



Table Grape Cultivars

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Outline

- Introduction
- Table grape cultivars
- Table grape fruit quality and cultural practices
- My thanks to:
 - Dr. Gail Nonnecke (ISU)
 - Dr. John Clark (UA)
 - Andrew Thomas (MU)
 - Jackie Harris (MU)





Introduction

- U.S. Fresh Fruit Market (USDA, 2008)
 - Banana, apple, orange, grapes (ranking 1-4)
 - Per capita consumption of grapes is ~ 8 lbs
- How many table grapes are produced locally? Not enough - room to expand production of table grapes in Missouri

Introduction

- Fresh market potential for table grapes in Midwest
 - Selling directly to consumer
 - Farmers markets, on-farm sales, pick-your-own sales, CSA shares
 - Selling to wholesale markets
 - Groceries, institutions



Table Grape Characteristics

Fruit

- Seedless or seeded
- Thick or thin skin
- Juice layer or flesh adhered to skin
- Cluster appearance and berry size (attractive)

Vine

- Winter hardiness
- Growth management
- Disease tolerance
- Yield potential



Table Grape Characteristics

- Consumers favor:
 - Seedless
 - Color
 - Thinner skin
 - Berry attached to skin (non-slipskin)
 - Fully filled cluster
 - Medium to large berries
 - Good flavor



Source: Dr. Gail Nonnecke, ISU

Table Grape Characteristics

- **Producers need:**
 - Cold hardy
 - Ease of management
 - Productive, good cluster and berry characteristics
 - Clusters that are not too loose or too tight
 - Clusters that are not too large or too small
 - Clusters that ripen uniformly
 - Berries that do not crack or shatter
 - Disease resistance
 - Market demands (see consumers)



Source: Dr. Gail Nonnecke, ISU

Table Grape Cultivars

- White
- Red
- Black or purple



Source: ksj.mit.edu

'Himrod'



Source: Dr. Gail Nonnecke, ISU

Cornell University, introduced in 1952.

- Season: **Early**
- Vine vigor: vigorous
- Hardiness: “**moderately hardy**”, less hardy than Reliance.
- Clusters large sized, **loosely filled with small berries** that have an excellent honey-like flavor; **berries are slipskin**.
- Moderately susceptible to black rot & powdery mildew.
- **Rachis is brittle & may break when handled; berries prone to “shelling” in storage.**
- Can be quite productive.
- Cluster thinning is required.

'Marquis'



Source: Dr. Gail Nonnecke, ISU

Cornell University, introduced in 1996.

- Season: Early mid-season
- Vine vigor: Vigorous
- Hardiness: “**moderately hardy**”; Less hardy than ‘Reliance’; **hardens-off slowly in the fall.**
- **Highly susceptible to powdery mildew & anthracnose**; moderately susceptible to black rot & downy mildew.
- **Not productive on secondary buds.**
- Produces large clusters with large berries.
- Berries have a melting texture and adherent skin.
- Holds well on the vine.
- **Flavor goes from mildly fruity to strong *labrusca* as it hangs.**
- Requires cluster thinning.

'Neptune'



University of Arkansas, introduced in 1998.

- **Berry Flavor** - Fruity and pleasant, but not a foxy flavor characteristic of *V. labrusca*; 19.7 percent soluble solids.
- **Berry Size** - Medium, 3 grams.
- **Berry Texture** - **Non-slipskin**; skin thickness similar to many eastern table grapes.
- **Cluster Size** - Large, 250 to 400 grams range.
- **Yield** - Moderate, 5 tons/acre in research trials.
- **Maturity Date** - Approximately August 4 at Clarksville, Arkansas.
- **Hardiness** - Hardy, observed to be similar to [Venus](#) or possibly hardier.
- **Comments** - **Medium-low vigor; resistant to fruit cracking; moderate resistance to common fungal diseases but does require fungicide sprays for successful production; small, soft seed traces observed occasionally but not noticeable due to berry texture.**

'Gratitude'



University of Arkansas, introduced in 2012.

- **Berry Flavor** - Neutral flavor, similar to *Vitis vinifera* table grapes; soluble solids averages 19%.
- **Berry Size** - Medium, 3.5 grams average.
- **Berry Texture** - **Non-slipskin; exceptionally crisp; very thin skinned.**
- **Cluster Size** - Large; often over 500 grams with very tight clusters.
- **Yield** - Moderate.
- **Maturity Date** - Late August, near [Neptune](#).
- **Hardiness** - Moderate hardiness, less than [Jupiter](#) and likely similar to [Neptune](#).
- **Comments** - **Excellent resistant to fruit cracking during summer rains with exceptionally thin skin; provides for a later-season, neutral flavored grape for local markets. Negative aspects include very tight clusters and occasional winter injury.**

'Hope'



University of Arkansas, introduced in 2012.

