

Flat Delight Three, an Early Ripening, Subacid, White-fleshed, Pantao Peach Adapted to Mild Winter Zones

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The ‘Flat Delight Three’ peach is being released for trial by Texas A&M AgriLife to provide a firm, early ripening, subacid, pantao peach with attractive white-flesh for the medium-chill zone. This peach ripens in late April to mid-May in the medium-chill zone of Texas and similar regions. This release extends the pantao peach harvest season forward by a week over the pantao cultivars available such as ‘Flat Delight One’, ‘Flat Delight Two’, and ‘Galaxy’.

Origin

The ‘Flat Delight Three’ peach [*Prunus persica* (Batsch) L.] originated in the Stone Fruit Breeding Program of the Department of Horticultural Sciences at Texas A&M University located in College Station, TX, USA, from a cross made between ‘Smooth Delight One’ a subacid, white-fleshed nectarine as the female parent and ‘Galaxy’ a subacid, white-fleshed pantao peach as the pollen parent. ‘Smooth Delight One’ was derived from a cross between the Florida white-fleshed nectarine ‘Sunmist’ and the California subacid, white-fleshed nectarine ‘Arctic Star’. ‘Galaxy’ traces to a cross between the yellow fleshed USDA selection P34-106 developed mainly from California germplasm and D33-1 a white-fleshed pantao peach with complex parentage developed by the Rutgers University Fruit Breeding program (Byrne and Anderson 2014b; Ramming 2005).

Among the seedlings of the 2007 cross a selection named TX3B376LWP was selected in 2010 from the high-density seedling selection block in College Station, TX, USA, for its early maturity, good productivity, white ground color, round shape, intense red overcolor, and excellent firmness. TX3B376LWP was propagated asexually by budding and has been evaluated in two locations in Texas.

Description

‘Flat Delight Three’, propagated on Nemared rootstock, was grown in two medium

chill sites (Somerville and Fairfield, TX, USA). Somerville (lat. 30°29’ N, long. 96°28’ W, 75 m elevation) and Fairfield (lat. 31°44’ N, long. 96°10’ W, 134 m elevation) have chilling accumulations that are generally above 550 and 700 chill units, respectively, as estimated with the mean monthly temperature of the coldest month (Byrne and Anderson 2024). These correspond to ~38 and ~49 chill portions (Leudeling and Brown 2011).

In the medium chill sites (Somerville and Fairfield, TX, USA), this peach bloomed ~3 d after ‘Smooth Delight One’, ~2 d before ‘TexKing’ (Byrne and Bacon 2004a), ~11 d before ‘Flat Delight One’ (Byrne and Anderson 2017), ~3 d before ‘Royal Zest Two’ (Byrne and Anderson 2014a), and ~11 d before ‘Galaxy’. Thus, based on its blooming behavior, the estimated chilling requirement is ~350 to 400 chilling units. ‘Flat Delight Three’ can be grown in medium-chill regions where the trees of ‘Flordaking’ (Andrews et al. 1979), ‘TexKing’, ‘Royal Zest Two’, and ‘White Delight Two’ (Byrne and Anderson 2013) are produced commercially and further north with frost protection.

This early-ripening, clingstone, melting-flesh pantao peach cultivar ripens ~76 d after full bloom. This is similar to the fruit development period of ‘Flat Delight One’ (~79 d) and ~21 d shorter than ‘Galaxy’. In the medium chill zone, it ripens ~12 d before ‘TexKing’, ~18 d before ‘Royal Zest Two’, ~11 d before ‘Flat Delight One’, ~30 d before ‘Galaxy’ and ~31 d before ‘White Delight Two’ (Table 1). ‘Flat Delight One’ ripens later than ‘Flat Delight Three’ as it blooms ~11 d later.

This cultivar bears pantao peaches of a good to excellent quality, size and attractiveness for an early ripening pantao peach when properly managed and thinned. The size of the fruit is similar to that of ‘Flat Delight One’ and, when properly managed, produces abundant fruit with a diameter of 2.25” to 2.5”. ‘Flat Delight Three’ has low acidity (0.4 g/L), and its mean soluble solids is 11 to 13 °Brix. Its quality as measured by total soluble solids and flavor rating are equal to that ‘Flat Delight One’ and ‘Galaxy’ as well as equal or better than other medium-chill commercial cultivars (Table 1) such as ‘TexKing’, ‘Royal Zest One’, and ‘Royal Zest Two’ when picked mature.

