'Summer Fantasia' Japanese Plum

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'Summer Fantasia', a new Japanese plum (*Prunus salicina* Lindl.), originated from a cross between 'Soldam' and 'Taiyo' made in 1999 at the National Institute of Horticultural & Herbal Science (NIHHS) of the Rural Development Administration (RDA) in the Republic of Korea. 'Summer Fantasia' is a midseason Japanese plum cultivar that produces round, firm and very sweet fruit for the fresh market. Flowers of 'Summer Fantasia' are self-incompatible (SI) and the *S*-genotype of 'Summer Fantasia' was determined as *SaSc* (cross-incompatibility group XIV). Therefore, cross-compatible cultivars which have a different *S*-genotypes such as 'Akihime (*SbSh*)', 'Formosa (*SbSd*)', 'Oishiwase (*ScSd*)', 'Purple Queen (*SbSc*)' and 'Santa Rosa (*ScSe*)' are required for cross pollination to ensure consistent fruit set. The cultivar could be widely adapted to wherever Japanese plums are grown. 'Summer Fantasia' is promising because of its superior fruit quality, fruit size and sweetness. In 2013, as Plant Variety Protection rights were granted in the Republic of Korea.

Origin

The 'Summer Fantasia' Japanese plum (*Prunus salicina* Lindl.) originated from a cross between 'Soldam' (female parent) and 'Taiyo' (male parent) at the NIHHS, under the auspices of RDA, Suwon, Republic of Korea, in 1999 (Fig. 1). 'Summer Fantasia' was first selected and propagated in 2008 for testing as Wonkyo Ma-07. This selection was grafted onto 'Maotao' (*Prunus persica* L.) wild peach seedling rootstocks and planted at Suwon (37° 16' N, 127° 02' E) in the Republic of Korea. Five grafted trees and one original seedling were observed from 2009 to 2013. At Suwon, six trees of 'Summer Fantasia' plus five Japanese plum trees, one of each 'Oishiwase', 'Purple Queen', 'Santa Rosa', 'Soldam', and 'Taiyo', were observed for comparison purposes.

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Description

'Summer Fantasia' is a midseason Japanese plum cultivar, ripens between 'Santa Rosa' and 'Taiyo' in South Korea and this season is commercially important in the Republic of Korea. 'Summer Fantasia' is large, firm, and very sweet fruit for the fresh market. The fruit ground color is yellowish green (YG 154D, Royal Horticultural Society, 2007) and the surface is weakly covered with mottled red to purple (Fig. 2). Fruit flesh of 'Summer Fantasia' is yellowish green without red pigmentation, while that of 'Soldam' is red. Fruit are large and round, averaging around 120 g, when thinned to 8–10 cm apart. Fruit of 'Summer Fantasia' are significantly larger than that of 'Soldam' (63 g) and 'Taiyo' (103 g). The fruit firmness of 'Summer Fantasia' at harvest time was greater than that of 'Oishiwase', 'Purple Queen', 'Santa Rosa', and 'Soldam' but not firmer than that of 'Taiyo' (Table 1). Skin cracking and preharvest drop of 'Summer Fantasia' occurred less frequently than those of 'Taiyo'. The soluble sugar content (14.5 °Brix) of 'Summer Fantasia' was higher than that of the other cultivars, whereas fruit acidity was similar to that of the other cultivars (Table 1). The pit of 'Summer Fantasia' is medium-sized, generally medium elliptical in shape, and semiadherent to the flesh similar to that of 'Taiyo' (Fig. 3).

Fig. 1. Pedigree of the Japanese plum cultivar Summer Fantasia.

Fig. 2. Fruit set of the 'Summer Fantasia' Japanese plum.

Leaves of 'Summer Fantasia' have obovate shape with pointed tips and downward attitude. Leaf color of 'Summer Fantasia' is medium green similar to that of 'Purple Queen' and darker than that of 'Taiyo'. 'Summer Fantasia' showed less than 1% lesions caused by brown rot [*Monilinia fructicola* (Winter) Honey] but 1% to 5% fruit lesions caused by bacterial leaf spot [*Xanthomonas arboricola* pv. *pruni* (Smith) Dye], similar to the rates in 'Soldam'. 'Summer Fantasia' has been shown to have a higher average yield than those of 'Oishiwase', 'Santa Rosa', and 'Soldam' (Table 2).

