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VIRTUAL MUSCADINE CONFERENCE 2021

**Evaluation of Cane vs. Spur Pruning in
Razzmatazz**

Mark Hoffmann – NC State University

Evaluation of Cane vs. Spur Pruning in Razzmatazz



Ervin Lineberger

Killdeer Farms, Kings Mountain, NC

January 27, 1940 – January 3, 2021



- We had two trials at Killdeer Farms in 2019/20
- Unfortunately, due to severe cold damage, we only could collect data on one trial: Evaluation of Cane vs. Spur Pruning in Razzmatazz

Evaluation of Cane vs. Spur Pruning in Razzmatazz

- Cordon/Spur on mature Razzmatazz. 100buds/vine



Evaluation of Cane vs. Spur Pruning in Razzmatazz

- Head/Cane on mature Razzmatazz. 100buds/vine



Evaluation of Cane vs. Spur Pruning in Razzmatazz

- Cordon/Cane



Data from 2019/2020

- please keep in mind: Cold Damage has caused severe die-off (40% of plants were lost in the trail, and many were damaged)
- We re-established the trails at Union Grove Farms in Chapel Hill

Treatment	Yield (g/vn)	Berry Wght (g)	Cluster Wght (g)	Brix (TSS)
Cordon/Spur	429b	0.81b	22.75b	17.6ns

Trials this year

- Re-established pruning trails at Union Grove Farms in Chapel Hill
- Established flower removal trial at Union Grove Farms in Chapel Hill



Thank You

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Penelope Perkins-Veazie

- Penelope_perkins@ncsu.edu
- Professor, North Carolina State University
- Postharvest Physiology, Fruits and Vegetables, mostly cucurbits, tomatoes, and berries (strawberry, blackberry, blueberry, raspberry, grapes)

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**Fresh market storage life of seeded and
seedless grape storage life and pigments**

Penelope Perkins-Veazie North Carolina State University

**NC STATE
UNIVERSITY**

Project Plan

- Obtained commercially grown, cooled fruit
- Transported about 1 h to Kannapolis
- Stored at 3 C for 21-28 days
- Types: Bronze (3 seedless, 4 seeded)
Purple (1 seedless, 4 seeded)
- Rated for mold, leak, wrinkle, scar tear
- Composition (Brix, acidity, pH)
- Anthocyanin and phenolic profiles

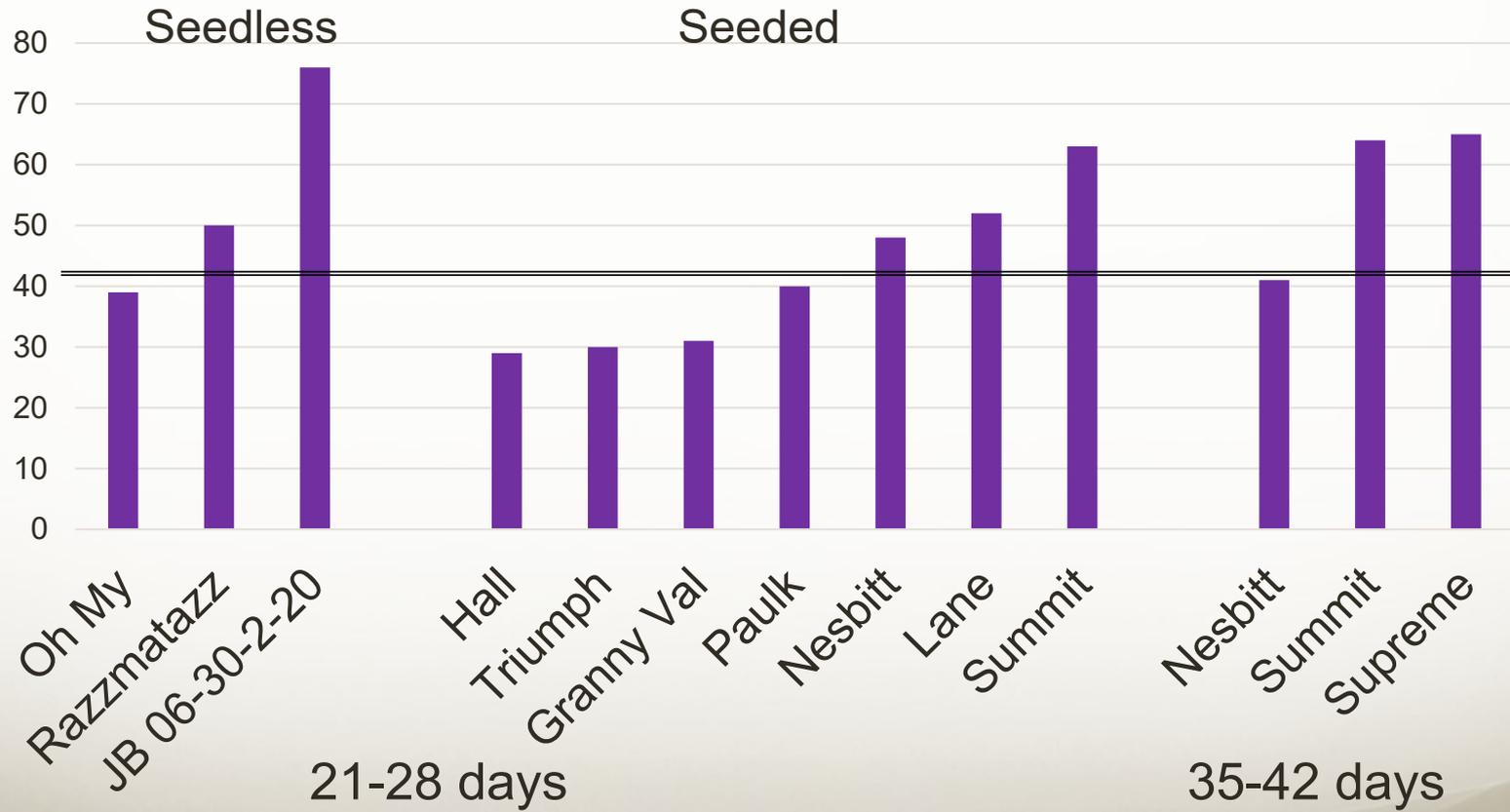
Fresh Market Varieties used

<u>Seedless</u>		<u>Seeded</u>
	Bronze	
Oh My		Triumph
JB 06-30-02		Granny Val
JB 09-15-3-9		Hall
		Summit
	Purple	
	(not used in storage)	
JB0 8-38-1-10		Lane
		Paulk
RazzMaTazz (red)		Supreme
		Nesbitt

