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'Tankeumchu': a Black Fruited, Seeded Table Grape

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Abstract

'Tankeumchu' is new table grape cultivar resulting from an interspecific (*Vitis* sp. x *Vitis vinifera*) cross. It is diploid, mid-ripening and black-fruited with large berries. It has a mean date of bud burst, at Suwon, Korea of 24 April, full bloom occurs on 1 June, and fruit matures on 10 September. It has an excellent taste with abundant juice and soft firmness. The mean weight of berries is 7.0 g, and mean total soluble solids concentration is 18.0 ºBrix. 'Tankeumchu' is more suitable to a mild climate with its moderate resistance to cold hardiness. It is a mid-season table grape with high quality and compares favorably with the cultivar 'Tano Red' in taste, harvest date and cluster setting. The harvest time is a major advantage in the Korean market and consequently it is recommended as an alternative to 'Tano Red'.

Materials and Methods

'Tankeumchu' originated from the cross 'Tano Red' X 'Super Hamburg' (Fig. 1). 'Tano Red', which has a large cluster (500 g) and red skinned berries, was used as a parent because of its high yield and abundant juice. 'Super Hamburg', which has large (6 to 7 g) dark-black berries, was used as the other parent because of its good coloring. The crossing for 'Tankeumchu' was carried at the National Institute of Horticultural & Herbal Science (NIHHS), RDA, Korea, in 1987. The original seedling was planted in 1990 and was initially selected as having desirable traits in 1995. Because of the high quality of its berries and large cluster, it was propagated for further trials as 'Wonkyo Ra-19'. It was tested for five fruiting seasons (from 2001 to 2007) in the north (Chuncheon), middle (Suwon, Okcheun, Yesan) and south (Daegu, Jinju and Naju), of Korea and was named in 2007. Three vines in each of three randomized plots were planted for the evaluation of vine and fruit characteristics from 2001 to 2007. These 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

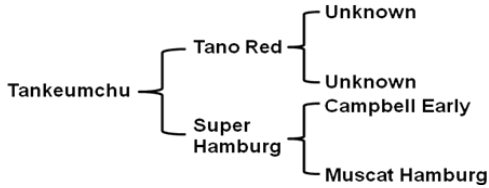

Fig. 1. Pedigree of 'Tankeumchu' grape

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through a double layer of gauze. Juice soluble solids concentration was measured using a digital refractometer (Atago PR-101, Japan) and titratable acidity by 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 'Tankeumchu' are perfect and self-fertile, blooming in late May (25 May) after bud break in late April (24 April) in Suwon, Korea.

Fruits. Fruits of 'Tankeumchu' have black skin when fully ripened. Berries are medium in size with an average weight of 7.0 g, and the berry shape is round to ovate. Each berry has two to three seeds of 5.8 mm in length. When the grapes are fully ripened, the aroma of 'Tankeumchu' is similar to that of 'Tano Red'. 'Tankeumchu' ripens between 5 Sept. and 10 Sept., 20 days earlier than 'Tano Red' in Suwon, Korea. The mean total soluble solids (TSS) concentration of 'Tankeumchu' is 18.0 °Brix, 1 to 2 °Brix higher than 'Tano Red' (Table 1). Although the soluble solids concentration is usually higher than for 'Tano Red', titratable acidity is 0.57% with a pH 3.2. These values indicate that 'Tankeumchu' can accumulate satisfactory amounts of sugar while maintaining sufficient acidity. The skin is medium in thickness, not as tough as 'Tano Red', and it does not adhere to the flesh. The berries are moderately susceptible to cracking following rainfall events near maturity. The flesh texture is soft and juicy.

Clusters. The cluster size of 'Tankeumchu' is large ranging from 367 to 499 g with 55 to 70 berries per cluster. Clusters are cylindrical in shape with a small shoulder. The berries are set tightly with no shattering (Fig. 2). The cluster appearance is excellent with uniform shape, abundant volume, and berries have black skin. Berries remain attached to the pedicel during storage and transportation. The yield of 'Tankeumchu' is slightly lower than that of 'Tano Red' at the same locations and with the same training system (data not presented).

