

Research Summary

Due to its inherent disease and pest resistance, productivity, and sweet flavorful berries, the muscadine grape (*Vitis rotundifolia*, Michx.) remains the most widely grown grape species in the southeastern U.S. The high level of disease resistance in muscades is attributed to an immune system capable of producing various phenolic compounds that enable the plant to fend off infection from fungal pathogens. These same compounds exist in high concentrations in the skins and seeds of muscades and numerous reports demonstrate that they effectively enhance the mammalian immune system when routinely consumed in the diet. Demand for fresh muscadine grapes and muscadine grape products steadily increases as consumer awareness of health benefits derived from consumption of fruits possessing high concentrations of health promoting compounds (nutraceuticals) increases. Currently, about 1/3 of the small fruit breeding, genetics and production research program at the SHL involves research on muscadine grapes, with the remainder focused on blueberries. The muscadine breeding program utilizes conventional breeding methods and is primarily focused on the development of improved cultivars for the fresh market. Germplasm utilized in breeding include wild accessions, elite breeding lines developed at the SHL., Univ. of FL., Univ. of GA., NCSU, and a large collection of named cultivars. Desirable traits being incorporated into new fresh-market types include the traditional properties of disease resistance, productivity, and high fruit quality. Improvements are also being made in eating quality (thinner skins, crisp pulp and fewer and smaller seed), enhanced nutraceutical properties. Typically fresh-market muscadine grapes are harvested individually as they ripen which contributes to poor shelf-life which is a major barrier to expanding their marketability. Strains with even-ripening clusters and intended to be cluster-harvested will substantially improve storage quality in comparison to individually harvested berries. The complex hybrid MS 12-115 (Fig. 1) and the cultivar 'Eudora' (Fig. 2) are examples of cluster harvested muscades developed at the SHL, and currently there are at least three elite fresh market muscadine selections being increased for patenting and release.



Muscadine Pruning Study 2010

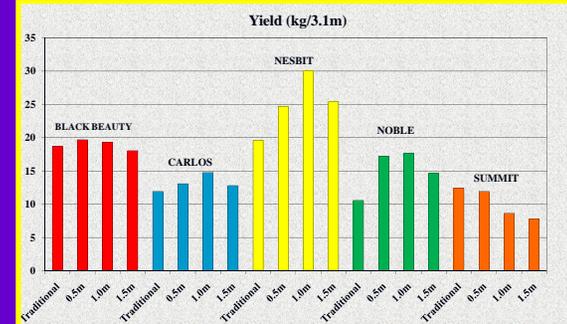
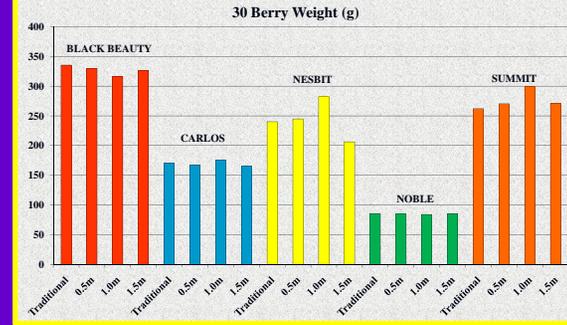
Performance of Muscadine Cultivars

Table 1. Skin color, flower type, vine vigor, berry rot resistance, berries per cluster, harvest date, and yield of muscadine grapes grown at the Mississippi State University, MAFES, McNeil Unit, McNeil MS (2001, 2002 and 2006).