- **Berry Flavor** - Fruity flavor; 19% soluble solids average.
- **Berry Size** - Small to medium, average 3 grams.
- **Berry Texture** - **Non-slipskin**; although soft.
- **Cluster Size** - Large, 300 to 330 grams; very tight clusters.
- **Yield** - High; 35 to 50 lbs per vine with consistent yields from year to year.
- **Maturity Date** - August 20th on average, near [Neptune](#).
- **Hardiness** - Good; anticipated comparable to [Jupiter](#).
- **Comments** - Only slight fruit cracking after rainfall noted even with a thin skin; nice fruity flavor should be very appealing for local markets. Major negative aspect is very tight clusters common.

'Canadice'



Cornell University, introduced in 1954.

- Season: **Early**
- Vine vigor: vigorous
- Hardiness: “**moderately hardy**”, less hardy than Reliance.
- Clusters medium sized with small berries that are similar to Delaware in flavor and appearance; **berries slipskin**
- **Highly susceptible to black rot**; moderately susceptible to downy mildew & bunch rot.
- Can be quite productive.
- Cluster thinning is required.

'Reliance'



Source: Dr. Gail Nonnecke, ISU

University of Arkansas, introduced in 1982.

- Season: early
- Vine vigor: moderately vigorous
- **Hardiness: “moderately hardy”**; hardy AR seedless cultivar.
- **Highly susceptible to black rot, anthracnose & downy mildew; moderately susceptible to powdery mildew.**
- Moderately susceptible to 2,4-D drift.
- Produces large clusters of round, red, medium-sized berries; **berries are slipskin**
- **Berries are very thin skinned, & are of excellent quality.**
- **Very prone to berry drop & “shelling” in storage (GA sprays will reduce).**
- Cluster thinning improves fruit quality.
- Requires leaf thinning to improve color.
- Moderately productive on secondary buds.
- **Comments - Medium vigor; susceptible to fruit cracking if rains occur near maturity; moderate resistance to common fungal diseases but does require fungicide sprays for successful production; seed trace free.**

'Saturn'



Source: Dr. John Clark, UA

University of Arkansas, introduced in 1987.

- **Berry Flavor** - Sweet and fruity; 20 percent soluble solids.
- **Berry Size** - Medium, 3 grams.
- **Berry Texture** - **Non-slipskin; crisp.**
- **Cluster Size** - Medium-large, 200 to 250 grams average.
- **Yield** - Moderate, 4 tons/acre in research trials.
- **Maturity Date** - Approximately July 30 at Clarksville, Arkansas.
- **Hardiness** - Moderately hardy, similar to Venus in hardiness.
- **Comments** - **Medium vigor; resistant to fruit cracking; moderate resistance to common fungal diseases but does require fungicide sprays for successful production; small seed traces observed occasionally.**

'Vanessa'



Source: Dr. Gail Nonnecke, ISU

Hort. Res. Inst. of Ontario, Canada
introduced in 1998.

- Season: Early-season
- Vine vigor: moderately vigorous
- Hardiness: “**moderately hardy**”; Less hardy than ‘Reliance’; **hardens-off slowly in the fall.**
- Highly susceptible to black rot; moderately susceptible to powdery & downy mildew.
- **Very susceptible to 2,4-D & dicamba drift.**
- **Not productive on secondary buds.**
- Produces medium sized berries on medium sized clusters.
- **Berries have a crisp, firm texture; non-slipskin.**
- Keeps well in cold storage.

'Somerset Seedless'



Source: Dr. Gail Nonnecke, ISU

Elmer Swenson cultivar

(E.S. 12-7-98):

- *V. riparia* hybrid
- Season: Early mid-season
- Vine vigor: moderately vigorous
- Hardiness: “very hardy”, **hardest seedless type.**
- Produces medium sized clusters w/ small berries.
- Berries are very sweet, flavorful.
- Suitable for table or juice.
- Cluster thinning may be necessary.