All grapes grown, packed, cooled at Kildeer Farm, Cherryville NC

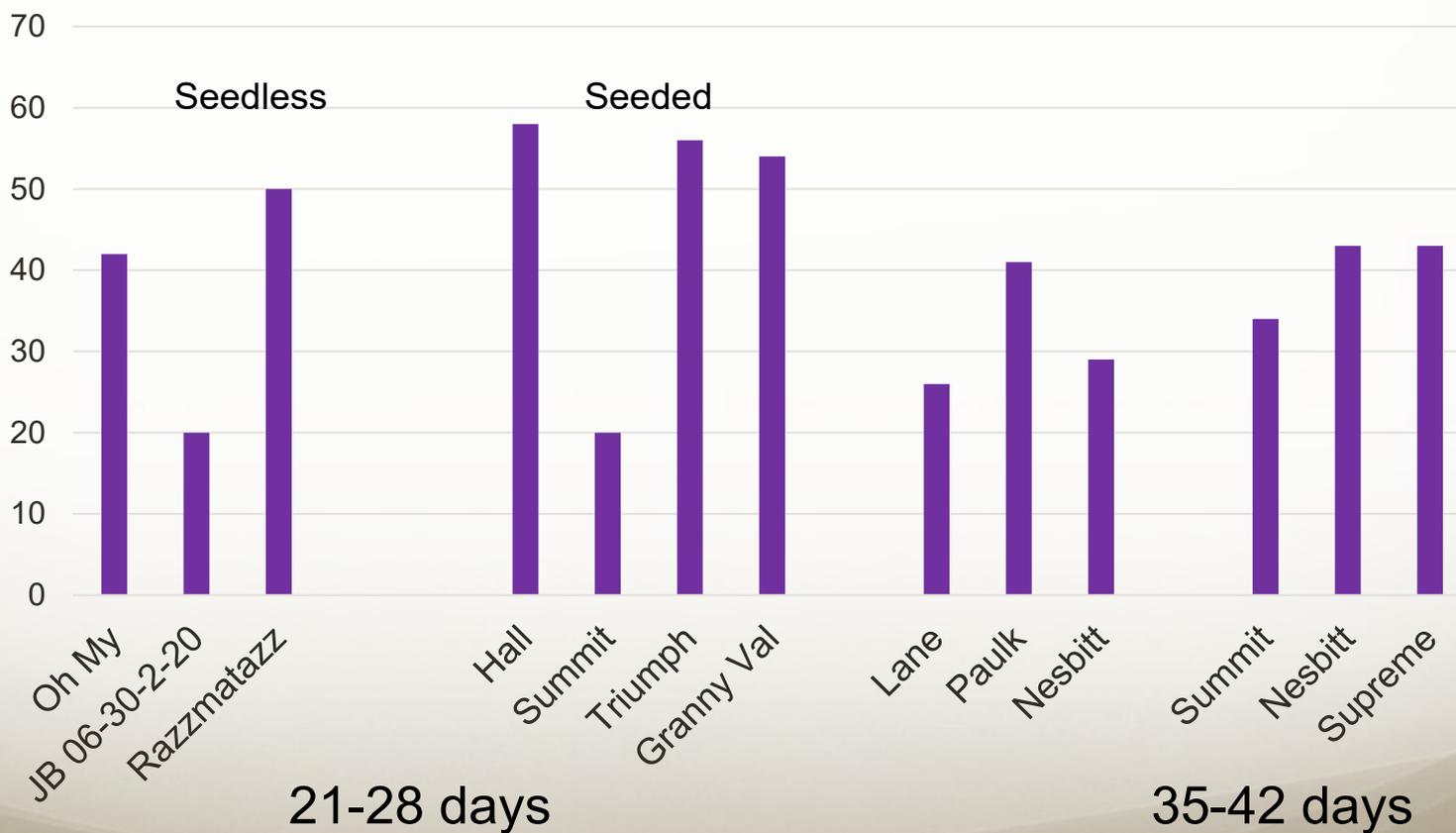
Storage index (based on no. mold, leak, soft grapes)

Storage Index (>40 is better)

