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Castillon et al.

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(54) **PISTACHIO ROOTSTOCK NAMED**
‘UCB1-D90’

(50) Latin Name: *Pistacia*
atlantica×*Pistacia integerrima*
Varietal Denomination: **UCB1-D90**

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(58) **Field of Classification Search**
USPC **Plt./152**
See application file for complete search history.

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(57) **ABSTRACT**

Disclosed is a new and distinct variety of pistachio rootstock
called ‘UCB1-D90’ characterized in that, when compared to
the industry standard ‘UCB1-D1’ rootstock, it has greater
growth and tolerance to the soil salts of calcium chloride,
sodium sulfate, sodium carbonate and sodium bicarbonate;
greater growth and tolerance to high levels of dissolved salts
in irrigation water; earlier vegetative bud break; and greater
graft compatibility with commercial pistachio clones.

2 Drawing Sheets

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Latin name: *Pistacia atlantica*×*Pistacia integerrima*.
Varietal denomination: ‘UCB1-D90’.

CROSS-REFERENCES TO RELATED
APPLICATIONS

The present variety was developed as part of a breeding
program which produced the following pistachio rootstocks
‘UCB1-D71’ (Ser. No. 14/756,673), ‘UCB1-D110’ (Ser. No.
14/756,675), and ‘UCB1-D154’ (Ser. No. 14/756,676).

BACKGROUND OF THE NEW VARIETY

The present invention comprises a new and distinct cul-
tivar of hybrid pistachio (*Pistacia atlantica* (not patented)×
Pistacia integerrima (not patented) used as a rootstock
known by the varietal name ‘UCB1-D90.’ The variety
‘UCB1-D90,’ is an in vitro, single selection of the segre-
gating controlled cross of (*P. atlantica*×*P. integerrima*) made
at Davis, Calif. The purpose of the selection program was to
develop rootstocks with superior tolerance to soil salts.
Seedlings were tested in salt trials in the laboratory and
compared to the ‘UCB1-D1’ rootstock (not patented). Those
seedlings that exhibited high tolerance to various soil salts
were selected. The new variety exhibits high tolerance to

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numerous, common salts found in the soil and irrigation
water. The present variety has higher resistance to *Verticil-
lium* disease than the female parent, *Pistacia atlantica*; and
has higher cold tolerance than the male parent, *Pistacia
integerrima*.

The following characteristics distinguish clone ‘UCB1-
D90’ from the industry standard, ‘UCB1-D1’ rootstock:

1. Greater growth and tolerance to the soil salts, calcium
chloride, sodium sulfate, sodium carbonate and sodium
bicarbonate.
2. Greater growth and tolerance to high levels of dissolved
salts in irrigation water.
3. Earlier vegetative bud break.
4. Greater graft compatibility with commercial pistachio
clones.
5. The present variety differs from rootstocks UCB1-D71,
UCB1-D110, and UCB1-D154 in that the present vari-
ety is more tolerant than the industry standard root-
stock, UCB1-D1, to the soil salts tested, sodium sulfate,
sodium carbonate and sodium bicarbonate; but it is the
least tolerant of these rootstock to these same soil salts.

ORIGIN AND ASEXUAL REPRODUCTION OF
THE NEW VARIETY

Asexual reproduction of the new and distinct variety of
rootstock was accomplished by germinating seed in vitro

under aseptic conditions and propagating the resulting seedlings using micropropagation techniques. Shoot epicotyl and hypocotyl tissue was collected from germinating seedlings and placed on a standard growth media to produce shoots. The shoots were sub-cultured and multiplied until desired numbers were obtained and then transferred to standard rooting media for rooting. Rooted plantlets were then transferred to a peat:perlite media in acclimation chambers under 100% humidity. Field environmental parameters were gradually introduced to harden plantlets which were then successively transferred to larger pots in the greenhouse as their size increased. These potted trees were used to establish field performance trials. Subsequent evaluations have shown those asexual reproductions are true-to-type to the original rootstock selection. All characteristics of the original tree were established and appear to be transmitted completely through succeeding asexual propagations.

SUMMARY OF THE NEW VARIETY

The 'UCB1-D90' rootstock is characterized by its tolerance to high levels of the soil salts, calcium chloride, sodium sulfate, sodium carbonate and sodium bicarbonate. In each case clone 'UCB1-D90' had greater growth in laboratory salt trials than the industry standard rootstock, 'UCB1-D1.' In another laboratory salt trial, media was supplemented with the total salt load detected in saline San Joaquin Valley irrigation water and also supplemented with twice that load. In all cases, growth of clone 'UCB1-D90' outperformed that of 'UCB1-D1' in the presence of these high salt levels. Vegetative bud break of 'UCB1-D90' was observed to be approximately 8 days earlier than 'UCB1-D1' and 'UCB1-D90' graft compatibility with 5 commercial pistachio clones, 'Golden Hills,' (U.S. Plant Pat. No. 17,158), 'Kerman,' (not patented), 'Lost Hills,' (U.S. Plant Pat. No. 17,702), 'Peters,' (not patented), and 'Randy' (U.S. Plant Pat. No. 18,262) was 10% greater than the graft success rate of 'UCB1-D1.'