Cultivar	Berry Skin color	Flower type	Vine vigor	Berry rot resistance	Berries per cluster	Yield (kg/vine)
Alachua	Blk	SF	234	6.88 d*	6.76 k-n	11.33 h-k
Albermarle	Blk	SF	234	7.63 b-c	8.25 b-c	8.24 p-s
Black Beauty	Blk	SF	233	5.00 m-n	5.53 m-n	8.60 t
Burgaw	Rd Blk	SF	237	5.63 l-m	6.38 l-f	7.46 r-s
Carlos	Brz	SF	235	7.89 b	6.75 e-g	5.90 g-l
Conard	Blk	SF	231	7.63 b-c	7.88 a-b	10.04 k-m
Darlene	Brz	P	230	6.25 f	6.38 l-f	6.13
Dearing	Gr Brz	SF	239	5.88 h-l	8.50 m-o	5.63 g-h
Dora	Blk	SF	237	7.25 d-e	6.76 e-g	5.88 h-l
Doveland	Brz	SF	240	5.38 k-m	4.63 q	5.00 j-r
Doreen	Brz	SF	237	6.00 h-k	6.25 g-k	5.63 g-h
Duffcut	Blk	P	227	5.63 l-m	6.00 l-m	7.63 e-e
Eudora	Blk	P	235	7.75 b	7.63 b-c	8.00 b-c
Fry	Brz	P	234	5.25 l-n	3.77	3.88 n
Higgins	Rd Brz	P	234	5.83 h-l	4.25 p-r	3.75 m
Hunt	Blk	P	235	5.50 j-m	4.75 p-r	6.63 f
Iron	Blk	SF	235	6.88 d-f	6.88 d-f	7.75 e-e
Janebell	Brz	SF	232	5.83 h-l	6.00 o-c	4.25 k-m
Jumbo	Blk	P	234	6.50 e-h	6.51 h-l	7.25 e
Magnolia	Blk	SF	230	6.13 q	5.00 e-e	2.63 n
Nesbit	Blk	SF	231	7.00 c-e	6.76 e-g	8.25 p-r
Noble	Blk	SF	232	7.38 b-d	6.38 l-f	8.00 b-c
Polyanna	Blk	SF	237	7.00 c-e	6.88 d-f	8.00 b-c
Redgate	Pk Brz	SF	236	6.75 e-g	6.13 h-l	6.75 e-g
Roseacke	Brz	SF	236	6.38 e-h	6.75 e-g	4.75 k
Scuppernon	Blk	SF	235	4.83 n	4.83 p-d	4.13 m
Southern Home	Blk	SF	239	8.75 a	6.38 l-f	8.63 f
Southern	Blk	SF	234	6.88 d-f	7.38 b-d	7.88 e-e
Stirling	Brz	SF	237	7.89 b	6.00 o-c	6.00 o-c
Summit	Blk	SF	230	6.75 e-g	6.38 l-f	6.00 o-c
Sweet Jenny	Brz	P	232	4.63 n	4.88 p-d	4.25 k-m
Tara	Brz	SF	235	7.00 c-e	6.88 d-f	5.5 g-h
Triumph	Blk	SF	237	6.88 d-f	6.13 h-l	7.42 e-e
Triumph	Rd Brz	SF	232	6.13 q	6.63 l-m	5.75 g-h
Watergate	Brz	SF	233	7.00 c-e	6.63 l-m	4.38 k-n
Weiser	Brz	SF	235	7.63 b-c	7.25 e-g	4.75 k

Table 2. Berry weight, seeds per berry, percent dry picking scar, pH, percent soluble solids, and firmness of muscadine grape cultivars grown at the Mississippi State University MAFES, McNeil Unit, McNeil MS (2001, 2002 and 2006).

