

Zest Peach Series, Five Medium-chill Yellow-fleshed Cultivars

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The Royal Zest peach series and the ‘Golden Zest’ peach are being released by Texas A&M AgriLife to provide firm, attractive, yellow-fleshed, high-quality peaches for the medium chill zone. The Zest peach series consist of five cultivars that ripen consecutively to supply peaches over 5 weeks from approximately mid-May until late June in the medium-chill zone of Texas and similar regions.

Origin

In the late 1990s, the *Prunus* Breeding and Genetics Program began to develop a series of early ripening, yellow peach cultivars adapted to the medium chill zone (minimum chilling accumulation of 500 to 600 chilling units) of the southern United States. This work has resulted in five new peach cultivars that ripen consecutively from mid-May to late June in the medium chill zone of Texas. These cultivars have similar size but better color, fruit shape, and firmness when compared with commercial cultivars such as ‘Regal’, ‘June Gold’, and ‘Harvester’ (Tables 2 to 5; Figs. 1 and 2). ‘Royal Zest One’ (RZ1), ‘Royal Zest Two’ (RZ2), ‘Royal Zest Three’ (RZ3), and ‘Royal Zest Four’ (RZ4) resulted from crosses done between adapted breeding materials with a high-colored California cultivar. ‘Golden Zest’ (GZ) is a cross between a Californian and a Brazilian peach cultivar.

The Zest peaches [*Prunus persica* (Batsch) L.] originated in the Stone Fruit Breeding Program at the Department of Horticultural Sciences at Texas A&M University located in College Station, TX, from crosses between selections adapted to the medium chill zone (TX2293-1, ‘Victor’, ‘Agata’) and two peaches from California (‘Rich Lady’ and ‘Crimson Lady’). ‘Royal Zest One’ (RZ1, TX4B235) is a cross between a yellow-fleshed, medium-chill peach selection (TX2293-1 = ‘Flordaking’ open-pollinated) and the California cultivar Rich Lady, an early/midseason, yellow-fleshed peach that was released by Zaiger Genetics. ‘Rich Lady’ is an open-pollinated seedling from ‘Amparo’ (Zaiger et al., 1990).

‘Royal Zest Two’ (RZ2, TX4D165), ‘Royal Zest Three’ (RZ3, TX4E218), and ‘Royal Zest Four’ (RZ4, TX4E169) are sister seedlings, which originate from a cross between the yellow-fleshed California peach ‘Rich Lady’ and the early-ripening, medium-chill peach, ‘Victor’. ‘Victor’ was released by Texas A&M University for use in Spain and is a seedling from the cross between the low-chill, yellow-fleshed, midseason cultivar Tropic Beauty and the early-ripening, yellow-fleshed, medium-chill peach ‘Gold-prince’. ‘Tropic Beauty’ was jointly released by the University of Florida and Texas A&M University (Rouse and Sherman, 1989) and is derived from a cross between a Florida selection Fla3-2 (K6E121 open-pollinated) and

‘Flordaprince’ (Fla2-7 × ‘Maravilha’). ‘Gold-prince’ was released by the USDA breeding program in Byron, GA (Okie, 1993) and is derived from a cross between ‘Loring’ and the Georgia selection FV3-257. ‘Golden Zest’ (GZ, TX4E220C) is a bright, golden yellow, clingstone peach with nonmelting flesh. It is from a cross between the California peach cultivar Crimson Lady and the Brazilian nonmelting cultivar Agata. ‘Crimson Lady’ is a high-chill, early-ripening, nonmelting, yellow-fleshed, clingstone peach released by Bradford in 1992, which resulted from a cross between the ‘Red Diamond’ nectarine and the ‘Springcrest’ peach (Bradford and Bradford, 1992; Okie et al., 1985). ‘Agata’ (Conserva 458), a nonmelting, processing peach, was released in 1985 by the EMBRAPA Fruit Breeding Program in Pelotas, Rio Grande do Sul, Brazil (Raseira et al., 1992). It is a selection from an open-pollinated seed from the selection 682011041 acquired from Dr. Hough at Rutgers University in 1972. This selection was derived from a cross between a nonmelting selection from New Jersey (NJC95) and a nonmelting, free-stone from South Africa (SN45/3).