DESCRIPTION OF THE ILLUSTRATIONS

The accompanying photographic illustrations show typical specimens of vegetative growth of the new variety, with the color being as nearly true as is possible with color illustrations of this type:

FIG. 1 shows a 4 year old pistachio tree of the new variety.

FIG. 2 shows a close-up of the mature leaves of the new variety.

DESCRIPTION OF THE NEW VARIETY

The following detailed description sets forth the characteristics of the new variety. The data which defines these characteristics was collected under natural daylight on plants grown in the central valley of California in Stanislaus County in the greenhouse and in the field. Descriptions may vary in slight detail due to climatic, soil and cultural conditions under which the variety may be grown. Color designations are presented with reference to the Inter-Society Color Council, National Bureau of Standards, except where common color names are also included.

TREE

Trunk circumference 1 foot off the ground is 28.4 cm.
 Trunk lenticels are approximately 2.4 mm in length and 1.1 mm in width.
 Trunk lenticels are elliptic in shape.
 Trunk lenticel color is strong brown [55. s.B].
 Trunk lenticels number approximately 60 per square inch.
 Bark color is dark grayish yellow [91. d.g.Y].
 Branch lenticels are approximately 2.2 mm in length and 0.6 mm in width.
 Branch lenticels are linear in shape.
 Branch lenticel color is strong brown [55. s.B].
 Branch lenticels number approximately 62 per square inch.

VEGETATIVE BUDS

Size: Approximately 50 mm in length and 4 mm in width.
 Shape: Conical.
 Color: Brilliant, yellowish green [130. b.y.G] with strong, orange yellow [68. s.OY] exterior basal scales. As tips unfurl they become strong purplish red [255. s.p.R].
 First vegetative buds of 'UCB1-D90' opened approximately 8 days earlier than 'UCB1-D1.'
 Leaflet blade color on the top and bottom surfaces is vivid red [11. v.R]. At the junction of the base of the petiole with the rachis, tissue color is brilliant, yellowish green [130. b.y.G].
 Expanding rachis color is brilliant, yellowish green [130. b.y.G] at the extreme tip and very dark purplish red [260. v.d.p.R] on all sides elsewhere.
 Leaf venation pattern is pinnate and alternate. Midrib and veins are brilliant, yellowish green [130. b.y.G].

FOLIAGE

Leaves are pinnately compound composed of alternate leaflets numbering between 14 and 17.
 Compound leaf size variations are great but average approximately 46 cm in length and 47 cm in width at the widest point.
 Young leaflets are glossy and dark greyish red [20. d.g.R] on upper surfaces and moderate olive green [125. m.OG] on lower surfaces. Older leaflet surfaces are strong olive green [123. s.OG] on upper surfaces and moderate olive green [125. m.OG] on lower surfaces.
 Leaflet shape is lanceolate with an acute apex and cuneate base.
 There is great variation in leaf and leaflet size depending on the time of the season, position on the tree and tree age. Leaflet size varies considerably but averages 78 mm in length and 27 mm in width.
 Leaflet venation pattern is pinnate and venation is brilliant yellowish green [130. b.y.G]. The midrib is prominent and the same color as the venation pattern.
 Leaflet margins are entire and surfaces are glabrous.
 Petiole and rachis younger tissue upper and lower surface color is predominately strong purplish red [255. s.p.R] with some strong yellowish green [131. s.y.G] streaking on lower surfaces of older tissues.
 Petiole length varies considerably but averages 60 mm in length from point of rachis attachment to basal leaflet, and is glabrous with no wings.

Rachis length varies considerably and averages about 35 cm in length.

SALT TOLERANCE

Different concentrations of individual salts that contribute to soil salinity and alkalinity ranging from 0 to 10,000 mg/l were added to the culture medium that rootstock was growing in. Each clone-salt combination was replicated four times. Observations were taken on visual injury symptoms and growth measured by number of shoots and leaves per plant. Clone 'UCB1-D90' rootstock is characterized by its tolerance to high levels of the soil salts, calcium chloride (at 10,000 mg/l), sodium sulfate (at 10,000 mg/l), sodium carbonate (at 1,000 mg/l) and sodium bicarbonate (at 1,000 mg/l). As measured on a growth scale of 1 to 10, in the case of each of these salt trials clone 'UCB1-90D' had greater growth than the industry standard rootstock, 'UCB1-D1.' In another salt trial, media was supplemented with the comparable total salt load detected in saline San Joaquin Valley

irrigation water (Sanden, B. et al. 2009. Large-Scale Utilization of Saline Groundwater for Irrigation of Pistachios Interplanted with Cotton. 2009 Progress Rpt. of CA Pistachio Comm.) plus twice the detected salt load. In all cases, growth of clone 'UCB1-D90' outperformed that of 'UCB1-D1' in the presence of high soluble salts.

DISEASE/COLD TOLERANCE

The present variety has higher resistance to *Verticillium* disease than the female parent, *Pistacia atlantica*.

The present variety has higher cold tolerance than the male parent, *Pistacia integerrima*.

Having thus described and illustrated the new variety of rootstock, what is claimed as new and desired to be secured by plant Letters Patent is:

1. A new and distinct variety of pistachio rootstock plant substantially as herein described and illustrated.

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FIG. 1



FIG. 2