Smooth Texan Nectarines, Three Medium Chill, Early-season Yellow Cultivars

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The Smooth Texan nectarine series is being released by Texas A&M University to provide high-quality, attractive, yellow-fleshed nectarines adapted in the medium chill zone of Texas and similar regions. These three early-ripening nectarines ripen over 3 weeks from mid-May until early to mid-June in this mild winter zone.

Origin

In the late 1990s, the *Prunus* Breeding and Genetics Program began to develop a series of early-ripening nectarine cultivars adapted to the medium chill zone (500 to 600 chill units) of the southern United States. This work has resulted in three new nectarine cultivars that ripen consecutively from mid-May to early to mid-June in the medium chill zone of Texas. These cultivars are the first nectarine series for the medium chill zone of the southeastern United States and are derived from crosses among Florida, California, and Chinese germplasm.

The Smooth Texan nectarines [*Prunus persica* (Batsch) L.] originated in the Stone Fruit Breeding Program in Department of Horticultural Sciences at Texas A&M University located in College Station, TX, from crosses among cultivars/selections adapted to the medium chill zone (TX2C104N, 'Crimson Baby', 'Danmo') and high chill nectarine cultivars (Diamond Ray and Bradley). 'Smooth Texan One' (ST1, TX3B298N) is a cross between 'Crimson Baby', a yellow-fleshed, medium chill nectarine released by the U.S. Department of Agriculture (USDA) Stone Fruit Breeding Program in Fresno, CA (Okie, 1998), and a low chill nectarine selection (TX2C104N) derived from an open-pollinated progeny of 'Suncoast'. 'Crimson Baby' is a cross between the University of Florida nectarine selection G69-83 [(Okinawa × Panamint) × Sunrise] and 'Mayfire' nectarine. 'Mayfire' is an early-ripening yellow-fleshed nectarine released by the USDA *Prunus* breeding program in 1984 (Okie et al., 1985).

'Suncoast' is a yellow-fleshed, low chill nectarine released by the Stone Fruit Breeding Program at the University of Florida. The complex pedigree of 'Suncoast' includes 'Sungold', 'Armking', 'Sunred', 'Sunrich', 'Southland', 'Jewel', 'Panamint', and 'Hawaiian' (Anderson and Sherman, 1995). 'Smooth Texan Two' (ST2, TX3B195N) is a hybrid between 'Crimson Baby' and 'Bradley'. 'Bradley' is a non-melting, orange-yellow-fleshed nectarine with high resistance to bacterial leaf spot [*Xanthomonas campestris* pv. *pruni* (Smith) Dye] from the Fruit Breeding Program of the University of Arkansas. It was selected among a F₂ progeny from a hybrid between two Arkansas selections (A190 peach × A178 nectarine) (Clark and Moore, 2002). 'Smooth Texan Three' (ST3, TX4C189LN) is a cross between the California nectarine 'Diamond Ray' (Bradford and Bradford, 1994) and 'Danmo', which is an early-ripening, medium chill, yellow-fleshed, subacid nectarine used in protected culture from China (Wang, personal communication). 'Diamond Ray' is a hybrid between the nectarine 'Red Diamond' and an unnamed seedling (Bradford and Bradford, 1994). 'Danmo' is a hybrid between Ruiguang 2 ('Jingyu' × NJN76) and Early Red2 (unknown parentage). NJN76 was a soft, non-melting, orange-yellow-fleshed nectarine, which was obtained from Dr. Hough of the Fruit Breeding program at Rutgers University (Lirong Wang, personal communication).

The original plants of these new releases were first identified in 2005, 2002, and 2005 for ST1, ST2, and ST3, respectively. Two-year and older trees of the selections were subsequently evaluated during the 2007 through 2011 fruit growing seasons in four locations: three medium chill sites (College Station, Fairfield, and Terrell, TX) and one higher chill location (Fowler, CA). College Station, TX (lat. 30°37' N, long. 96°22' W, 94 m elevation), Fairfield, TX (lat. 31°44' N, long. 96°10' W, 134 m elevation), Terrell, TX (lat. 32°42' N, long. 96°11' W, 151 m elevation), and the Fowler, CA, site (lat. 36°38' N, long. 119°42' W, 92 m elevation) have a chilling accumulation that is generally above 550, 750, 700, and 850 chill units, respectively, as estimated with the mean monthly temperature of the coldest month (Byrne and Bacon, 1992; Sharpe, 1970; Weinberger, 1956) (Table 1).