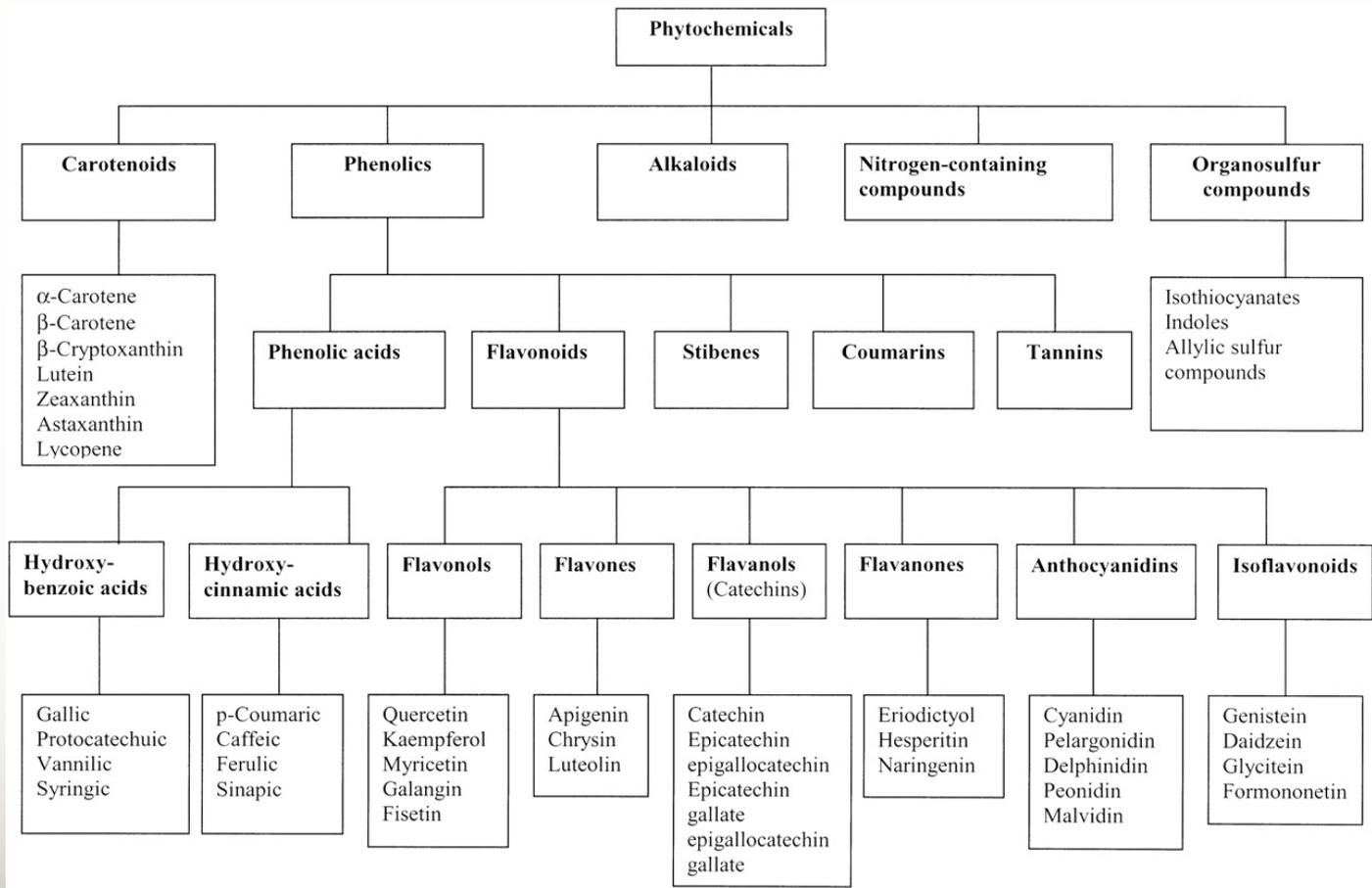


%Soft grapes after storage at 37 F for 21-42 days

% Soft grapes (want to keep below 20%)

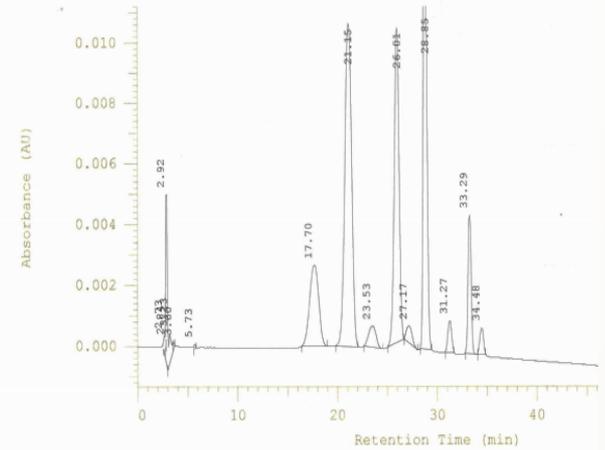
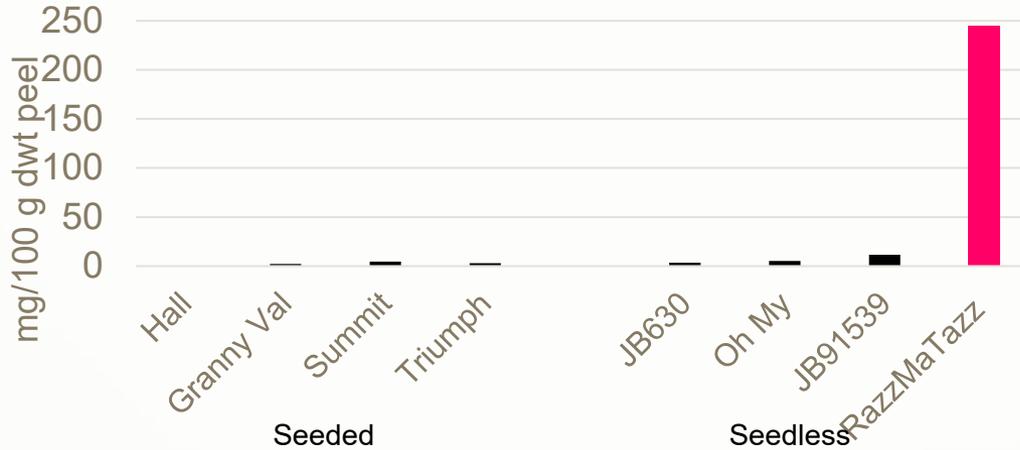


