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

(10) **Patent No.:** **US PP14,829 P3**

(45) **Date of Patent:** **May 25, 2004**

(54) **BLACK WALNUT TREE NAMED 'BEINEKE 5'**

PP9,906 P 6/1997 Jones
PP9,924 P 6/1997 Jones
PP9,925 P 6/1997 Jones

(50) Latin Name: *Juglans nigra L.*
Varietal Denomination: **Beineke 5**

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

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

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 50 days.

(21) Appl. No.: **10/141,103**

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

(65) **Prior Publication Data**

US 2003/0213038 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

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(57) **ABSTRACT**

A new and distinct cultivar of black walnut tree (*Juglans nigra L.*) which is distinctly characterized by extremely rapid growth rate, extremely resistant to anthracnose leaf disease, fair central stem tendency, and average straightness, thereby producing fair timber qualities. 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 a previously selected tree for outstanding timber producing potential. This selection has been designated as BW501, a seedling progeny of BW 95 in records maintained by the applicant on the performance of the selection and grafts made from the selection and will be known henceforth as 'Beineke 5'.

3 Drawing Sheets

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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 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 BW501, a seedling progeny of BW 95 (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 'Beineke 5'. 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

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rapid growth rate, extremely resistant to anthracnose leaf disease, fair central stem tendency, and average straightness, thereby producing fair timber qualities at 7 years. Beineke 5 was 7 years old when described in West Point Ind.

After the original clone was selected, and assigned an identity number of BW501 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 original clone and to each other in all respects. A comparison between BW95 and Beineke 5 could not be made at this site because BW95 was not planted at West Point and the original tree was cut down.

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

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a photograph showing the timber form of 'Beineke 5'.

FIG. 2 is a photograph showing the leaves of 'Beineke 5'.

FIG. 3 is a photograph showing the nuts of 'Beineke 5'.

BOTANICAL DESCRIPTION OF THE PLANT

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

Tree:

Size.—Large, 32 ft. at 7 years; crown diameter 15 ft.

Vigor.—Vigorous.

Growth rate.—Very rapid, 50% larger in diameter than the average of 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) averages 0.814 inches per year over 7 years, was 5.7 inches at 7 years.

Form.—Average timber form, 20% poorer than average of the entire planting. 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 5 averages 3 on the 1 to 5 scale but is straighter than the parent tree, BW 95. 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 — About average; average length — 15.25", width 2.93".

Leaflets.—Size — Average; average length — 3.8"; average width — 1.39"; average number of leaflets — 19.0 — lanceolate; acutely pointed.

Thickness.—Thin; Texture — smooth; Margin — serrated; Petiole — short; Color — Topside — dark green, (2.5 G 4/4 by the Munsell Color Chart for Plant Tissues); Underside — light green, (5GY5/4 on the Munsell Color Chart).

Anthraxnose resistance.—Excellent—far better than any other black walnut tree observed.

Nut:

Size.—Large; average length — 1.50"; average diameter in suture plane — 1.20"; average diameter cheek to cheek — 1.43".

Uniformity of size.—Not much variation.

Form.—Somewhat elongated; oblong; flattened in suture plane. See FIG. 3.

Blossom end.—Rounded.

Basal end.—Rounded.

Thickness of shell.—Thick.

Ridges.—Sharp.

Color.—Mottled, 5 YR 3/2 and 2.5 YR 3/4 by the Munsell Color Chart for Plant Tissues.

Flowering habit:

Age at which trees start producing catkins.—Early, 3–4 years.

Number of catkins produced.—Abundant.

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

Number of pistillate flowers produced by young trees.—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 ¼" 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.

Ripening period.—Very late, October. Evenness of maturity (period between time first and last nuts are ready for harvest). Uneven.

Quality.—Good.

Distribution of nuts on tree.—Throughout.

GENETIC METHOD OF IDENTIFICATION

DNA "Fingerprint" for Identification of 'Beineke 5':

DNA was isolated from the leaves of 'Beineke 5'. 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 5.

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, 0.7M NaCl, 0.4M 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 350bp Ladder Standard (Promega, Fitchburg Center, Wis.) in a new 96-well 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.