'Petite Jewel'



2000 Elmer Swenson cultivar

(E.S. 3-20-36):

- *V. riparia* hybrid
- Season: Very early.
- Vine vigor: Medium high vigor.
- Hardiness: "very hardy".
- Resistant to downy mildew & black rot.
- Produces medium sized clusters w/ small berries.
- Hangs well on the vine.
- Berries are sweet with a rich & spicy flavor.
- Cluster thinning may be necessary.
- Suitable of table & wine.

'Jupiter'



Source: Dr. Gail Nonnecke, ISU

University of Arkansas, introduced in 1998.

- **Berry Flavor** - **Mild muscat**; rated highly and exceeded only by [Reliance](#) in flavor ratings; 20.6 percent soluble solids.
- **Berry Size** - Large, 4 to 5 grams.
- **Berry Texture** - **Non-slipskin; semi-crisp; skin thickness less than many eastern table grapes.**
- **Cluster Size** - Medium-large, 200 to 250 grams average; similar weight to [Venus](#).
- **Yield** - High, 8 to 13 tons/acre in research trials.
- **Maturity Date** - Early, approximately July 24 at Clarksville, Arkansas, five days after [Venus](#).
- **Hardiness** - Hardy; harder than [Venus](#), Einset Seedless, Himrod and Marquis, **but not as hardy as [Mars](#) or [Reliance](#)**. Consistent cropping recorded in all trials in Arkansas, and lack of hardiness has not been observed.
- **Comments** - **Medium vigor; resistant to fruit cracking; moderate resistance to common fungal diseases but does require fungicide sprays for successful production; small, soft seed traces observed occasionally but not noticeable due to berry texture.**

'Faith'



Source: Dr. John Clark, UA

University of Arkansas, introduced in 2012.

- **Berry Flavor** - Mostly neutral flavor with slight fruity flavor in some observations; 19% soluble solids.
- **Berry Size** - Medium Large, 4 grams.
- **Berry Texture** - **Non-slipskin**.
- **Cluster Size** - From 150 to 250 grams.
- **Yield** - Moderate
- **Maturity Date** - Early ripening in late July to early August with [Jupiter](#).
- **Hardiness** - Good, likely comparable to [Jupiter](#).
- **Comments** - **Intended for use in the local market for the early season providing a neutral flavor. Good resistance to fruit cracking. Should compliment 'Jupiter' in the early local market. Negative aspects include uneven set in some years resulting in reduced cluster fill, occasional seed traces in some years, and occasionally slight skin astringency.**

'Joy'



Source: Dr. John Clark, UA

University of Arkansas, introduced in 2012.

- **Berry Flavor** - Exceptional fruity flavor.
- **Berry Size** - Small to medium, 3 grams average.
- **Berry Texture** - **Non-slipskin, soft texture.**
- **Cluster Size** - Medium-large, averaging 300 grams.
- **Yield** - Moderate to high.
- **Maturity Date** - August 11th on average, between [Jupiter](#) and [Neptune](#).
- **Hardiness** - Not fully evaluated, likely slightly less than [Jupiter](#), comparable to [Neptune](#).
- **Comments** - **Vines have moderate vigor and very good resistance to fruit cracking. Flavor is exceptional with unique flavor for *V. labrusca* and *V. vinifera* hybrids and should be very good for local markets. Skin is the thinnest of Arkansas-developed table grapes. Negative aspects include soft texture, occasional variable berry set resulting in some “shot” berries, and shatter of ripe berries at maturity in some years.**

'Mars'



Source: Dr. Gail Nonnecke, ISU

University of Arkansas, introduced in 1984.

- **Berry Flavor** - Typical *V. labrusca*, resembling somewhat that of Campbell's Early; 17 percent soluble solids.
- **Berry Size** - Medium, 3 grams.
- **Berry Texture** - **Slipskin**; skin thickness typical of eastern table grapes.
- **Cluster Size** - Medium, 200 grams average.
- **Yield** - High, 8 to 12 tons/acre in research trials.
- **Maturity Date** - Approximately August 5 at Clarksville, Arkansas.
- **Hardiness** - **Very hardy**, exceeded only by [Reliance](#) in hardiness among the Arkansas varieties.
- **Comments** - **High vigor; has the least susceptibility to common grape diseases among the Arkansas varieties, but still requires fungicide applications for disease control; resistant to fruit cracking; occasional seed traces found in some berries in some years.**

'Trollhaugen'



2000 Elmer Swenson blue seedless cultivar (E.S. 3-22-18):

- *V. riparia* hybrid
- Season: Very early.
- Vine vigor: Vigorous
- Hardiness: "very hardy".
- Resistance to downy mildew & black rot.
- Produces medium sized clusters w/ small to medium sized berries.
- Hangs well on the vine.
- Berries are sweet with a mild Concord flavor.
- Cluster thinning may be necessary.
- Suitable of table & wine.