The original plants of these new releases were first identified in 2000–02. Two-year-old and older trees of the selection were subsequently evaluated during the 2004–11



Fig. 1. Fruit of the Royal Zest peach series.

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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 800 chill units, respectively, as estimated with the mean monthly temperature of the coldest month (Byrne and Bacon, 1992; Sharpe, 1970; Weinberger, 1956) (Table 1).

Description

These five cultivars ripen consecutively from mid-May through late June (Tables 2 to 5). RZ1 and GZ are clingstone and the rest are semifreestones or freestones. All of the new releases have large fruit size and good to excellent flavor when properly managed and thinned. The mean soluble solids for these cultivars when picked mature are similar to or better than the common commercial cultivars. RZ1, RZ2, RZ3, and RZ4 have an attractive yellow ground color with a red blush over 60% to 95% of the fruit surface depending on the cultivar and environmental conditions. GZ has nonmelting flesh, an attractive golden yellow ground color with 20% to 30% red blush over the fruit surface (Tables 2 to 5; Figs. 1 and 2).

Although the Zest peaches bloom before 'June Gold' in the medium-chill zone (Table 2), they cropped consistently in the region where 'TexRoyal', 'JuneGold', and 'Harvester' are grown commercially. Based on the relative



Fig. 2. Fruit of the Golden Zest peach.

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 ^z		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	June Gold, Harvester, Julyprince, GaLa
Terrell	8.9	4.1–10.8	8.3	5.9–12.8	1004	655–1353	June Gold, Harvester, Redskin, White Rock
Fowler	7.6	5.3–10.3	7.9	5.1–12.0	1119	788–1301	O'Henry, Elegant Lady

^zChilling estimated with the mean monthly temperatures of the two coldest months using the equation chilling = 4280 – (68.8*Dec/Jan mean monthly temperature in °F) and chilling = 2079 – (123.8*Dec/Jan mean monthly temperature in °C). (Byrne and Bacon, 1992; Sharpe, 1970; Weinberger, 1956). Fairfield used data from Waco, Terrell used data from Dallas, and Fowler used data from the Fresno weather station. All Texas sites used data from 2000 to 2011 and the California site used data from 1975–96.

Table 2. Fruiting characteristics of the 'Zest' peaches compared with three medium-chill commercial peach cultivars at College Station, TX (2005–11).

Name	Full bloom ^z	FDP (days) ^z	Ripe date ^z	Size ^y	Weight (g)	Firm ^x	Blush ^x	Shape ^x	Tip ^x	Ground color ^x	Appearance ^x	Soluble solids (°Brix)	Taste ^x
Royal Zest One	6 Mar. b	70 c	16 May e	4.3 b	100 bc	6.8 bc	7.8 ab	7.3 ab	7.3 ab	6.8	7.5 ab	12.2 ab	6.5
Goldprince	11 Mar. a	73 c	22 May de	5.1 ab	116 ac	6.8 bc	7.6 ab	6.7 bc	6.9 bc	7.0	6.7 bc	11.0 b	6.1
Royal Zest Two	22 Feb. d	92 ab	23 May cd	4.8 b	96 bc	7.4 ab	8.6 a	7.9 ab	8.0 a	7.3	8.0 a	12.2 ab	6.8
June Gold	9 Mar. a	85 bc	1 June c	7.0 a	160 ab	7.0 ac	7.0 ab	6.0 c	6.0 c	7.0	7.0 ab	12.0 ab	7.0
Royal Zest Four	27 Feb. c	91 ab	4 June bc	4.7 b	174 a	8.0 a	8.3 ab	7.3 ab	7.7 ab	7.0	7.7 ab	10.5 b	6.5
Royal Zest Three	5 Mar. b	94 ab	9 June ab	4.8 b	100 bc	7.3 ab	8.0 ab	7.0 ab	7.2 ab	7.0	7.3 ab	13.7 ab	6.8
Harvester	14 Mar. a	92 ab	13 June ab	5.0 ab	—	7.0 ac	5.0 c	6.0 c	6.0 c	7.0	6.0 c	—	6.0
Golden Zest	4 Mar. bc	102 a	18 June a	4.0 b	—	8.0 a	2.0 d	8.0 a	8.0 a	7.0	7.0 ab	16 a	8.0

^zFull bloom = 60% to 80% flowers open; FDP = fruit development period, days from full bloom to ripe; Ripe date = date when 20% of the fruit is firm ripe.

