‘Shefa’ Almond

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Among the local almond cultivars that are highly adapted to the climate of Israel, only a few have high-quality fruit and yield (Spiegel-Roy, 1985). The Israeli consumers prefer large, sweet kernels and, as a result, the local cultivars such as ‘Um ElFahem’ were selected for their size and taste. Today, the Israeli modern orchard is based mainly on ‘Um ElFahem’ (≈70%) and its pollinators such as ‘Kochav’ and ‘Kochba’. However, there are disadvantages in an orchard that is based mainly on one cultivar, and a search for additional productive high-quality cultivars was required. The newly introduced almond cultivars, including ‘Nonpareil’, ‘Guara’, ‘Masbovera’, and so on, do not perform well under the growth conditions of Israel. An exception was ‘Ne Plus Ultra’ that became a commercial cultivar as a result of its high yields. The high yield-producing cultivars such as ‘Lauranne’ bear small rather low-quality fruit, which cannot compete in the Israeli market (Birger, 2000; Holland et al., 2003). A local breeding program aimed to produce new productive cultivars with high-quality kernels was performed in parallel to introduction. This article describes the characteristics of a newly developed cultivar, ‘Shefa’, which combines good yield with high-quality kernel and early crop production. The availability of ‘Shefa’ offers a new alternative cultivar, which is also compatible with ‘Um ElFahem’ with respect to flowering time and pollination.

Origin

‘Shefa’ is a selection from seedlings originated from a cross between ‘Tuono’ and ‘73’ (a local cross) performed by the group at P. Spiegel-Roy in 1978 in the almond-breeding plot in Bet Dagan, Israel. In 1985, four trees of this selection, numbered 7/39 and later

20/5, were planted in the almond experimental plot of Kibbutz Sa’ad (31°30’N, 34°30’E, elevation 100 m) for preliminary examination. In 2001, 20/5, grafted on GF.677, was planted in Newe-Ya’ar Research Center experimental orchard. Two replications of four trees per replica were planted in Newe Ya’ar along with cultivar ‘Um ElFahem’. Newe-Ya’ar is located in the western Yizre’el Valley, 32°42’N, 35°11’E, elevation 100 m. The mean diurnal minimum temperature in January is 6 °C. The mean diurnal maximum temperature in July is 33 °C. The annual precipitation in Newe Ya’ar is 580 mm, mainly in winter, and the plot was irrigated from April to October. The orchard was irrigated with about 6000 m³·ha⁻¹ using a drip irrigation system. A total of 250 Kg·ha⁻¹ nitrogen net content and 320 Kg·ha⁻¹ potassium net content were applied by liquid fertilizer through the irrigation system.

Description

Tree characteristics

Vigor and growth habit. ‘Shefa’ trees are vigorous. The branches tend to spread to form a wide open tree. Vigor and growth rate are good and are not inferior to cultivars such as ‘Um ElFahem’ or ‘Nonpareil’. Flowering and fruit set are observed on 1-year-old branches. The lanceolate leaves are finely serrate and the color of a mature leaf is green (RHS137B). Although chilling requirements of ‘Shefa’ have not been determined, it was observed that 200 chilling hours (below 8 °C) or 30 chilling portions according to the dynamic model (Erez et al., 1988) are sufficient for budbreak, good foliage cover, and blooming.

Productivity. Under the conditions of Newe-Ya’ar, ‘Shefa’ is highly productive. ‘Shefa’ starts to crop early like ‘Um ElFahem’. In Newe-Ya’ar, the first commercial kernel crop, in 2004, was 1067 ± 167 Kg·ha⁻¹, whereas ‘Um ElFahem’ yielded 888 ± 100 kg·ha⁻¹. In 2005, ‘Shefa’ yielded 2035 ± 100 kg·ha⁻¹ and ‘Um ElFahem’ 1956 ± 149 kg·ha⁻¹. Data derived from the yield of the first 2 years indicate that ‘Shefa’ appears to be more productive than ‘Um ElFahem’. Yields from

mature trees are not known. We did not observe as yet any tendency to biennial bearing.

Disease resistance. The climatic conditions in Newe-Ya’ar region are favorable for leaf fungal diseases such as stone fruit rust (*Tranzschelia discolor* [Fuckel] Tranzschel & Lit.) and *Alternaria* fruit spot (*Alternaria alternata* [Fr.:Fr.] Keissl.), but ‘Shefa’ performed well under these conditions and did not display unusual sensitivity to these diseases.