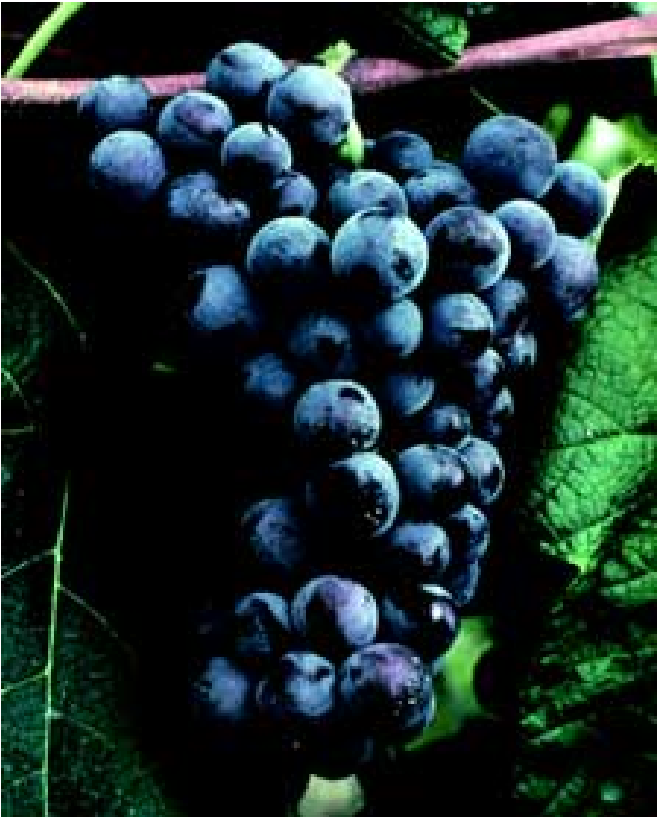
'Seedless Concord'



Source: Dr. Gail Nonnecke, ISU

- Season: **Early mid-season**
- Vine vigor: vigorous
- Hardiness: **“hardy”**
- Clusters & berries smaller than Concord.
- Highly susceptible to black rot; moderately susceptible to powdery mildew.
- Sensitive to sulfur fungicides.
- **Very susceptible to 2,4-D drift.**
- Suited for sweet juice, preserves & wine; **higher flavor than Concord.**
- **Production is erratic; in warm years will produce seedy berries.**

'Sunbelt'



Source: Dr. John Clark, UA

University of Arkansas, introduced in 1993.

- **Berry Flavor** - Typical *V. labrusca*; similar to Concord; 17 percent soluble solids.
- **Berry Size** - Large, 4 grams.
- **Berry Texture** – **Slipskin; seeded fruit.**
- **Cluster Size** - Small, 150 grams.
- **Yield** - Moderate, 4 to 5 tons/acre in research trials.
- **Maturity Date** - Approximately August 17 at Clarksville, Arkansas.
- **Hardiness** - Hardy, similar to Concord.
- **Comments** - **A significant attribute of Sunbelt is its even-ripening under hot conditions,** compared to Concord which exhibits uneven ripening in these conditions; medium vigor; moderate resistance to black rot and anthracnose but higher resistance to powdery and downy mildews; disease control program used for Concord production is suggested for Sunbelt; juice quality rated similar to or higher than Concord.

Seeded Table Grapes



Edelweiss



Swenson White



Brianna



Niagara



Esprit



Cayuga White

Source: Dr. Gail Nonnecke, ISU

Seeded Table Grapes



U. Of Minnesota

Blue Bell



B. Nonnecke

Swenson Red



NYSAES

Steuben



Concord



Missouri St. Univ

Delaware



NYSAES

Buffalo



NYSAES

Fredonia



NYSAES

Catawba



Table Grape

Quality and Cultural Practices

- Cultural practices can overcome limitations of eastern table grape cultivars:
 - Promote fruit maturity
 - Reduce cluster compactness
 - Increase cluster compactness
 - Increase berry size



