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‘Odysseus’ Apple

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The apple (*Malus domestica* Borkh.) cultivar Odysseus is a cross between ‘Mutsu’ and ‘Firiki’. The productivity and fruit weight of ‘Odysseus’ is higher than ‘Firiki’ but lower than ‘Mutsu’. For the climatic conditions of northern Greece, fruits of ‘Odysseus’ mature the second week of September. The fruit flesh of the cultivar Odysseus is white, aromatic, crisp, and juicy. Fruits do not show symptoms of epidermal russeting. Fruit firmness of the cultivar Odysseus at harvest was not different from ‘Firiki’ but higher than ‘Mutsu’. The total soluble solids content of ‘Odysseus’ was higher than ‘Firiki’ but not different from ‘Mutsu’. Total antioxidant power of ‘Odysseus’ is considered high and similar to ‘Firiki’. During storage, fruits of ‘Odysseus’ do not show symptoms of the physiological disorder ”bitter pit” or ”external browning.” The fruit maintains firmness, juiciness, and flavor very well in standard cold storage (0 to 1 °C) for ≈5 months.

Origin

The cultivar Odysseus is a cross between ‘Mutsu’ and ‘Firiki’ (seed parent). The cross was made in 2000 by T. Sotiropoulos in his private orchard and the initial selection was done by the same researcher. Firiki is a Greek local cultivar that has a characteristic aroma and taste and is preferred by a significant percentage of consumers. The selected cultivar was propagated initially by grafting on the apple rootstock M9. The evaluation and the description were done over 3 consecutive years (from the fourth until the sixth year of the trees) in a private orchard that is located in Naoussa (northern Greece, long. 22°12′0″ E; lat. 40°29′04″ N; elevation 270 m). The soil of the experimental orchard at a depth of 0 to 60 cm was characterized as a silty clay loam, neutral (pH 6.7), with low electrical conductivity (0.74 mS·cm^{-1}) and low organic matter (1.73%) content. Soil nutrient contents were (mg·kg^{-1}): phosphorus 33.2, potassium 291, calcium 460, magnesium121, manganese 18, zinc 4.9, iron 26, and boron 0.24 (mg·L^{-1}) in the saturation extract of the soil. Data from the nearest meteorological station showed that the mean maximum temperature of the experimental area is 38 °C in July and 9.5 °C in January, whereas the mean minimum temperature in January is –7 °C.

The scope of this research was to give information about the new cultivar Odysseus and to evaluate it in comparison with its parent cultivars regarding productivity and several fruit quality attributes.

Description

Leaves, tree. The trees in the experimental orchard were trained as a palmette at distances 3.5 × 2 m apart. The leaves of the cultivar Odysseus have the following dimensions: length 9.8 cm, width 6 cm, length of leaf petiole 2.8 cm, and thickness of leaf petiole 3.4 mm. Leaf fall occurs in early December. When grafted on M9 rootstock, first fruiting occurred at the second year of the trees. Full bloom of the cultivar Odysseus occurs between 14 and 19 Apr., whereas full bloom of the cultivars Mutsu and Firiki occurs 14 to 18 and 16 to 20 Apr., respectively. Unopened flowers of the cultivar Odysseus are medium pink at full balloon stage, whereas at full bloom, the petals are mainly white with a slight medium pink blush. The productivity of ‘Odysseus’ is higher than ‘Firiki’ but lower than ‘Mutsu’ (Table 1). Leaf nutrient concentrations were within the range proposed by Bergmann (1988) (data not shown).

Fruits. The experimental layout was a randomized complete block design including four replications of the three cultivars, including five trees per replication. Fruit characteristics presented are mean values of 15 fruits per tree from 20 trees (four replications × five trees) of each cultivar taken over a period of 3 consecutive years. The differences between means were evaluated by using the Duncan’s multiple range test at $P \leq 0.05$ carried out by SPSS Version 17 (SPSS Inc., Chicago, IL).