Bloom characteristics

Flower. ‘Shefa’ has a large (a diameter of 5.0–5.6 cm) flower with light pink (RHS 56D) to white smooth petals. The style is straight with the stigma at anthers height at anthesis. The sepals are green (RHS 143C) to purple (RHS 185A). The anthers are yellow (RSH 162A). Flowering is abundant.

Time of bloom. ‘Shefa’ is an early flowering cultivar compared with ‘Nonpareil’. Flowering in Newe-Ya’ar begins in early February and continues until March. The time of bloom of ‘Shefa’ is almost identical to that of ‘Um ElFahem’. ‘Nonpareil’ flowers in Newe-Ya’ar from mid-February to mid-March and ‘Lauranne’ flowers during March.

Self-compatibility and pollination. ‘Shefa’ is a self-incompatible almond. Because the blooming time of ‘Shefa’ and ‘Um ElFahem’ is very similar and their S-alleles are different (Holland et al., 2005), both cultivars can cross-pollinate. ‘Shefa’ contains the S30 allele (GenBank accession no. AY876939), which is unique among the known almond S-alleles.

Fruit characteristics

Almond and kernel traits. ‘Shefa’ has a large cordate nut. The shell is soft, immediately pored with a light brown color (RHS 164B). The shell is not completely sealed and is partly open (up to 3 mm). The outer layer of the shell is partly missing sometimes. The nut multiannual average weight is 2.29 ± 0.10 g (as compared with 1.59 ± 0.06 g for ‘Nonpareil’ and 2.23 ± 0.09 g for ‘Um ElFahem’) with a kernel multiannual average percentage of 63.5% and 68.0% for ‘Um ElFahem’. The kernel is large and its width: length ratio is intermediate. Its length is 2.91 ± 0.03 cm, its width is 1.46 ± 0.01 cm, its thickness is 0.72 ± 0.01 cm, and its weight is 1.45 ± 0.02 g (as compared with 1.03 ± 0.03 g for ‘Nonpareil’ and 1.51 ± 0.04 g for ‘Um ElFahem’). The kernel is attractive and has an ovate shape (Fig. 1). It has a light brown (RHS 164A) seedcoat (Fig. 1). The taste of the kernel is sweet without any bitterness and was ranked higher than ‘Um ElFahem’ in taste examinations among growers and marketing people. Mature ‘Shefa’ does not produce double kernels and almost no wrinkled kernels.

Harvest maturity. ‘Shefa’ is an early maturing cultivar. The maturation time of ‘Shefa’ coincides with ‘Um ElFahem’, the main commercial cultivar in Israel. In Newe-Ya’ar, it matures in the end of July, 2 to 3 weeks before ‘Lauranne’. ‘Shefa’ can

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Fig. 1. Nut and kernel of 'Shefa' almond.

easily be harvested using a shaker. Fruits do not drop before harvest and the hull can easily be removed.

Availability

'Shefa' was applied for registration under the terms of the Israeli Plant Breeders' Right Law 5733–1973 (application number not yet available). It was released for commercial use in Israel in 2005. Nonindexed budwood is available from Neve Ya'ar Research Center on written request and under a special contract through Kidum R&D applications unit (www.agri.gov.il/Units/Kidum/Kidum.html).

Literature Cited

- Birger, R. 2000. Almond culture in Israel. *Alon HaNorea* 54:88–89(in Hebrew).
- Erez, A., S. Fishman, Z. Gat, and G.A. Couvillon. 1988. Evaluation of winter climate for breaking bud rest using the dynamic model. *Acta Hort.* 232:76–89(ISHS).
- Holland, D., R. Assaf, I. Bar-Ya'akov, K. Hatib, R. Birger, and A. Lin. 2003. New almond cultivars trials. *Alon HaNorea* 57:229–231(in Hebrew).
- Holland, D., I. Bar-Ya'akov, K. Hatib, T. Trainin, and R. Birger. 2005. Trial and development of new almond cultivars that excel in productivity, size and taste in Israel. *Alon HaNorea* 60:127–129(in Hebrew).
- Royal Horticultural Society. 1966. The Royal Horticultural Society's color chart. Royal Hort. Soc., London.
- Spiegel-Roy, P. 1985. 'Kochba' almond. *Hort-Science* 20:310.