Locus	Forward	Reverse
WGA2	GACGACGAAGGTGTACGGAT (SEQ ID NO: 1)	GTACGGCTCTCCTTG CAGTC (SEQ ID NO: 10)
WGA6	CCATGAAACTTCATGCGTTG (SEQ ID NO: 2)	CATCCCAAGCGAAGGTTG (SEQ ID NO: 11)
WGA24	TCCCCCTGAAATCTTCTCCT (SEQ ID NO: 3)	TTCTCGTGGTGCTTGTGGAG (SEQ ID NO: 12)
WGA32	CTCGGTAAGCCACACCAATT (SEQ ID NO: 4)	ACGGGCAGTGTATGCATGTA (SEQ ID NO: 13)
WG33	TGGTCTGCGAAGACACTGTC (SEQ ID NO: 5)	GGTTCGTCGTTGTGACCT (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)

-continued

Locus	Forward	Reverse
WGA97	GGAGAGGAAAGGAATCCAAA (SEQ ID NO: 9)	TTGAACAAAAGGCCGTTTTC (SEQ ID NO: 18)

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 less than 1 in 10⁻¹⁷.

Sizes (bp) of microsatellites at 9 loci used to fingerprint 'Beineke 5' (2 alleles at each locus)

WGA2	WGA6	WGA24	WGA32	WGA90					
150	150	142	146	226	240	181	215	150	156
WGA86	WGA97	WGA33	WGA89						
222	222	153	167	220	220	209	209		

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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*.

SEQUENCE LISTING

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<210> SEQ ID NO 18

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<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

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I claim:

1. A new and distinct variety of black walnut tree named 'Beineke 5' substantially as illustrated and described, which has fair timber quality, is fast growing, has average central

stem tendency, no sweep, few crooks, and is extremely anthracnose resistant.

* * * * *



FIG. 1

FIG. 2



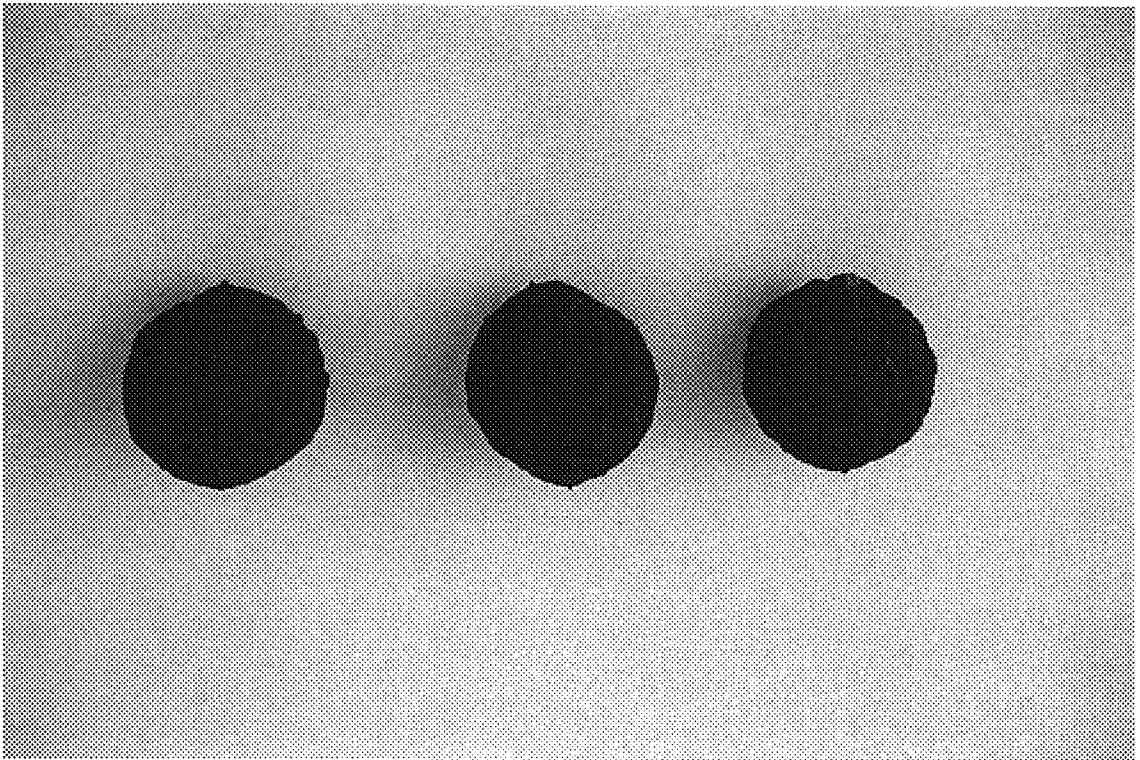


FIG. 3