

# MUSCADINE BREEDING OUT OF THE SWAMP AND ONTO YOUR TABLE.



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# *Vitis rotundifolia* – America's first grape.

‘swamp grapes’, ‘muscadines’, ‘Scuppernongs’, ‘bullace’, ‘fox grapes’

- *Muscadinia*

- *V. rotundifolia*
- 40 chromosomes

- *Euvitis*

- *V. vinifera* – wine grapes
- *V. labrusca* – concord grapes
- 38 chromosomes



# Native Muscadines

- Found growing wild throughout the Southeast.
- Excellent regional adaptation.
- Muscadine was the first domesticated American grape.





# First Cultivars - Wild selections

## Female vines

- 'Scuppernong'
- 'Thomas'
- 'Flowers'
- 'Mish'
- 'James'
- 'Memory'

## Male vines

- 'White Male #1'
- 'Black Male'

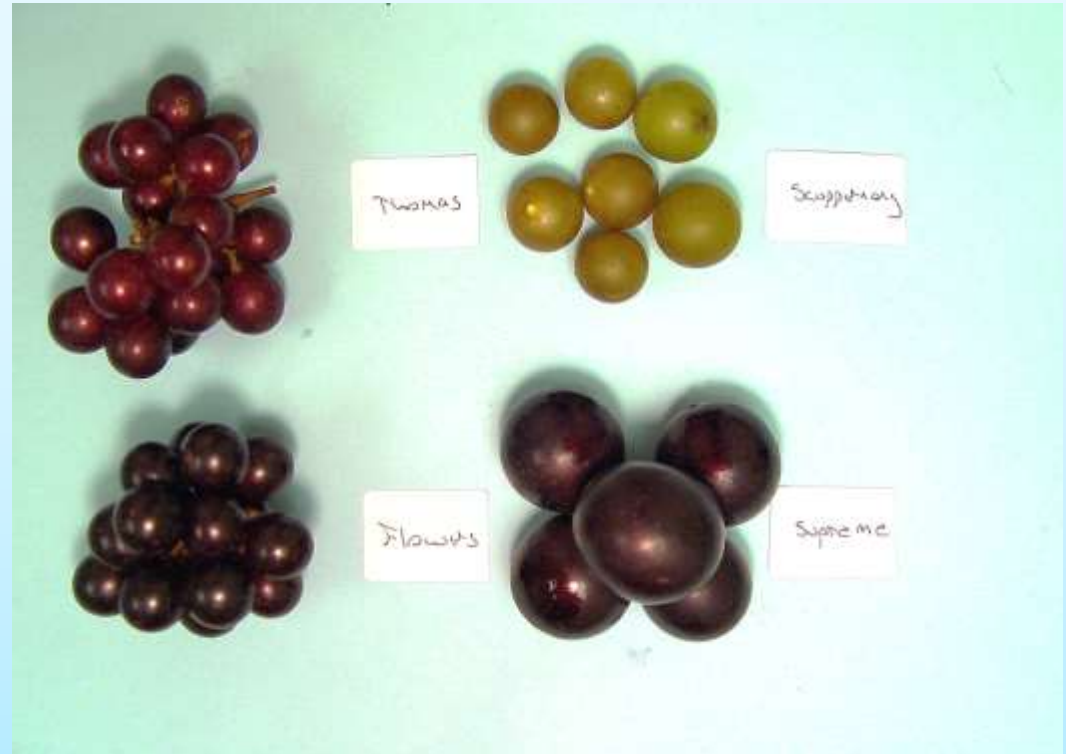


Fig. 9.—Scuppernong vines trained on an overhead arbor.

'Scuppernong' was the dominant cultivar from 1750-1947.

# History of the UGA muscadine program

First era: 1909-1938

H.P. Stuckey and J.G. Woodroof

- 3 female vines and 2 male vines used as parents.
- 13 cultivars released (1917-1938).
- Selected for yield, sweet tender pulp, and non-shattering berries. Often cluster picked.
- 'Hunt', 'Dulcet', 'Yuga', 'Creek' most important cultivars.



'Hunt'



'Yuga'

# History of the UGA muscadine program

Second era: 1951-1968

Breeder - B.O. Fry

'Fry', 'Cowart', 'Higgins', 'Jumbo'

- Selected for large size, bronze color, high soluble solids.

'Fry' most important fresh use cultivar developed,

9.3 g / berry.

Bronze

Large Size

High soluble solids

Good green flavor



'Fry' - 1971



# Perfect flowered cultivars developed.



Male



Perfect



Female

'Cowart', first perfect flowered cultivar  
with good fruit quality released.



# History of the UGA muscadine program

Third era: 1969-1996

Breeder - R. P. Lane

- Wanted large berry size of 'Fry' combined with perfect flowers.
- Needed a dry stem scar so they could be packed for supermarket.
- 'Triumph' – bronze perfect flowered.
- 'Tara' – large size with perfect flowers.





