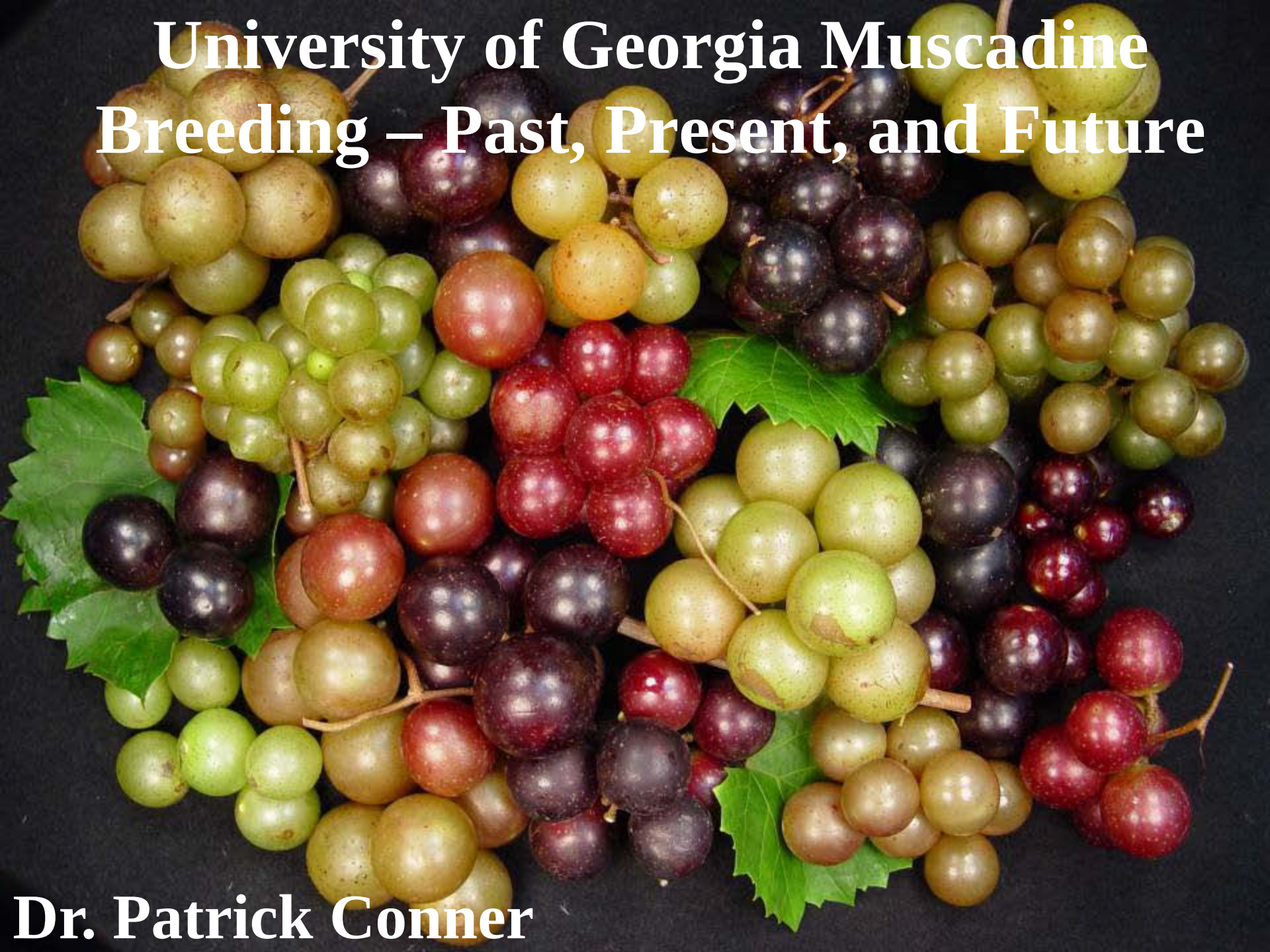


University of Georgia Muscadine Breeding – Past, Present, and Future

Dr. Patrick Conner

Vitis

- *Muscadinia*
  - *V. rotundifolia*
  - *V. munsoniana*
  - *V. popenoei*
    - 40 chromosomes
    - unbranched tendrils
    - berries abscise from cluster
    - berries have thick skin and fruity aroma

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

Muscadine Production

1. Georgia – 898 acres
2. North Carolina – 662 acres
3. Mississippi – 600 acres
4. Florida – 551 acres
5. South Carolina – 498 acres