Fruits of the cultivar Odysseus have a light green skin color and are oblong conical with the following dimensions: length 7.5 cm, width 7.3 cm, pedicel length 1.3 cm, pedicel thickness 1.5 mm (Fig. 1; Table 1). Mean width and depth of the calyx cavity of the cultivar Odysseus is 1.85 cm and 1 cm, respectively. The fruit flesh of the cultivar Odysseus is white, aromatic, crisp, and juicy. Fruits do not show symptoms of epidermal russeting. Fruits are not covered by a waxy layer and have an average number of small inconspicuous lenticels. Length/width ratio values of ‘Odysseus’ fruit were lower than ‘Firiki’ and ‘Mutsu’ (Table 1). For the climatic conditions of northern Greece, fruits of ‘Odysseus’ mature at the second week of September (7 to 10), whereas harvest dates for the cultivars Mutsu and Firiki are 4 to 8 Sept. and 8 to 13 Sept., respectively. Fruit weight of ‘Odysseus’ is higher than ‘Firiki’ but lower than ‘Mutsu’ (Table 1). ‘Odysseus’ trees, like its parent ‘Firiki’, have a very low percentage of preharvest fruit drop (less than 2%), expressed as a percentage of the total number of fruits per tree. Thinning is necessary so the trees can set annually heavy crops and to avoid biennial bearing. Bearing occurs mainly on spurs. Two harvesting dates are required with ≈1-week interval. Fruit firmness [(kg·cm^{-2}) measured with an Effegi penetrometer with an 11-mm tip (Effegi Model FT 327, Alfonsine, Italy)] of the cultivar Odysseus at harvest was not different from ‘Firiki’ but was higher than ‘Mutsu’ (Table 1). The total soluble solids content [(°Brix) measured with an Atago PR-1 electronic refractometer (Atago Co Ltd., Tokyo, Japan)] of ‘Odysseus’ was higher than that of ‘Firiki’ but not different from ‘Mutsu’ (Table 1). The pH of juice of ‘Odysseus’ was higher than the rest of the cultivars (Table 2). Total titratable acidity [(expressed as percent malic acid) measured as described by Koukourikou-Petridou et al. (2007)] of ‘Odysseus’ was lower than

Table 1. Productivity, fruit weight, fruit firmness, fruit length/maximum width, and total soluble solids of the apple cultivars Odysseus, Firiki, and Mutsu grafted on M9 rootstock over a period of 3 years (from the fourth until the sixth year of the trees).

Cultivar	Productivity (kg/tree)	Fruit wt (g)	Fruit firmness (kg·cm^{-2})	Fruit length/width	Total soluble solids (°Brix)
Odysseus	45.19 b[z]	201.3 b	6.91 a	1.03 b	15.16 a
Firiki	35.20 c	163.2 c	7.08 a	1.18 a	12.90 b
Mutsu	57.61 a	261.0 a	6.68 b	1.16 a	15.32 a

[z]Means 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 Odysseus.

'Firiki', whereas 'Mutsu' showed the highest value (Table 2). Ascorbic acid was quantified with a reflectometer (Reflectometer RQflex; Merck, Darmstadt, Germany). Ascorbic acid content of the cultivar Odysseus was 6.9 mg/100 g fresh weight. Total antioxidant power (Benzie and Strain, 1996) of 'Odysseus' is considered high compared with other cultivars (Wojdylo et al., 2008) and similar to 'Firiki'. 'Mutsu' showed low value of total antioxidant power.

Table 2. Total titratable acidity, pH of juice and total antioxidant power of the apple cultivars Odysseus, Firiki, and Mutsu grafted on M9 rootstock over a period of 3 years (from the fourth until the sixth year of the trees).

Cultivar	Total titratable acidity (% malic acid)	pH of juice	Total antioxidant power (μmol ascorbic acid equivalent/g fresh wt)
Odysseus	1.50 c[z]	4.10 a	10.48 a[y]
Firiki	2.07 b	3.39 b	12.00 a[y]
Mutsu	3.58 a	3.44 b	3.60 b[y]

[z]Means followed by the same letter in the same column are not significantly different (Duncan's multiple range test, $P \leq 0.05$).
[y]Measurement of 1 year.

During storage, fruits of 'Odysseus' do not show symptoms of the physiological disorder "bitter pit" or "external browning." The fruit maintains firmness, juiciness, and flavor very well in standard cold storage (0 to 1 °C) for ≈5 months.

In conclusion, 'Odysseus' seems to be a promising apple cultivar as a result of its high quality and nutritional value.

Availability

'Odysseus' apple will be in the near future registered in the official list of the Greek Ministry of Agriculture.

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