‘Solbrio’ Table Grape

Craig A. Ledbetter

U.S. Department of Agriculture, Agricultural Research Service, San Joaquin Valley Agricultural Sciences Center, 9611 S. Riverbend Avenue, Parlier, CA 93648-9757

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‘Solbrio’ is an early midseason black-skinned seedless table grape (*Vitis vinifera* L.) suitable for production where *V. vinifera* can be grown. The significant characteristics of ‘Solbrio’ are its consistent production of large crunchy textured berries with full color development on spur-pruned vines without any applications of plant growth regulators. Berry taste is sweet and neutral with flesh texture playing an important role in consumer acceptability.

Origin

‘Solbrio’ originated from a planned cross designed by retired Agricultural Research Service (ARS) table grape breeder David Ramming. ARS selection B55-70 (female parent) was a black-skinned seedless selection that typically ripened during mid-September in the Central San Joaquin Valley. The selection had a noticeable seed trace, making it suitable as a female parent for seedless × seedless hybridizations (Emershad and Ramming, 1984). ARS selection C49-3 (pollen parent) typically ripened a week before B55-70 and was also black-skinned with a large berry size, firm flesh, and a small seed trace. The cross was performed in 2004, with immature berries being harvested ≈6 weeks after pollination and established in *in ovulo* embryo culture. Seedlings from this planned cross were field transplanted during Spring 2005 and began fruiting during Summer 2006. One seedling, designated as Y130-163-05, was identified for its attractive black seedless fruit with firm, crisp flesh, and neutral flavor. Selection Y130-163-05 was propagated for further evaluation at the Parlier location and for comparison with commercial cultivars having similar ripening

periods. A U.S. Plant Patent (PP30,126) was awarded to ‘Solbrio’ on 22 Jan. 2019.

Description and Performance

‘Solbrio’ was established in a production trial at the San Joaquin Valley Agricultural Sciences Center in Parlier, CA, during 2007. A 27-vine plot of own-rooted ‘Solbrio’ vines was trained to a three-crossarm ‘T’ trellis on Hanford fine sandy loam soil. Vines were planted at a spacing of 3.7 m between rows and 2.4 m between vines (1121 vines/ha) and developed to quadrilateral cordons with ≈28 two-bud spurs. Cordons were located ≈142 cm above the soil level on the lowest (76 cm width) crossarm. The central crossarm (102 cm width) was located 33 cm above the cordons and was equipped with catch wires to trap growing canes and allow light penetration to the canopy center. The top crossarm (122 cm width) was placed 33 cm above the center crossarm and was also equipped with catch wires for maximizing light entry into the canopy. Commercial black-, red-, and white-skinned cultivars that ripened throughout the maturity season were also established in the same vineyard in seven vine plots using identical vine spacing for evaluation purposes. Commercial cultivars were pruned per industry recommendations, and fruit were produced using the best-known combination of cultural techniques [gibberellic acid (GA) sprays, trunk girdling, ethephon sprays, cluster thinning, and tipping] to optimize berry size and fruit quality.

Evaluation data were obtained at harvest (typically late July in the Central San Joaquin Valley) for ‘Solbrio’ and ‘Summer Royal’, a commercial black-skinned seedless cultivar, from 2013 through 2018. The similar ripening time of ‘Summer Royal’ made the cultivar an obvious choice for comparison with ‘Solbrio’. Harvest timing was based on subjective organoleptic quality and visual appearance of the fruit. Annual evaluations of these two accessions included vine fruitfulness, cluster and berry weights, berry dimensions, juice chemistry, and vine yield. Vine fruitfulness was determined through annual counts of inflorescences when current season shoots had extended 30 to 50 cm. Berry dimensions and weights were based on 50 berry samples collected randomly from each vine. Similarly, juice chemistry was also determined using the randomly collected 50 berry samples. Vine yield and cluster weights were determined through direct harvest of

individual vines with known numbers of clusters. Means reported for these characteristics were based on data obtained from five replicate vines during each harvest year.

Vineyard management included standard production practices such as annual dormant pruning, weed control, and applications of commercial crop care products to control grape powdery mildew, caused by *Erysiphe necator* Schw. [syn. *Uncinula necator* (Schw.) Burr]. Vines received water exclusively through daily drip irrigation during the fruit development period to replace what was lost in the soil profile to evapotranspiration. At veraison, vines were enclosed in plastic bird netting for protection. CAN-17 was applied annually in the drip line during rapid shoot growth to provide ≈25 kg N/ha to replace what was lost to prior crop removal (Peacock et al., 1998).

Cultural treatments used to increase berry size and fruit quality differed with the two cultivars. Berries of ‘Summer Royal’ were enhanced with a 40 ppm (89 g/ha) GA spray applied just after berry set. A trunk girdle (4.76-mm blade gap) and tipping of the conical clusters followed soon thereafter. For ‘Solbrio’, no cultural treatments were identified that increased berry size and fruit quality. GA sprays at bloom or berry set were found to be detrimental, inducing postharvest berry shatter. Similarly, trunk girdling did not improve berry size or fruit quality. Through repeated trials over numerous harvest years, it was determined that ‘Solbrio’ was best cultured as a natural grape without GA sprays or trunk girdles. Data reported here for ‘Solbrio’ were obtained from vines without these cultural treatments whereas data reported for ‘Summer Royal’ were from vines treated with a GA sizing spray, trunk girdle, and tipped clusters. Hence, there were significant treatment differences used to produce these two table grapes, and no statistical analysis between the two was performed.

