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-bearing 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; Sütçe, 1998; Vahdati et al., 2014). For this reason, our study evaluates the tree characteristics of the walnut cultivar Maras 12, which has been registered in Turkey. ‘Maras 12’ is a new walnut cultivar with a high number of nuts per cluster. This cultivar was released in 2016 by Kahramanmaraş Sütçü Imam 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.

Origin
‘Maras 12’ was selected among a diverse range of genotypes in the Kahramanmaraş province of Turkey in 1994 (Sütçe, 1998, 2016; Sütçe et al., 2018). To compare the performance of ‘Maras 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 Imam, 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 Maras 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 ‘Maras 12’ and 10 ‘Chandler’ trees.

Phenological evaluation. ‘Maras 12’ is an early-season cultivar; its leafing date is about 3 weeks earlier than ‘Chandler’. In general evaluations, ‘Maras 12’ tends to initiate the growth of leaves before other established cultivars in the season. In comparison with ‘Chandler’, ‘Maras 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 ‘Maras 12’ as its most important trait (Fig. 1). The clusters of the female flowers in ‘Maras 12’ can be comprised of up to 21 flowers, leading to a high estimated yield.

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

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

| Characteristics                  | Maras 12 | Chandler | References |
|----------------------------------|----------|----------|------------|
| Leafling date                    | 23 Mar.  | 12 Apr.  | Sütçe (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 (1994) |
| 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) |

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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 ‘Maras x 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).

‘Maras x 12’ was registered and patented as a new walnut cultivar within the framework of walnut breeding regulations at the University of Kahramanmaras Sütçü Imam University, Kahramanmaras, Turkey.

Availability

Scions of ‘Maras x 12’ are available to walnut growers for grafting and, by appointment, can be collected from the Faculty of Agriculture, Kahramanmaras Sütçü Imam University, Kahramanmaras, Turkey.

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