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(54) **APPLE TREE NAMED 'CIVG198'**

(30) **Foreign Application Priority Data**

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(57) **ABSTRACT**

(73) Assignee: **Consorzio Italiano Vivaisti**

A new and distinct *Malus domestica* Mill. apple tree variety named 'CIVG198' particularly characterized by having deep, red skin color, high sugar content, very firm flesh, scab resistance, long storage capacity and long shelf life.

(21) Appl. No.: **11/342,555**

(22) Filed: **Jan. 31, 2006**

**PRIORITY CLAIM**

[0001] This application claims priority under 35 U.S.C. § 119(f) of the European Community Plant Variety Rights No. 2005/0312 filed Feb. 21, 2005.

**STATEMENT REGARDING SPONSORED RESEARCH OR DEVELOPMENT**

[0002] None.

**LATIN NAME OF THE GENUS AND SPECIES OF THE PLANT CLAIMED**

[0003] *Malus domestica* Mill.

**VARIETY DENOMINATION**

[0004] 'CIVG198'

**BACKGROUND OF THE INVENTION**

[0005] The present invention relates to a new and distinct variety of apple tree, botanically known as *Malus domestica* Mill. of the Family Rosaceae, and hereinafter referred to by the variety denomination 'CIVG198'.

[0006] The new *Malus* variety is a product of a planned breeding program conducted by the inventors, Michelangelo Leis, Alessio Martinelli, Gianfranco Castagnoli and Francesco Tagliani in S. Giuseppe di Comacchio (Ferrara), Italy. The objective of the breeding program was to develop a new *Malus* variety with deep, red skin color, high sugar content, very firm flesh, scab resistance, long storage capacity and long shelf life.

[0007] The new *Malus* variety, 'CIVG198', originated from a cross made in a planned, controlled breeding program in S. Giuseppe di Comacchio (Ferrara), Italy. The female parent is *Malus domestica* Mill. 'Gala' (unpatented, 'Kidd's Orange' x 'Golden Delicious'— 1939). The male parent is *Malus domestica* Mill. 'Liberty' (unpatented, 'Macoun' x Purdue 54-12- 1955). 'CIVG198' was discovered and selected in 1996 by the inventors as a flowering plant within the progeny of the stated cross in a controlled environment in S. Giuseppe di Comacchio (Ferrara), Italy.

[0008] Asexual reproduction of the new *Malus* variety by budding and grafting was first performed in September, 1996, and then again in September, 1999, and in the following years in S. Giuseppe di Comacchio (Ferrara), Italy, and has demonstrated that the combination of characteristics as herein disclosed for the new *Malus* variety are firmly fixed and retained through successive generations of asexual reproduction. The new variety reproduces true to type.

**BRIEF DESCRIPTION OF THE INVENTION**

[0009] The following traits have been repeatedly observed and are determined to be unique characteristics of 'CIVG198' which in combination distinguish this apple tree as a new and distinct variety:

- [0010] 1. Deep red skin color of the fruit;
- [0011] 2. High sugar content;
- [0012] 3. Very firm flesh;
- [0013] 4. Scab resistance;
- [0014] 5. Long storage capacity; and
- [0015] 6. Long shelf life.

[0016] In comparison to the parental varieties, 'Gala' and 'Liberty', 'CIVG198' differs primarily in the traits listed in Table 1:

**TABLE 1**

Variety	Time of maturity for consumption	Flesh firmness	Fruit shape
'CIVG198'	Medium	Very strong	Conic
'Gala'	Early	Strong	Globose conical
'Liberty'	Early	Medium	Globose

[0017] Of the commercial cultivars known to the inventors, the most similar in comparison to 'CIVG198' is the male parental variety 'Liberty' as compared in Table 1.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0018] The accompanying photographs illustrate the overall appearance of the new apple tree 'CIVG198' showing the

colors as true as is reasonably possible with color reproductions of this type. Color in the photographs may differ slightly from the color value cited in the detailed botanical description, which accurately describe the color of 'CIVG198'

[0019] 1) FIG. 1 shows dormant wood of 'CIVG198',

[0020] 2) FIG. 2 shows typical inflorescence and leaves of 'CIVG198',

[0021] 3) FIG. 3 shows a blooming tree of 'CIVG198',

[0022] 4) FIG. 4 shows a bearing tree of 'CIVG198',

[0023] 5) FIG. 5 shows different images of the typical fruit of 'CIVG198',

[0024] 6) FIG. 6 shows different images of the flowers of 'CIVG198', and

[0025] 7) FIG. 7 shows a close-up view of a mature fruit attached to a 'CIVG198' tree.

