US00PP15728P3

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

(10) **Patent No.: US PP15,728 P3**
(45) **Date of Patent: Apr. 26, 2005**

(54) **BLACK WALNUT TREE NAMED 'BEINEKE 9'**

(50) Latin Name: ***Juglans nigra L.***
Varietal Denomination: **Beineke 9**

(75) Inventor: **Walter Beineke**, West Lafayette, IN (US)

(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 269 days.

(21) Appl. No.: **10/141,095**

(22) Filed: **May 8, 2002**

(65) **Prior Publication Data**

US 2003/0213036 P1 Nov. 13, 2003

(51) **Int. Cl.**[7] **A01H 5/00**
(52) **U.S. Cl.** **Plt./154**
(58) **Field of Search** Plt./154

(56) **References Cited**

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Primary Examiner—Kent Bell
(74) *Attorney, Agent, or Firm*—Alice O. Martin; Barnes & Thornburg

(57) **ABSTRACT**

A new and distinct cultivar of black walnut tree (*Juglans nigra L.*) which is distinctly characterized by extremely rapid growth rate, very strong central stem tendency, and excellent straightness, thereby producing excellent timber qualities. Nut crops are biennial. This new variety of black walnut tree (*Juglans nigra L.*) was discovered by the applicant near West Lafayette, Ind. in a black walnut planting of seedling progeny from a previously selected tree for outstanding timber producing potential. This selection has been designated as BW429, a seedling progeny of BW 41 in records maintained by the applicant on the performance of the selection and grafts made from the selection and will be known henceforth as 'Bieneke 9.'

3 Drawing Sheets

Latin name of the genus and species: *Juglans nigra L.*

BACKGROUND OF THE INVENTION

This new variety of black walnut tree (*Juglans nigra L.*) was discovered by the applicant near West Lafayette, Ind. in a black walnut planting of seedling progeny from previously selected trees for outstanding timber producing potential. This selection has been designated as BW429, a seedling progeny of BW 41(unpatented) in records maintained by the applicant on the performance of the selection and grafts made from the selection and will be known henceforth as 'Bieneke 9.' 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.*) which is distinctly characterized by extremely

rapid growth rate, very strong central stem tendency, and excellent straightness, thereby producing excellent timber qualities, the trait of commercial interest. Beineke 9 was 21 years old when described at a location near West Lafayette, Ind.

After the original clone was selected, and assigned an identity number of BW 429 the aforesaid tree was reproduced 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 9 is hardy in zones 4, 5, 6, 7, and 8.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a photograph showing the timber form of 'Beineke 9.'

FIG. **2** is a photograph showing the leaves of 'Beineke 9.'

FIG. **3** is a photograph showing the nuts of 'Beineke 9.'

BOTANICAL DESCRIPTION OF THE PLANT

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

Tree:

Size.—Large, 62 ft. at 21 years; crown diameter is 20 ft.

Vigor.—Vigorous.

Growth rate.—Very rapid, 46% larger in diameter than the average of parental BW 41 grafts, planted the same year on the same land. Diameter at 4½ feet above the ground at 21 years was 11.4 inches for an average growth rate of 0.543 inches per year.

Form.—Excellent timber form, as good as Purdue 1 (U.S. Plant Pat. No. 4,543), which has a form rating of 2.04, 30% straighter than average of the entire planting. 33% straighter than the parent tree BW 41 on the same site. 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; 3, about average straightness; 4, several severe crooks or a single fork; and 5, a very crooked, forked and/or leaning central stem. Beineke 9 averages 1.0 on the 1 to 5 scale. The trees of the present invention are grown in plantations, not 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 — Much longer than average; average length — 19.33".

Leaflets.—Size — Much larger than average; average length — 5.18"; average width — 4.06"; average number of leaflets — 17.0 — lanceolate; acutely pointed.

Thickness.—Thin; Texture — smooth; Margin — serrated; Color — Topside — dark green, 2.5 G 4/4 on the Munsell Color Chart for Plant Tissues; Underside — light green.

Anthracnose resistance.—Excellent.

Nut:

Size.—Small; average length — 1.27"; average diameter in suture plane — 1.10"; average diameter cheek to cheek — 1.37".

Uniformity of size.—Not much variation.

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

Blossom end.—Rounded.

Basal end.—Slightly pointed to rounded.

Thickness of shell.—Thick.