Table Grape

Quality and Cultural Practices

- Promote fruit maturity
 - Choice of training system
 - Increased pruning severity
 - Shoot positioning
 - Crop adjustment



Table Grape Quality and Cultural Practices

- Reduce cluster compactness
 - Cluster thinning
 - Gibberellic acid sprays
 - Brushing



Table Grape

Quality and Cultural Practices

- Increase cluster compactness
 - Increased pruning severity
 - Flower cluster thinning
 - Girdling prior to bloom
 - Shoot topping
 - Berry thinning



Table Grape

Quality and Cultural Practices

- Increase berry size
 - Flower cluster thinning
 - Berry thinning
 - Girdling at fruit set
 - Gibberellic acid sprays
 - Brushing



Table Grape

Quality and Cultural Practices

- Crop Adjustment
 - Each vine has an optimum cropping level to produce a quality crop
 - Starting point
 - 4T/acre crop load is a good target
 - About 24 clusters per vine (more or less depending on average cluster size)
- How do we adjust the crop?
 - Dormant pruning severity
 - Adjustment of crop
 - Altering the number of clusters per vine
 - Altering the size of individual clusters

Table Grape Quality and Cultural Practices

- Flower cluster thinning
 - Done before start of bloom (shoots 8-10")
 - Leave basal cluster, remove one or more of additional clusters
 - Increases berry set; good for loose clustered cultivars
 - Not used for compact clustered cultivars



Table Grape Quality and Cultural Practices

- Cluster thinning
 - Berry set per cluster declines as the number of fruit clusters retained increases; useful for compact clustered cultivars
 - Excess clusters retained at pruning, and then removed **after fruit set**
 - Labor intensive, best for valuable cultivars



Source: Dr. Gail Nonnecke, Iowa State University

Table Grape Quality and Cultural Practices

- Berry thinning
 - Berry thinning is very useful to modify cluster shape when a variety has elongated, straggly clusters
 - used only on varieties with loose clusters
 - Remove a portion of the cluster when berries are slightly smaller than peas



Source: MSU Extension Bulletin E 2774

Table Grape Quality and Cultural Practices

- Girdling at fruit set
 - cutting through the phloem tissues below the bark so that the downward (basal) flow of sugars and other compounds produced in the leaves is blocked
 - Girdling can increase berry size, promote berry set, and advance fruit maturity
 - Results variable – timing, location, width of girdle



Source: cesanjoaquin.ucanr.edu

Table Grape Quality and Cultural Practices

- Brushing
 - tight clusters combined with a thin berry skin can eliminate the commercial potential of a cultivar
 - Brushing can reliably reduce cluster compactness, but this is a labor-intensive practice
 - Brush prior to the start of bloom
 - Stroke through flower cluster with one or a pair of brushes



Source: MSU Extension Bulletin E 2774

Table Grape Quality and Cultural Practices

- Gibberellic acid sprays
 - GA is a naturally occurring compound in a group of plant hormones called gibberellins
 - Application can increase berry size of seedless cultivars
 - Spray concentration and timing varies with cultivar
 - Adverse effects sometimes noted – winter hardiness, poor fruit set, off flavors



Source: Dr. Gail Nonnecke, Iowa State University

Table Grape Quality and Cultural Practices

- Experiment 'Reliance'
 - Reported at 2009 GPGC by Dr. Gail Nonnecke, ISU
 - Vines established in 1985 (18 yr. old vines)
 - Research treatments
 - Cluster-thinning
 - Berry-thinning
 - GA₃ application
 - Treatments applied alone and combined