Cultivar	Berry wt. (g)	Seeds per berry	Dry Scar (%)	pH	Soluble Solids (%)	Firmness (g/mm ²)	Fresh Eating Quality
Alachua	6.69 i-k*	3.30 l-m	85.56 a-b	3.77 d-g	16.86 g-j	250.67 e-h	6.13 h-j
Albermarle	5.81 l-m	3.66 h-l	81.00 b-d	3.66 h-l	18.81 a	267.14 c-e	6.50 k-m
Black Beauty	14.68 a	3.42 k-n	45.76 c-d	3.83 e-e	17.71 c-d	239.84 d-f	8.25 p-r
Burgaw	3.25 n	3.74 b-l	71.1 c-d	3.39 m-n	16.09 f-j	261.84 d-f	6.25 m-h
Carlos	5.74 k-m	3.73 b-l	89.67 a-b	3.45 k-n	14.63 k-n	228.49 h-l	4.88 k-k
Conard	7.13 j	3.33 e-l	70.66 c-d	3.53 e-e	16.39 f-j	221.50 j-m	6.25 m-h
Darlene	14.63 a	3.79 b-l	58.53 k-m	3.61 e-l	17.35 b-c	156.39 n-o	6.38 i
Dearing	3.47 n	3.71 q	69.81 c-d	3.62 g-l	18.24 a-b	300.57 a-b	6.75 l
Dora	6.08 k-l	3.67 g-l	49.58 m-p	4.08 a	18.63 a	248.46 e-l	6.38 l-m
Doreen	4.66 n	2.90 q-r	78.67 b-c	3.43 l-n	17.85 a-d	206.39 l-o	6.63 k-m
Duffcut	3.10 o	2.37 q	55.55 j-n	3.52 j-m	17.31 b-e	263.78 c-e	6.63 k-m
Eudora	3.62 d-e	3.22 m-n	63.53 i-k	3.65 f-l	17.83 b-e	155.61 r	7.51 b-c
Fry	11.25 c	2.93 q-r	38.69 q-r	4.03 a-b	18.24 h-l	177.00 p-r	7.13 c-d
Higgins	9.53 e-f	3.09 m-o	60.42 g-l	3.41 m-n	14.33 l-n	181.15 o-q	3.75 r
Hunt	4.59 p-r	3.41 n	29.74 s	3.38 m-n	19.22 f-f	167.17 r	4.63 o-q
Iron	7.68 h-l	3.66 h-l	67.50 e-e	3.70 e-l	16.53 e-h	233.67 g-k	6.25 m-h
Janebell	6.43 g-h	3.58 g-l	51.58 j-o	3.79 f-l	14.97 j-m	177.31 p-r	6.75 l
Jumbo	10.36 e-f	3.73 f-l	69.74 k	3.60 h-k	16.09 f-j	303.57 a	4.63 o-q
Magnolia	5.47 l-m	3.47 h-l	57.33 j-m	3.64 f-l	14.93 j-m	134.13 s	3.88 r
Nesbit	8.79 e-g	3.53 e-l	62.75 k	3.95 e-e	16.01 f-j	260.33 d-f	6.13 h-j
Noble	3.64 n	3.45 n-l	26.42 s	3.68 e-l	16.31 g-l	277.68 c-d	4.38 p-q
Polyanna	5.17 e-e	3.42 m-l	65.83 i-l	3.74 e-l	16.75 d-g	216.02 j-m	7.25 e
Redgate	4.83 m	3.63 e-l	52.50 k-o	3.68 e-l	14.68 k-m	181.01 j-m	6.75 k-m
Regale	4.82 m	3.62 k	35.71 r	3.34 m-n	13.54 n	211.49 k-o	4.75 o-p
Roseacke	5.18 e-e	3.74 e-l	54.53 k-o	3.68 f-l	13.89 m-o	268.93 h-l	4.63 o-q
Scuppernon	5.08 m	3.42 j-m	76.67 b-e	3.24 o	16.48 h-k	172.99 q-r	4.63 o-q
Southern Home	6.62 j-k	3.86 a-c	58.00 l-m	3.69 e-l	15.88 g-l	250.67 e-h	6.38 l-m
Southern	4.63 n	3.11 l-l	59.53 k	3.41 m-n	17.23 b-c	248.63 e-h	6.38 l-m
Stirling	5.14 m	3.47 h-l	56.33 j-m	3.90 b-d	16.03 a-c	223.97 q-r	4.75 o-p
Summit	9.30 e-g	2.87 p	60.83 g-l	3.83 e-e	16.53 e-e	233.51 g-k	8.00 a-b
Sweet Jenny	4.83 m	3.15 l-l	48.42 f-g	3.87 e-e	16.63 e-h	237.01 g-l	7.89 a-d
Tara	10.42 c-d	3.27 l-l	77.67 b-d	4.03 a-b	16.24 j-l	303.57 a	7.00 d-f
Triumph	2.76 n	3.91 a-b	70.55 c-f	3.48 k-n	16.00 j-m	286.59 b-c	6.25 m-h
Triumph	6.51 f-g	3.73 f-l	47.76 p-r	3.94 e-e	16.55 h-k	207.34 c-e	6.88 e-l
Watergate	4.51 m	3.14 l-l	60.00 b-l	3.68 f-l	16.31 g-l	163.44 t	2.75 s
Weiser	4.88 m	3.67 h-l	69.08 d-h	3.51 j-m	14.93 j-m	212.13 k-o	4.28 q-r



Periodic evaluations comparing the performance of muscadine cultivars provide valuable information to growers involved in selecting cultivars best adapted for their particular locations and best suited for their usages. Such evaluations are also valuable to breeders selecting materials to include in gene pools for various traits that may include disease resistance, ripening uniformity and period, fruit quality, productivity, etc. Studies conducted at the Mississippi State University Experiment Station, McNeil MS provide information most pertinent to growers in the Gulf-coast region of the U.S. (Tables 1, 2).

Additional research is underway to evaluate cultural practices associated with muscadine grape production. One example is that little information is available on cultivar-specific pruning methods for obtaining optimum yields. Preliminary research is demonstrating that yield of some cultivars such as Noble, which is widely grown for the wine/juice market, may be dramatically increased by leaving shoots spaced at 0.5 to 1.0 m during pruning (Fig. 3), while other cultivars (ie. Carlos, Black Beauty) show no increased production (Fig. 4).