These three early-ripening, clingstone, melting flesh nectarines cultivars ripen consecutively from mid-May until early to mid-June (Tables 2 and 3). All have large fruit size for the early season and good to excellent flavor when properly managed and thinned. ST1 and ST2 have flesh with a medium to high acid level, whereas ST3 has subacid flesh. The mean soluble solids for ST1 and ST2 when picked mature are similar to the common commercial cultivars such as 'Regal', 'June Gold', 'Sentinel', and 'Harvester'. ST3, as does 'White Delight Two', generally has better flavor and higher soluble solids than the common commercial cultivars. All three nectarines have an excellent yellow-orange ground color and an attractive red blush over 70% to 90% of the fruit skin surface depending on the cultivar and environmental conditions. None has shown a tendency to skin crack or to have problems with split pits in Texas, although ST1 was occasionally observed to skin crack and have split pits in the Fowler, CA, evaluation plot. The nectarines have a similar or better firmness, shape, attractiveness, and quality than the common commercial peach as well as some new medium chill cultivars ('Royal Zest One', 'Royal Zest Two', and 'White Delight Two') (Tables 2 and 3; Fig. 1).

In the higher chill site (Fairfield, TX), these nectarines bloomed with or shortly before 'June Gold', whereas in the lower chill site (College Station, data not shown), ST1 bloomed 6 d before ST3 and 'June Gold'. All three nectarines cropped consistently in the region where 'TexRoyal', 'June Gold', and 'Harvester' are grown commercially. Based on the relative bloom times of standard cultivars, ST1 and ST2 need ≈600 chilling units (CU), whereas ST3 requires an accumulation of ≈650 CU to break dormancy.

The stones are rounded to ovate in shape. 'Smooth Texan One' has larger stones (length 36 to 39 mm, width 29 to 30 mm, thickness 19 to 21 mm) than do the other two nectarines (length 31 to 36 mm, width 22 to 27 mm, thickness 16 to 21 mm).

Flowers of ST1 and ST3 are non-showy with five petals, whereas ST2 has showy flowers with up to 10 petals. The non-showy petals are a darker pink and smaller than the showy petals. Pollen is yellow and abundant. The trees are self-fertile.

The trees are vigorous with the typical semispreading growth habit similar to 'Tex-Prince' and 'TexRoyal'. No observations have been made on resistance for either peach rust (*Tranzschelia discolor*) or bacterial leaf spot (*Xanthomonas campestris* pv. *pruni*). All three of the Smooth Texan nectarines have moderately large leaves that are lanceolate with acuminate apices, crenate margins, and reniform petiolar glands.

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Table 1. Chilling conditions at three Texas (College Station, Fairfield, and Terrell) and one California (Fowler) evaluation sites.

Location	December temp (°C)		January temp (°C)		Chilling accumulation ²		Common commercial cultivars
	Mean	Range	Mean	Range	Mean	Range	
College Station	11.2	7.3–12.9	10.7	8.4–14.1	723	561–1097	TexKing, TexRoyal, June Gold
Fairfield	9.4	6.8–10.8	8.9	6.7–12.9	947	757–1303	Regal, June Gold, Harvester, Sentinel
Terrell	8.9	4.1–10.8	8.3	5.9–12.8	1004	655–1353	Regal, June Gold, Harvester, Sentinel
Fowler	8.8	7.2–10.6	8.5	6.5–13.1	1017	857–1166	O'Henry, Elegant Lady

²Chilling estimated with the mean monthly temperatures of the 2 coldest months using the equation Chilling = 2079 – (123.8*December/January mean monthly temperature in °C). (Byrne and Bacon, 1992; Sharpe, 1970; Weinberger, 1956). Fairfield used data from the Waco, Terrell used data from Dallas, and Fowler used data from the Fresno weather station. All data from 2000 to 2011.

Table 2. Fruiting characteristics of the Smooth Texan nectarines as compared with eight medium chill peach cultivars at Fairfield, TX (2007–11).

Name	Full bloom ²	FDP (days) ²	Ripe date ²	Size ³	Wt (g)	Firm ⁴	Blush ⁴	Shape ⁴	Tip ⁴	Ground color ⁴	Appearance ⁴	Soluble solids (Brix)	Taste ⁴
Smooth Texan One	6 Mar. cd	69 e	13 May g	5.7	107	7.4 ab	8.4 ac	7.9 a	7.8 a	7.2 ab	7.6 ad	10.3 cf	6.4 de
Royal Zest One	4 Mar. cd	75 de	17 May g	6.1	132	7.2 ab	7.0 ce	7.0 be	6.8 cd	6.8 ac	7.3 ae	9.8 df	6.2 de
Smooth Texan Two	7 Mar. cd	72 e	19 May g	5.3	115	7.4 ab	8.6 ab	7.4 ad	7.3 ac	7.4 a	7.7 ac	9.3 ef	6.5 ce
Regal	13 Mar. ab	70 e	21 May fg	5.2	109	7.0 ab	7.2 be	6.6 df	6.4 de	7.0 ac	7.0 ce	10.8 bf	6.3 de
June Gold	9 Mar. bc	84 cd	31 May ef	6.2	135	6.0 c	4.5 gh	6.0 f	5.8 ef	7.0 ac	6.0 f	11.0 af	6.5 ce
Yellow Zest Two	2 Mar. d	93 bc	1 June de	6.4	141	7.4 ab	8.5 ab	7.6 ac	7.9 a	7.3 a	8.0 a	12.1 ae	6.9 be
Smooth Texan Three	7 Mar. cd	85 c	2 June de	5.3	115	7.5 ab	7.8 ad	7.7 ab	8.0 a	7.3 a	8.0 a	13.8 ab	7.5 ab
Sentinel	17 Mar. a	88 c	11 June cd	5.0	107	6.0 c	5.6 fg	6.4 ef	5.6 f	6.4 cd	6.0 f	12.0 ae	6.4 de
TexRoyal	9 Mar. bc	93 bc	11 June cd	5.8	134	7.0 ab	7.2 be	7.0 be	7.2 ad	6.7 ac	6.8 de	11.3 af	6.8 be
White Delight Two	5 Mar. cd	102 ab	14 June bc	6.2	142	7.7 ab	7.9 ad	7.3 ad	7.5 ac	6.4 cd	8.0 a	13.7 ab	7.3 ac
Harvester	15 Mar. a	100ab	23 June ab	5.0	106	6.8 bc	6.0 ef	7.0 be	7.0 bd	6.2 d	6.6 ef	13.2 ac	6.8 be

