‘Liberty Joy’ Peach

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The U.S. Department of Agriculture, Agricultural Research Service (ARS) peach breeding program in Byron, GA is one of the few public programs that remain active in developing new peach cultivars for adaptation to the Southeastern climate and the shipping market need of the regional peach industry. The “prince” series of peach cultivars were released for this need (Okie, 1993; Okie and Layne, 2008a, 2008b; Okie et al., 1982; Okie and Reilly, 1987). Most of the cultivars produce freestone peaches that are large, high-blushed, yellow-fleshed, of normal acidity, and slow-melting. As a continuing effort, ‘Liberty Joy’ (tested as BY06P1627) was released. It requires about 650 h chill (CH) and is a reliable lower-chill alternative, ripening in late June to early July. Current commercial cultivars in the harvest window, including ‘Fireprince’, ‘Blazeprince’, ‘Scarletprince’, and ‘Redglobe’, require 850 CH and do not crop well when chill is insufficient (Chen and Beckman, 2019). ‘Liberty Joy’ produces attractive, almost full-blushed, yellow-fleshed, firm, and melting fruit. Trees are well adapted to the Southeastern climate, and they are suggested for trial wherever “prince” cultivars are grown.

Origin

‘Liberty Joy’ was a seedling selection from BY99P1405 × BY02P3862 (Fig. 1). BY99P1405 was a seedling selection from BY87P254 × BY93P3643. BY87P254 was a seedling selection from ‘Sunprince’ × ‘Fire Red’. BY93P3643 was a selection of ‘Blazeprince’ × ‘BY89P3023’.

BY89P3023 was an open-pollinated (OP) seedling of BY86P0366, which was a seedling of ‘Hakuto’ × ‘Flavorcrest’. BY02P3862 was a seedling of BY95P5518 × BY96P3473. BY95P5518 was an OP seedling from ‘Rich Joy’ (BY92P2710). BY96P3473 was from ‘Blazeprince’ × BY90P2932, an F3 selection from ‘Flavortop’ × ‘Willowleaf’. The original seedling tree of BY06P1627 was planted at the Southeastern Fruit and Tree Nut Research Laboratory, Byron, GA in 2006, evaluated and selected when it first fruited in 2008, and continually evaluated every year afterward.

Description

‘Liberty Joy’ trees are moderately vigorous and semispreading in their growth habit. Leaf glands are reniform. Trees bloom slightly after ‘June Gold’, requiring about 650 h of chilling below 7.2 °C (≈45 °F) to break the bud dormancy in Byron, GA. Flowers are large, showy, pink, and self-fertile. Fruit are firm,

freestone, and melting with yellow flesh, normal acidity, and pleasant eating quality, typically ripening in late June to early July in Byron, GA (about with ‘Redglobe’ and about one week after ‘Sunland’). Fruit usually have a high percentage of red blush, with an attractive yellow ground color on the skin surface, and usually are almost round with a slightly oblong apex in some years. Trees have not been extensively tested in northern climates, but the original seedling was one of the few peaches to crop well at Byron in several years with severe freezes. For example, it had a full crop when a freeze occurred on 29 Mar. 2015. The temperature was −1.8 °C (≈28.7 °F) in the location’s weather shelter and −3.3 °C (≈26.1 °F) in a neighboring orchard (Chen et al., 2016).

Performance

Performance was based on annual evaluation on the selected original seedling and multiple nonreplicated grafted trees on ‘Guardian’ rootstock in Byron, GA. The CH received each year at Byron or other cities in Georgia can be calculated using the calculator at www.georgiaweather.net, and the CH at Byron during 2007–19 (average ≈937.5) were previously listed (Chen and Okie, 2020). Appropriate pesticide sprays were applied on the schedule as recommended by the station’s farm management team and in the Southeastern extension guide (<https://extension.uga.edu/publications/detail.html?number=B1171>),

Fig. 1. Pedigree of ‘Liberty Joy’ peach. OP = open-pollinated seedling.