Phenolics, anthocyanins etc



Anthocyanins

Total anthocyanin Bronze and Red

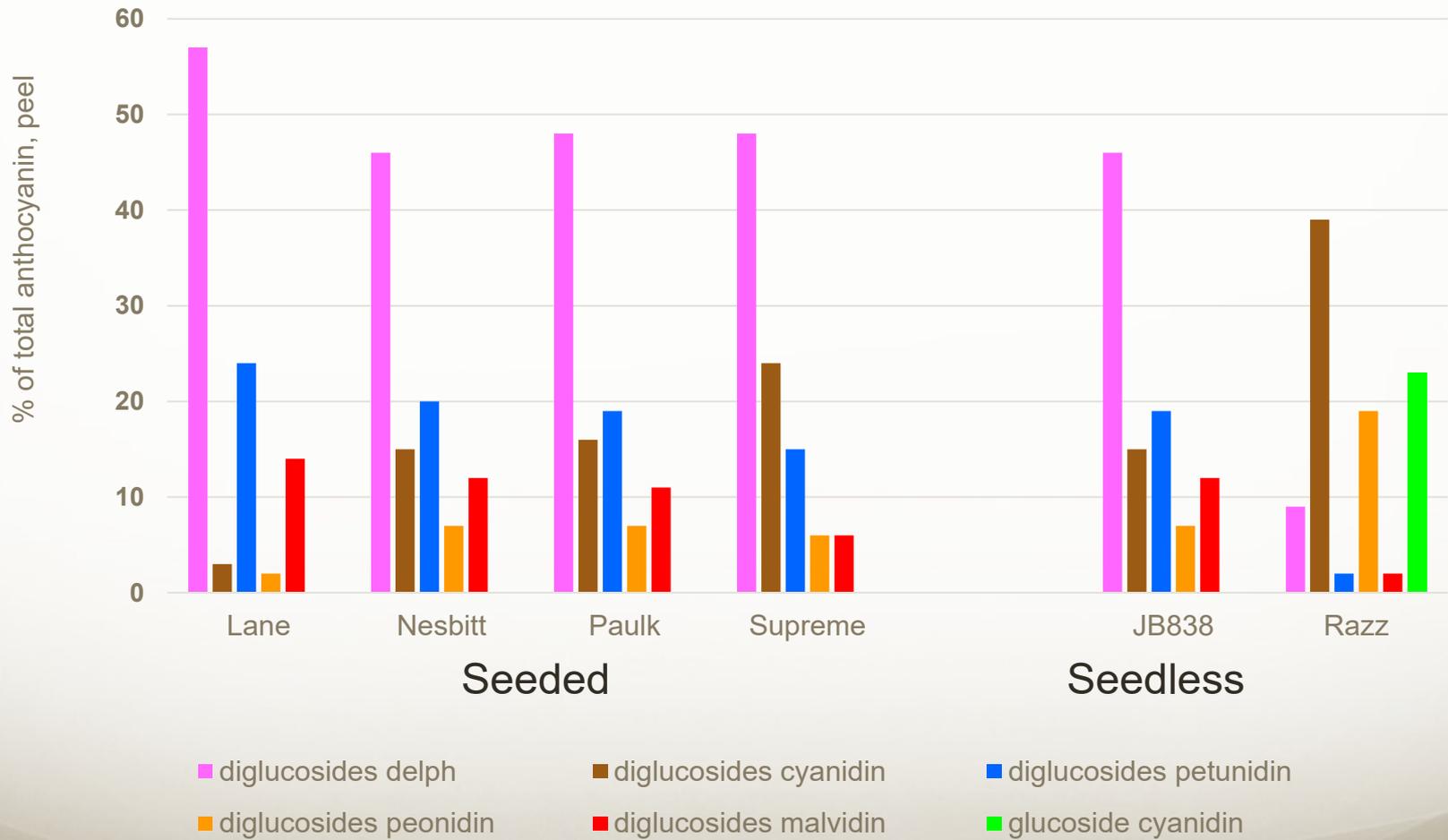


Total anthocyanin Purple



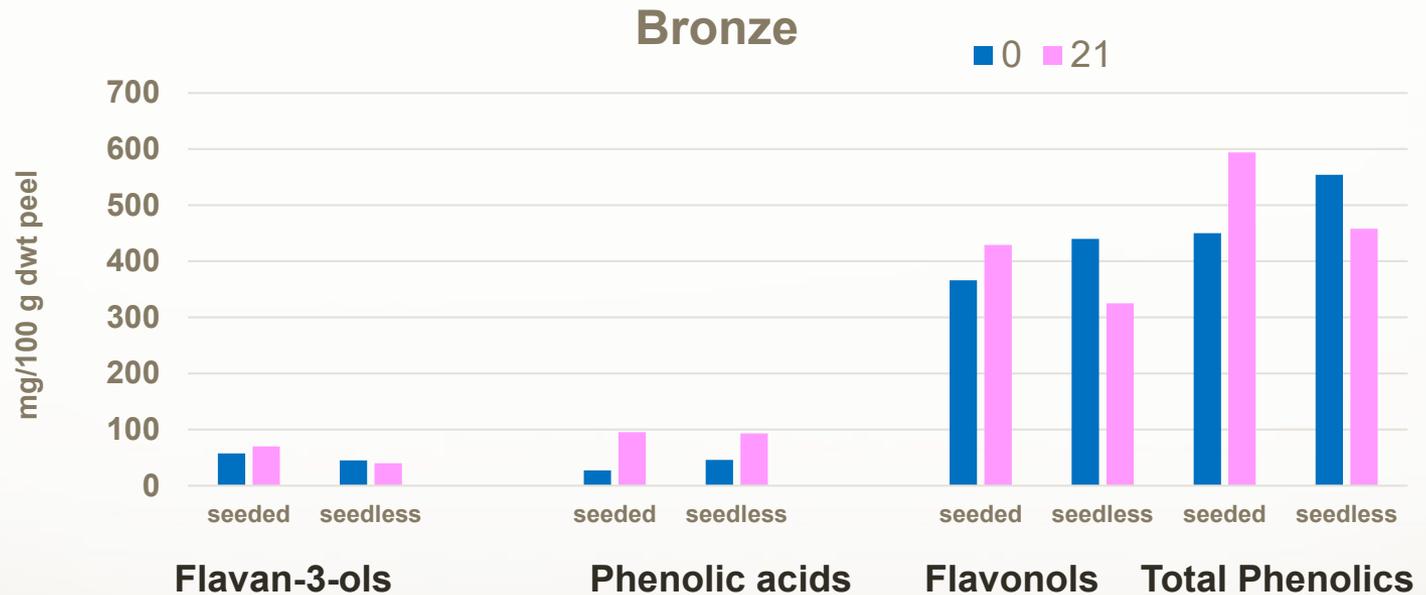
Pigment profiles

Anthocyanin in purple or red muscadine



Phenolics (non-anthocyanin)

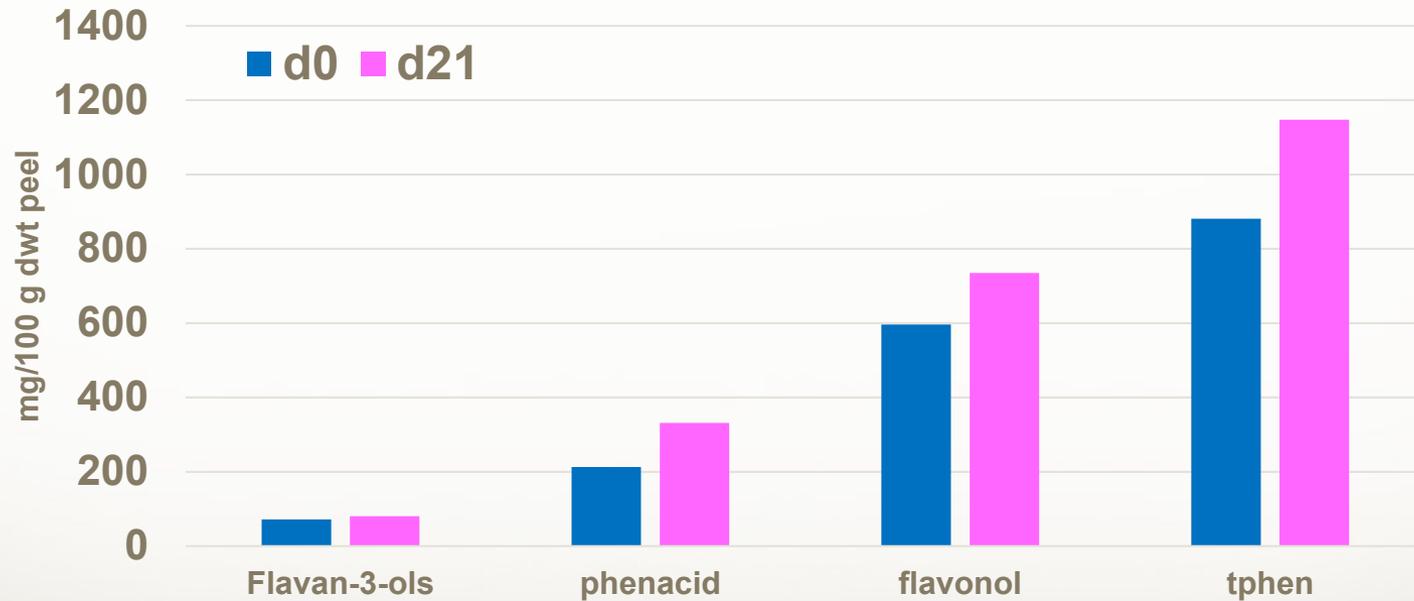
Seeded vs Seedless



Flavonols highest; seeded and seedless similar

Phenolics (non-anthocyanin)

