,543). 'Beineke 11', averages 2, no crooks, very strong central stem tendency. Stem form was 1% poorer than the average (1.98) of the entire plantation. Stem form was obtained by subjectively rating the straightness of the main stem on a scale of 1 to 5 with 1 representing a perfectly straight stem; 2, slight crook or deviation of the central stem (no crooks); 3, about average straightness; 4, several severe crooks or a single fork; and 5, a very crooked, forked and/or leaning central stem.

The trees of the present invention are grown in plantations, not in open fields (not natural stands). In plantations, trees are upright and have no distinctive or characteristic crown shape because all branches are seeking to grow upwards.

Branches: Diameter depends on age and size of tree, varies from ½" to 12", bark color varies from grays to browns.

Leaves:

Compound leaves.—Size — Large; average length — 18.93"; width 8.38". Compared to 'Purdue 1' (U.S. Plant Pat. No. 4,543), the leaves of 'Beineke 11' are much longer. 'Beineke 11' averages 4.4 inches longer than 'Purdue 1'.

Leaflets.—Size — Large; average length — 4.18"; average width 1.80"; average number of leaflets — 19.0 — lanceolate; acutely pointed, rounded base; the leaflets of 'Beineke 11' are 0.2 inches shorter and 0.3 inches wider than 'Purdue 1'. 'Purdue 1' has an unusually long, narrow leaflet compared to most other black walnut trees. 'Beineke 11' averages 1.2 fewer leaflets than 'Purdue 1'. Leaflet number appears to be a consistent trait within tree and year to year.

Thickness.—Thin.

Texture.—Smooth.

Margin.—Serrated.

Petioles.—Short.

Color.—Topside — dark green (5GY3/4 by the Munsell Color Chart for Plant Tissues); Underside — light green (5GY5/4 on the Munsell Color Chart for Plant Tissues).

Anthracnose resistance.—Average.

Nut:

Size.—Large; average length — 1.53"; average diameter in suture plane — 1.20"; average diameter cheek to cheek — 1.45".

Uniformity of size.—Not much variation.

Form.—Rounded; flattened in suture plane. See FIG. 3.

Blossom end.—Pointed, acute.

Basal end.—Flat.

Thickness of shell.—Thick.

Ridges.—Rounded off; not sharp.

Color.—Mottled, 5YR3/2 and 2.5YR3/4 by the Munsell Color Chart for Plant Tissues.

The nut 'Beineke 11' averages 0.2 inches shorter than 'Purdue 1' (U.S. Plant Pat. No. 4,543). 'Beineke 11' averages 0.1 inches wider in the suture plane and 0.2 inches wider cheek to cheek than 'Purdue 1'.

Nut with husk:

Size.—Medium; average length — 2.51"; Average suture plane width — 2.10"; average. Cheek to cheek width — 2.31".

Husk thickness.—0.9 inches.

Form.—Rounded; slightly flattened in suture plane; slightly elongated.

Blossom end.—Slight point.

Basal end.—Rounded.

Surface.—Warty; slightly waxy.

Color.—Greenish yellow, 2.5 GY 6/6 by the Munsell Color Chart for Plant Tissues.

The nut in the husk of 'Beineke 11' is the same length as 'Purdue 1' (U.S. Plant Pat. No. 4,543). 'Beineke 11' average 0.2 inches wider in the suture plane and 0.25 inches wider cheek to cheek than 'Purdue 1'. The husk of 'Beineke 11' averages 0.15 inches thicker than 'Purdue 1'.

Flowering habit:

Age at which trees start producing catkins.—Early, it takes about 4–5 years to flower, but the flower number varies with the age of the tree.

Number of catkins produced.—Abundant.

Age at which trees start producing pistillate flowers.—Early, about 4–5 years.

Number of pistillate flowers produced by young trees.—Abundant.

Lateral shoots producing pistillate flowers.—Yes.

Number of pistillate flowers per inflorescence.—3 to 6.
Flower season: Flowers typically in May in Indiana. There are probably 1-million pollen per catkin. Female flowers are about 1/16" long and grow to two “pollen pick up points” which subsequently break apart. Pollen exists as “dust” which is not feasible to quantitate.
Nut crop:
Bearing.—Annual.
Productivity.—Low.
Ripening period.—Early — mid September.
Evenness of maturity (period between first and last nuts are ready for harvest).—Even.
Quality.—Good.
Distribution of nuts on tree.—Throughout.

