‘Tsolakeiko’: A Greek Sweet Cherry Cultivar

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‘Tsolakeiko’ is a local Greek cherry cultivar. Productivity and mean fruit weight of ‘Tsolakeiko’ were significantly greater than ‘Bigarreau Burlat’ and ‘Tragana Edessis’. Total soluble solids of ‘Tsolakeiko’ were lower than ‘Tragana Edessis’ but wasn’t significantly different from ‘Bigarreau Burlat’. Fruits of ‘Tsolakeiko’ mature 5 d later than ‘Bigarreau Burlat’. The fruits of ‘Tsolakeiko’ are symmetrical, heart-shaped and of mahogany color. Fruits of ‘Tsolakeiko’ are juicy, sour-sweet when mature, and have a good eating quality. S-RNase alleles determined by PCR fragment analysis of the cultivar ‘Tsolakeiko’ were S5S6 (self fertile and a universal donor). In conclusion, ‘Tsolakeiko’ is an early promising sweet cherry cultivar due to its quality characteristics.

**Origin**

The genotype ‘Tsolakeiko’ was first observed during the 80s in a private orchard owned by Mr. Christos Tsolakis, at the area of Loutraki Aridaia (northern Greece, long. 21°94’ 59” E; lat. 40°97’11” N; elevation 350 m). This study took place in a commercial orchard at that area. The soil of the experimental orchard at a depth of 0 to 30 cm was characterized as a clay loam, neutral (pH 6.5), and with low electrical conductivity (0.748 mS cm⁻¹) and low organic matter (1.83%) content. The average maximum temperature from May to August for the years 2011, 2012, 2013, and 2014 was 28.03, 29.78, 31.35, and 30.25 °C, respectively. The mean precipitation in May for the years 2011, 2012, 2013, and 2014 was from 2.9 to 4.5 mm, and 4.05 mm, respectively. The cultivar was a budding from the wild cherry rootstock, which was grafted with the cultivar ‘Tragana Edessis’ scion. It should be noted at this point that it is a normal practice in mountainous “Almopia” area to allow budding from the wild cherry rootstock to aid the pollination of the cultivars in the orchard as wild cherry is a very good pollinator of all cherry cultivars when they blossom at the same period. It was observed that such a budding produced fruits of superior quality than the cultivar ‘Tragana Edessis’ (which was the scion variety). For this reason, the owner of the orchard Mr. Tsolakis took care to maintain, propagate, and cultivate the “new” cultivar. Since this new cultivar was proved to be successful as a commercial cultivar as it matured when other remarkable cultivars was present in the market at that period, it spread quickly in the region and acquired a distinct name and place in the market.

**Table 1. Mean yield, fruit weight, total soluble solids, and acidity of the cultivars Bigarreau Burlat, Tsolakeiko, and Tragana Edessis during a period of 4 years.**

| Cultivar          | Total yield (kg·ha⁻¹) | Fruit wt (g) | Total soluble solids (% Brix) | Acidity (malic acid %) |
|-------------------|-----------------------|--------------|-------------------------------|------------------------|
| Bigarreau Burlat  | 26,600 b              | 8.0 b        | 13.7 b                        | 3.8 c                  |
| Tsolakeiko        | 32,200 a              | 10.4 a       | 15.1 b                        | 5.2 b                  |
| Tragana Edessis   | 28,800 b              | 7.7 b        | 18.2 a                        | 7.1 a                  |

*Means followed by the same letter in the same column are not significantly different (Duncan’s multiple range test; P < 0.05).*

**Table 2. Data of anthesis, maturation, and leaf shedding periods of the cultivars Bigarreau Burlat, Tsolakeiko, and Tragana Edessis during a period of 4 years.**

| Yr        | Cultivar          | Anthesis | Maturity | Leaf shedding |
|-----------|-------------------|----------|----------|--------------|
|           | Beginning² | Full² | End      | Beginning | Full | End    |
| 2011      |           |       |          |           |      |        |
| Bigarreau | 20/3      | 30/3  | 30/3     | 20/5      | 28/10| 18/11  |
| Tsolakeiko| 24/3      | 30/3  | 4/4      | 25/5      | 28/10| 18/11  |
| Tragana   | 2/4       | 7/4   | 12/4     | 2/6       | 31/10| 23/11  |
| Edessis   |           |       |          |           |      |        |
| 2012      |           |       |          |           |      |        |
| Bigarreau | 18/3      | 21/3  | 27/3     | 18/5      | 25/10| 14/11  |
| Tsolakeiko| 23/3      | 27/3  | 1/4      | 22/5      | 26/10| 13/11  |
| Tragana   | 31/3      | 4/4   | 10/4     | 31/5      | 28/10| 19/11  |
| Edessis   |           |       |          |           |      |        |
| 2013      |           |       |          |           |      |        |
| Bigarreau | 23/3      | 28/3  | 2/4      | 23/5      | 30/10| 21/11  |
| Tsolakeiko| 27/3      | 2/4   | 7/4      | 27/5      | 31/10| 23/11  |
| Tragana   | 5/4       | 9/4   | 15/4     | 3/6       | 2/11 | 25/11  |
| Edessis   |           |       |          |           |      |        |
| 2014      |           |       |          |           |      |        |
| Bigarreau | 19/3      | 23/3  | 31/3     | 21/5      | 27/10| 16/11  |
| Tsolakeiko| 25/3      | 31/3  | 3/4      | 26/5      | 27/10| 16/11  |
| Tragana   | 3/4       | 5/4   | 13/4     | 4/6       | 1/11 | 24/11  |