Jill Crozier

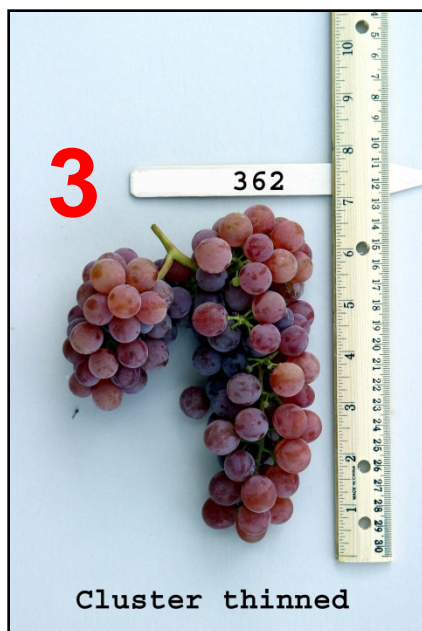
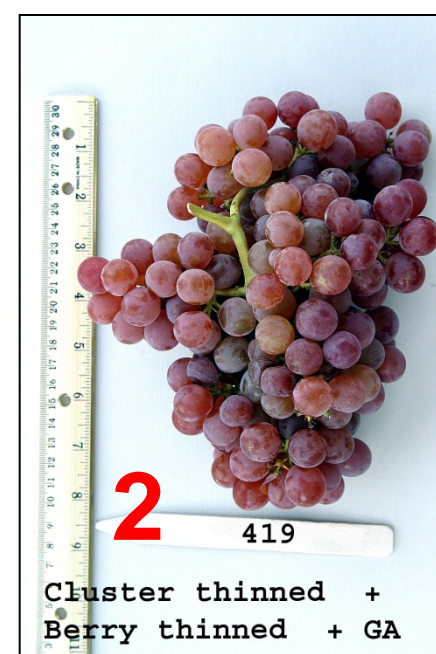
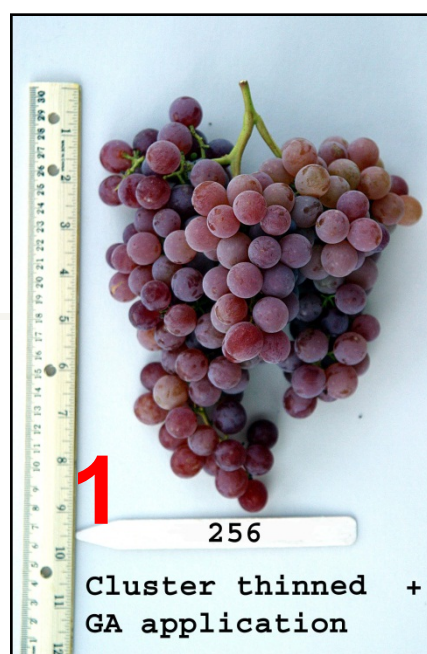