The fruit is white with a medium pink melting flesh which is firm. In addition, the flesh does not brown readily, nor has it shown a tendency to develop split or shattered pits during the final stage of fruit swelling.

This new peach has a light-yellow ground color, light short pubescence, and an attractive dark pink to dark maroon blush over 50% to 80% of its surface. ‘Flat Delight Three’ generally is as or more attractive than ‘Flat Delight One’ and ‘Galaxy’ pantao peaches. (Table 1; Fig. 1). The trees are vigorous with a semispreading growth habit similar to ‘TexPrince’ (Byrne and Bacon 2004b), ‘TexKing’, and ‘TexRoyal’ (Byrne and Bacon 1991). No observations have been made on resistance for either peach rust (*Tranzschelia discolor*) or bacterial leaf spot [*Xanthomonas campestris* pv. *pruni* (E. F. Smith) Dye]. This peach has small to medium leaves that are lanceolate with acuminate apices, and crenate margins.

Flowers are showy with a diameter between 37 to 40 mm and petal length of 20 to 21 mm. The five petals are medium pink when young becoming darker near the petal claw. The sepals are maroon and green with white texture. The medium to dark orange anthers are on filaments (9 to 16 mm length), which are slightly longer than the pistil (12 to 14 mm including ovary). The filaments are white when young and darken with advanced maturity. The pollen is medium yellow and abundant. The tree is self-fertile.

The stones are small with dimensions of 12 to 13 mm in length, 15 to 17 mm in width, and 17 mm in thickness. The dry-stone surface is tan.

Availability

This peach is the subject of a plant patent application. Requests for budwood should be directed to the Texas A&M Innovation office at innovation@tamus.edu.



Fig. 1. ‘Flat Delight Three’ fruit from tree in Fairfield, TX, USA, on tree and in laboratory showing the high external coloration and excellent symmetrical shape.

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Table 1. Fruiting characteristics of ‘Flat Delight Three’ at Somerville,ⁱ TX, USA, and Fairfield,ⁱ TX, USA.

Name	Full bloom ⁱⁱ	Ripe date ⁱⁱ	Weight (g)	Firmness ⁱⁱⁱ	Blush ^{iv}	Shape ⁱⁱⁱ	Tip ⁱⁱⁱ	Ground color ⁱⁱⁱ	Appearance ⁱⁱⁱ	Soluble solids (%)	Taste ⁱⁱⁱ
Somerville, TX, USA											
Flat Delight Three	21 Feb bc ^v	8 May cd	79 b	7.1 ab	7.5 ab	7.2 bc	7.5 ab	7.0	7.6 a	12.8 ab	6.9 ab
Smooth Delight One	18 Feb c	9 May cd	104 ab	7.7 a	8.0 a	8.0 a	8.1 a	6.6	7.6 a	12.9 ab	6.8 ab
Royal Zest One	1 Mar a	9 May cd	103 ab	7.0 ab	7.7 ab	6.8 cd	6.6 cd	6.7	7.1 ab	12.1 bc	6.7 ab
Texking	23 Feb b	17 May bc	123 a	6.6 b	5.6 bc	6.1 d	6.0 d	6.9	6.2 b	12.0 b	6.3 b
Flat Delight One	28 Feb a	18 May bc	83 b	7.2 ab	7.9 ab	6.8 cd	7.8 ab	7.0	7.4 a	13.6 ab	6.8 ab
Royal Zest Two	23 Feb b	22 May b	94 ab	7.1 ab	8.3 a	7.5 ab	7.6 ab	7.0	7.7 a	12.0 b	6.8 ab
White Delight Two	2 Mar a	7 Jun a	98 ab	7.5 a	7.7 ab	7.4 ab	7.3 bc	6.4	7.6 a	14.5 ab	7.5 a
Galaxy	4 Mar a	6 Jun a	119 ab	7.2 ab	6.4 b	7.3 ab	7.4 abc	7.0	7.0 ab	14.8 a	7.3 a
Fairfield, TX, USA											
Flat Delight Three	12 Feb c	27 Apr d	89 c	7.0 ab	6.2 ab	7.2 ab	7.7 a	7.0 ab	7.5 ab	11.2 bc	6.5 ab
Royal Zest One	20 Feb ab	5 May cd	102 c	7.1 ab	6.1 b	6.7 b	6.6 b	6.7 abc	6.6 bc	9.2 c	5.8 b
Flat Delight One	27 Feb a	9 May c	97 c	7.0 ab	7.0 ab	6.7 ab	7.5 ab	6.7 abc	7.3 ab	12.9 a	6.7 a
Texking	13 Feb bc	13 May bc	160 ab	6.5 b	2.8 b	5.9 b	6.0 b	5.9 abc	5.5 c	8.3 c	6.0 ab
Royal Zest Two	15 Feb bc	19 May ab	112 bc	7.7 a	8.2 a	7.6 a	7.6 a	7.0 a	7.8 a	10.3 bc	6.2 ab
Texstar	21 Feb bc	22 May ab	117 bc	6.5 b	4.3 b	3.7 c	2.3 c	6.0 c	3.3 d	11.1 abc	6.0 ab
Galaxy	25 Feb a	29 May a	179 a	7.3 ab	5.5 b	7.2 ab	7.0 ab	6.7 abc	6.5 bc	12.0 ab	6.7 a
White Delight Two	25 Feb a	1 Jun a	141 b	7.7 a	6.8 ab	7.1 ab	6.8 ab	6.4 bc	7.5 ab	11.8 ab	6.7 a

