'Myrto' Apple

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Myrto is a late-maturing apple (*Malus* × *domestica* Borkh.) cultivar and is a cross between 'Golden Delicious' and 'Granny Smith'. The productivity of 'Myrto' is similar to that of 'Golden Delicious', but it is higher than that of 'Granny Smith'. 'Myrto' trees produce large fruit (similar to 'Golden Delicious' but larger than 'Granny Smith') and have a very low percentage of preharvest fruit drop. Fruits do not show symptoms of epidermal russetting and have a light green skin color with the flesh being creamy white, very crisp, aromatic, and juicy. Fruit firmness at harvest is high. The total sugars of the cultivars Myrto and Golden Delicious were higher than those of 'Granny Smith'. In field observations, the characteristics of cultivar Myrto combine the desirable traits of both its parents, including large size and high sugar from 'Golden Delicious' with late maturing, high acidity, and lack of russetting from 'Granny Smith'. The storability of the fruits of this cultivar in common refrigerated rooms (0 to 1 °C) is ≈6 months.

Origin

The cultivar Myrto (Greek female name) is a cross between 'Golden Delicious' and 'Granny Smith' (seed parent). The cross was made in 1978 at the Greek Pomology Institute by the researcher Georgios Syrgianidis and the initial selection was done by the same researcher 6 years later. Propagation wood was given to few growers so that this cultivar could be tested in their private orchards. The objective of this research was to give information about the new cultivar Myrto and to evaluate it in comparison with its parents regarding productivity and some fruit quality attributes.

Description

Leaves of the tree. The leaves of the cultivar Myrto have the following dimensions: length 10.7 cm, width 6.3 cm, length of

leaf petiole 4.8 cm, and thickness of leaf petiole 2 mm. On MM 106 rootstock, this cultivar is moderately vigorous and has excellent productivity that is stable from year to year. However, its performance has not been tested on other rootstocks. The anthesis of the cultivar Myrto occurs between 16 and 22 Apr., whereas the anthesis of the cultivars Golden Delicious and Granny Smith occurs 12 to 20 and 13 to 18 Apr., respectively. Unopened flowers of the cultivar Myrto are medium pink in full balloon stage, whereas at full bloom, the petals are mainly white with a slight medium pink blush. The productivity of 'Myrto' is not significantly different from 'Golden Delicious', but it is higher than 'Granny Smith' (Table 1). 'Myrto' trees are as susceptible to apple scab [*Venturia inaequalis* (Cke.) Wint.] and powdery mildew [*Podosphaera leucotricha* (Ell. & Ev.) Salm] as its parents (Syrgianidis, 2004). However, more research is needed so its resistance to other diseases can be evaluated.

Fruits. Fruit characteristics reported in Tables 1 and 2 are mean values taken over 4 consecutive years from 2004 to 2007. The experimental layout was a randomized complete block design including six replications of the three cultivars, including five trees per replication. The differences between means were evaluated by using the Duncan's multiple range test at $P \leq 0.05$.

Fruits of the cultivar Myrto have a light green skin color and are oblong conical with the following dimensions: length 8.5 cm, width 8 cm, pedicel length 2.5 cm, pedicel thickness 1.5 mm (Table 1; Fig. 1). Length/width of 'Myrto' fruits is not significantly different from 'Golden Delicious', but it is higher than 'Granny Smith' (Table 1). The width and depth of the calyx cavity of the cultivar Myrto is 1.75 cm and 0.6 mm, respectively. Fruits are covered by a light waxy layer and have an average number of small, inconspicuous lenticels. The lenticels are white with halos like 'Granny Smith'. This variety is not subject to sunburn. For the climatic conditions of northern Greece, fruits ripen late (20 to 25 Oct.), whereas harvest dates for the cultivars Golden Delicious and Granny Smith are 8 to 14 Sept. and 19 to 25 Oct., respectively. Fruit weight of 'Myrto' is not significantly different from that of 'Golden Delicious', but it is higher than 'Granny Smith' (Table 1). Larger fruit size is one advantage of 'Myrto' over the also late-maturing cultivar Granny Smith. 'Myrto' trees have a very low percentage of preharvest fruit drop (1.2%), expressed as a percentage of a total number of fruits per tree. Thinning is necessary so that the trees can set annually heavy crops and to avoid biennial bearing. Bearing happens mainly on spurs but also on 1-year-old shoots. Two pickings are required. An important characteristic of 'Myrto' is that its fruits do not show symptoms of epidermal russetting. However, the fruits of the cultivar Golden Delicious showed some symptoms of epidermal russetting during some years. The fruit flesh of the cultivar Myrto is creamy white, aromatic, very crisp, and juicy. Flesh of fruits does not brown soon after being cut. The fruits have a tart flavor. Fruit firmness ($\text{kg} \cdot \text{cm}^{-2}$) measured with an Effegi penetrometer 11-mm tip (Effegi Model FT 327; Alfonsine, Italy) of the cultivar Myrto at harvest is high, higher than 'Granny Smith' and similar to 'Golden Delicious' (Table 1). The total soluble solids (%) measured with an Atago PR-1 electronic

