

‘Yellow Dream’ Nectarine

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‘Yellow Dream’ is the fifth nectarine [*Prunus persica* (Batsch) L.] released from the National Institute of Horticultural and Herbal Science (NIHHS), Rural Development Administration (RDA). The NIHHS RDA has released 10 peach and 7 nectarine cultivars through the national peach and nectarine breeding program since 1962. ‘Yellow Dream’ is the first yellow-fleshed nectarine with low acidity (<0.30%). Before ‘Yellow Dream’, three nectarine cultivars with standard acidity (>0.80%), ‘Cheonhong’ (Kang et al., 1999a), ‘Suhong’ (Jun et al., 2007), and ‘Hahong’ (Jun et al., 2014), were released from 1990 through 2010. Recently, the nectarine breeding program has focused on better-tasting fruit with sweetness and low acidity, longer shelf-life, and later blooming to avoid spring frost. Peaches (including nectarines) are the second most important deciduous fruit after apples and account for 20% of the total production value in the Republic of Korea. Usually consumed as fresh fruit, 302,000 t of peaches were produced in the country in 2017, and the total cultivated area was 21,000 ha (Korean Statistical Information Service, 2017). Peaches and nectarines account for 83% and 17%, respectively, of the total cultivated area in the Republic of Korea (Kim et al., 2018). More than 70% of peach cultivars have white, nonacidic flesh, whereas most nectarine cultivars have yellow flesh with standard acidity (Jun et al., 2016). Some consumers prefer the sweet-and-sour taste of nectarine such as ‘Sunfre’, ‘Fantasia’, and ‘Redgold’, whereas other consumers feel that the nectarine acidity is too high because they prefer a sweet taste (Wi and Jo, 2016). Although peach cultivation area is increasing at an average annual rate of 6% in the Republic of Korea, the high acidity of nectarine is one of the major obstacles to the expansion of nectarine

cultivation. ‘Yellow Dream’ has very firm and melting flesh and excellent nectarine flavor with low acidity. It ripens in early July in Wanju, Republic of Korea. ‘Yellow Dream’ is promising because of its superior sweetness with low acidity, early maturation, and late flowering to avoid frost damage.

Origin

‘Yellow Dream’ nectarine was originated from a cross between ‘Baekhyang’ and ‘Romamer I’ in 1999 (Fig. 1). The female parent ‘Baekhyang’ (Kang et al., 1999b) is a white-fleshed peach cultivar whose acidity is less than 0.30%. This cultivar was originated from an open pollination of ‘Garden State’, which is a yellow-fleshed nectarine. The male parent ‘Romamer I’ is a yellow-fleshed nectarine and ripens 3 d before ‘Sunfre’. Acidities of both ‘Garden State’ and ‘Romamer I’ are higher than 0.80%. ‘Yellow Dream’ was preliminarily selected as ‘99PH1084’ for early maturation and sweet taste with low acidity in 2004. To evaluate the properties of this selection, three grafted trees and one original seedling were observed at Suwon from 2005 to 2010 and then designated ‘Wonkyo Da-37’ in 2011 for local test. This selection were grafted onto ‘Maotao’ (*Prunus persica* L.) wild peach seedling rootstocks and planted in five sites: Suwon (lat. 37°17’N, long. 127°01’E), Yesan (lat. 36°41’N, long. 126°51’E), Cheongwon (lat. 36°33’N, long. 127°32’E), Cheongdo (lat. 35°39’N, long. 128°44’E), and Wanju (35°49’N, long. 126°59’E). In all testing, trees were trained as open-center form spaced 3 m between trees in rows spaced 6 m apart. At each

site except Wanju, three randomized single-tree plots were observed from 2011 to 2016, along with other cultivars for comparison purposes. At Wanju, eight grafted trees were observed to evaluate the properties of ‘Wonkyo Da-37’. After 6 years of evaluation, this cultivar was named as ‘Yellow Dream’ in 2016 and released for commercial use in the Republic of Korea in 2017.

Description

Temperature and growth. ‘Yellow Dream’ cultivar could be widely adapted to wherever nectarines are grown. Freezing injury of ‘Yellow Dream’ was not observed at any of the five evaluation sites from 2011 to 2016, with the lowest experienced temperature at Yesan of -16.9 °C. ‘Yellow Dream’ fruited well in all evaluation sites where the mean temperatures of January, the coldest month in Republic of Korea, ranged from -2.9 to -0.1 °C (Table 1).

