



‘O17-19-1’, An Early Ripening Self-fertile Hybrid for Muscadine Table Grape

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‘O17-19-1’ is an early ripening muscadine breeding line developed in 2011 at the Center for Viticulture, Florida A&M University, by crossing ‘Majesty’ × ‘Ison’. Its fruits ripen in the end of July to early August in Tallahassee, Florida, about 2–3 weeks earlier than most muscadine grapes. This breeding selection is self-fertile, productive, uniform in fruit ripening and fruit size, moderate in vine vigor, and disease resistance. The fruits of ‘O17-19-1’ are attractive with an elongated shape (1.14 L/D) and smooth skins. The fruits average 11.1g, with a sweet, crunchy taste.

Muscadine (*Vitis rotundifolia* Michx.) grape is a multimillion-dollar industry in the southeastern United States. The grapes are grown for processing and the fresh grape or table fruit market. With the steady growth of the industry and market expansion over the past decades, the diversity of muscadine grapes has become more urgent than ever. This is special true for table muscadine grapes, due to more diversified consumers today and the short postharvest shelf life of muscadine grapes. Unlike the cluster harvesting of bunch grapes, muscadine grapes are harvested individually without a stem by detaching the fruit from their stems or rachis. This separation results in either a wet or dry scar on the skin of every fruit. The dry scar fruit used for fresh market have minimal damage to the skin with no apparent juice leaking. Since skin integrity is compromised, the scar could provide an entrance into the fruit for mold pathogens, which could cause fruit to spoil or rot and make storage very difficult. Current table muscadine grapes are overwhelmingly are only a few mid-season ripening cultivars such as ‘Fry’ and ‘Ison’, due to their large fruits, satisfactory yields, and good fruit tasting. This mid-season concentration of production could easily create problems during harvesting season, since it is difficult to use the storage system used with bunch grapes. Because of the short postharvest shelf life nature of muscadine grapes, the muscadine grape industry has been trying to solve this problem through cultivar diversity with different ripening or harvest dates. Unfortunately, the effort has not been successful due to the lack of commercially available cultivars.

To provide the industry with these cultivars, in recent years FAMU’s grape breeding program has been working to develop table muscadine grapes with different ripening dates. ‘O19-17-1’, is a breeding line we developed recently. It possesses four key traits as a table grape: early ripening, self-fertile, large fruit, and high yield. Together with other preferred horticultural characteristics, this breeding line has shown good potential for table muscadine grape industry.

Origin

‘O17-19-1’ originated from the grape breeding program at the Center for Viticulture and Small Fruit Research (CVSFR),

Florida A&M University (FAMU), Tallahassee, FL (30°28’42”N; 84°10’21”W). It is a hybrid of ‘Majesty’ × ‘Ison’ in 2009, which was selected in 2015. ‘Majesty’ is a newly patented (2011) muscadine cultivar developed by the CVSFR which produces very large black-red colored fruits weighing about 3–4 grams more than the largest muscadine varieties. ‘Majesty’ bears female (pistillate) flowers and requires pollinators to set fruits. ‘Majesty’ is a hybrid between ‘Supreme’ (US Plant Pat. No. 7,267) and ‘Triumph’ (unpatented). ‘Ison’ was released by Ison’s Nursery and Vineyard (Brooks, GA) in 1986. It is self-fertile, uniform in ripening, and a leading cultivar for the table muscadine grape industry. It can ripen a few days earlier than other midseason cultivars.

The early ripening trait with larger fruits of ‘O17-19-1’ was first observed in 2014. Its self-fertile flowers were confirmed in 2015 and further evaluation started then. Two leading table cultivars, ‘Fry’ and ‘Ison’, have been compared with ‘O17-19-1’ for major horticultural characteristics.

Evaluations were conducted at the vineyard in the CVSFR. Vines were planted at density of 10 ft in rows and 12 ft between rows, trained into single-wire bilateral cordon system. Vines have been annually pruned with 3~4 buds spur-pruning technics. Commercial vineyard management have been applied to the vines.

Major Characteristics

EARLY UNIFORM RIPENING. ‘O17-19-1’ fruits ripen from late July to mid-August in Tallahassee, FL, which makes it one of the earliest muscadine grapes, if not the earliest. Its harvest period is about 10 days, which is short compared with other muscadine grapes. In comparison, the harvest dates of ‘Fry’ and ‘Ison’ start from late August to early September, which are about two to three weeks later than ‘O17-19-1’ (Fig. 1, Table 1).

FLOWERS. ‘O17-19-1’ bears hermaphroditic (perfect, self-fertile) flowers (Fig. 2). Inflorescences typically grow at the 3rd and 4th nodes; there are about 75 individual flowers in a flower cluster.

FRUIT CHARACTERISTICS. *Larger fruit.* ‘O17-19-1’ fruit averaged 11.1g, which is larger than ‘Ison’ (Fig. 3, Table 2), though the fruits are smaller than those of the gynoecious cultivar ‘Fry’. On the other hand, the self-fertile flower trait may make ‘O17-19-1’ more attractive to the grape industry.