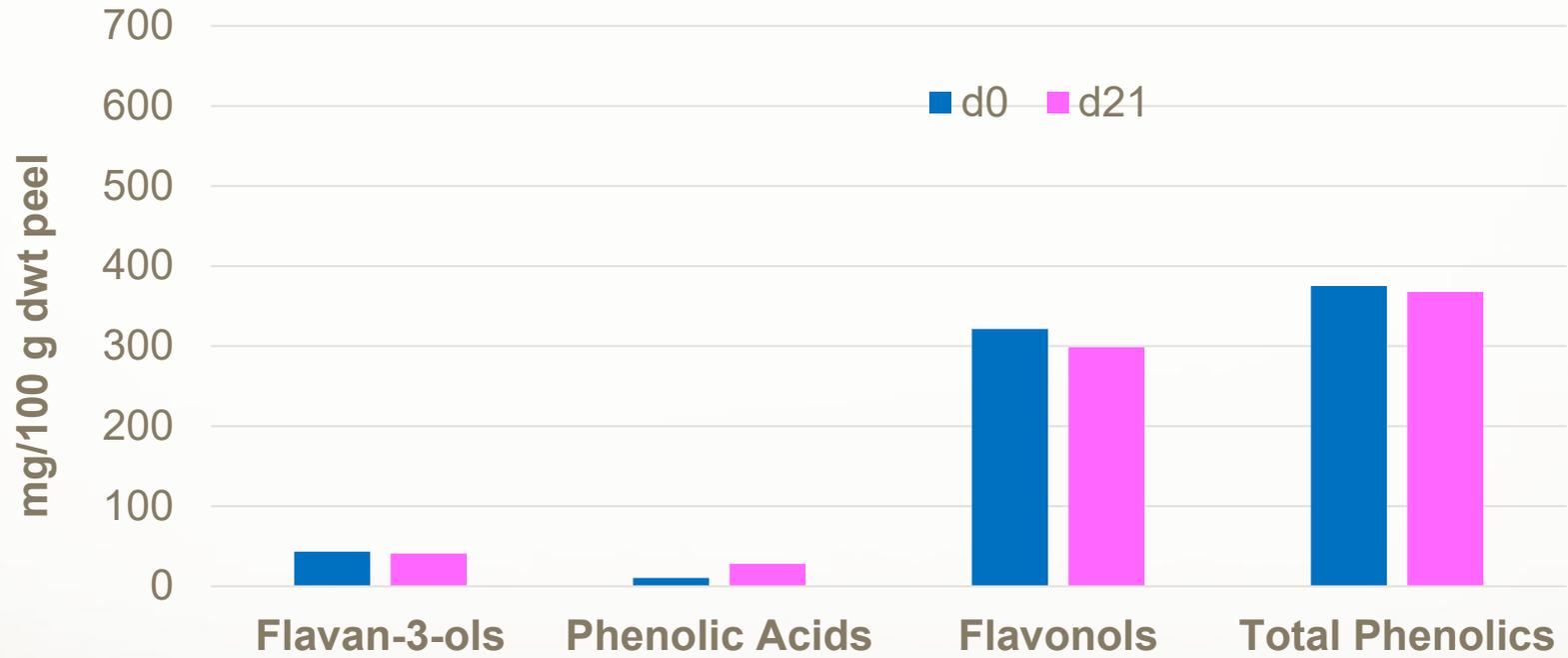
Purple grapes



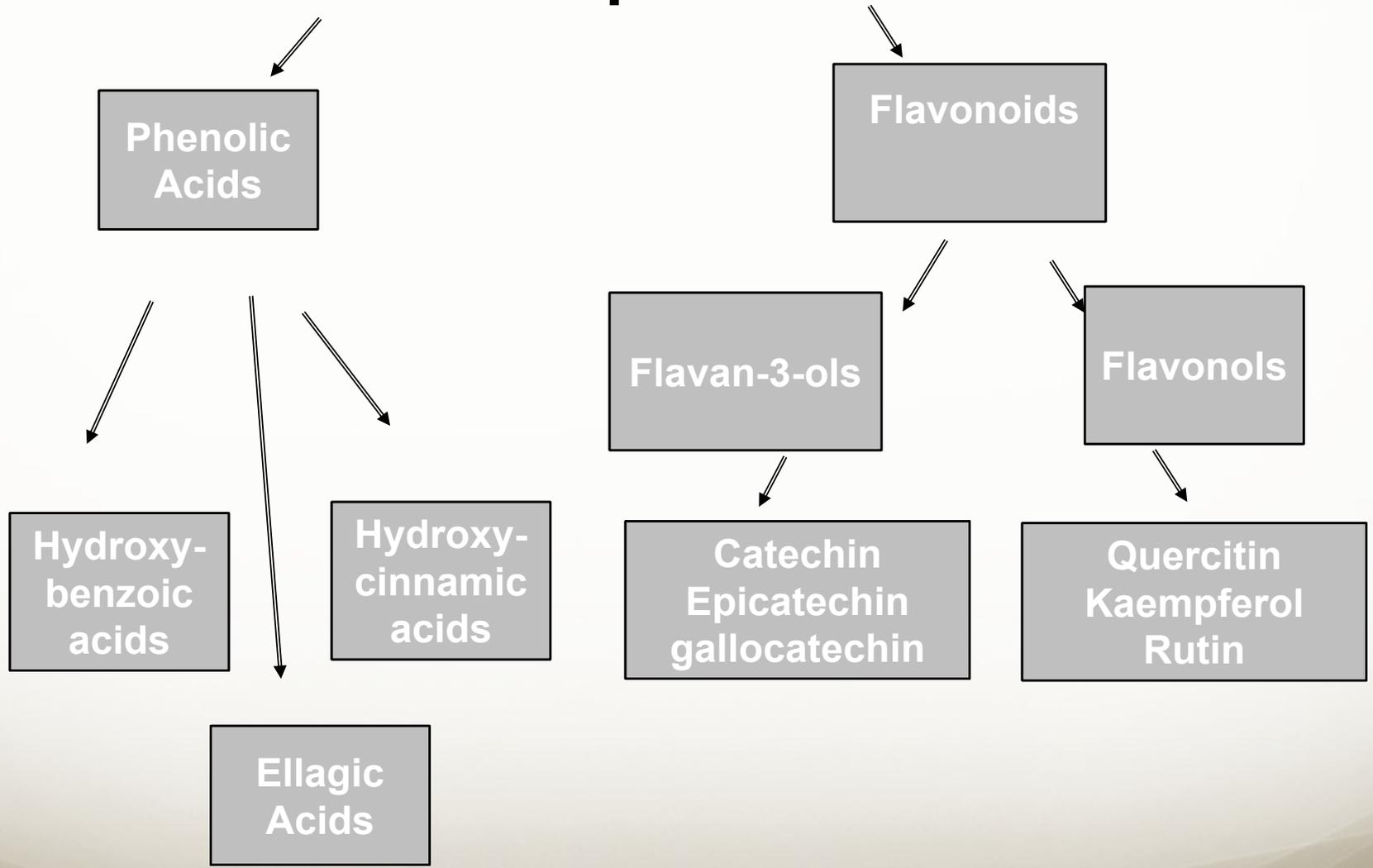
Flavonols > phenolic acids > flavanols

Seedless (JB0838110) similar to seeded values

RazzMaTazz (red seedless)