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

^xRating 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. No letters within a column indicates no significant differences. SAS statistical program used for analysis of variance.

Table 3. Fruiting characteristics of the 'Zest' peaches compared with two medium-chill commercial peach cultivars at Fairfield, TX (2006–11).

Name	Full bloom ^z	FDP (days) ^z	Ripe date ^z	Size ^y	Wt (g)	Firm ^x	Blush ^x	Shape ^x	Tip ^x	Ground color ^x	Appearance ^x	Soluble solids (°Brix)	Taste ^x
Royal Zest One	4 Mar. eh	76 de	20 May d	6.1 ac	137 ad	7.2 bd	7.0 cd	7.2 bc	7.1 c	6.8 bc	7.3 bc	10.8 cd	6.3 ab
Regal	13 Mar. ab	70 e	23 May d	5.1 c	111 de	7.0 cd	7.3 cd	6.8 d	6.5 d	7.0 ab	7.0 c	10.6 d	6.2 b
June Gold	11 Mar. bc	83 cd	3 June c	6.2 ab	148 ab	6.3 d	4.7 e	6.5 d	6.3 d	7.0 ab	6.1 d	11.9 bc	6.6 ab
Royal Zest Two	1 Mar. i	97 ab	5 June c	6.4 ab	147 ac	7.3 bc	8.5 a	7.7 ab	8.0 a	7.1 ab	8.0 a	12.3 bc	6.5 ab
Royal Zest Three	5 Mar. dg	101 ab	13 June b	6.3 ab	148 ab	7.2 bd	7.8 ac	7.3 bc	7.4 bc	7.2 ab	7.6 ab	12.4 ab	6.7 ab
Royal Zest Four	2 Mar. gh	104 ab	16 June b	6.1 ac	146 ac	7.6 ab	8.4 ab	7.4 bc	7.7 ab	7.2 ab	7.8 a	12.0 bc	6.5 ab
Golden Zest	6 Mar. de	106 a	22 June a	6.5 a	167 a	7.9 a	2.9 f	8.0 a	8.0 a	7.4 a	7.1 c	13.0 a	6.9 a
Harvester	16 Mar. a	96 ab	23 June a	5.7 bc	126 bc	6.8 cd	5.0 e	7.1 c	7.1 c	6.7 bc	6.3 d	12.6 ab	6.5 ab

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Table 4. Fruiting characteristics of the 'Zest' peaches compared with three medium-chill commercial peach cultivars at Fowler, CA (2004–11).

Name	Full bloom ^z	FDP (days) ^z	Ripe date ^z	Size ^y	Wt (g)	Firm ^x	Blush ^x	Shape ^x	Tip ^x	Ground color ^x	Appearance ^x	Soluble solids (°Brix)	Taste ^x
Royal Zest One	23 Feb	92 b	26 May f	6.9 ab	164 b	7.3 ab	6.7 bc	7.7 bc	7.7 ab	6.9 b	7.2 ac	12.6	6.4
TexKing	27 Feb	98 ab	6 June e	7.1 ab	193 ab	6.8 ac	5.9 cd	7.2 cd	7.4 bc	6.7 b	6.6 cd	11.0	6.1
June Gold	—	—	7 June de	6.3 b	178 ab	6.5 bc	4.8 de	7.0 d	7.0 c	7.0 b	6.0 de	12.5	6.5
Royal Zest Two	23 Feb	109 a	8 June de	7.6 ab	193 ab	6.8 ac	8.7 a	8.1 ab	8.4 a	7.0 b	8.1 a	12.2	6.4
Royal Zest Three	25 Feb	109 a	14 June cd	7.4 ab	179 ab	7.1 ab	6.9 bc	7.6 bc	7.8 ab	6.8 b	7.2 bc	11.6	6.5
Sweet Delight Two	25 Feb	108 a	17 June c	8.1 a	236 a	7.4 ab	6.9 bc	7.8 bc	7.8 ab	6.9 b	8.1 a	13.4	6.7
Royal Zest Four	26 Feb	113 a	20 June ac	6.9 ab	194 ab	7.5 a	8.4 ab	7.5 bc	7.9 ab	7.0 b	8.0 ab	11.4	6.3
Harvester	—	—	22 June ab	7.3 ab	180 ab	6.0 c	3.3 ef	7.7 bc	7.7 ab	6.7 b	5.7 e	11.3	6.3
Golden Zest	27 Feb	—	25 June a	7.8 a	198 ab	7.6 a	2.8 f	8.4 a	8.4 a	7.8 a	7.4 ac	13.2	7.3