Tree characteristics. Trees of ‘Yellow Dream’ are moderately vigorous with a semi-upright growth habit similar to ‘Romamer I’ or ‘Sunfre’. Leaves of ‘Yellow Dream’ have reniform nectaries, and the average size of leaf was 3.63 cm wide and 15.2 cm long.

Flowering time and chilling requirement. Full bloom date of ‘Yellow Dream’ in Wanju was 11 Apr., which is 2 to 4 d later than that of ‘Sunfre’, ‘Fantasia’, and ‘Redgold’ (Table 2). The chilling requirements of ‘Yellow Dream’ was estimated by cuttings and calculated according to Richardson et al. (1974). The chilling requirement of the ‘Baekhyang’ and ‘Romamer I’, the parental cultivars of ‘Yellow Dream’, was estimated by comparing flowering dates with other cultivars whose chilling requirements are already known (Table 2). ‘Yellow Dream’ was estimated to have a high chilling requirement of 950 to 1000 chill units. In general, nectarine cultivars with early flowering are exposed to the risk of frost damage in spring and this can cause problems such as low fruit set. The late flowering of ‘Yellow Dream’ has the advantage of avoiding frost damage in southern region of Korea (Table 2). In 2018, the full bloom date of ‘Yellow Dream’ was 10 Apr., which was 4 d later than that of ‘Sunfre’ in Wanju. ‘Sunfre’ showed low fruit set due to the severe frost damage in southern region of Korea in 2018.

Flower characteristics. Flowers of ‘Yellow Dream’ are nonshowy, as are those of the

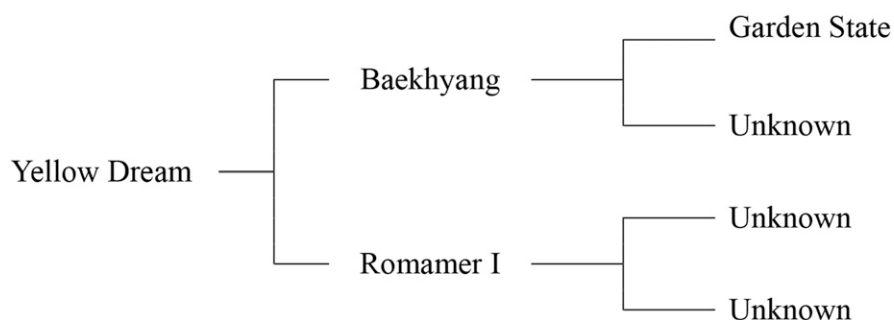


Fig. 1. Pedigree of ‘Yellow Dream’ nectarine.

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female parent ‘Baekhyang’. The corolla color is dark pink (RP 68B, Royal Horticultural Society, 2007), with five narrow elliptically shaped petals. The inner color of calyx is orange (OG 28A) and pubescence was absent on outer wall of ovary (Fig. 2). The flower is self-fertile with abundant bright yellow pollen.

Fruit characteristics. The average ripening date of ‘Yellow Dream’ in Wanju was 11 July (Table 3), which is early season for the nectarine market in the Republic of Korea. The fruit of ‘Yellow Dream’ ripens about 90 d after full bloom, usually 3 d before ‘Sunfre’, which is one of the earliest ripening cultivars. Fruit shape of ‘Yellow Dream’ is round and ground color of fruit skin is greenish yellow (GY 1B) with light red blush in a mottled pattern (Fig. 3). Fruit flesh of ‘Yellow Dream’ has melting texture. Fruit

flesh color is yellow (YG 10A) like the male parent, ‘Romamer I’. Red pigmentation is very weak in the outer flesh and around the pit. The average fruit weight of ‘Yellow Dream’ was 203.8 g when thinned to 10–15 cm apart. The fruit is relatively large for the early season. Fruit weight and yield per tree of ‘Yellow Dream’ tends to increase as the trees age. The average soluble solids content of ‘Yellow Dream’ was 13.1°Brix. This is highly acceptable considering the ripening time is July in which the quarter of yearly precipitation occurs (Table 1). The average fruit acidity of ‘Yellow Dream’ was 0.25%, which was similar to female parent ‘Baekhyang’. The acidity value was very low compared with that of other growing nectarine cultivars, such as ‘Cheonhong’ and ‘Sunfre’, in Republic of Korea (Table 4). The fruit of ‘Yellow Dream’ was semi-

freestone, whereas that of ‘Baekhyang’ and ‘Romamer I’ were freestone and semi-clingstone, respectively (Table 4). The productivity of ‘Yellow Dream’ was ≈ 1517 kg/10 a without alternate bearing in 7-year-old trees while ‘Cheonhong’ have productivity of ≈ 1942 kg/10 a (Kim et al., 2012).