These phenolics



Summary

- Several fresh market cultivars had low mold after 21-28, even 42 days
- Softness 20-50%, wrinkle a problem on tiny Razz
- Weight loss 1-2%
- Brix was 15 to 18%, titratable acidity 0.3 to 0.7%

Summary

- Phenolics increased in peel after storage, primarily the flavonols
- Anthocyanin pigments and phenolics not very different between seeded and seedless peel
- Diglucoside pigments dominated in both seeded, seedless.
- A few monoglucoside pigments found in seedless, especially in RazzMaTazz

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**Evaluating Harvest and Postharvest
Potential of Fresh-market Muscadine
Grapes Grown in Arkansas**

*Dr. Renee Threlfall, Dr. Margaret Worthington,
and Cody Rawls*

*University of Arkansas System Division of
Agriculture (UA System)*



Project Plan

- Harvest and postharvest attributes of muscadine genotypes (cultivars and selections) grown in Arkansas evaluated at the UA System
- Nine muscadine genotypes (AM-26, AM-70, AM-77, AM-102, AM-131, AM-135, AM-195, Summit, and Supreme) hand harvested in 2020 from UA System Fruit Research Station, Clarksville
- 1.8 kg of each genotype harvested into clamshells, placed in ice chests, and transported to the UA System Food Science Department, Fayetteville
- Harvest attributes evaluated
 - Physical attributes (berry weight, seed number, stem scar tear, and berry firmness) and composition attributes (soluble solids, pH, titratable acidity, and soluble solids/titratable acidity ratio)
- Postharvest attributes evaluated
 - Weight loss and unmarketable berries at 0, 14, and 28 d at 2°C

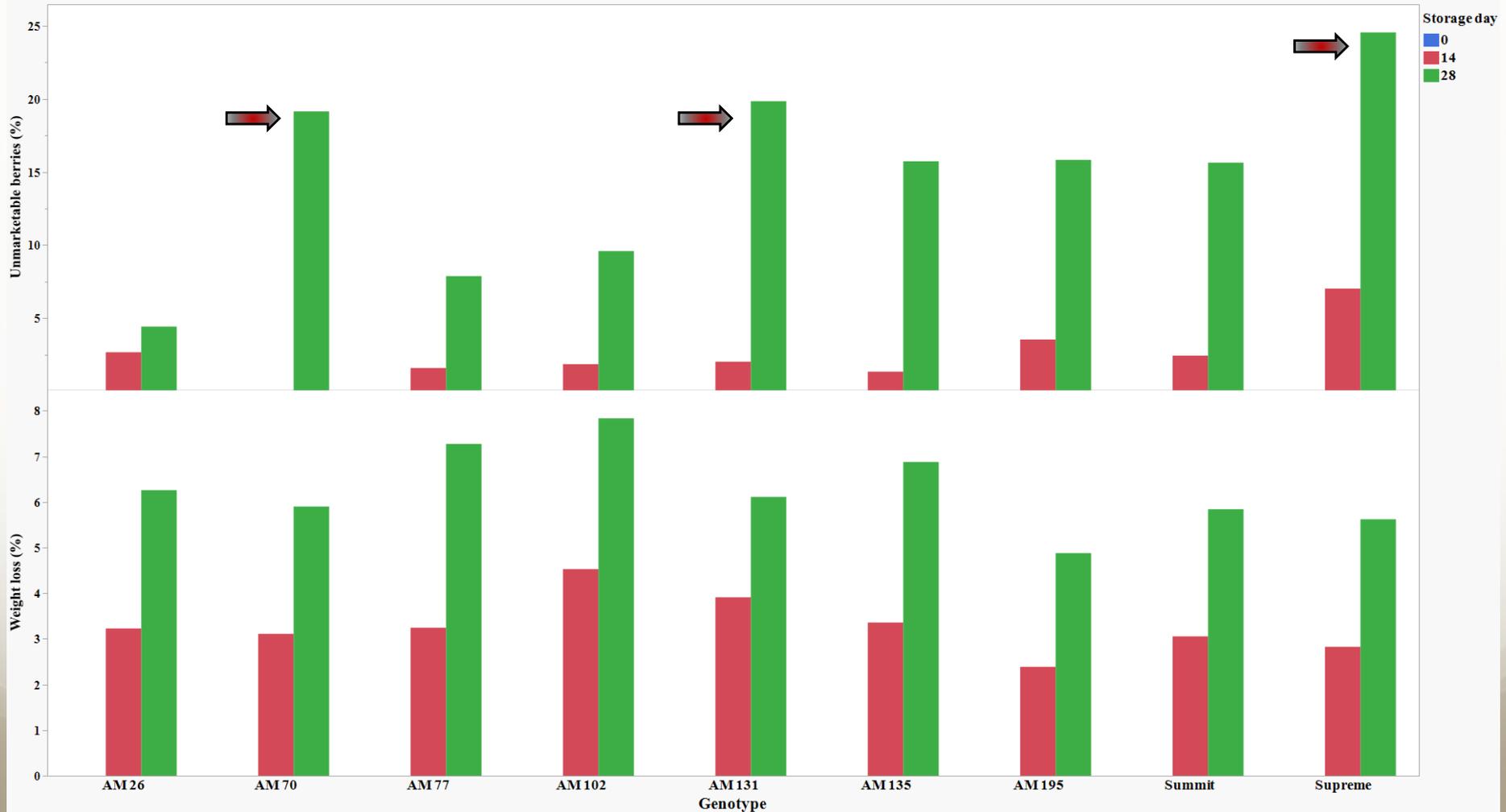
Physical and composition attributes of muscadine grapes at harvest, Clarksville AR (2020)