^zFull bloom = 60% to 80% flowers open; FDP = fruit development period, days from full bloom to ripe; Ripe date = date when 20% of the fruit is firm ripe.

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

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Mean separation within columns by Duncan's multiple range test at the 5% level. Items with the same letter are not significantly different. No letters within a column indicates no significant differences. SAS statistical program used for analysis of variance.

Table 5. Fruiting characteristics of the 'Zest' peaches compared with three medium-chill commercial peach cultivars at Terrell, Texas (2004–11).

Name	Ripe date ^z	Size ^y	Wt (g)	Firm ^x	Blush ^x	Shape ^x	Tip ^x	Ground color ^x	Appearance ^x	Soluble solids (°Brix)	Taste ^x
Royal Zest One	23 May e	6.0 a	139	7.0	6.8 ab	7.4 ab	7.0 bc	6.4	7.0 bc	11.8 ab	6.4 ab
Regal	26 May e	5.0 b	115	7.0	7.3 ab	7.0 b	6.7 c	7.0	7.0 bc	10.0 b	6.0 b
Royal Zest Two	13 June cd	5.6 ab	114	7.4	8.5 a	7.5 ab	7.8 ab	7.1	7.8 ab	12.4 ab	6.4 ab
Royal Zest Three	19 June bc	5.9 a	120	7.4	7.8 ab	7.8 ab	7.6 ab	7.4	7.9 ab	12.8 ab	7.0 a
Royal Zest Four	20 June ab	5.7 a	117	7.8	8.4 a	7.7 ab	7.6 ab	7.4	8.0 a	12.0 ab	6.6 ab
Golden Zest	29 June ab	5.6 ab	118	8.0	1.9 d	8.0 a	8.1 a	7.3	7.3 ac	14.4 a	6.7 ab
Harvester	4 July a	5.3 b	120	7.0	5.0 c	7.0 b	7.0 bc	7.3	6.3 c	13.0 a	6.7 ab

^zRipe date = date when 20% of the fruit is firm ripe.

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

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

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bloom times of standard cultivars, these new peaches need between 500 and 600 chilling units (CU). The latest blooming releases RZ1, RZ4, and GZ require 600 CU, whereas RZ3 requires 550 CU and RZ2 requires ≈500 CU to break dormancy.

The stones are elliptical to ovate in shape. RZ1, RZ3, RZ4, and GZ have larger stones (length 31 to 36 mm, width 21 to 26 mm, thickness 16 to 19 mm) than does RZ2 (length 28 to 30 mm, width 18 to 23 mm, thickness 16 to 17 mm).

Flowers of RZ1 are non-showy, whereas RZ2, RZ3, RZ4, and GZ have showy flowers. All the new peach cultivars have five pink petals with the non-showy petals being 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 'TexPrince', and 'TexRoyal'. No observations have been made on resistance for either

peach rust or bacterial leaf spot. The leaves are lanceolate with acuminate apices and crenate margins. RZ1, RZ3, and GZ have small globular petiolar glands, whereas RZ2 and RZ4 have reniform petiolar glands.

Availability

Requests for budwood should be directed to The Texas A&M University System's Office of Technology Commercialization. These cultivars are the subject of plant patent applications.

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