Diseases and physiological disorder. ‘Yellow Dream’ showed less than 1% leaf or fruit with lesions resulting from brown rot [*Monilinia fructicola* (Winter) Honey] and bacterial leaf spot [*Xanthomonas campestris* pv. *pruni* (E. F. Smith) Dye] (Table 5). This result was similar to that of other cultivars, and other specific diseases were not observed. ‘Yellow Dream’ has a low incidence of fruit cracking and little preharvest drop. Incidence of split pits was rare, which is desirable in early-season cultivars.

Table 1. Location and meteorological information of five evaluation sites, 2011–16.

Site	Lat.	Long.	Chilling accumulation ^z		Yr	Avg temp (°C) ^y		Precipitation (mm) ^y		
			CU	CH		January ^x	August ^x	Cumulative	July ^w	Avg
Suwon	37°17'N	127°01'E	1,021 ± 174	2,394 ± 133	12.7	-2.8 (-15.0) ^v	26.6 (35.6) ^v	1,265	430	105
Yesan	36°41'N	126°51'E	1,063 ± 149	2,393 ± 123	11.6	-2.9 (-16.9)	25.8 (35.4)	1,310	324	109
Cheongwon	36°33'N	127°32'E	1,104 ± 199	2,339 ± 110	11.6	-2.0 (-14.1)	26.7 (35.8)	1,174	272	98
Cheongdo	35°39'N	128°44'E	1,237 ± 103	2,103 ± 174	14.0	-0.1 (-12.6)	26.6 (37.4)	1,278	266	107
Wanju	35°49'N	126°59'E	1,185 ± 180	2,181 ± 138	13.8	-0.9 (-12.4)	26.7 (36.6)	1,231	286	103

^zChilling accumulation were calculated based on hourly temperature by Korean Meteorological Administration from 1 Oct. to 28 Feb. of next year. Chill unit (CU) was calculated according to Utah model (Richardson et al., 1974), and chill hour (CH) is the number of hours below 7.2 °C.

^yTemperature and precipitation data were obtained from Korean Meteorological Administration, Seoul, Republic of Korea.

^xJanuary and August in Republic of Korea have the lowest and the highest average monthly temperature of the year, respectively.

^wJuly is ripening season of ‘Yellow Dream’, and yearly precipitation is concentrated in this season.

^vValues in parentheses are the coldest and the highest temperature of the year, respectively.

Table 2. Flowering dates, chill units, and degree of frost damage of ‘Yellow Dream’, the female parent ‘Baekhyang’ peach, the male parent ‘Romamer I’ nectarine, and other nectarine cultivars in Wanju, 2014–16 and 2018.

Cultivar	Flowering date					Chill unit	Frost Damage (%) ^z
	2014	2015	2016	2018	Avg		
Yellow Dream	13 Apr.	15 Apr.	7 Apr.	10 Apr.	11 Apr.	950–1000 ^y	1
Baekhyang (♀)	14 Apr.	No data	8 Apr.	11 Apr.	11 Apr.	1000–1050 ^x	1
Romamer I (♂)	No data	15 Apr.	7 Apr.	11 Apr.	10 Apr.	950–1000 ^x	1
Sunfre	12 Apr.	No data	5 Apr.	6 Apr.	7 Apr.	500 ^w	3
Fantasia	13 Apr.	11 Apr.	7 Apr.	8 Apr.	9 Apr.	750 ^w	2
Redgold	No data	14 Apr.	7 Apr.	9 Apr.	9 Apr.	850 ^w	2
Summercrest	No data	15 Apr.	7 Apr.	11 Apr.	11 Apr.	950 ^w	1
Garden State	No data	15 Apr.	11 Apr.	13 Apr.	13 Apr.	1050 ^w	1

^zDegree of frost damage: 1 = 0% to 10%, 2 = 10% to 20%, and 3 = 30% to 50% of damaged flower buds or young fruits by frost at full blooming time.