Vine characteristics. In California’s Central San Joaquin Valley, ‘Solbrio’ vines exhibit medium vigor with a semidrooping growth habit. The cane surface is smooth with a round shape and average 41 nodes of growth during a typical season. Cane length at the end of a growing season ranges from 240 to 490 cm, averaging 340 cm. ‘Solbrio’ vines are not resistant or tolerant of powdery mildew. Relative to other table grape

Fig. 1. Natural untreated ‘Solbrio’ table grape vine at harvest, 29 July 2014 in Parlier, CA.

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Table 1. ‘Solbrio’ table grape as compared with ‘Summer Royal’ at Parlier, CA, during 2013 through 2018 harvests (N = 6). Values represent means $\pm$ SD of variables across harvest years.

Cultivar	Average harvest date	Cluster		Berry			Juice		Vine yield (kg)
		No. per vine	Wt (g)	Wt (g)	Length (cm)	Diam (cm)	Brix (°)	Acidity ^z	
Summer Royal	26 July	42 $\pm$ 15.7	472 $\pm$ 122	7.92 $\pm$ 1.28	2.59 $\pm$ 0.15	2.23 $\pm$ 0.09	19.7 $\pm$ 0.82	0.53 $\pm$ 0.06	20.3 $\pm$ 4.1
Solbrio	30 July	104 $\pm$ 26.4	354 $\pm$ 70	7.27 $\pm$ 0.70	2.73 $\pm$ 0.16	2.12 $\pm$ 0.07	19.1 $\pm$ 1.37	0.39 $\pm$ 0.06	22.8 $\pm$ 3.9

^zJuice acidity based on titration to pH 8.2 and reported as milligram tartaric acid/100 mL juice.

cultivars common in the San Joaquin Valley, ‘Solbrio’ has an early budbreak. Shoots arising from spurs average 2.1 clusters per shoot, with most clusters occurring at nodes four and five of the current season’s growth. ‘Solbrio’ vines grown in the San Joaquin Valley exhibit consistent fruitfulness, with an average of 104 clusters per vine (71–137 cluster range) between 2013 and 2018. When 6- to 11-year old vines are thinned to 55 to 60 clusters per vine, fruit yields across harvest years (2013 through 2018) ranged from 18.3 to 27.7 kg/vine (22.8 kg/vine average) without other cultural treatments (Fig. 1). Using the best-known cultural practices for ‘Summer Royal’ (40 ppm GA at berry set, girdle, tipped clusters) and an average crop load of 34 clusters per vine, fruit yield averaged 20.3 kg/vine (15.5–21.3 kg/vine range) during this same period (Table 1). On average, 81% of the available ‘Summer Royal’ clusters were used in making a given season’s crop, whereas only 53% to 58% of the available clusters of ‘Solbrio’ were used. Hence, growers can be more selective with ‘Solbrio’ regarding the specific clusters used for making yield.

Cluster characteristics. Clusters of ‘Solbrio’ are typically medium in size, conical in shape and slightly loose in compactness. An average ‘Solbrio’ cluster contains $\approx$ 60 berries. When vines have been adequately thinned, growers can expect a cluster mass of $\approx$ 350 g (0.8 lb). Tipped ‘Summer Royal’ clusters are larger, having an approximate mass of 470 g (Table 1).

Berry characteristics. Berries of ‘Solbrio’ are fully colored and attractive with a crisp and crunchy flesh texture. Berry skin adheres to the nonpigmented flesh and the skin has a medium thickness. The stenopermic berries have an average of 1.4 non-detectable seed traces per berry, with fresh weights of traces averaging 2.6 mg. Sunburn on fruit has not been noted as a problem when cultured in the San Joaquin Valley. Fruit quality is excellent at harvest, and with appropriate handling, little berry shatter has been noted on clusters that have been in commercial postharvest storage (precooling, 1 °C in storage with weekly SO₂ exposures) for as long as 8 weeks. From an appropriately thinned vine (no GA application or girdling), growers can expect a berry mass of 7.3 g. In contrast, berry mass of ‘Summer Royal’ after all cultural treatments averaged 7.9 g (Table 1). Berry shape for ‘Solbrio’ is elliptical, with a length: diameter ratio of 1.29. At harvest, ‘Solbrio’ and ‘Summer Royal’ exhibit similar Brix levels (19.1 vs. 19.7, respectively), but juice acidity is higher in ‘Summer Royal’ compared with ‘Solbrio’ (0.53% vs. 0.39%, respectively). These different juice chemistries lead to large differences in °brix:acid ratios, which can be used as an indication of consumer acceptability of table grapes (Jayasena and Cameron, 2008). °Brix:acid ratio of ‘Solbrio’ averages 50.4 (39.1–57.3 range) across harvest years, substantially more than the 37.7 °brix:acid ratio (30.5–

45.7 range) encountered for ‘Summer Royal’.

Availability

‘Solbrio’ has been indexed by the Foundation Plant Services, University of California, Davis, and found free of known viruses. The cultivar is licensed exclusively to the California Table Grape Commission, which will make it widely available through sub-licensing agreements. Inquiries regarding availability of ‘Solbrio’ should be addressed to Ross Jones, ross@grapesfromcalifornia.com, California Table Grape Commission, 392 W. Fallbrook, Suite 101, Fresno, CA 93711, or Craig Ledbetter, craig.ledbetter@ars.usda.gov, ARS, 9611 S. Riverbend Avenue, Parlier, CA 93648. It is requested that appropriate recognition be made if this cultivar contributes to the development of a new breeding line or cultivar.

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