#### DETAILED BOTANICAL DESCRIPTION

[0026] The new *Malus* variety 'CIVG198' has not been observed under all possible environmental conditions. The phenotype of the new variety may vary with variations in environment such as temperature, light intensity, and day length without any change in the genotype of the plant.

[0027] The aforementioned photographs, together with the following observations, measurements and values describe the new *Malus* variety 'CIVG198' as grown in the apple farm in S. Giuseppe di Comacchio (Ferrara), Italy, under conditions which closely approximate those generally used in commercial practice. The apple farm where 'CIVG198' is grown is situated near the Adriatic sea (44°45' North, 12°11' East) and is zero (0) meters above sea level. The soil of the apple farm where 'CIVG198' is grown is sandy, and the soil is treated with manure every year and irrigated with drip irrigation systems. The climate is temperate continental with high summer temperatures and low winter temperatures.

[0028] Unless otherwise stated, the detailed botanical description includes observations, measurements and values based on four (4) year old 'CIVG198' trees that were grown in the apple farm in S. Giuseppe di Comacchio (Ferrara), Italy, from 2003 to 2004. All trees were of cropping maturity. Quantified measurements are expressed as an average of measurements taken from a number of individual trees of 'CIVG198'. The measurements of any individual tree, or any group of trees, of the new variety may vary from the stated average.

[0029] Color references are made to The Royal Horticultural Society Colour Chart (RHS), except where general colors of ordinary significance are used. Color values were taken under daylight conditions at approximately at 10:00 am in S. Giuseppe di Comacchio (Ferrara), Italy.

[0030] All trees of 'CIVG198', insofar as they have been observed, have been identical in all the characteristics described below.

[0031] Classification:

[0032] *Botanical*.—*Malus domestica* Mill.

[0033] Parentage:

[0034] *Female parent*.—*Malus domestica* Mill. 'Gala' (unpatented).

[0035] *Male Parent*.—*Malus domestica* Mill. 'Liberty' (unpatented).

[0036] Propagation: Budding and grafting on M9 rootstock.

[0037] Tree:

[0038] *Age*.—Observed plants were four years old.

[0039] *Vigor*.—Average vigor.

[0040] *Form*.—Pyramidal.

[0041] *Habit*.—Upright, branches angle is 70° to 80° with respect to trunk if allowed to grow naturally.

[0042] *Density*.—Medium density.

[0043] *Cropping behavior*.—Early beginning of production; very high and constant productivity and regular and abundant flowering; no biennial bearing.

[0044] *Production*.—4<sup>th</sup> year: 22 Kg.

[0045] Size:

[0046] *Height*.—2.28 m.

[0047] *Spread*.—1.20 m.

[0048] *Trunk diameter*.—28.8 mm as measured 20 cm above point of grafting.

[0049] Surface texture: Smooth.

[0050] Bark color: Brown, RHS 166A.

[0051] Trunk lenticels:

[0052] *Length*.—2.64 mm.

[0053] *Width*.—0.99 mm.

[0054] *Color*.—Yellow-brown, RHS 164B.

[0055] *Density*.—3.17 n°/cm<sup>2</sup>.

[0056] Branches:

[0057] *Number per tree*.—About twenty (20).

[0058] *Length*.—Varies due to pyramidal shape of tree. At 4 years, maximum of 100 cm to 110 cm; minimum of 10 cm to 12 cm.

[0059] *Diameter (at 3 years)*.—About 9 mm to 11 mm.

[0060] *Surface texture*.—Smooth.

[0061] *Color (at 3 years)*.—RHS 176A, (greyed-orange group).

[0062] *Internode length*.—About 2 cm to 5 cm.

[0063] *Internode diameter*.—About 9 mm to 11 mm.

[0064] Branches lenticels:

[0065] *Length*.—1.0 mm.

[0066] *Width*.—0.4 mm.