# Current UGA muscadine program

2004 -

Breeder – P. Conner

- Program moved to Tifton from Griffin in 1999.
- Working closely with Paulk Vineyards, the world's largest muscadine grower in the trial of new selections.
- Emphasis on improved fresh-market muscadine cultivars.

All new releases will have perfect flowers.

Yield of female vines reduced due to “cap-stick”, smaller cluster size, lack of pollination.





# Short-range goals of the program

- Very large berry size with perfect flowers.
  - Bronze and black color.
  - Early, mid, and late-season harvest.



Lane  
10.9g

Paulk  
15.0g

Supreme  
14.7g

# Short-range goals of the program

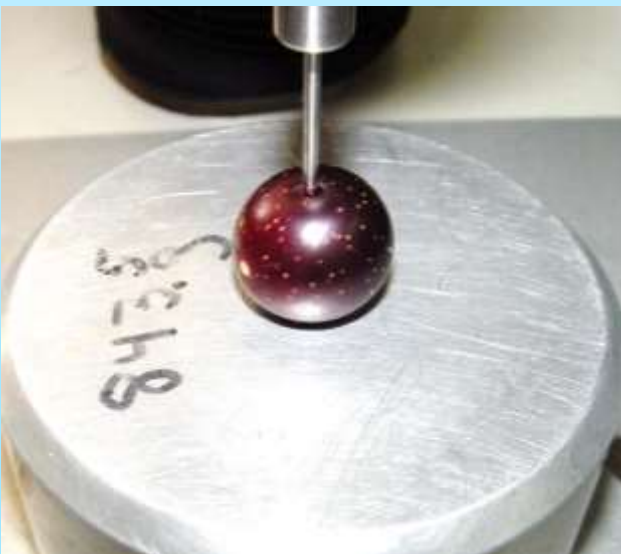
- Red berry color.
  - Flavor also seems unique.
  - Requires shelf space in market.





# Mid-range goals of the program

- Improved fruit texture
  - Firm crisp flesh.
  - Tender skin with neutral flavor.



# Long-range goals of the program

- Seedlessness
  - Only available in *V. vinifera*.
  - Stenospermocarpic – seeds abort when small.
  - Eat-it-all fruit for fruit mixtures, salad bars, etc.





# Questions?



# ‘Lane’ muscadine

‘Lane’ has moderate yields and can split at the stem scar. We currently recommend planting ‘Lane’ for early season black production and transitioning into ‘Supreme’ for main season black production.





# ‘Hall’ muscadine

‘Hall’ has good yields with very low stem scar split and tear.

‘Hall’ berries are similar to ‘Tara’ with a better flavor and higher brix.





# ‘Paulk’ muscadine

- Self-fertile flowers with a size similar to female cultivars.
- Main-season self-fertile replacement for ‘Supreme’.
- Excellent storage ability.
- Excellent picking scar.



# Up Next - Ga. 8-1-338 muscadine.

- Attributes
  - Red berry colors
  - Perfect flowers
  - Large berry size
  - Thin skin







Questions?



# Desirable Traits for a New Muscadine Cultivar

## 1. Good flavor: flesh and skin.

Ideally will have good flavor even when picked before fully ripe. Skin should break up when chewed and lack bitter and sour flavors.



# Desirable Traits for a New Muscadine Cultivar

## 2. Self-fertile flowers

Yield of female vines reduced due to “capstick”, smaller cluster size, lack of pollination.