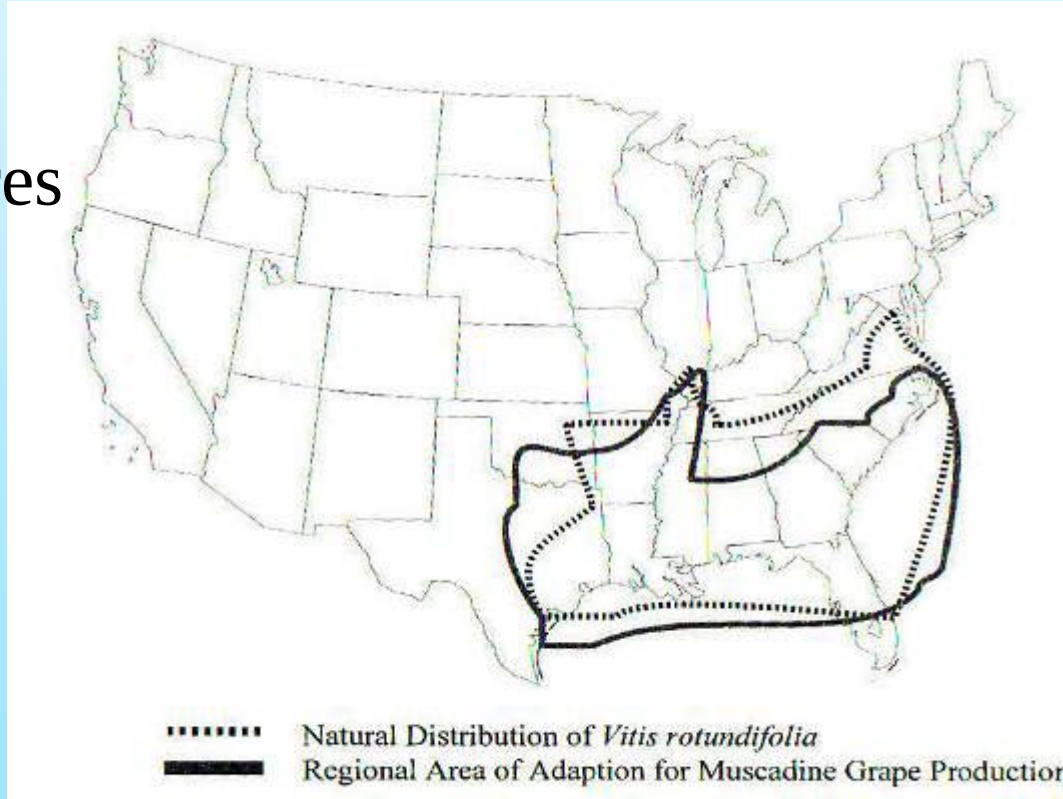


Fig. 1-2. Distribution of wild and cultivated muscadines.

Native Muscadines

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

"In all of the world the like abundance of this grape is not to be found"
-Amadas and Barlowe, 1584.

Scuppernong or Muscadine?

Scuppernong – from the scuppernong river in North Carolina. Refers to a particular cultivar of bronze grape that was widely planted in that region.

Muscadine – should refer to all *V. rotundifolia* grapes of which 'Scuppernong' is one cultivar. Often used to refer to black colored varieties.

'Scuppernong' muscadine

Mother Scuppernong

- Planted in 1584 (1770's?) in the Roanoke colony, still alive and producing.

Early Production – Muscadine Wine

- Very popular from 1809 – 1919, never recovered after prohibition and development of California *vinifera* industry. 'Virginia Dare' was the most popular wine in U.S. in that period.

"Show me the way to your homes" says Virginia Dare. "So you folks can enjoy the only wine of its kind in the world".

First Cultivars - Wild selections

Female vines

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

Male vines

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

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

Several different 'Scuppernong' cultivars likely exist.

History of the UGA muscadine program

First era: 1909-1938

H.P. Stuckey and J.G. Woodroof

'Hunt'

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

'Stuckey'

History of the UGA muscadine program

Second era: 1951-1968

B.O. Fry

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

- Selected for large size, bronze color, high soluble solids.
- 'Higgins' created – source of large size in most muscadine cultivars.
- Lower vine vigor and increased susceptibility to fruit rots.

'Higgins' - 1955

'Fry' muscadine

'Fry' most important fresh use cultivar developed,

9.3 g / berry.

Bronze

Large Size

High soluble solids

Good green flavor

Fruit rot susceptible

Female

'Fry' - 1971

Perfect flowered cultivars developed.

