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'O42-21-5', a Potential Early Ripening Breeding Selection for Florida Muscadine Grape Industry

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'O42-21-5' is a muscadine hybrid grape from the open pollination of 'O26-1-2' ('Supreme' x 'Ison', 1998) in 2005. The seedling was planted out in 2007. It was noticed in 2012 for its early and uniform ripening. Its horticultural characteristics were further evaluated since 2013. This selection is self-fertile, produce about 60 pounds of fruits per vine, with high dry scar rate, low fruit ripening rot, and uniform fruit ripening. Its dark red fruits ripen in the middle of August at Tallahassee, FL, about 2 to 3 weeks earlier than most of the table muscadine grapes. The average fruit weight is 11.2 g, sugar content (SSC) is 17.2%, with a pleasant, crunchy, and sweet taste.

The grape and wine industries have a nearly $1 billion impact on Florida's economy (SRG, 2010), which are mostly accounted for by muscadine grapes (*Vitis rotundifolia* Michx), as *Euvitis* grapes are limited in Florida by Pierce's disease (PD). Muscadine grapes are grown for fresh fruit market, wine, and juice. The industry has been successful and continues to expand in Florida (FGGA information). As the result, muscadine cultivar improvement has been highly in demand by the muscadine grape industry.

There are hundreds of muscadine cultivars. Currently, the majority of them are not recommended for commercial production as table muscadine grapes in Florida for several reasons including: low or inconsistent yields; small fruit size; poor flavor; disease susceptibility; and low dry scar rate. Several cultivars have been recommended for table muscadine grape industry In Florida (Anderson et al., 2003). The majority of them have pistillate flowers or are female flower vines. As the stamens of pistillate flowers are not completely developed and are non-functional, pollinators are necessary for these flowers to set fruit. This can be inconvenient for growers, and fruit from the pollinator may or may not be of interest to the grower. On the other hand, self-fertile or perfect flowers have functional pistils along with extended stamens and do not need a pollinator to set fruits. They generally have higher and consistent yields compared to vines with pistillate flowers. Therefore, self-fertile cultivars are always preferred by the grape industry.

To accomplish our mission of "improving the quality of Florida's grapes and wines", FAMU's grape breeding program has been working intensively on table muscadine grapes, especially those with self-fertile flowers for the past 20 years. We recently obtained breeding line 'O42-21-5'. It possesses several key traits as a table grape: being self-fertile; having large fruit, good taste, and high yield.

Origin

'O42-21-5' originated from the grape breeding program at the Center for Viticulture and Small Fruit Research, Florida A&M University (FAMU), Tallahassee, FL. It is a decedent of 'O26-1-2' through open pollination in 2005. 'O26-1-2' is a hybrid with pistillate flowers, bred from the cross of 'Supreme' x 'Ison' in 1998, which produces very large dark red fruit. 'Ison' and 'Supreme' are the two of the most recommended cultivars for the table muscadine market, 'Ison' is self fertile, while 'Supreme' is a pistillate flower cultivar. The seedlings were planted out in 2007. It was noticed in 2012 for having large fruit and uniform early ripening. Its horticultural characteristics have been further evaluated since 2013.

Major Characteristics

'O42-21-5' is a self-fertile muscadine breeding line. It produces large fruit with dark red skin (Fig 1). The vine is moderate in vigor, similar to 'Ison', but seems more vigorous than 'Fry' and 'Supreme'. Yields of 'O42-21-5' have been higher than those of 'Fry', 'Majesty', and 'Supreme', a little lower than 'Ison' (Table 1).

Fig 1. O42-21-5 during ripening.

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Table 1. The major characteristics of leading muscadine cultivars and FAMU breeding lines O42-21-5 in 2013–14.

Cultivar	Flower type	Fruit/ cluster	Fruit size (g)	SSC (%)	Fruit width/ length	Dry scar rate (%)	Ripen rot (%)	Yield/vine (ib)	Shoot node length (cm)	Diameter (mm)	Ripening
Ison	self fertile	7.9	8.8	15.0	0.95	84.0	3.1	65.0	5.2	0.62	late August
Fry	pistillate	5.9	10.3	17.0	1.03	78.2	21.9	40.5	4.9	0.55	early September
Majesty	pistillate	5.8	16.5	15.2	---	82.6	6.4	56.3	---	---	early September
Supeme	pistillate	6.7	12.8	14.4	---	81.3	5.6	42.2	---	---	early September
O42-21-5	self fertile	7.2	11.2	17.2	1.03	91.3	1.9	62.3	5.1	0.60	mid August

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Fruit weight averages 11.2 g, which is higher than 'Ison' and 'Fry', but lower than 'Supreme' and 'Majesty'. Sugar content of 17.2%, is similar to 'Fry' and higher than 'Ison', 'Majesty', and 'Supreme' (Table 1). Fruits are attractive in color and have a round shape (Fig 1, Table 1). Fruits taste sweet and crunchy with a pleasant flavor.

Over 90% bulk harvested fruit are dry scar fruit, highest among those evaluated, 'O42-21-5' also showed lowest rot rate for ripe fruit (Table 1).

In Tallahassee, FL, fruits of 'O42-21-5' ripen in the middle of August, which is about 10 days earlier than 'Ison' and 2–3 weeks earlier than other major cultivars of table muscadine grapes. Unripened fruit accounted only 4.2% of total fruit from a once over, lump-sum harvest in 2014. This indicates that this selection has uniform ripening, which is an advantage for commercial production.

Principal Advantages

The principal advantages of 'O42-21-5' are the self-fertile flower, high yield, large fruit size, excellent fruit quality, and uniform early ripening. It appears to have good potential as a table muscadine grape in the future.

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