^yEstimated by cuttings (see section *Performance*).

^xEstimated chill units based on the other cultivars.

^wOkie (1998).



Fig. 2. (A) Flowers of ‘Yellow Dream’ nectarine, (B) comparison of (I) ‘Yellow Dream’ and (II) ‘Cheonhong’ flowers, and (C) comparison of longitudinal section of (III) ‘Yellow Dream’ and (IV) ‘Cheonhong’ nectarine flower. The scale is in millimeters.

Table 3. Seasonal growth, yield, and flower characteristics of ‘Yellow Dream’, the female parent ‘Baekhyang’ peach, the male parent ‘Romamer I’ nectarine, and other nectarine cultivars in Wanju, 2014–16.

Cultivar	Sprouting date ^z	Flowering date ^y	Ripening date	Days to ripen	Yield (kg/tree)	Flower type	Pollens in anther	Pubescence on ovary
Yellow Dream	20 Mar. a ^x	12 April a	11 July f	90 f	27.2 ab	Nonshowy	Present	Absent
Baekhyang (♀)	20 Mar. a	13 April a	21 Aug. b	132 b	26.7 ab	Nonshowy	Present	Present
Romamer I (♂)	20 Mar. a	12 April a	11 July f	90 f	17.2 b	Nonshowy	Present	Absent
Sunfre	20 Mar. a	10 April a	14 July e	98 e	25.8 ab	Showy	Present	Absent
Cheonhong	20 Mar. a	11 April a	22 July d	100 d	30.8 a	Showy	Present	Absent
Redgold	20 Mar. a	11 April a	16 Aug. c	127 c	27.5 ab	Showy	Present	Absent
Fantasia	20 Mar. a	11 April a	27 Aug. a	139 a	28.8 ab	Showy	Present	Absent
Flavortop	20 Mar. a	11 April a	29 Aug. a	141 a	30.3 a	Showy	Present	Absent

^zDates were recorded when the floral buds protruded 1 to 2 mm.

^yDates were recorded when 70% to 80% of the flowers were open.

^xMeans with a column followed by the same letter are not significantly different, $P \leq 0.05$, by Duncan’s multiple range test.

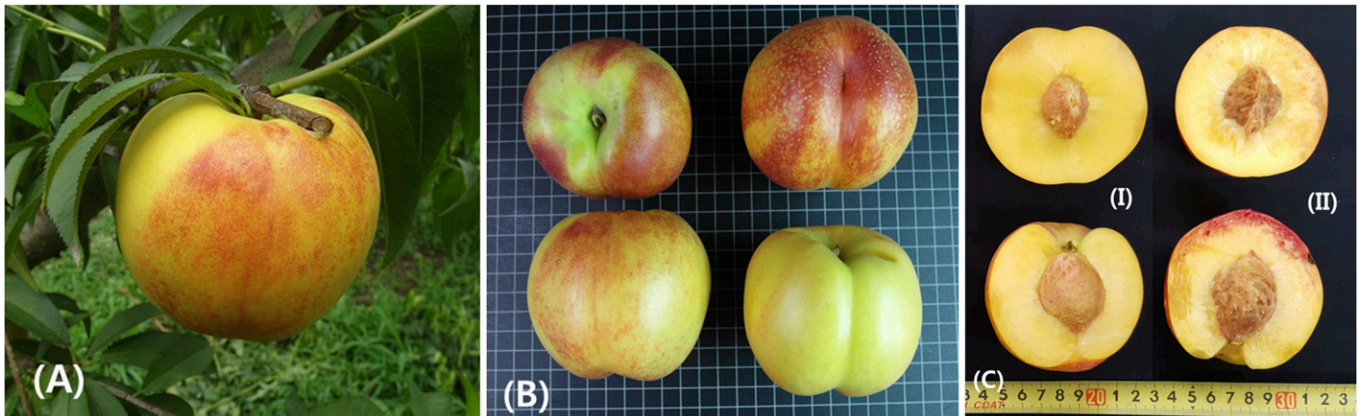


Fig. 3. (A) Fruit set, (B) fruits of ‘Yellow Dream’, and (C) comparison of (I) ‘Yellow Dream’ and (II) ‘Cheonhong’ nectarine fruit. The scale is in centimeters.

Table 4. Fruit characteristics of ‘Yellow Dream’, the female parent ‘Baekhyang’ peach, the male parent ‘Romamer I’ nectarine, and other nectarine cultivars in Wanju, 2014–16.