[0067] *Color*.—Yellow-brown, RHS 164B.

[0068] *Density*.—4.93 n°/cm<sup>2</sup>.

- [0069] Leaves:
- [0070] Arrangement: Alternate, simple, petiolated.
- [0071] Lamina:
- [0072] *Size*.—Length (4 year old): 98.8 mm (from 3<sup>rd</sup> to 5<sup>th</sup> fully expanded leaf) Width (4 year old): 60.4 mm (from 3<sup>rd</sup> to 5<sup>th</sup> fully expanded leaf).
- [0073] *Length/width ratio*.—1.64.
- [0074] *Overall shape*.—Elliptical-elongated.
- [0075] *Base shape*.—Obtuse.
- [0076] *Apex shape*.—Acuminate.
- [0077] *Margin*.—Bluntly serrate.
- [0078] *Pubescence*.—Absent on upper surface and lightly pubescent on lower surface.
- [0079] *Attitude in relation to shoot*.—Outwards.
- [0080] *Color (mature leaves)*.—Green, RHS 137 A.
- [0081] *Color (immature leaves)*.—Yellow-Green, RHS 144 B.
- [0082] Venation:
- [0083] *Type*.—Prominent pinnate venation from central vein to the leaf edge.
- [0084] *Color*.—Light green, RHS 139 D.
- [0085] Petiole:
- [0086] *Length*.—43.1 mm.
- [0087] *Diameter*.—1.64 mm.
- [0088] *Color*.—Light green, RHS 138 B.
- [0089] Stipule:
- [0090] *Arrangement*.—Adnate.
- [0091] *Length (distance of stipules from basal attachment of petiole)*.—Short, 0 mm to 0.5 mm.
- [0092] *Width*.—0.7 mm to 1.2 mm.
- [0093] Spur:
- [0094] *Present*.—Yes.
- [0095] *Distance between each spur*.—On the three year old branches, the distance is about 20 mm to 50 mm.
- [0096] *Number of fruit per spur*.—2 to 4.
- [0097] Flowers:
- [0098] *Blooming time*.—Full bloom on April 16<sup>th</sup>.
- [0099] *Blooming period*.—10 to 12 days.
- [0100] *Fragrance*.—Very slight.
- [0101] *Type*.—Inflorescence.
- [0102] *Number of flowers per inflorescence*.—5 to 6.
- [0103] Flower size:
- [0104] *Diameter*.—35.5 mm.
- [0105] *Flower color*.—Primarily white-pink, RHS 69 D, when petals fully opened, but undersides of petals light red-purple color, making pink blooming stage pink.
- [0106] Buds:
- [0107] *Number of buds per spur*.—one (1).
- [0108] *Shape*.—Pointed.
- [0109] *Length*.—9.1 mm.
- [0110] *Width*.—4.98 mm.
- [0111] *Color*.—Dark purple-brown, RHS value 187 A.
- [0112] Petals:
- [0113] *Number per flower*.—Five to six (5 to 6).
- [0114] *Length*.—19.54 mm.
- [0115] *Width*.—13.41 mm.
- [0116] *Length/width ratio*.—1.46.
- [0117] *Overall shape*.—Ellipsoid.
- [0118] *Apex shape*.—Obtuse.
- [0119] *Base shape*.—Obtuse.
- [0120] *Texture*.—Smooth.
- [0121] *Margin*.—Slightly crenate.
- [0122] *Color (upper surface)*.—White-pink, RHS 69D.
- [0123] *Color (lower surface)*.—Light red-purple, RHS 63B.
- [0124] Sepals:
- [0125] *Number per flower*.—Five to six (5 to 6).
- [0126] *Length*.—7.71 mm.
- [0127] *Width*.—3.54 mm.
- [0128] *Length/width ratio*.—2.2.
- [0129] *Overall shape*.—Lanceolate.
- [0130] *Apex shape*.—Acute.
- [0131] *Texture*.—Hairy.
- [0132] *Margin*.—Entire.
- [0133] *Color*.—Light green, RHS 139C.
- [0134] Pedicel:
- [0135] *Length*.—13 mm to 15 mm.
- [0136] *Diameter*.—2.0 to 2.5 mm.
- [0137] *Color*.—Light green, RHS 139C.
- [0138] Fruit:
- [0139] *Keeping quality*.—The fruit keeps very well on the tree. It can be stored in cold temperature conditions for up to seven months without loosing

firmness and juiciness. It has a long shelf life, up to three weeks without losing firmness and juiciness.