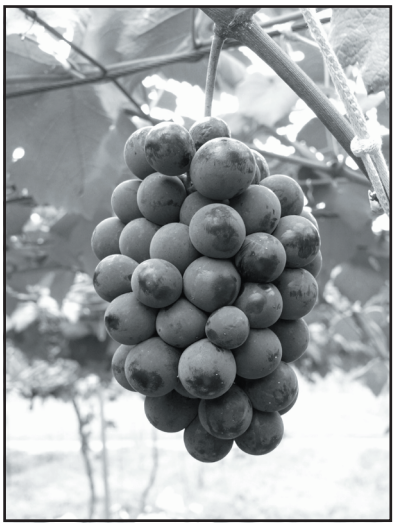

Fig. 2. Fruit of 'Tankeumchu' grape

Vines. 'Tankeumchu' has high vine vigor and moderate cold-hardiness with no bud damage occurring at -15°C in Suwon, Korea. Leaf petioles may be shorter than the leaf midrib. Tendrils have no branches and develop opposite to the leaves, and sometimes arising at each node of a shoot. Current season's shoots from dormant buds typically produce inflorescences at the second and third nodes.

Table 1. Fruit characteristics of the grape cultivars 'Tankeumchu' and 'Tano Red'.

Cultivar	Harvest date	Cluster weight (g)	Berry skin color	Berry weight (g)	Soluble solids (°Brix)	Acidity (%)
Tankeumchu	10 Sept.	403±54[z]	Black	7.0±1.0	18.0±1.4	0.53±0.13
Tano Red	30 Sept.	500±76	Red	6.0±1.2	16.8±1.6	0.60±0.18

[z]Mean ± SD.

Diseases. 'Tankeumchu' is moderately resistant to downy mildew (*Plasmopara viticola* Berl. & de Toni) and to anthracnose (*Elsinoe ampelina* Shear) but is more resistant than European cultivars to both of these diseases. The trunk is also moderately resistant to crown gall (*Rhizobium vitis* (Ophel & Kerr) Young et al.). Although own-rooted vines of 'Tankeumchu' grape were cultivated in the vineyard, they were not infested with phylloxera owing to the low risk of natural attacks in soils in Korea.

'Tankeumchu' is the tenth table grape cultivar developed by NIHHS in Korea and follows the release of 'Suok' (2, 3) and 'Doonuri' (1). It is expected that 'Tankeumchu' vines will be planted by a number of grape growers because of the characteristics desired by Korean grape consumers (2).

Availability

In Apr. 2010, 'Tankeumchu' became a protected, registered new variety in Korea (2008-114). Requests for cuttings for research purposes may be addressed to Jungho 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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Pre-harvest spray application of methyl jasmonate improves red blush and flavonoid content in 'Cripps Pink' apple

Poor and erratic red blush development in 'Cripps Pink' apple causes serious economic losses to growers. The effects of a single pre-harvest spray application of various methyl jasmonate (MJ) emulsions on the development of red blush and fruit quality in 'Cripps Pink' apple were investigated at three locations. In the first and second experiments, during 2005, apple trees were sprayed separately with 0.0, 1.0, 5.0, 10.0, or 15.0 mM MJ at Perth Hills (PH) and at Manjimup (MM). In the third and fourth experiments, during 2006, 0.0, 1.25, 2.5, 5.0, or 10.0 mM MJ was sprayed separately at PH and at Donnybrook (DB). In 2005, at PH and MM, fruit treated with 1.0 mM or 5.0 mM MJ exhibited the greatest increases in red blush, in the percentage of export-grade fruit, and in the levels of total anthocyanins, cyanidin 3-galactoside, chlorogenic acid, phloridzin, flavanols, and flavonols. In 2006, at PH, the maximum improvement in red blush, in the percentage of export-grade fruit, and in the accumulation of total anthocyanins and colour parameters (lower CIE L^* and h^o values, and higher a^* and C^* values) were achieved with a 1.25 mM MJ spray application. In contrast, at DB, the same results were achieved with 5.0 mM MJ. In both years, fruit quality (i.e., firmness, and the soluble solids concentration: titratable acidity ratio) was not significantly influenced by the application of MJ. In conclusion, a single pre-harvest application of 1.0 – 5.0 mM MJ emulsion improved the development of red blush, the accumulation of total anythocyanins, and the level of flavonoids in fruit skin, without affecting fruit quality at commercial harvest. Orchard location also had a significant influence on the efficacy of the application of MJ on the development of red blush and on the level of flavonoids in 'Cripps Pink' apple. Abstract from Shafiq et al. 2011. Journal of Horticultural Science and Biotechnology 86 (4): 422-430.