Cultivar	Ripening date	Fruit wt (g)	SSC (%) ^z	Titratable acidity (%) ^y	Firmness ^x	Flesh color	Pubescence	Adherence of stone to flesh
Yellow Dream	11 July f ^w	203.8 abc	13.1 ab	0.25 c	4.2 ab	Yellow	Absent	Semi-freestone
Baekhyang (♀)	21 Aug. b	192.9 abc	14.7 a	0.24 c	3.0 c	Cream white	Present	Freestone
Romamer I (♂)	11 July f	95.6 d	12.2 bc	0.81 b	4.2 ab	Yellow	Absent	Semi-clingstone
Sunfre	14 July e	175.7 bc	10.5 d	0.90 ab	4.5 a	Yellow	Absent	Semi-freestone
Cheonhong	22 July d	226.0 a	11.3 cd	0.85 ab	4.5 a	Yellow	Absent	Clingstone
Redgold	16 Aug. c	173.4 bc	13.6 ab	0.95 ab	4.0 b	Yellow	Absent	Freestone
Fantasia	27 Aug. a	170.5 c	12.6 bc	0.97 ab	4.3 ab	Yellow	Absent	Freestone
Flavortop	29 Aug. a	220.0 ab	13.1 ab	0.99 a	4.3 ab	Yellow	Absent	Freestone

^zSSC = soluble solids content.

^yVolume percent of malic acid.

^xFirmness rating based on 1 to 5 scale, with 5 being very firm.

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

Table 5. Diseases and physiological disorder of ‘Yellow Dream’ and other nectarine cultivars in Wanju 2014–16.

Cultivar	Brown rot (%) ^z	Bacterial leaf spot (%) ^z	Fruit cracking ^y	Pit split ^y	Preharvest drop ^x
Yellow Dream	1	1	1	2	1
Baekhyang (♀)	2	3	1	1	3
Romamer I (♂)	1	2	2	2	2
Sunfre	1	2	2	2	2
Cheonhong	2	2	1	2	2
Redgold	3	2	1	1	1
Fantasia	2	2	1	1	1
Flavortop	2	3	1	1	1

^zDegree of susceptibility to brown rot [*Monilinia fructicola* (Winter) Honey] and bacterial leaf spot [*Xanthomonas arboricola* pv. *Pruni* (E. F. Smith) Dye]: 1 = less than 1%, 2 = 1% to 5%, 3 = 6% to 10% of fruit infected on the trees 60 d after full bloom.

^yDegree of fruit cracking and pit split: 1 = 0% to 3%, 2 = 3% to 7%, and 3 = 7% to 11% of fruit with skin cracking or pit split at harvest time.

^xDegree of preharvest drop: 1 = 0% to 3%, 2 = 3% to 7%, and 3 = 7% to 11% of the dropped fruit before harvest.

Performance

To evaluate the properties of ‘Yellow Dream’, eight trees (five trees for local

testing and three trees for primary testing) were observed for comparison purposes from 2011 to 2016. The trees were planted in 6 × 3 m plots and trained to an open center

system under standard commercial conditions in the Republic of Korea (Shin et al., 2002). Fruit are mainly set on medium to long (10–15 cm) branches. Because ‘Yellow

Dream' is productive without alternate bearing, it is recommended that flower buds or fruit are thinned to maximize the fruit size. During harvest, 30 fruit samples were collected each year to determine their weight, flesh firmness, soluble solids content, and titratable acidity. The tree and fruit characteristics were evaluated according to the National Manual for Agricultural Investigation (RDA, 2012) and the International Union for the Protection of New Varieties of Plants (2010) guidelines for distinctness, uniformity, and stability of the peach (UPOV, 2010). Chilling requirement was estimated as chill unit according to Richardson et al. (1974) by taking cuttings. The branches were taken every 7 d and maintained at 25 °C under a 16-h photoperiod with relative humidity of 60% to 65%. After 14 d, the flower buds on the branch were monitored. Chilling requirement was considered to be satisfied if more than 50% of the floral buds were germinated.

Availability

'Yellow Dream' is the subject of plant variety protection according to Korean Seed Industry Law. Requests for bud wood should be directed to the NIHHS RDA. Nonindexed scions for research purposes may be addressed to Eun Young Nam (eynam@korea.kr).

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