- [0140] *Maturity when described.*—Ripe for eating.
- [0141] *Maturity period after full bloom.*—About 147 days after full bloom (April 16<sup>th</sup>).
- [0142] *Date of picking.*—September 09<sup>th</sup> through September 13<sup>th</sup>.
- [0143] *General shape.*—Conic.
- [0144] *Average weight.*—205.03 g.
- [0145] *Fruit size:*
- [0146] *Average height.*—76.44 mm.
- [0147] *Average diameter (at widest point).*—75.23 mm.
- [0148] *Position of maximum diameter.*— $\frac{3}{4}$  of the height near stem end.
- [0149] *Height/thickness ratio.*—1.02.
- [0150] *Stem:*
- [0151] *Length.*—23.34 mm.
- [0152] *Diameter.*—2.94 mm.
- [0153] *Color.*—Green, RHS 144A.
- [0154] *Basin.*—Depth: 14.75 mm Width: 34.1 mm.
- [0155] *Calyx:*
- [0156] *Depth.*—9.1 mm.
- [0157] *Width.*—31.7 mm.
- [0158] *Crowning at calyx end.*—Weak.
- [0159] *Position of sepals.*—Half-closed.
- [0160] *Calyx tube.*—Closed (it does not communicate with locules).
- [0161] *Skin:*
- [0162] *Thickness.*—Thick.
- [0163] *Texture.*—Smooth.
- [0164] *Firmness (at picking time).*—9.5 to 10 kg/cm<sup>2</sup>.
- [0165] *Overcolor color.*—Deep red (dark greyed-purple group), RHS value 187B.
- [0166] *Percentage of skin surface with overcolor color.*—85-95%.
- [0167] *Pattern of overcolor.*—Solid flush.
- [0168] *Intensity of overcolor.*—High; very bright.
- [0169] *Ground color.*—Greyed-Yellow, RHS value 160B.
- [0170] *Flesh:*
- [0171] *Color.*—Yellow-white, RHS 158A.
- [0172] *Texture.*—Firm, crisp and juicy.
- [0173] *Aroma.*—Medium light intensity, slightly acidic.

- [0174] *Eating quality.*—Good with high level of sugar and acidity.
- [0175] *Sugar content (at picking time).*—14 to 15 Brix.
- [0176] *Acidity/starch (at picking time).*—Acidity: 7 to 7.5 g/lit Malic acid/starch: 3 (scale 1 to 5).
- [0177] *Core:*
- [0178] *Symmetry of core.*—Big and symmetric.
- [0179] *Distinctness of core lines.*—Medium — strong.
- [0180] *Locules.*—Number (per fruit): 5 Length: 10.6 mm Width: 4.5 mm Form: Partly open.
- [0181] *Seeds:*
- [0182] *Number per fruit.*—8 to 10.
- [0183] *Number per locule.*—About 2.
- [0184] *Shape.*—Ellipsoid, elongated and pointed.
- [0185] *Length.*—9.7 mm.
- [0186] *Width.*—5.2 mm.
- [0187] *Color.*—Brown, RHS 200D.
- [0188] *Reproductive organs:*
- [0189] *Androecium:*
- [0190] *Stamens.*—Number per flower: 17.9 Length: 10.31 mm.
- [0191] *Filament.*—Length: 8.56 mm.
- [0192] *Anther.*—Shape: Ovoid, flat in the center Length: 2.21 mm Diameter: 1.75 mm Color: Pale yellow, RHS 11B.
- [0193] *Pollen.*—Amount: Abundant Color: Pale yellow, RHS 11B Requirements: Gala, Golden and Granny Smith are good pollinators.
- [0194] *Gynoecium:*
- [0195] *Stigma.*—Shape: Bulbous on top Length: 0.86 mm Width: 0.43 mm Color: Green, RHS 134A.
- [0196] *Style:* Number per flower: 5 Length: 11.32 mm Width: 0.28 mm Color: Yellow-green, RHS 150C.
- [0197] *Ovary.*—Length: 2.82 mm Width: 1.98 mm Color: Yellow-green, RHS 144A.
- [0198] *Use:* Fresh market.
- [0199] *Sensitivity to disease/pests:* Scab resistance.
- [0200] *Winter hardiness:* Tolerance to temperatures of -12° C. without observed damage to wood and buds of dormant apple trees; but open flowers and young fruitlets are killed by exposure to -3° C. to -5° C., depending on the length of exposure.