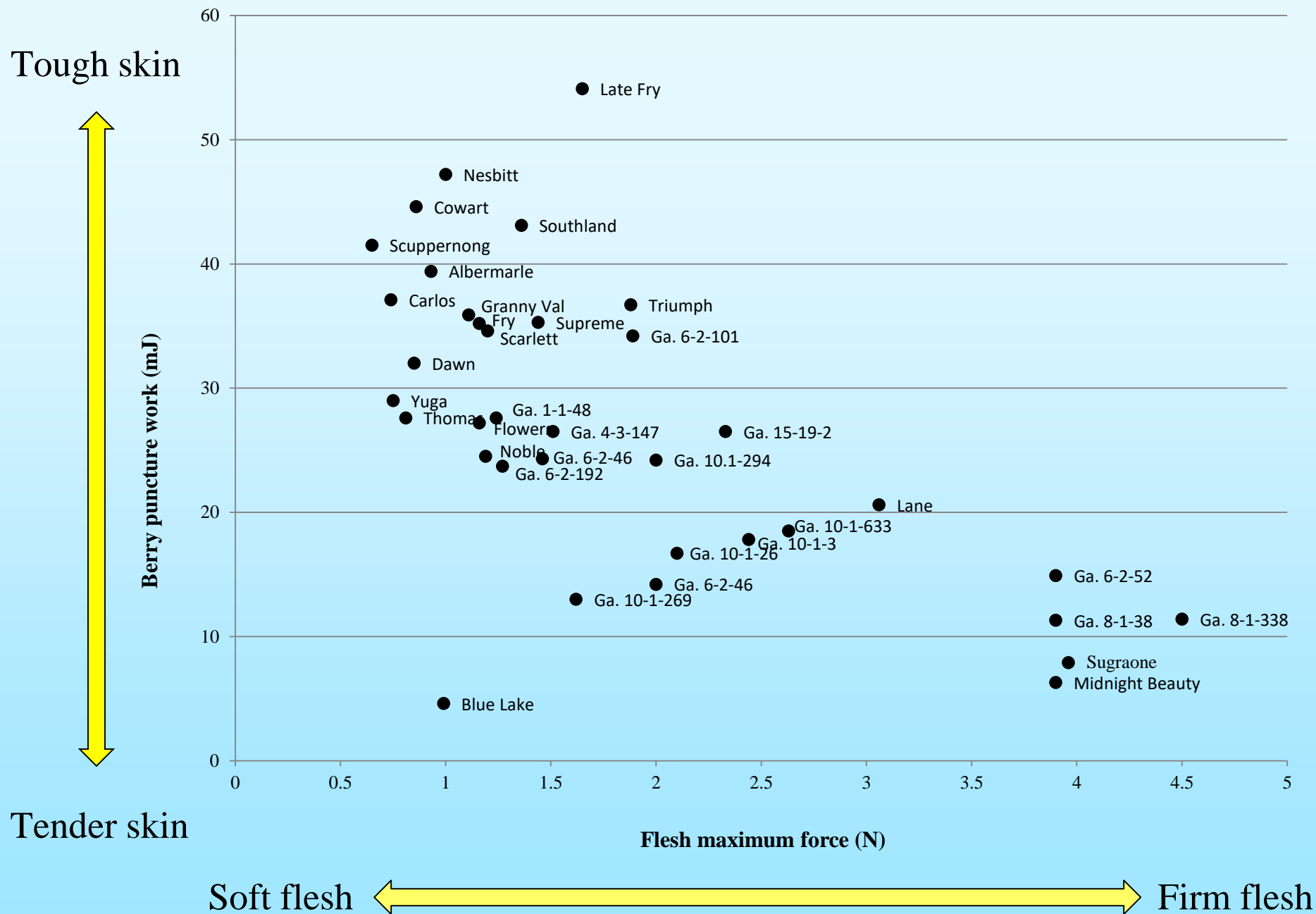


# Mid-range goals of the program

- Improved fruit texture
  - Firm crisp flesh.
  - Friable skin.







# Current Goals of the Program

- Very large berry size with perfect flowers.
  - Need to replace all female cultivars.

## Avg. % full crop 2004-2008

- |                        |                          |
|------------------------|--------------------------|
| • Pistillate cultivars | • Self-fertile cultivars |
| – Fry – 70             | – Alachua - 100          |
| – Supreme – 90         | – Cowart – 90            |
| – Sweet Jenny – 50     | – Nesbitt – 100          |
| – Pam – 60             | – Pollyanna – 80         |
| – Scarlett – 30        | – Tara – 90              |
| – Darlene - 40         | – Triumph - 100          |

# Desirable Traits for a New Muscadine Cultivar

## 3. Large berry size

- Self-fertile cultivars are usually smaller than female cultivars, but more consistent in size.
- Minimum = 10-11 grams, 1 inch diameter



'Supreme'  
14.7 g

Ga. 5-1-38  
13.9 g



# Desirable Traits for a New Muscadine Cultivar

## 4. Dry stem scars and firm flesh.

Torn and split berries are often juiced rather than packed. Often juice up to 1/3 of cultivars with wet scars.



Split scar

# Desirable Traits for a New Muscadine Cultivar

## 5. Vigorous, disease resistant vines.

Much easier in purple varieties.



# Short-range goals of the program

- Very large berry size with perfect flowers.
  - Bronze and black color.
  - Early, mid, and late-season harvest.
  - Two cultivars for each category.



Lane  
13.9g

Ga. 6-2-26  
15.0g

Supreme  
14.7g



# Short-range goals of the program

- Red berry color.
  - Flavor also seems to vary.
  - Requires shelf space in market.

## HPLC analysis

Low total anthocyanins (400 ug/g)

High % Cyanidin (60%)

Low % Delphinidin (20%)





# Muscadine Breeding Techniques





Muscadine seedlings have vigorous growth.





Flowering begins in  
2<sup>nd</sup> year.

Turnover seedling  
vineyard in 3-4  
years.













- Yield trials take place on UGA farms and with Paulk Vineyards.
- Observational trials throughout the Southeast.