²Full bloom = 60% to 80% flowers open; FDP = fruit development period, number of days from full bloom to ripe; Ripe date = date when 20% fruit is firm ripe stage.

³Size ratings of diameter (mm) 0 to 9, 4 = 51 to 57, 5 = 58 to 64, 6 = 65 to 70, 7 = 71 to 76.

⁴Rating scale 0 to 9; 0 to 4 = unacceptable, 5 = marginal, 6 = good, 7 = very good, 8 to 9 = excellent for commercial use.

Mean separation within columns by Duncan's multiple range test at the 5% level. Items with the same letter are not significantly different.

Table 3. Fruiting characteristics of Smooth Texan nectarines compared with six medium chill peach cultivars at Fowler, CA (2008–11).

Name	Full bloom ²	FDP (days) ²	Ripe date ²	Size ³	Wt (g)	Firm ⁴	Blush ⁴	Shape ⁴	Tip ⁴	Ground color ⁴	Appearance ⁴	Soluble solids (Brix)	Taste ⁴
Smooth Texan One	27 Feb.	79 c	17 May e	4.8 d	103 c	7.7 a	8.3 ab	7.5 ac	7.8 ab	7.0 ab	8.0 a	11.7 b	6.2 c
Smooth Texan Two	27 Feb.	86 bc	26 May d	6.6 bc	158 b	7.3 ab	7.8 ac	7.6 ac	7.6 bc	7.0 ab	7.2 ab	12.7 ab	6.8 ac
Royal Zest One	23 Feb.	92 b	26 May d	6.9 ac	164 b	7.2 ab	6.7 cd	7.7 ab	7.7 b	6.9 ab	7.2 ab	12.7 ab	6.4 c
JuneGold	—	—	8 June c	6.3 c	178 b	6.5 bc	4.8 ef	7.0 c	7.0 c	7.0 ab	6.0 c	12.5 b	6.5 c
Smooth Texan Three	30 Feb.	98 ab	10 June c	7.1 ac	166 b	7.4 a	7.1 bd	7.5 ac	7.9 ab	7.5 a	7.4 ab	14.6 a	7.5 a
Royal Zest Two	25 Feb.	109 a	9 June c	7.6 ab	192 ab	6.8 ac	8.7 a	8.1 a	8.4 a	7.0 ab	8.1 a	12.3 b	6.4 c
Sentinel	—	—	10 June c	6.9 ac	173 b	6.0 c	3.5 fg	6.8 c	6.6 d	6.1 c	5.4 c	12.5 b	6.3 c
White Delight Two	25 Feb.	108 a	17 June ab	8.1 a	236 a	7.4 a	6.9 bd	7.8 ab	7.8 ab	6.9 ab	8.1 a	12.8 ab	6.7 bc
Harvester	—	—	22 June a	7.3 ac	180 b	6.0 c	3.3 fg	7.7 ab	7.7 bc	6.7 bc	5.7 c	11.3 b	6.3 c

²Full bloom = 60% to 80% flowers open; FDP = fruit development period, number of days from full bloom to ripe; Ripe date = date when 20% fruit is firm ripe stage.

³Size ratings of diameter (mm) 0 to 9, 4 = 51 to 57, 5 = 58 to 64, 6 = 65 to 70, 7 = 71 to 76.

⁴Rating scale 0 to 9; 0 to 4 = unacceptable, 5 = marginal, 6 = good, 7 = very good, 8 to 9 = excellent for commercial use.

Mean separation within columns by Duncan's multiple range test at the 5% level.

Fig. 1. Smooth Texan nectarines One (right), Two (center), and Three (left). These three medium chill early-ripening nectarines ripen consecutively from mid-May until early to mid-June in the medium chill zone of Texas and similar regions.

Availability

Budwood can be acquired under a license agreement with the Texas A&M AgriLife Research.

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