Genotype ^z	Berry weight (g)	Seed number	Stem scar tear (%)	Berry firmness (N)	Soluble solids (%)	pH	Titrateable acidity (%) ^y	Soluble solids/titrateable acidity ratio
AM 26	9.47 b	3.00 a	0.00 d	9.66 ab	11.77 ef	3.45 bc	0.57 de	20.79 bcd
AM 70	12.50 a	3.33 a	13.99 b	8.90 abc	14.50 bcd	3.49 b	0.43 e	35.17 a
AM 77	4.76 c	4.00 a	0.78 d	7.54 cd	11.37 f	2.81 f	1.06 a	10.75 d
AM 102	6.15 c	2.33 a	1.85 d	8.43 bcd	16.80 ab	3.18 e	0.67d	24.90 abc
AM 131	8.79 b	3.67 a	15.34 b	9.52 ab	16.13 abc	3.27 cde	0.96 ab	16.83 cd
AM 135	8.76 b	3.33 a	3.18 cd	6.53 d	13.33 def	3.37 b-e	0.70 cd	18.91 bcd
AM 195	10.17 b	3.00 a	9.53 bc	8.74 bc	14.67 bcd	3.80 a	0.72 cd	20.44 bcd
Summit	8.48 b	2.67 a	3.77 cd	10.75 a	14.07 cde	3.21 de	0.85 bc	16.53 cd
Supreme	10.17	2.67 a	30.61 a	9.53 ab	17.43 a	3.41 bcd	0.60 d	29.60 ab
P-value	<0.0001	0.1277	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

^z Genotypes were evaluated in triplicate. Means highlighted are highest value and means underlined are lowest. Means with different letters for each attribute are significantly different ($p < 0.05$) using Tukey's Honestly Significant Difference test.

^y Titrateable acidity expressed as % citric acid.

Marketability attributes of muscadine grapes during storage at 2°C (0, 14, and 28 days), Clarksville AR (2020)



Conclusions and Future Plans

The outcomes from this research demonstrate the potential for muscadines as a fresh-market crop.

- ❖ Good physical and composition attributes
 - ❖ Need to address stem scar tear
- ❖ Storage potential for up to 28 days at 2°C
 - ❖ Low weight loss during storage
 - ❖ Low number of unmarketability berries during storage

Project in Arkansas will be repeated in 2021.

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UPDATE ON SEEDLESS MUSCADINE BREEDING

Jeff Bloodworth
March 2, 2021





Bunch Grapes

Muscadine Grapes



Quality

- Table Grapes
 - Seedlessness, Large Cluster, Crisp Texture
- European Style Wine