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Fig. 2. Typical ripe ‘Liberty Joy’ fruit on a tree (A) and freshly harvested without washing or any other treatment (B) in Byron, GA showing the size, shape, exterior, flesh, and pit in different views: back side and suture side (left top and bottom), blossom end and stem end (middle top and bottom), and longitudinal halves with and without the pit (right top and bottom). The square is about equivalent to 1 cm × 1 cm.

primarily to manage pests and fungal diseases on fruit or control weeds. No bactericides were used on any test trees or at any locations, to maximize bacterial spot expression. Trees appeared to be highly resistant to bacterial spot disease based on few visualized symptoms on fruit and leaves throughout the evaluation years. No virus symptoms were observed. ‘Liberty Joy’ trees are productive and have cropped well in most years, including a fruit set rated at 7 on the 0–9 scale (i.e., none to highest, 6–8, presumably commercially desirable) in 2015 and rated at 6 in 2017. The average fruit set rating throughout the evaluation years was 5.74, suggesting ‘Liberty Joy’ was considerably reliable. In 2015, a spring freeze caused substantial crop loss in many peach cultivars (the average fruit set rating of all evaluated cultivars at the location was 2.61 and that of the 650-CH cultivars was 1.33) (Chen et al., 2016). It is suggested this peach might be less vulnerable to spring freeze, compared with others with the same 650 CH range (most were rated at 0 to 3 and the average was 1.33 in 2015) (Chen et al., 2016), although additional years of observations and more tests are needed. In 2017, a

record low CH (520) occurred, and bud-break delayed about a month in most high-chill peach cultivars that produced few flowers and no fruit set (rated at 0) (Chen and Beckman, 2019). Due to its lower chill requirement, it apparently was much less likely to be devastated by (extremely) insufficient chill, compared with the high-chill counterparts. ‘Liberty Joy’ fruit typically ripen in late June to early July in Byron, GA. At maturity, the fruit surface is 90% to 95% bright red, with an attractive yellow ground color and little pubescence. The fruit is medium to large, 6–8 cm (≈ 2.5 – 3.0 inches) in diameter when adequately thinned, and usually very round to slightly elongated (Fig. 2). The flesh is yellow, which may develop some red if allowed to mature on the tree. The freestone fruit is attractive and firm, with an excellent melting texture and tasty flavor.

Availability

The cultivar is maintained at the USDA–ARS Southeastern Fruit and Tree Nut Research Laboratory in Byron, GA. Request for the cultivar should be addressed to USDA–

ARS, Office of Technology Transfer, 5601 Sunnyside Avenue, Room 4-1192, Beltsville, MD 20705-5131. Prospective licensees can also contact the same office via e-mail: license@usda.gov.

Literature Cited

- Chen, C. and T.G. Beckman. 2019. Effect of a late spring application of hydrogen cyanamide on high-chill peaches. *Agronomy* 9:726.
- Chen, C. and W.R. Okie. 2020. ‘Rich Joy’ peach. *HortScience* 1–2, doi: 10.21273/HORTSCI14720-19.
- Chen, C., W.R. Okie, and T.G. Beckman. 2016. Peach fruit set and buttoning after spring frost. *HortScience* 51:816–821.
- Okie, W.R. 1993. ‘Goldprince’ and ‘Scarletpearl’ peaches. *HortScience* 28:231.
- Okie, W.R. and D.R. Layne. 2008a. ‘Early August-prince’ and ‘Augustprince’ peaches. *HortScience* 43:1600–1602.
- Okie, W.R. and D.R. Layne. 2008b. ‘Scarletprince’ and ‘Julyprince’ peaches. *HortScience* 43:1603–1605.
- Okie, W.R., V.E. Prince, and C.C. Reilly. 1982. ‘Sunprince’ peach. *HortScience* 17:414.
- Okie, W.R. and C.C. Reilly. 1987. ‘Juneprince’ and ‘Fireprince’ peaches. *HortScience* 22:325–326.