'Summer Fantasia' fully blooms in mid-to-late April in Suwon which is one or 2 d later than 'Oishiwase', 'Purple Queen', 'Santa Rosa', and 'Soldam' but earlier than 'Taiyo' (Table 3). The flowers of 'Summer Fantasia' have long peduncles (1.89 cm), and their petals are obovate and separated. Although 'Summer Fantasia' has abundant pollen, it is self-incompatible. The *SI*-genotype of 'Summer Fantasia' was determined as *SaSc* which belongs to the cross-incompatibility group XIV of Japanese plum as established by Guerra et al., (2009). Therefore, cross-compatible cultivars with different *S*-genotypes such as 'Akihime (*SbSh*)', 'Formosa (*SbSd*)', 'Oishiwase (*ScSd*)', 'Purple Queen (*SbSc*)', and 'Santa Rosa (*ScSe*)' that bloom same time need to be interplanted in commercial orchards to ensure consistent fruit set.

Performance

Trees of 'Summer Fantasia', 'Oishiwase', 'Purple Queen', 'Santa Rosa', 'Soldam', and 'Taiyo', were evaluated from 2009 to 2013 under standard commercial conditions in the Republic of Korea. The trees were planted a 6 × 3 m and trained to an open-center form. Fruit thinning was carried out each year to prevent biennial fruiting. The final distance

Fig. 3. Fruit of the 'Summer Fantasia' Japanese plum. The scale is in centimeters.

Table 1. Fruit characteristics of ‘Summer Fantasia’ compared with the Japanese plum cultivars Oishiwase, Purple Queen, Santa Rosa, Soldam, and Taiyo in Suwon, Republic of Korea, 2009–13.

Cultivar	Harvest date	Fruit shape	Fresh color	Fruit wt (g)	Soluble solids content (°Brix)	Titrateable acidity (%) ²	Flesh firmness ³	Skin cracking ⁴	Fruit drop
Summer Fantasia	6 Aug. b ^w	Circular	Yellowish green	121.0 a	14.54 a	0.76 a	5.2 b	1.0 b	1.6 c
Oishiwase	5 July d	Obcordate	Yellow	60.6 d	11.52 b	0.64 a	3.0 c	1.0 b	2.2 abc
Purple Queen	22 July c	Oblate	Yellow	85.6 c	12.52 ab	0.72 a	4.0 c	1.0 b	1.8 bc
Santa Rosa	21 July c	Obcordate	Yellow	63.1 d	11.26 b	0.52 a	4.0 c	1.6 a	2.6 a
Soldam	31 July bc	Circular	Red	66.8 d	12.90 ab	0.64 a	3.8 c	1.6 a	1.6 c
Taiyo	25 Aug. a	Elliptic	Whitish	103.6 b	13.26 ab	0.66 a	6.6 a	1.4 ab	2.4 ab

²Volume percent malic acid.

³Firmness rating: 3 = soft, 5 = medium, 7 = hard.

⁴Degree of skin cracking and fruit drop: 1 = 0% to 3%, 2 = 3% to 7%, 3 = 7% to 11%, 4 = 11% to 15%, 5 = more than 15% of fruit with skin cracking at harvest.

^wMeans within a column followed by the same letter are not significantly different at $P \leq 0.05$, according to Duncan’s multiple range test.

Table 2. Tree characteristics of ‘Summer Fantasia’ compared with the Japanese plum cultivars Oishiwase, Purple Queen, Santa Rosa, Soldam, and Taiyo in Suwon, Republic of Korea, 2009–13.

Cultivar	Tree vigor	Tree habit	Brown rot ²	Bacterial leaf spot	Days to ripen from blooming	Yield (kg/tree)	
						2013	CV (%) ³
Summer Fantasia	Medium	Spreading	0.4 b [*]	1.4 c	108.2 b	22.9 ab	21.6
Oishiwase	Medium	Semi-upright	0.8 ab	3.8 a	78.0 d	17.3 c	24.0
Purple Queen	Strong	Upright	0.6 ab	0.2 d	94.0 c	25.2 a	13.3
Santa Rosa	Strong	Upright	1.0 ab	2.6 b	94.0 c	17.9 c	16.6
Soldam	Medium	Spreading	0.4 b	1.6 c	103.2 b	21.3 b	26.0
Taiyo	Strong	Upright	1.4 a	0.0 d	124.8 a	22.6 ab	22.8

²Degree of susceptibility to brown rot [*Monilinia fructicola* (Winter) Honey] and bacterial leaf spot [*Xanthomonas arboricola* pv. Pruni (Smith) Dye]: 0 = 0%, 1 = less than 1%, 2 = 1% to 5%, 3 = 5% to 10%, 4 = 10% to 20%, and 5 = more than 20% of fruit infected on the trees 60 d after full bloom.