²10% anthesis.
³80% anthesis.
The significance of the differences between means was evaluated using Duncan's multiple range test analysis of variance at P < 0.05 carried out in SPSS Version 17 (SPSS Inc., Chicago, IL).

Total yield and mean fruit weight of ‘Tsolakeiko’ were significantly higher than ‘Bigarreau Burlat’ and ‘Tragana Edessis’ (Table 1). Total soluble solids of ‘Tsolakeiko’ were lower than ‘Tragana Edessis’ but were not significantly different from ‘Bigarreau Burlat’. Acidity of ‘Tsolakeiko’ was lower than ‘Tragana Edessis’ but higher than ‘Bigarreau Burlat’ (Table 1).

Trees of ‘Tsolakeiko’ are semivigorous with a semiupright growth habit. One-year-old shoots are very vigorous, especially on young trees. Trees become productive from the third year, especially when grafted on dwarfing rootstocks.

Flower buds are conical. The flower density of ‘Tsolakeiko’ is high. The number of flower buds per fruiting spur is 5–6. ‘Tsolakeiko’ has an average of three flowers per fruit bud and full anthesis occurs at Mar. 30. S-RNase alleles determined by polymerase chain reaction fragment analysis of the cultivar ‘Tsolakeiko’ were S1S4 (self-fertile cultivar and a universal donor; Bekefi, 2006).

Fruits of ‘Tsolakeiko’ mature 5 d later than ‘Bigarreau Burlat’, May 25 and 20 respectively, whereas they mature 8 d earlier than ‘Tragana Edessis’ (Table 2).

The fruits of ‘Tsolakeiko’ are symmetrical, heart shaped, and of mahogany color (Fig. 1). Color characteristics (L, a, and chroma) of fruits did not differ among cultivars (Table 3).

Fruit width did not differ among the studied cultivars. Fruit length of ‘Tsolakeiko’ was greater than ‘Tragana Edessis’ (Table 4). Fruit of ‘Tsolakeiko’ are juicy, sour-sweet when mature, and have a good eating quality (firmness, juiciness, total soluble solids/acids, etc.). Fruit firmness of ‘Tsolakeiko’ did not differ compared with ‘Bigarreau Burlat’ and ‘Tragana Edessis’ (Table 4).

From our results according to the Christensen’s method for resistance to cracking (Christensen, 1984), fruits of ‘Tsolakeiko’ are sensitive to cracking when precipitation occurs before harvest (Table 4). The pedicel mean length of the fruit is 4.6 cm. The percentage of double fruits is very low and without an economic importance. Stone shape of ‘Tsolakeiko’ is ovoid. The ratio of stone weight to fruit weight is 1/22.1, whereas stone size to fruit size is 1/18.9. The ratios of stone weight to fruit weight of the cultivars ‘Bigarreau Burlat’ and ‘Tragana Edessis’ are 1/10.7 and 1/19.25, respectively.

The leaves are large, elliptical in shape, and have dentate margins. Blade length to width ratio is 1/0.37. The petiole is relatively short (3.6 cm) and thick (0.18 cm). The nectaries are usually two, kidney shaped and orange-red in color. The ratio of petiole to blade is 1/4.97. Leaf fall of ‘Tsolakeiko’ starts at Oct. 10 and ends at Nov. 18 (Table 2).

In conclusion, ‘Tsolakeiko’ is a precocious, promising sweet cherry cultivar due to its quality characteristics. Fruits are large (for the period of harvesting), juicy, sour-sweet when mature, and have a good eating quality. Furthermore, it is a self-fertile cultivar and a universal donor for pollination.

Availability

‘Tsolakeiko’ sweet cherry has not registered yet in the official list of the Greek Ministry of Rural Development and Food. Propagation wood is available from the Institute of Plant Breeding and Phytogenetic Resources, Department of Deciduous Fruit Growing in Naoussa.

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