Maraş 12: A Walnut Cultivar with Cluster-bearing Habit

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Walnut (*Juglans regia* L.) is one of the most important fruit species in the world because it is rich in nutrients and elements, and is a high-quality wood. There is an increasing interest by consumers in eating walnuts, especially in Middle Eastern countries. Walnuts have favorable amounts of fatty acids, nutrients, and minerals. Anatolia is one of the originating centers of many fruit species, including the walnut (*Juglans regia* L.), which is a result, in part, of its unique geographic location, which brings about different types of climatic and edaphic conditions. Encountering a walnut tree in almost any part of Anatolia is a common experience, and many Anatolians are interested in walnuts as a local nut crop. The existing genetic diversity of walnuts in this area is very important for walnut breeders. To date, numerous walnut breeding studies have been carried out throughout the world (Akça et al., 2016; Germain, 1990, 1995; Vahdati et al., 2019). The general objectives of walnut breeding programs in many countries are to provide late-leaving cultivars with a high yield and a resistance to biotic and abiotic stresses. However, there has been a limited number of studies on the cluster-bearing habit in walnuts (Germain et al., 1997; Rezaee et al., 2006; Sütyemez, 1998; Vahdati et al., 2014). For this reason, our study evaluates the tree characteristics of the walnut cultivar Maraş 12, which has been registered in Turkey. ‘Maraş 12’ is a new walnut cultivar with a high number of nuts per cluster. This cultivar was released in 2016 by Kahramanmaraş Sütçü İmam University, Faculty of Agriculture, Kahramanmaraş province, Turkey (Anonymous, 2019). This walnut cultivar has a high estimated yield, with a nut weight of 9 to 12 g and a kernel weight of 5 to 7 g.

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Origin

‘Maraş 12’ was selected among a diverse range of genotypes in the Kahramanmaraş province of Turkey in 1994 (Sutyemez, 1998, 2016; Sütyemez et al., 2018). To compare the performance of ‘Maraş 12’ with ‘Chandler’, 10 replicates (i.e., scions) of both cultivars were grafted onto walnut rootstocks of the same age in 2001. The walnut breeding program was carried out at the University of Kahramanmaraş Sütçü İmam, Nut Application and Research Center (SEKAMER). The objective of this breeding program, which took from 1994 to 2018, was to obtain promising cultivars characterized by important tree habits, nut traits, and resistance to some diseases.

Description

The aim of our research was to provide information on the new walnut cultivar Maraş 12. Here we report phenological and pomological traits according to the walnut descriptor and International Union for the Protection of New

Varieties of Plants (UPOV) (Anonymous, 1994, 2015). Data were collected for 4 years of observation (2015–18) on 10 ‘Maraş 12’ and 10 ‘Chandler’ trees.

Phenological evaluation. ‘Maraş 12’ is an early-season cultivar; its leafing date is about 3 weeks earlier than ‘Chandler’. In general evaluations, ‘Maraş 12’ tends to initiate the growth of leaves before other established cultivars in the season. In comparison with ‘Chandler’, ‘Maraş 12’ shows an earlier blooming of its male and female flowers. Both types of flowers bloom simultaneously (which indicates homogamy). Nonetheless, the aim of this article is to emphasize the cluster-bearing habit of ‘Maraş 12’ as its most important trait (Fig. 1). The clusters of the female flowers in ‘Maraş 12’ can be comprised of up to 21 flowers, leading to a high estimated yield.

The abundance of female flowers in ‘Maraş 12’ is heavy, and catkin abundance is intermediate. About 80% to 85% of the lateral buds turn out to be fruitful. ‘Maraş 12’ is generally harvested toward the second week of September in the Kahramanmaraş region. ‘Maraş 12’ fruits mature about 1 month earlier than ‘Chandler’. Its defoliation date is generally about 3 weeks earlier than that of ‘Chandler’ (Table 1).

Fig. 1. A tree view of ‘Maraş 12’ at full-yield stage.

Table 1. Average phenological and pomological traits of ‘Maraş 12’ compared with the standard ‘Chandler’ cultivar during 4 consecutive years.

Characteristics	Maraş 12	Chandler	References
Leafing date	23 Mar.	12 Apr.	Sutyemez (1998)
Harvest date	11 Sept.	5 Oct.	Anonymous (1994)
Defoliation date	11 Nov.	30 Nov.	Anonymous (1994)
First male bloom date	31 Mar.	12 Apr.	Anonymous (1994)
Last male bloom date	10 Apr.	20 Apr.	Anonymous (1994)
First female bloom date	6 Apr.	22 Apr.	Anonymous (1994)
Last female bloom date	18 Apr.	7 May	Anonymous (1994)
Dichogamy	Homogamy	Protandry	Anonymous (2015)
Catkin abundance	Intermediate	Heavy	Anonymous (1994)
Lateral bud flowering (%)	80–85	90–95	Anonymous (1994)
Female flower abundance	Intermediate	Heavy	Anonymous (1994)
Flowers (no. per cluster)	>21	3–4	Anonymous (2015)
Fruit set type	Cluster lateral	Lateral	Anonymous (2015)
Estimated yield	High	High	Anonymous (1994)
Nut shape	Ovate	Ovate	Anonymous (1994)
Shell texture	Very smooth	Smooth	Anonymous (1994)
Shell color	Very light	Light	Anonymous (1994)
Shell strength	Weak	Weak	Anonymous (1994)
In-shell nut weight (g)	9–12	12–14	Anonymous (1994)
Kernel weight (g)	5–7	6–7	Anonymous (1994)
Kernel percentage	55–65	48–51	Anonymous (1994)
Kernel fill	Well	Moderate	Anonymous (1994)
Ease of removal of kernel halves	Very easy	Very easy	Anonymous (1994)
Kernel color	Light brown	Yellowish white	Anonymous (2015)

Fig. 2. A view of 'Maraş 12' nuts from different angles.

Pomological traits. The shape of the nuts is medium-size ovate. The shell of most nuts is weak, very smooth in texture, and very light in color. The kernel is very easy to remove. The kernels of 'Maraş 12' are light brown (Fig. 2). By conducting measurements on 800 nuts during a period of 4 years, it was observed that each nut can weigh 9 to 12 g, each kernel can weigh 5 to 7 g, and kernel percentage is 55% to 65% (Table 1).

'Maraş 12' was registered and patented as a new walnut cultivar within the framework of walnut breeding regulations at the University of Kahramanmaraş, Sütçü İmam, Turkey. This cultivar is important because the fruitfulness of its cluster-bearing habit that, for this particular type, is comparable to other

walnut cultivars. 'Maraş 12' can also be appreciated for its high fruit yield, which results in part from the existence of more than 21 flowers per cluster; good fruit quality; and early harvest and defoliation dates. These qualities are measurably distinct from other commercially grown cultivars in the world. 'Maraş 12' is recommended for regions where early spring frost is not a high risk of damage to flowers and fruit set.

Availability

Scions of 'Maraş 12' are available to walnut growers for grafting and, by appointment, can be collected from the Faculty of Agriculture, Kahramanmaraş Sütçü İmam University, Kahramanmaraş, Turkey.

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