³CV (2012–13).

^{*}Means within a column followed by the same letter are not significantly different at $P \leq 0.05$, according to Duncan’s multiple range test.

Table 3. Flowering dates and *S*-genotype of ‘Summer Fantasia’ compared with the Japanese plum cultivars Oishiwase, Purple Queen, Santa Rosa, Soldam, and Taiyo.

Cultivar	Bloom date	<i>S</i> -genotype ²
Summer Fantasia	20 Apr. ab ^y	<i>SaSc</i>
Oishiwase	18 Apr. b	<i>ScSd</i>
Purple Queen	19 Apr. b	<i>SbSc</i>
Santa Rosa	18 Apr. b	<i>ScSe</i>
Soldam	19 Apr. b	<i>SaSb</i>
Taiyo	22 Apr. a	<i>SbSc</i>

²Based on Beppu et al. (2002), Halasz et al. (2007) and Jun et al. (2007).

^yMeans within a column followed by the same letter are not significantly different at $P \leq 0.05$, according to Duncan’s multiple range test.

between fruits at harvest was maintained at a distance of 8 to 10 cm. The tree and fruit characteristics were evaluated according to the National Manual for Agricultural Investigation (RDA, 2012) and International Union for the Protection of New Varieties of Plants (UPOV) guidelines for distinctness, uniformity, and stability of Japanese plum (UPOV, 2011).

Trees of ‘Summer Fantasia’ are moderately vigorous with a spreading growth habit similar to that of ‘Soldam’ which is the one of the parents (Table 2). Precocity is similar to ‘Soldam’ on wild peach rootstock, with the onset of fruiting in the third year. Fruits are mainly set on long (more than 30 cm) branches and the length of spurs is medium (4.28 cm). Trees of ‘Summer Fantasia’ were estimated to require 600–625 chilling units according to the Utah model (Richardson et al., 1974) during 2012–14. Even though full bloom date of ‘Summer Fantasia’ is later than that of ‘Purple Queen’, the chilling requirement of ‘Summer Fantasia’ is less than that of ‘Purple Queen’ (650–700 chilling units).

The *S*-genotype of ‘Summer Fantasia’ was determined using polymerase chain reaction and compared with other cultivars (Beppu et al., 2002; Halasz et al., 2007; Jun et al., 2007). Self-incompatibility is controlled by highly multiallelic *S*-locus, and the feasibility of a cross is determined by the *S*-alleles expressed by the pollen and pistil tissues. Pollen tube growth is arrested if the same allele is present in both the pollen and the style (Silva and Goring, 2001). Therefore, cross-compatible pollinizer cultivars that bloom simultaneously should be interplanted to ensure fruit set.

During harvest, five fruits per tree were taken from six trees through 5 years from 2009 to 2013 to determine their characteristics. Fruit of ‘Summer Fantasia’ ripen 108 d after full bloom (Table 2), typically in early August at Suwon, 6 d after ‘Soldam’ which is a midseason Japanese plum cultivar in the Republic of Korea.

In the Republic of Korea, most Japanese plum production is occupied by just a few cultivars such as Akihime, Oishiwase, Santa Rosa, and Soldam. Also, suitable cultivars which can be harvested after ‘Soldam’ are rare. Considering these facts, ‘Summer Fantasia’ is a promising new cultivar, which can be harvested after ‘Soldam’. Moreover, this cultivar would be commercially profitable with superior fruit quality such as large fruit size and sweetness.

Availability

Plant Variety Protection for ‘Summer Fantasia’ was achieved in 2013 according to Korean Seed Industry Law. It was released for commercial use in the Republic of Korea in 2014. Nonindexed scions for research

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