GENETIC METHOD OF IDENTIFICATION

DNA “fingerprint” for identification of ‘Beineke 11’:
DNA was isolated from the leaves of ‘Beineke 11’. For purposes of DNA fingerprinting, eleven highly polymorphic loci from a suite of microsatellites developed by Woeste et al. (2002) were chosen. Microsatellites sizes were checked against previously published standards and verified by a second independent analysis. The “fingerprint” is the collection of microsatellite allele sizes at each locus for ‘Beineke 11’.
DNA was isolated from the leaves of 4 black walnut trees obtained from Walter Beineke using CTAB extraction buffer (50 mM TRIS-HCL, pH 8.0, 20 mM EDTA, pH 8.0, 0.7 M NaCl 0.4 M LiCl, 2% SDS, 2% CTAB, nd 1% PVP). After isolation the DNA from each tree was quantified and diluted with nanopure distilled water to a final concentration of 5 ng/microliter. The samples were stored in 96-well plates at -20 degrees C.
For purposes of DNA fingerprinting, eleven highly polymorphic loci from a suite of microsatellites developed by Woeste et al. (2002) were chosen. Amplification of each locus was performed with an MJ Research Tetrad Thermocycler (Waltham, Mass.) using 10 microliter reactions in 96-well plates. The PCR reaction mix contained 2 microliter of the aforementioned black walnut DNA, 5 microliter Sigma Taq ReadyMix (Sigma Aldrich, St. Louis, Mo.), 0.4 microliter of a 20 pmol mixture of forward and reverse fluorescence labeled primer, and 3 microliter PCR grade water supplied with the Sigma ReadyMix. PCR amplification was for 30 cycles of 94 degrees C. for 20 sec, 55 degrees C. for 30 sec, and 72 degrees C. for 1 min. All primers were annealed at 55 degrees C. The products were then held at 4 degrees C. until aliquots could be loaded into 6% Long Ranger (polyacrylamide) denaturing gels (BMA, Rockland, Me.). For each individual 0.5 microliter PCR product was added to 0.75 microliter blue dextran and 0.25 microliter of CXR 350 bp Ladder Standard (Applied Biosystems, Inc., Foster City, Calif.) in a new 96-well plate. The samples were denatured for 2 min at 95degrees C. and loaded onto a CAL96 96-well laminated membrane comb (The Gel Company, San Francisco, Calif.). Electrophoresis was at 3,000 V, 60 mA, 200 Watts, 50degrees C. for 2 hours using an ABI 377 (Perkin Elmer) with 36 cm plates and 0.2 mm spacers. The resulting data was analyzed using ABI’s GeneScan 3.1.2 and Genotyper 2.5 (Perkin Elmer). Microsatellite sizes were checked against previously published standards and verified by a second independent analysis. The “fingerprint” is the collection of microsatellite allele sizes at each locus for each tree.

Locus	Forward (SEQ ID NOS: 1–10)
WGA6	CCATGAAACTTCATGCGTTG
WGA24	TCCCCCTGAAATCTTCTCCT
WGA27	AACCCTACAACGCCTTGATG
WGA32	CTCGGTAAGCCACACCAATT
WGA72	AAACCACCTAAAACCCTGCA
WGA89	ACCCATCTTTCACGTGTGTG
WGA90	CTTGTAATCGCCCTCTGCTC
WGA97	GGAGAGGAAAGGAATCCAAA
WGA69	TTAGTTAGCAAACCCACCCG
WGA76	AGGGCACTCCCTTATGAGGT
WGA82	TGCCGACACT6CCTCACTTC

Locus	Reverse (SEQ ID NOS: 11–22)
WGA6	CATCCCAAGCGAAGGTTG
WGA24	TTCTCGTGGTGCTTGTTGAG
WGA27	TGCTCAGGCTCCACTTCC
WGA32	ACGGGCAGTGTATGCATGTA
WGA72	ACCCATCCATGATCTTCCAA
WGA89	TGCCTAATTAGCAATTGCCA
WGA90	TACCTGCAACCCGTTACACA
WGA97	TTGAACAAAAGGCCGTTTTC
WGA69	AGATGCACAGACCAACCCTC
WGA76	CAGTCTCATTCCCTTTTTC
WGA82	CGTGATGTACGACGGCTG

The best interpretation of the current data indicates that the probability that any other black walnut tree would have the collection of microsatellite allele sizes listed is estimated to be less than 3×10⁻¹⁴.
Sizes (bp) of microsatellites at 10 loci used to fingerprint ‘Beineke 11’ (2 alleles at each locus).