Fitness

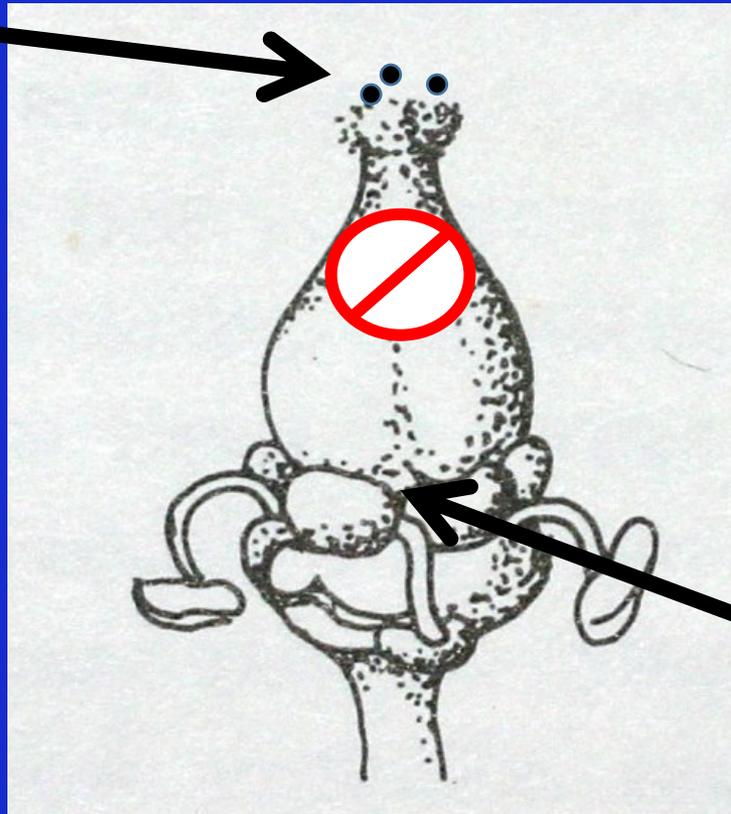
- Disease Resistance
- Adaptability

Hybrid



The Muscadine Block

Seedless
Bunch
Pollen



Muscadine Egg



38 CHROMOSOMES



40 CHROMOSOMES

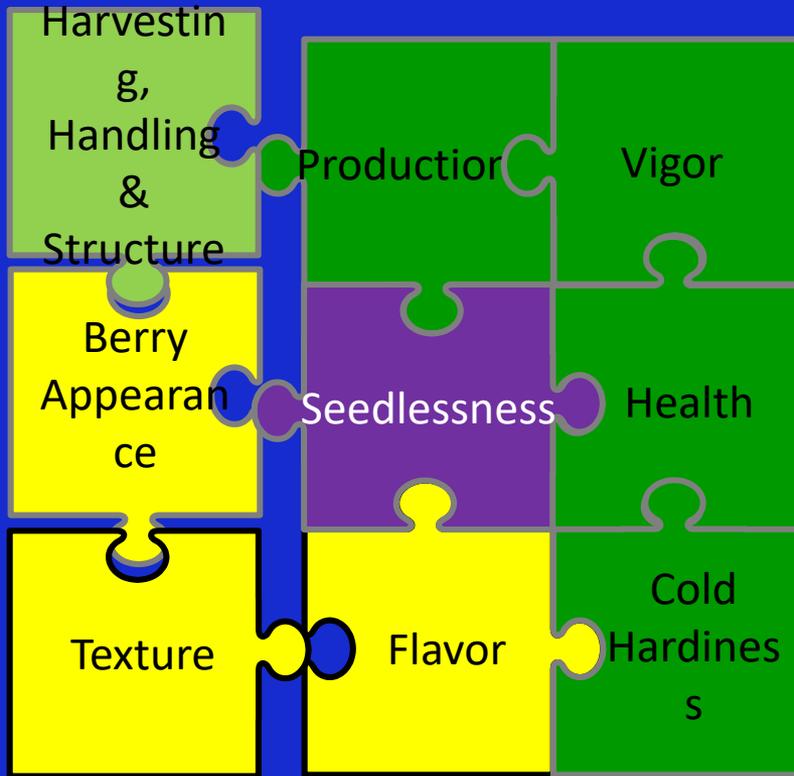


F1 HYBRID
39 CHROMOSOMES



First Perfect Flowered Productive Seedless Muscadine Backcross





Consumer Traits



Grower Traits



Consumer and Grower Traits

DRY SCAR



H1 Flower Cluster



H1 Cluster



H1 Cluster



Larger Berry Size in Seedless Selections



RazzMatazz Cluster Sizes



19.6



29.0



35.4



35.5



35.8



39.5



45.4



53.0

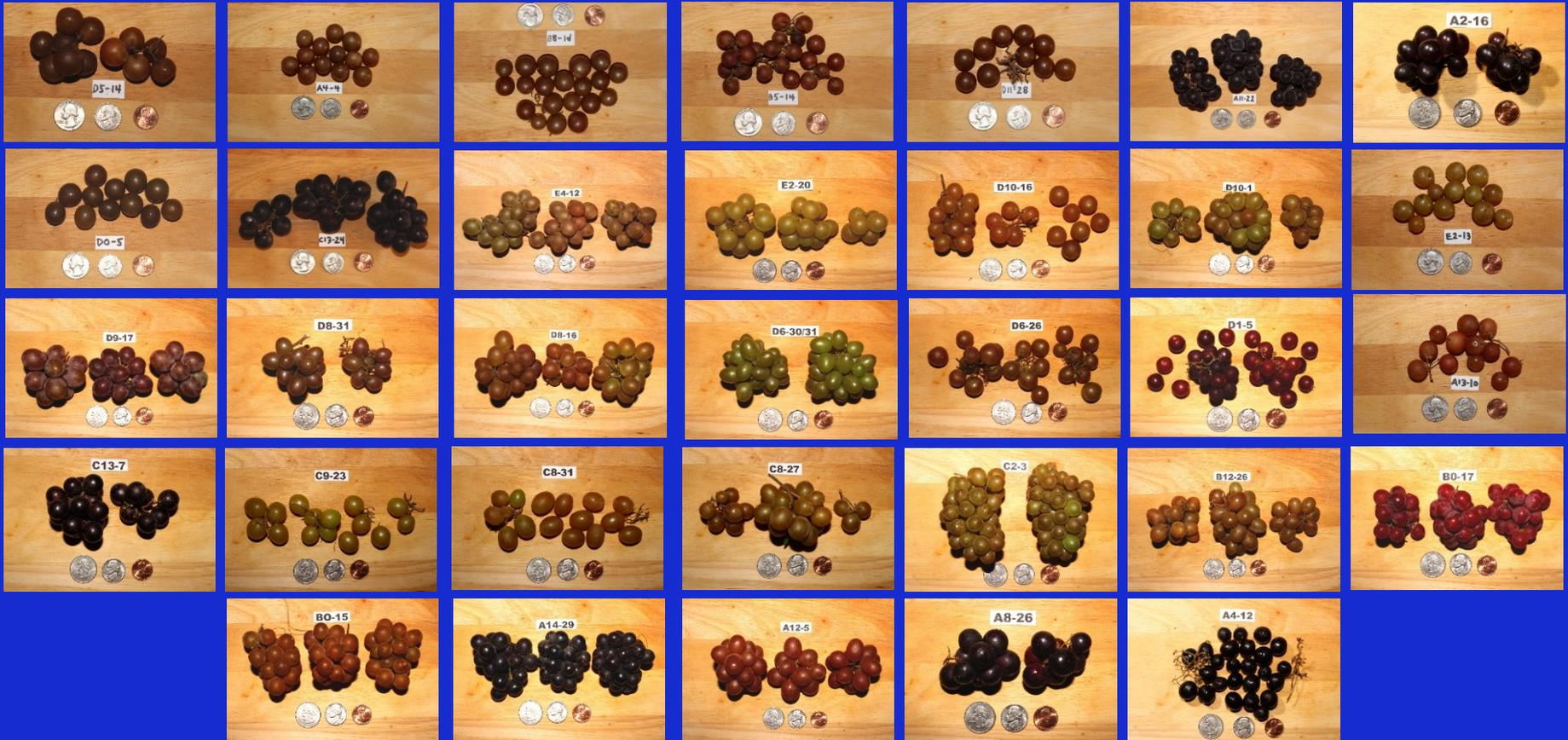


61.5

A14-29



Selections From Wasco, CA



**Oh My!
Original Vine
(14th leaf)**



E4-12



E4-12



E4-12



Jeff Bloodworth
Garden's Alive!
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**Breeding Seedless Muscadine Grapes at
the University of Arkansas**

Margaret Worthington
mlworthi@uark.edu

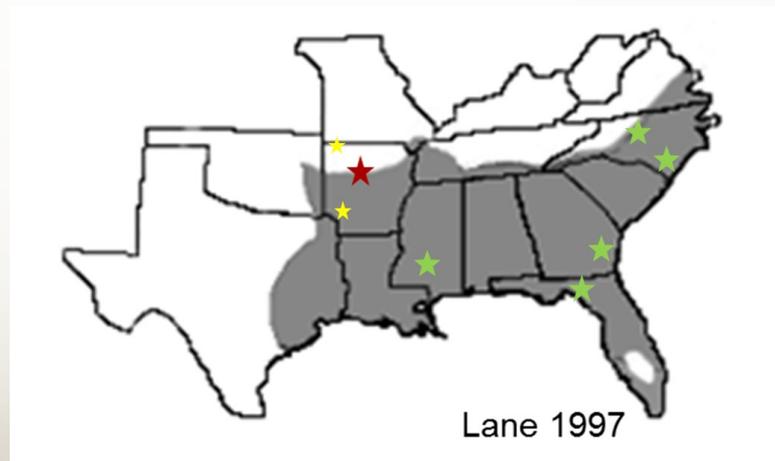
Arkansas Fruit Breeding

- Established in 1964 by Arkansas native Dr. Jim Moore
- Active programs in blackberries, peaches, bunch grapes, muscadines
- 121 total cultivar releases
- Muscadine program established in 2007 by John Clark
- I started in 2016 and assumed leadership of the muscadine program in 2019



Muscadine Breeding Program

- Over 19,000 seedlings planted
- 300 selections made
- A group of advanced selections moving along
 - Replicated trials
 - NCPN virus indexing
- Breeding objectives:
 - Cold hardiness & adaptation
 - Improved texture
 - Unique flavors
 - Dry scar / postharvest
 - Etc...



Seedless Crossing & Selections

- Breeding agreement with Gardens Alive! signed in 2017
- Crosses with Bloodworth seedless material in 2017-2020
- First seedless selection (AM-270S) made in 2020!
- 8 successful seedless crosses in 2020 and 3765 seeds currently germinating in the greenhouse



Plans for the Future

- Continue to establish best Bloodworth selections in Clarksville for crossing and evaluation
- Select for adaptation to Arkansas/NC environment
- Release of seedless materials in collaboration with Gardens Alive! in the next 5-10 years