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Table 1. Horticultural characteristics of O17-19-1 and leading table muscadine cultivars in Tallahassee, FL.

Cultivar	Flower	Fruit ripening	Uniform ripening	Vine vigor	Pruning wt [†] (lb/vine)	Internode length (cm)	Internode diam. (cm)	PD score (0–5)	Ripe rot rate (%)
Fry	f [‡]	early Sept.	even	m	7.4	3.8	1.6	0	18.9
Ison	p	end Aug.	even	m–h	10.7	4.1	1.7	0	5.2
O17-19-1	p	end Jul. ~ mid Aug.	even	m	7.1	4.0	1.6	0	5.5

[‡]f = gynoecious (female) flowers; p = perfect flowers.

[†]10-ft canopy vines with single-wire bilateral cordon training system.



Fig 1. Fruit veraison of 'Ison' (left) and fruit ripening of 'O17-19-1' (right) around 1 Aug. 2021.



Fig 2. Self-fertile flowers of 'O17-19-1'.



Fig 3. Fruit of 'O17-19-1' (L), 'Fry' (M), and 'Ison' (R).



Fig 4. Semi-compact clusters and fruits of 'O17-19-1' at harvest.

Fruit SSC. The fruit soluble solid content (SSC) of 'O17-19-1' was 15.5%, which is close to 'Ison' but somewhat lower than 'Fry' (Table 2).

Pleasant taste. 'O17-19-1' fruits have a moderate aroma and a neutral sweet taste with semi-firm flesh texture, edible skin. This produces an overall pleasant taste.

Fruit appearance. The fruits of 'O17-19-1' are attractive with their obtuse-ovate shape (1.14 L/D, Table 2) and smooth skin. The color of 'O17-19-1' fruits is dark purple to near black at peak ripeness with inconspicuous lenticels (Fig. 4).

Fruit dry scar. Average dry scar rate of 'O17-19-1' was 88% from 2018 to 2021, which is similar to 'Ison', but higher than 'Fry' (Table 2).

Ripe rot. The ripe rot rate of 'O17-19-1' was 5.5%, which is close to 'Ison', but lower than 'Fry' (Table 1).

Storage quality. Studies with 'O17-19-1' during a 2-week storage at 75 °F showed that marketable fruits after 1 and 2 weeks in storage were 79% and 34% respectively. This was virtually the same as 'Ison', and much higher than the 48% and 11% marketable yields of 'Fry' (Table 2).

MEDIUM SIZED AND SEMI-COMPACT CLUSTERS. The semi-compact clusters of 'O17-19-1' are mid-sized with eight fruits on average (Table 2, Fig. 4). The semi-compact clusters may allow for better air flow inside the clusters than the very compact ones of most muscadine grapes, which may reduce disease.

Table 2. Productivity and fruit characteristics of 'O17-19-1' and leading table muscadine cultivars in Tallahassee, FL.

Cultivar	Fruits/cluster	Dry scar rate (%)	Yield [‡] (lb/vine)	Fruit shape (L/D)	Fruit size (g)	SSC (%)	TA (%)	Commercial fruit % at 75 °F	
								1 week	2 week
Fry	7.3	81.3	32	0.99	11.8	16.3	0.40	48	11
Ison	10.0	86.0	37	1.10	9.8	15.8	0.45	77	35
O17-19-1	8.0	88.8	31	1.14	11.1	15.5	0.41	79	34

[‡]10-ft canopy vines with single-wire bilateral cordon training system

PRODUCTIVITY. from 10-ft of 'O17-19-1' vines on a single-wire bilateral cordon training system. This is similar to 'Fry', but lower than 'Ison' (Table 2).

GROWTH HABIT. 'O17-19-1' is a moderately vigorous vine. Its shoot internode length and diameter are 4.0 cm and 1.6 cm respectively, which is similar to 'Fry' and 'Ison' (Table 1). The pruning weight from a 10-ft canopy vine of 'O17-19-1' 7.1 lb, which is close to 'Fry', but lower than 'Ison' (Table 1). The shoots of 'O17-19-1' tend to grow horizontally with a somewhat semi-erect growth.

ANNUAL GROWTH CIRCLE. In Tallahassee FL, 'O17-19-1' bud breaks from late March to early April. It blooms in late May, fruit

veraison starts in early July, fruits ripen from late July to early August, and leaves fall in late December.

SYMPTOMS OF DISEASE. Pierce's disease (PD) symptoms have not been observed on 'O17-19-1' vines during the evaluation period, while a few black rot symptoms on leaves could be observed during or after harvest.

In brief, the primary advantage of 'O17-19-1' is early ripening, together with its self-fertile flower, large fruit, and satisfactory productivity that industry always looking for. This breeding line has demonstrated good potential to produce early ripening table muscadine grapes.