ⁱData collected for eight seasons (2010, 2012–13, 2015, 2018–19, 2022–23) in Somerville and three seasons (2016 to 2018) in Fairfield, TX, USA. Bloom data in Fairfield was only collected in 2016 and 2017.

ⁱⁱ Full bloom = 60% to 70% bloom open, Ripe date = date when 20% fruit is firm ripe stage.

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

^{iv} Blush rating based on the percentage of the fruit surface covered by red coloration. 0 = no blush, 5 = 50% and 9 = 90% of fruit surface covered with red coloration.

^v Analysis was done by location. Mixed model (JMP version 17) was used with means separations done with the Tukey honestly significant difference test.

References Cited

- Andrews CP, Sherman PM, Lyrene WB. 1979. Flordaking peach. *HortScience*. 14(1):81–82. <https://doi.org/10.21273/HORTSCI.14.1.81b>.
- Byrne DH, Anderson N. 2013. White Delight peach series, four medium-chill subacid white-fleshed peaches. *HortScience*. 48(8):1056–1058. <https://doi.org/10.21273/HORTSCI.48.8.1056>.
- Byrne DH, Anderson N. 2014a. Zest peach series: Five medium-chill yellow-fleshed cultivars. *HortScience*. 49(4):506–508. <https://doi.org/10.21273/HORTSCI.49.4.506>.
- Byrne DH, Anderson N. 2014b. ‘Smooth Delight One’ and ‘Smooth Delight Two’, medium-chill subacid nectarines. *HortScience*. 49(12):1593–1594. <https://doi.org/10.21273/HORTSCI.49.12.1593>.
- Byrne DH, Anderson N. 2017. *Prunus persica* tree Flat Delight One. US Plant Patent 27,741.
- Byrne DH, Anderson N. 2024. Fire Zest One, an early-ripening, non-melting flesh, medium-chill peach. *HortScience*. 59(4):529–530. <https://doi.org/10.21273/HORTSCI.59.4.529>.
- Byrne DH, Bacon TA. 1991. ‘TexRoyal’, a medium chilling peach. *HortScience*. 26(10):1338–1340. <https://doi.org/10.21273/HORTSCI.26.10.1338>.
- Byrne DH, Bacon TA. 2004a. TexKing, an early ripening medium chill peach. *HortScience*. 39(2):442–443. <https://doi.org/10.21273/HORTSCI.39.2.442>.
- Byrne DH, Bacon TA. 2004b. TexPrince, a mid-season medium chill peach. *HortScience*. 39(3):631–632. <https://doi.org/10.21273/HORTSCI.39.3.631>.
- Luedeling E, Brown PH. 2011. A global analysis of the comparability of winter chill models for fruit and nut trees. *Int J Biometeorol*. 55(3):411–421. <https://doi.org/10.1007/s00484-010-0352-y>.
- Ramming DW. 2005. ‘Galaxy’ peento peach. *HortScience*. 40(6):1921–1922. <https://doi.org/10.21273/HORTSCI.40.6.1921>.