Ridges.—Rounded off; not sharp.

Color.—Mottled, 5 YR 3/2 and 2/5 YR 3/4 on the Munsell Color Chart for Plant Tissues.

Flowering habit:

Age at which trees start producing catkins.—Early. It takes 4–5 years to flower but the flowers number vary with the age of the tree.

Number of catkins produced.—Few.

Age at which tree starts producing pistillate flowers.—Early. 3–4 years.

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

Number of pistillate flowers produced by mature trees.—Below average.

Lateral shoots producing pistillate flowers.—None.

Number of pistillate flowers per inflorescence.—2 to 4.

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 exits as "dust" which is not feasible to quantitate.

Nut crop:

Bearing.—Biennial.

Productivity.—Medium.

Ripening period.—Mid-season. September–October.

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 9:'

DNA was isolated from the leaves of 'Beineke 9.' For purposes of DNA fingerprinting, nine 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 9.

DNA was isolated from the leaves of 10 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% TAB, 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/μL. The samples were stored in 96-well plates at 20° C.

For purposes of DNA fingerprinting, nine 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 μL reactions in 96-well plates. The PCR reaction mix contained 2 μL of the aforementioned black walnut DNA, 5 μL Sigma Taq ReadyMix (Sigma Aldrich, St. Louis, Mo.), 0.4 μL of a 20 pmol mixture of forward and reverse fluorescence labeled primer, and 3 μL PCR grade water supplied with the Sigma ReadyMix. PCR amplification was for 30 cycles of 94° C. for 20 sec, 55° C. for 30 sec, and 72° C. for 1 min. All primers were annealed at 55° C. The products were then held at 4° C. until aliquots could be loaded into 6% Long Ranger (polyacrylamide) denaturing gels (BMA, Rockland, Me.). For each individual 0.5 μL PCR product was added to 0.75 μL blue dextran and 0.25 μL of CXR 350 bp Ladder Standard (Promega, Fitchburg Center, Wis.) in a new 96-well 1 late. The samples were denatured for 2 min at 95° 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, 50° 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.

Primer Sequences

Locus	Forward	Reverse
WGA2	GACGACGAAGGTGTACGGAT (SEQ ID NO: 1)	GTACGGCTCTCCTTGCAGTC (SEQ ID NO: 10)
WGA6	CCATGAAACTTCATGCGTTG (SEQ ID NO: 2)	CATCCCAAGCGAAGGTTG (SEQ ID NO: 11)
WGA24	TCCCCCTGAAATCTTCTCCT (SEQ ID NO: 3)	TTCTCGTGGTGCTTGTTGAG (SEQ ID NO: 12)
WGA32	CTCGGTAAGCCACACCAATT (SEQ ID NO: 4)	ACGGGCAGTGTATGCATGTA (SEQ ID NO: 13)
WG33	TGGTCTGCGAAGACACTGTC (SEQ ID NO: 5)	GGTTCGTCGTTTGTTGACCT (SEQ ID NO: 14)
WGA86	ATGCCTCATCTCCATTCTGG (SEQ ID NO: 6)	TGAGTGGCAATCACAAGGAA (SEQ ID NO: 15)
WGA89	ACCCATCTTTCACGTGTGTG (SEQ ID NO: 7)	TGCCTAATTAGCAATTTCCA (SEQ ID NO: 16)
WGA90	CTTGTAATCGCCCTCTGCTC (SEQ ID NO: 8)	TACCTGCAACCCGTTACACA (SEQ ID NO: 17)
WGA97	GGAGAGGAAAGGAATCCAAA (SEQ ID NO: 9)	TTGAACAAAAGGCCGTTTTC (SEQ ID NO: 18)

The best interpretation of the current data indicate that the probability that any other black walnut tree would have the collection of microsatellite allele sizes listed is less that 1 in 10^{-17}.

Sizes (bp) of Microsatellites at 9 Loci Used to Fingerprint 'Beineke 9' (2 Alleles at Each Locus)

WGA2		WGA6		WGA24		WGA32		WGA90	
136	138	142	142	234	236	179	189	148	164
WGA86		WGA97		WGA33		WGA89			
216	226	153	161	224	224	185	219		

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Woeste, K., Burns, R., Rhodes, O., and Michler, C. (2002) Thirty polymorphic nuclear microsatellite loci from black walnut. *Journal of Heredity.*

I claim:

1. A new and distinct variety of black walnut tree named 'Beineke 9' substantially as illustrated and described, which has excellent timber quality, is fast growing, has strong central stem tendency, no sweep and no crooks.