Table 1. Productivity, fruit weight, fruit firmness, fruit length/width, and total soluble solids of the cultivars Golden Delicious, Granny Smith, and Myrto over a period of 4 years.

Cultivar	Productivity (kg/tree)	Fruit wt (g)	Fruit firmness ($\text{kg} \cdot \text{cm}^{-2}$)	Fruit length/width	Total soluble solids (%)
Golden Delicious	75 a ²	240 a	7.81 a	0.98 a	13.2 a
Granny Smith	67 b	205 b	7.17 b	0.81 b	11.4 b
Myrto	78 a	242 a	7.90 a	1.06 a	13.7 a

²Means followed by the same letter in the same column are not significantly different (Duncan's multiple range test, $P \leq 0.05$).

Table 2. Total sugars, pH of juice, ascorbic acid, L-malic acid, Thiault index, and total titratable acidity of the cultivars Golden Delicious, Granny Smith, and Myrto over a period of 4 years.

Cultivar	Total sugars ($\text{g} \cdot \text{L}^{-1}$)	pH of juice	Ascorbic acid		Thiault index	Total titratable acidity (%)
			content (mg/100 g fresh wt)	L-malic acid ($\text{g} \cdot \text{L}^{-1}$)		
Golden Delicious	137 a ²	3.7 a	7.5 a	3.5 c	172 b	3.9 c
Granny Smith	125 b	3.8 a	6.8 b	5.7 a	182 a	6.1 a
Myrto	140 a	3.9 a	7.2 ab	4.4 b	184 a	4.9 b

²Means followed by the same letter in the same column are not significantly different (Duncan's multiple range test, $P \leq 0.05$).

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Fig. 1. Fruits of the cultivar Myrto.

refractometer (Atago Co Ltd., Tokyo, Japan) of 'Myrto' were not significantly different from 'Golden Delicious' but were higher than those of 'Granny Smith' (Table 1). The total sugars (as described by Koukourikou-Petridou et al., 2007) of the cultivars Myrto and Golden Delicious were higher than those of 'Granny Smith', whereas the pH of juice was not different for the three cultivars

(Table 2). The ascorbic acid content (vitamin C; mg/100 g fresh weight) measured by oxalic acid 1%; Koukourikou-Petridou et al., 2007) of the cultivar Golden Delicious was higher than that of 'Granny Smith'. L-malic acid ($\text{g}\cdot\text{L}^{-1}$) and the total titratable acidity (%) measured as described by Koukourikou-Petridou et al. (2007) were decreased in the following order: 'Granny Smith' > 'Myrto' > 'Golden Delicious' (Table 2). The Thiault index (total sugars plus 10-fold of malic acid) of the cultivars Myrto and Granny Smith were higher than those of 'Golden Delicious' (Table 2). Thiault index is used to characterize apple fruit quality at harvest (optimum value for the cultivar Golden Delicious is 180) as well as fruit storability during cold storage (Thiault, 1971). Some years fruits showed the physiological disorder "bitter pit," but this problem was resolved by calcium sprays (Syriganidis, 2004). The fruit maintains firmness, juiciness, and flavor very well in standard cold storage (0 to 1 °C) for ≈ 6 months (Syriganidis, 2004).

In conclusion, 'Myrto' seems to be a promising apple cultivar that may eventually

replace 'Granny Smith' as the late-maturing green apple of choice for commercial production.

Availability

'Myrto' apple has been registered in the official list of the Greek Ministry of Agriculture and is presently available from the Greek Pomology Institute. However, we have not yet applied for a protection of the cultivar according to UPOV (International Union for the Protection of New Varieties of Plants) guidelines.

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