Microsatellites used to fingerprint ‘Beineke 11’:									
WGA6		WGA27		WGA32		WGA72		WGA89	
142	144	219	227	169	191	147	147	197	209
WGA90		WGA97		WGA69		WGA76		WGA82	
158	162	155	171	176	176	232	232	188	188

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SEQUENCE LISTING

<160> NUMBER OF SEQ ID NOS: 22

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<212> TYPE: DNA

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<400> SEQUENCE: 11

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<212> TYPE: DNA

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<400> SEQUENCE: 12

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<212> TYPE: DNA

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<400> SEQUENCE: 13

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I claim:
1. A new and distinct variety of black walnut tree named ‘Beineke 11’ substantially as illustrated and described, which has excellent timber quality, extremely rapid growth rate, and fairly strong central stem tendency.
* * * * *



FIG. 1



FIG. 2

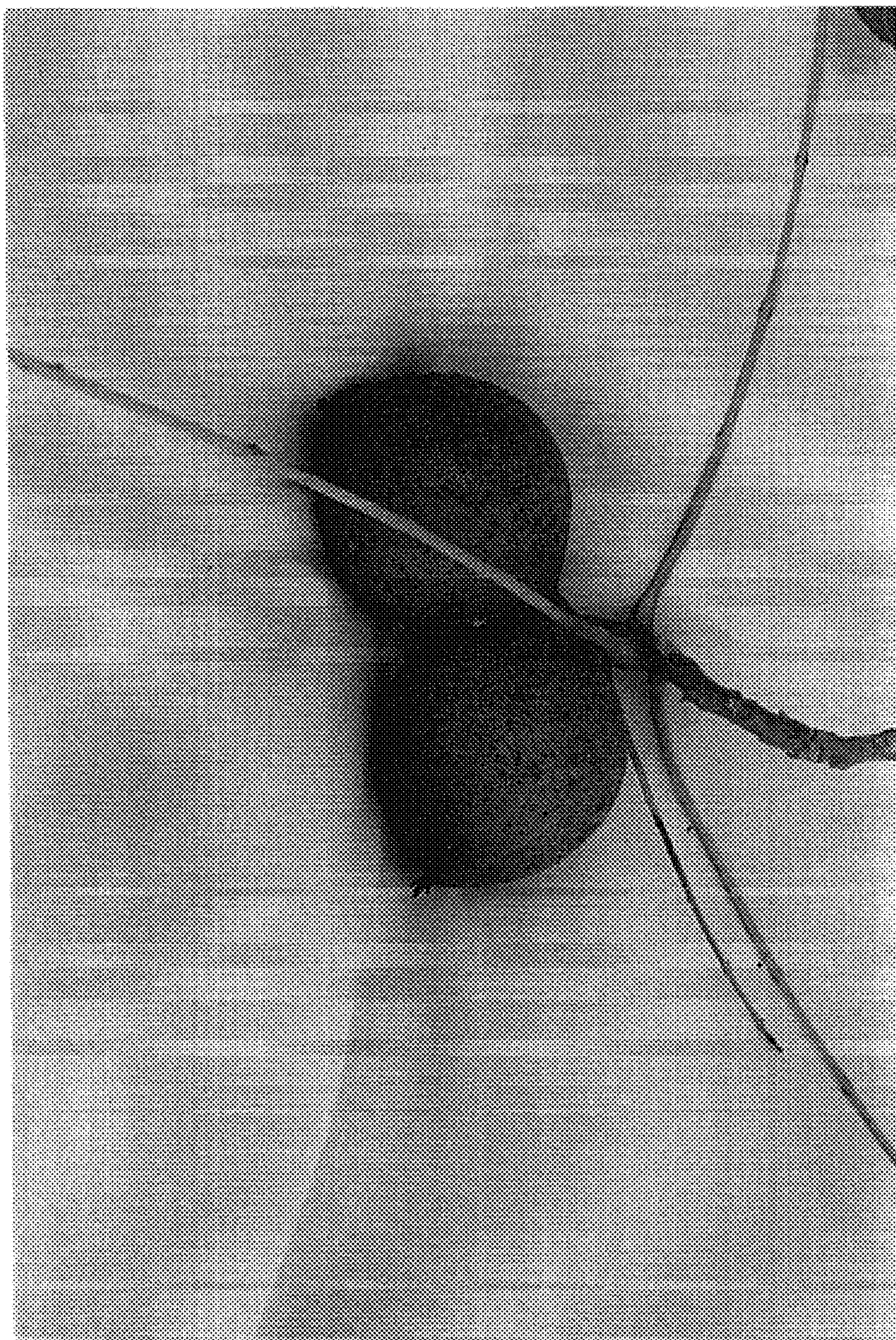


FIG. 3