* * * * *

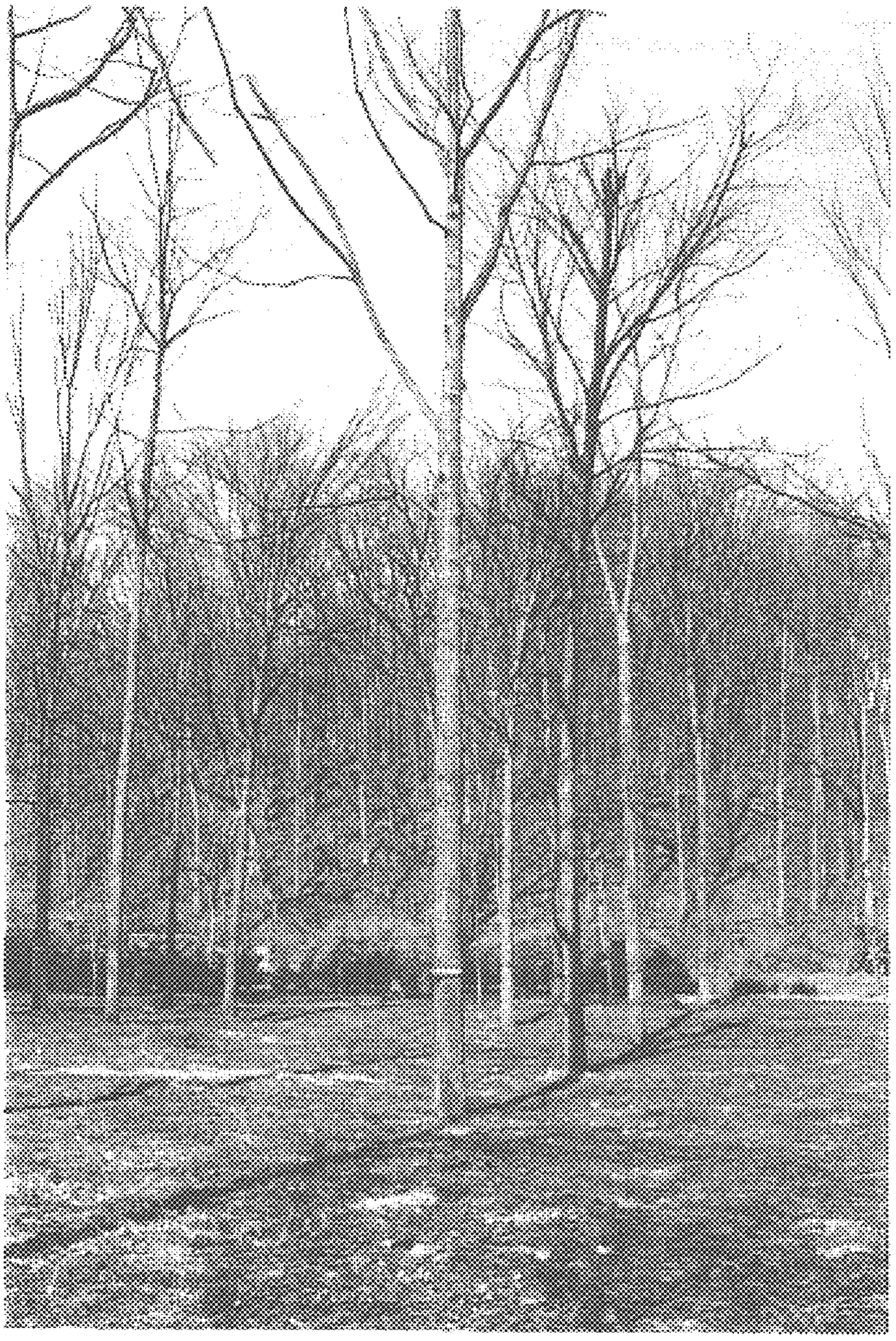

FIG. 1

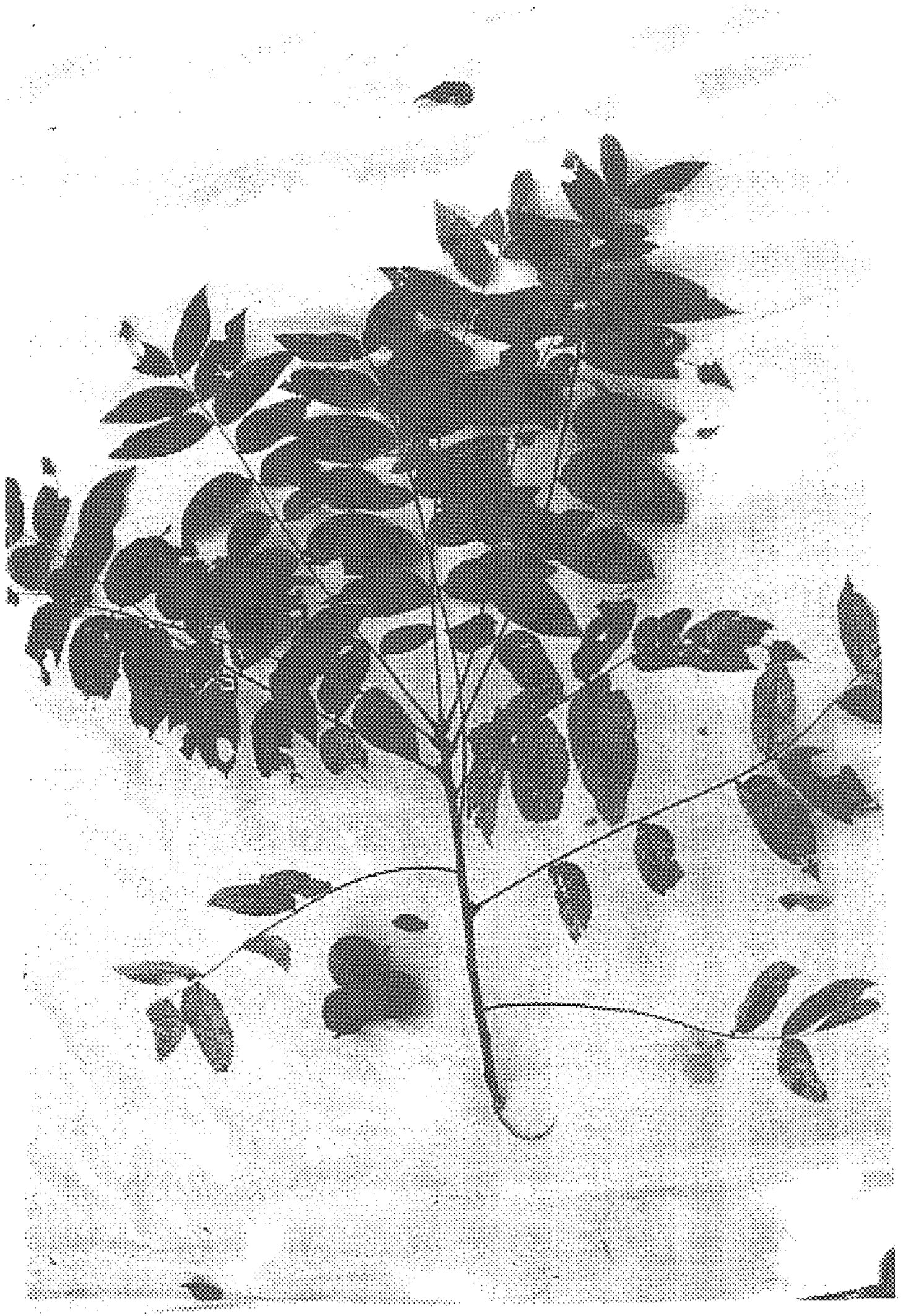

FIG. 2

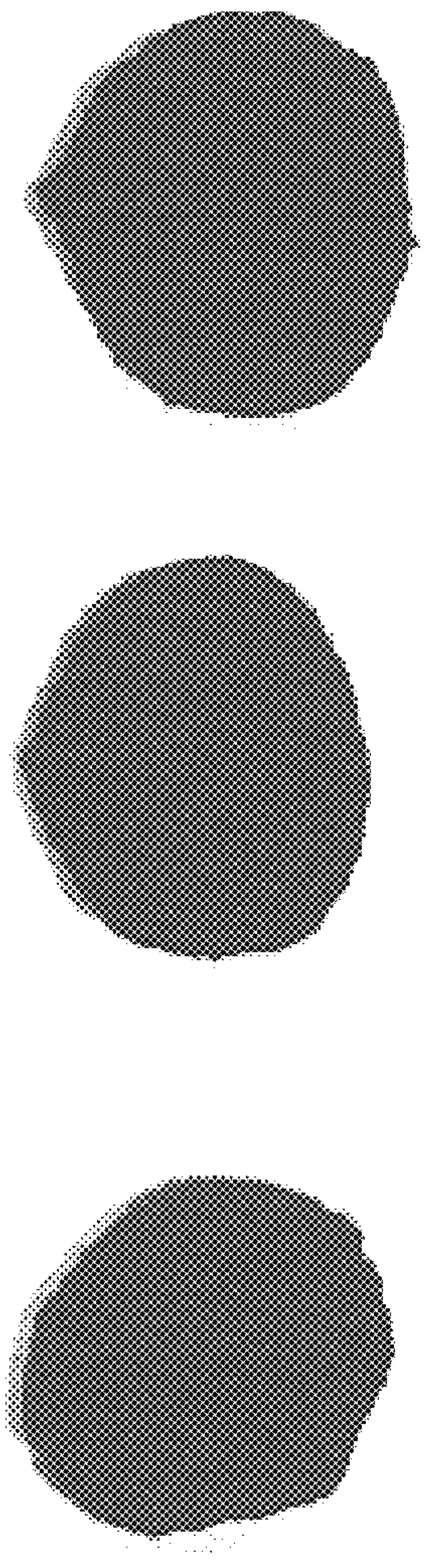

FIG. 3

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APPLICATION NO. : 10/141095
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INVENTOR(S) : Walter F. Beineke

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Column 6, line 6, under Documents Cited, after "Journal of Heredity" add --93(1):58-50--.
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SEQUENCE LISTING

