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Developing the New Black Table Grape Cultivar, 'Doonuri'

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Abstract

'Doonuri' is a new table grape cultivar with early ripening berries, uniform coloring of skin, and high quality. Mean budburst is on 16 April, flowering on 29 May, and ripening on 26 August at Suwon, Korea. Mean berry weight is 5.1 g and mean total soluble solids concentration is 16.4 ˚Brix and a low titratable acidity (0.50%). The clusters are cone-shaped (conical) and have circular, juicy, and attractive black-skin colored berries with abundant bloom. Wines made from 'Doonuri' showed attractive character with low acidity, high tannin content, and a flavor of black berries and caramel. It is a mid-season grape cultivar to be used for desert and wine making which is distinguished by its superior fruit quality combined with good productivity, partial resistance to several diseases, and cold hardiness superior to its acclaimed parent, 'Campbell's Early'.

Materials and Methods

'Doonuri' resulted from the cross 'Schuyler' (*Vitis* sp.) X 'Campbell's Early' (*Vitis labruscana* L.) which was made at the National Institute of Horticultural and Herbal Science (NIHHS), RDA, Korea in 1982. The intention was to produce high quality table grapes with the flavor of 'Campbell's Early'. It was initially selected as having desirable traits in 2001, tested from 2002 to 2006 in the north (Chuncheon), middle (Suwon, Okcheun, Yesan) and south (Daegu, Jinju and Naju) of Korea as 'Wonkyo RA-20'. It was named in 2006. Three randomized plots each with three vines were planted to evaluate vine and fruit production characteristics. Vines were spaced 4 m (between rows) x 5 m (between plants) and trained to an overhead arbor. Pests and diseases were controlled with periodic fungicide and insecticide applications following the guidelines of the Rural Development Administration. No irrigation was applied during the 5-year evaluation period and weed management was controlled using a grass sward system. Fruit bearing branches were pruned to two buds in February and cluster thinning was carried out 10 days before flowering. In this trial, the harvest dates were based on fruit maturity. A random sample of 5 clusters per vine/replicate was collected for determination of cluster and berry weight. Cluster weight was calculated by averaging the combined weights of the five-cluster samples. Berry weights were measured on a 10-berry subsample randomly selected from the five-cluster samples. The five-cluster samples were manually crushed and filtered through a double layer of gauze. Juice soluble solids concentration was measured using a digital refractometer (Atago PR-101, Japan) and titratable acidity using an automatic titrator (Schott TitroLine alpha, Mainz, Germany) where the juice was titrated to an endpoint of pH 8.2 using 0.1 N sodium hydrogen thalate.

Description

Flowers. Flowers of 'Doonuri' are perfect and self-fertile, blooming in mid-season (on 29 May in Suwon, Korea) following mid season bud-break on 16 April.

Fruits. Fruits of 'Doonuri' have black skin when fully ripened. Berries are medium in size averaging 5.1 g, similar to that of 'Campbell's Early', and are round to slightly ovate. Each berry has 2~4 seeds of 6.6 mm in length. When the grapes are fully ripened, the aroma of 'Doonuri' is very similar to that

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of 'Campbell's Early' with a pronounced, balanced, foxy flavor. 'Doonuri' ripens between 23 August and 29 August in Suwon, Korea, similar to 'Campbell's Early' and can, therefore, be considered as a mid-season grape cultivar. The mean total soluble solids (TSS) concentration of 'Doonuri' is 16.4 °Brix, about 1~2 °Brix higher than 'Campbell's Early'. Juice soluble solids concentration is usually higher and fruit pH is usually lower than 'Campbell's Early' (Table 1). The balance between sugar (16.4 °Brix) and acidity (0.50% titratable acidity) is excellent. These values indicate that 'Doonuri' can accumulate satisfactory amounts of sugar while maintaining sufficient acidity. It has a slipskin, juicy texture, berries are pulpy, and skin is medium-thick. Berries resist splitting or cracking in rainfall near to maturity.

Clusters. The clusters of 'Doonuri' are medium in size (285 to 385 g with 55-65 berries per cluster), conical, sometimes shouldered, and are tightly filled. The cluster appearance is excellent with uniform shape and with berries having a black skin color. Berries remain attached to the pedicel during storage and transportation. Although gibberellic acid treatment is traditionally used to induce seedless berries in tetraploid grapes, the treatment is not applicable for the induction of seedless 'Doonuri' grape, due to side effects such as the incidence of hardened peduncles, rachises, and pedicels. The yield of 'Doonuri' is slightly lower than that of 'Campbell's Early' at the same locations and with the same training system (data not presented).

Vines. Own-rooted vines of 'Doonuri' are vigorous, and very cold hardy with no bud damage at -20°C in Suwon, Korea. Vines have uniform clusters in size and a uniform ripening period with excellent berry setting when managed by spur pruning.

Fig. 1. Fruit cluster of grape cultivar 'Doonuri' at full maturity.

Diseases. This grape cultivar is resistant to bunch rot disease (*Botrytis cinerea* Persoon : Fries) and clusters have long shelf life with a good retention of quality even when overripe. The foliage is moderately resistant to anthracnose (*Elsinoe ampelina* Shear) and is resistant to downy mildew (*Plasmopara viticola* Berl. & de Toni) but sensitive to leaf blight (*Pseudocercospora vitis* Speg.). The trunk is also moderately resistant to crown gall (*Rhizobium vitis* (Ophel & Kerr 1990) Young et al. 2001).

Table 1. Fruit characteristics of the grape cultivars 'Doonuri' and 'Campbell's Early'.

Cultivar	Maturity date	Cluster weight (g)	Berry skin color	Berry weight (g)	Soluble solids (°Brix)	Acidity (%)
Dunoori	26 Aug.	331±51[z]	Black	5.1±0.4	16.4±1.2	0.50±0.11
Campbell's Early	28 Aug.	370±45	Black	5.5±0.5	14.7±0.7	0.60±0.13

[z]Mean±standard deviation.

Wines. Wines made from 'Doonuri' showed attractive character with low acidity, high tannin content, and a flavor of blackberry and caramel.

'Doonuri', which means "all over the country" in Korean, is the ninth table grape cultivar developed in NHHIS. It followed the release of 'Cheongsoo' (1), 'Hongdan' (4), 'Tamnara' (2), 'Heukgoosul' (3), 'Hongisul' (5), 'Heukboseok' (6), 'Jinok' (7), and 'Suok' (8).

Availability

Requests for cuttings for research purposes may be addressed to Jung Ho Noh (jeongho89@korea.kr). Vines are available for sale at the Korean Society for Fruit Tree Nursery (4-38 Seonghwang-dong, Cheonan 330-130, Korea).

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