Male

Perfect

Female

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

Pedigree for Supreme

- Supreme
  - Black Fry
    - Fry
      - Ga 19-13
        - Higgins
        - Ga 20-38
      - USDA 19-11
        - Dulcet
        - USDA 27-9B
    - Cowart
      - Higgins
        - Yuga
        - White Male
      - Ga 28
        - Dulcet
        - Burgaw
  - Dixieland
    - Fry
      - Ga 19-13
        - Higgins
        - Ga 20-38
      - USDA 19-11
        - Dulcet
        - USDA 27-9B
    - Ga 29-49
      - Higgins
        - Yuga
        - White Male
      - Ga 1
        - Hunt
        - Tarheel

History of the UGA muscadine program

Third era: 1969-1996

R.P. Lane

- Wanted large size of 'Fry' combined with perfect flowers.
- 'Triumph' – bronze perfect flowered.
- 'Summitt' – female with higher productivity than 'Fry'.
- 'Tara' – large size with perfect flowers.
- 'Scarlett' – new red color.
- 'Golden Isles' – juice grape with less pronounced muscadine taste

Most of these cultivars feature 'Fry' heavily in their pedigree.

Scarlett

Summitt

Fry

Ga. 19-13

Higgins

Ga. 20-38

Dulcet

USDA 19-11

USDA 27-9B

Yuga

Higgins

White Male

Ga. 29-49

Hunt

Ga. 1

Tarheel

Triumph

Fry

Ga. 19-13

Higgins

Ga. 20-38

Dulcet

USDA 19-11

USDA 27-9B

Yuga

Higgins

White Male

Ga. 29-49

Hunt

Ga. 1

Tarheel

Future of the UGA muscadine program

Moved to Tifton - 2000

- Expanding genetic base by incorporating new unrelated germplasm.
- No sprays on seedlings to select for fruit rot resistance.
- Expanded numbers of seedlings (2,000/year).

Muscadine seedlings have vigorous growth.

Flowering begins in 2nd year.

Turnover seedling vineyard in 4-5 years.

Current Goals of the Program

- Very large berry size with perfect flowers.

'Supreme'
14.7 g

Ga. 5-1-38
13.9 g

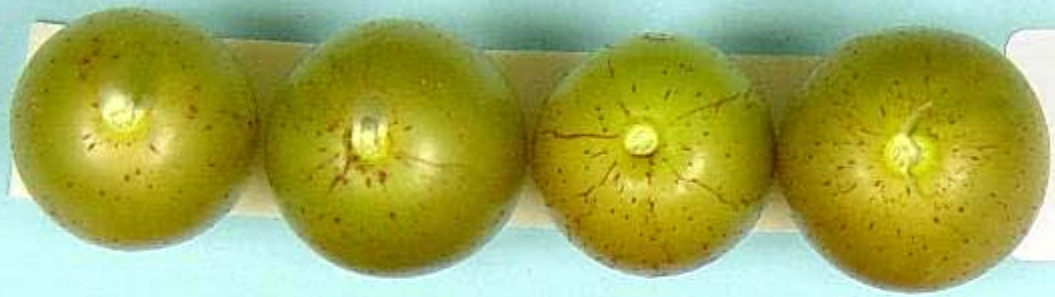
Current Goals of the Program

- Altered harvest dates, earlier and later.

Supreme – Mid August

Ga. 5-1-45 – First week August

Dry stem scars.



Fry

Tara

Ga 6-2-27

Superior eating quality.

Thin edible skins, small seeds, crisp soft pulp.

Ga. 1-6-2
'Scarlett' x 'Tara'

Ga. 1-11-61
'Scarlett' x Ga. 15-20-1

Fry

Summitt

Ga. 29-49

Scarlett

Fry

Triumph

Ga. 29-49

Ga 1-6-2

Fry

Summitt

Ga. 29-49

Tara

Fry

Triumph

Ga. 29-49

New colors

Ga. 1-6-14 'Scarlett' x 'Tara'
Light red fruit

Ga. 6-2-140 x 'Tara'
Champagne color fruit

Ga. 5-1-34
Dark red fruit


Ga 6-2-140
Tara
Fry

Ga.1-1-67

Fry x Tara

Oval shape

Fruit rot resistance

–ripe rot, *Glomerella cingulata*

–macrophoma rot, *Botryosphaeria dothidea*

–bitter rot, *Greeneria uvicola*

Purple fruited cultivars seem more resistant in general.
Thin skins may increase susceptibility to beetle damage and fruit rots.

Ga. 2-8-10
'Pam' x 'Southland'

'Golden Isles'

Euvitis x *Muscadinia* Hybrids – Expanding the germplasm

Possible traits from *Euvitis*

- Fruit rot resistance
- Stable juice color
- Earlier ripening
- Improved berry flesh
- Larger clusters

NC B4-50

Dearing, 1917 *V. rotundifolia* x Black Morocco (*V. vinifera*)

Euvitis x *Muscadinia* Hybrids

'Southern Home'

J. Mortensen

V. rotundifolia
V. munsoniana
V. popenoei
V. vinifera

‘Southern Home’ is reported to be highly resistant to ripe rot, bitter rot, and black rot, and has shown no symptoms of Pierce’s disease (*Xylella fastidiosa*).


1-23


Tara