[0201] Drought/heat tolerance: Good tolerance to heat, up to 40° C., growth is limited by drought periods without irrigation.

[0202] Shipping/storage characteristics: Little sensitivity to bruising; very good storability under ULO-conditions (1° C., 2% O<sub>2</sub>, 2% CO<sub>2</sub>) for up to seven (7) months.

We claim:

1. A new and distinct *Malus domestica* Mill. apple tree variety named 'CIVG198', substantially as illustrated and described herein.

\* \* \* \* \*

**FIGURE 1**

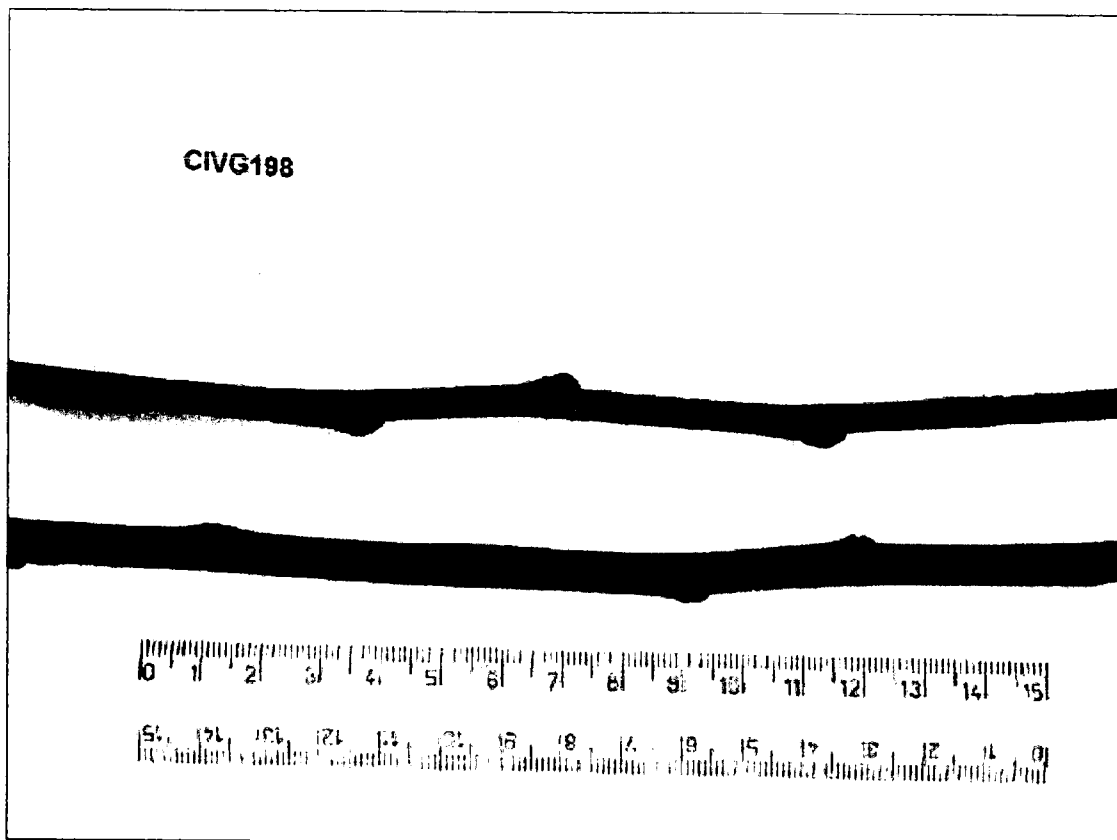


FIGURE 2



FIGURE 3





FIGURE 4

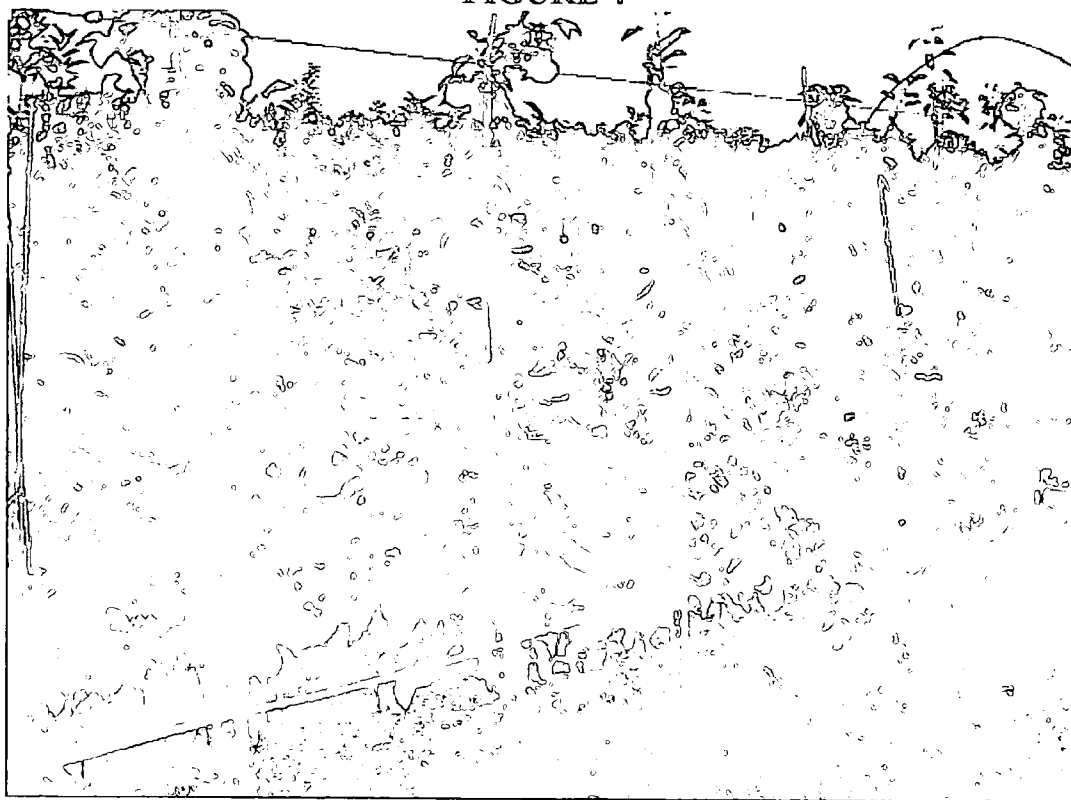


FIGURE 5

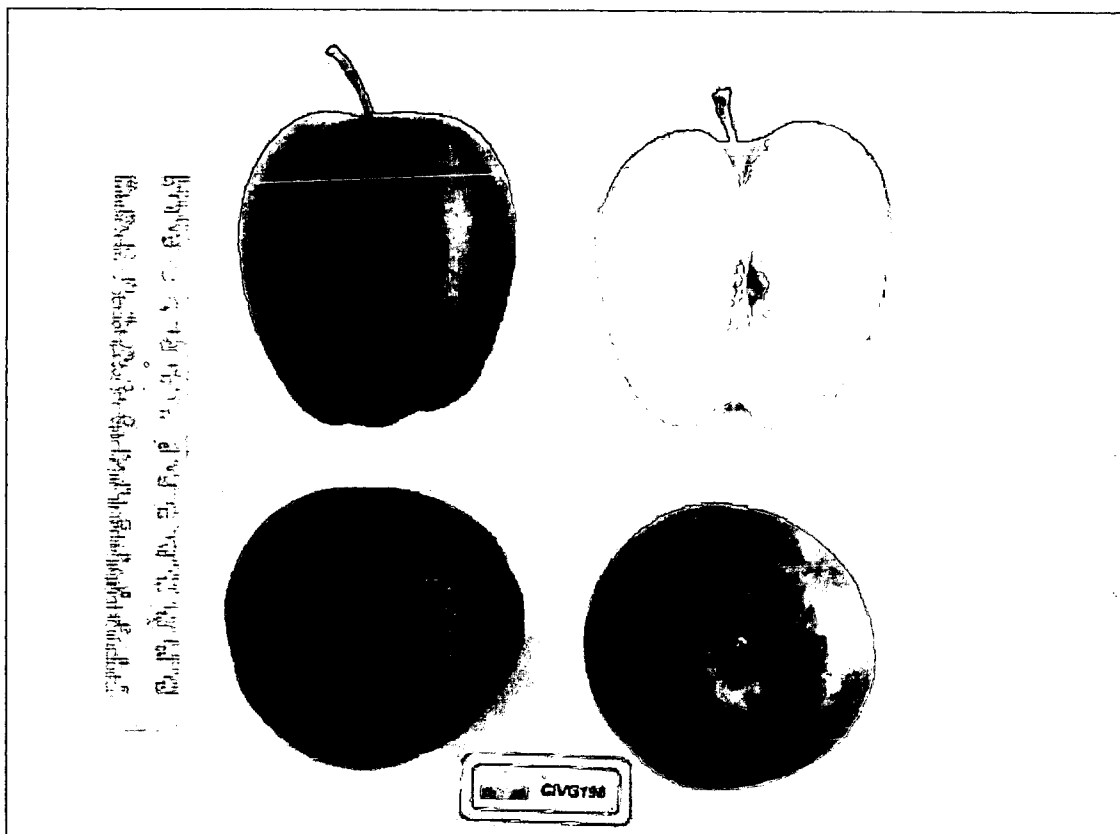


FIGURE 6

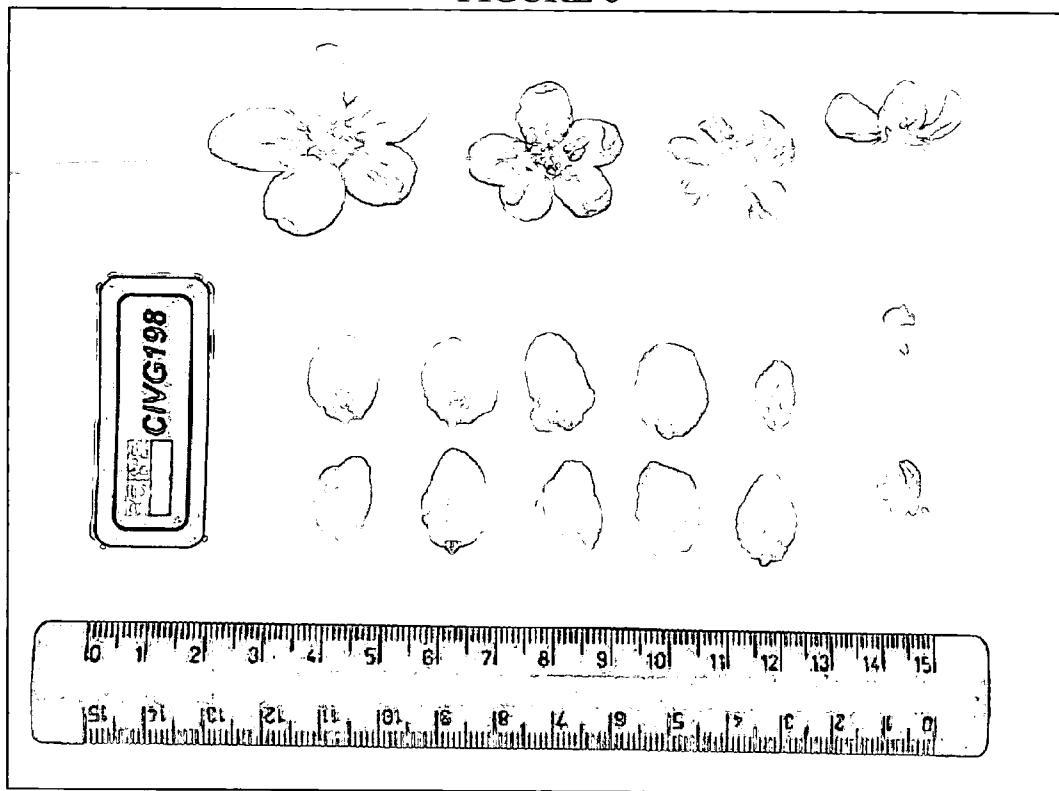


FIGURE 7