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<120> BLACK WALNUT TREE NAMED "BEINEKE 9"
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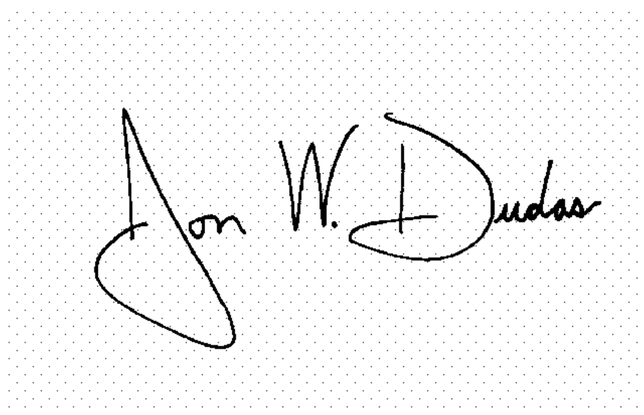
Sixteenth Day of January, 2007



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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 16
tgcctaatta gcaatttcca 20

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : PP 15,728 P3
APPLICATION NO. : 10/141095
DATED : April 26, 2005
INVENTOR(S) : Walter F. Beineke

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 17
<211> 20
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Primer

<400> 17
tacctgcaac ccgttacaca 20

<210> 18
<211> 20
<212> DNA
<213> Artificial Sequence

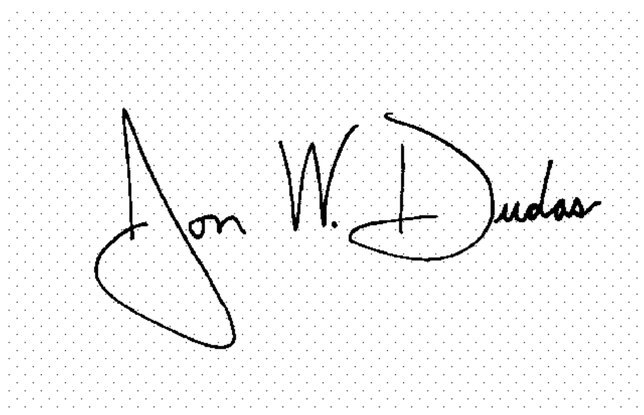
<220>
<223> Description of Artificial Sequence: Primer

<400> 18
ttgaacaaaa ggccgtttc 20

This certificate supersedes Certificate of Correction issued January 16, 2007.

Signed and Sealed this

Sixth Day of February, 2007



JON W. DUDAS
Director of the United States Patent and Trademark Office