Table Grape Quality and Cultural Practices

'Reliance' grapes, 2003

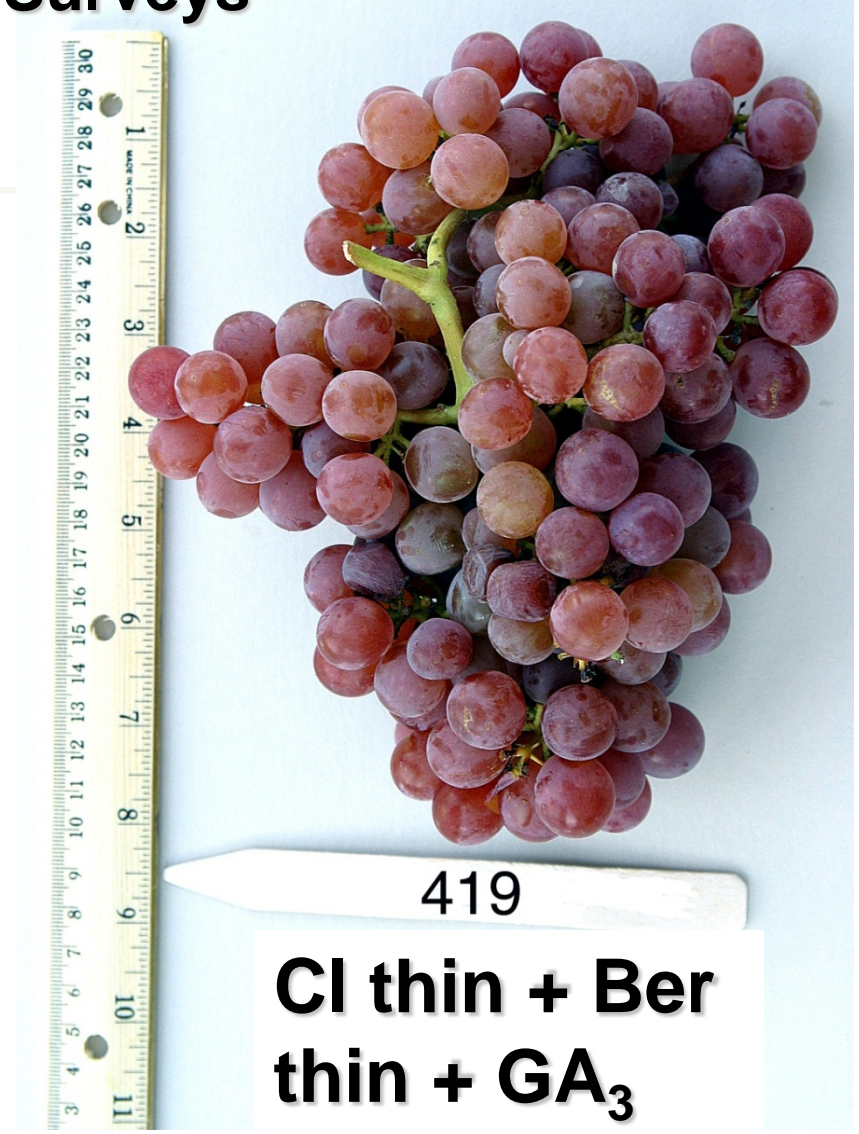
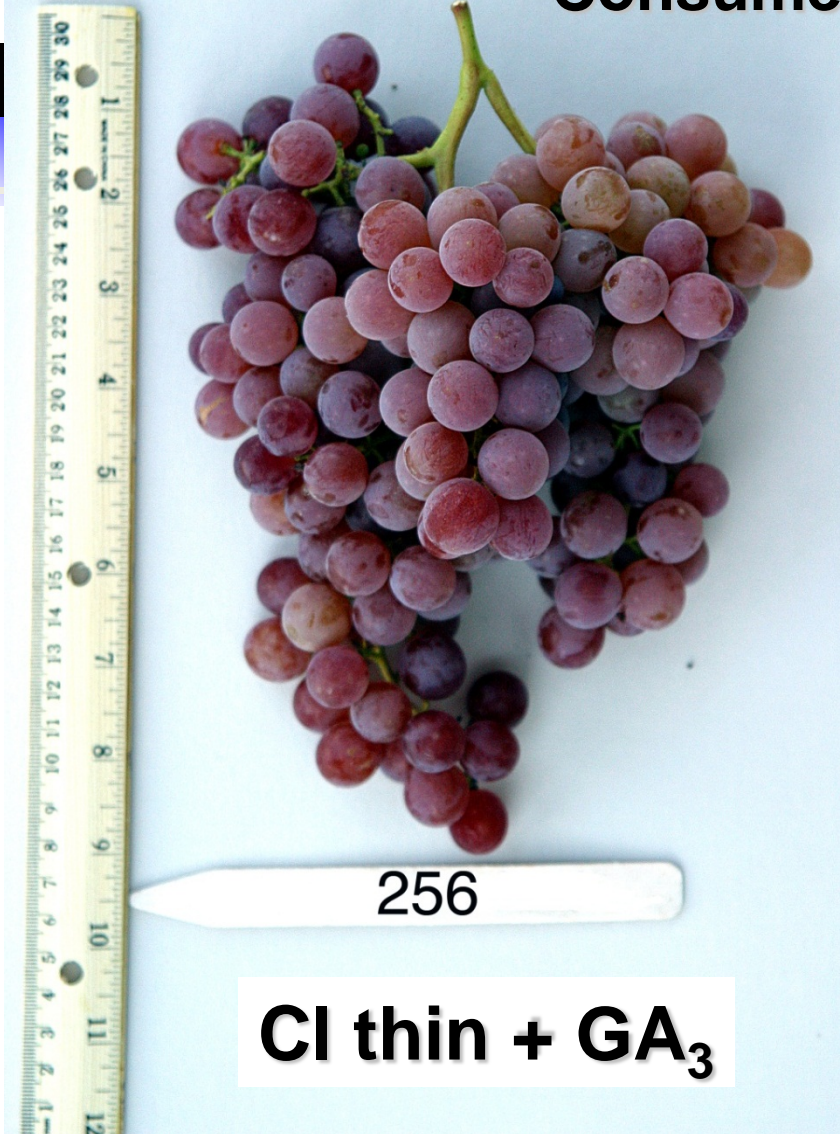
Treatment	Berry Weight (g)	Berry Diameter (cm)
Control	2.75	1.65
Cluster thin	2.78	1.56
Berry thin	2.84	1.67
GA3	2.85	1.63
Cl. thin + Ber. thin	2.49	1.54
Cl. thin + GA3	2.94	1.68
Ber. thin + GA3	3.27	1.66
Cl. thin + Ber. thin + GA3	3.70	1.75

Reliance Grape Consumer Preference for Cluster Appearance



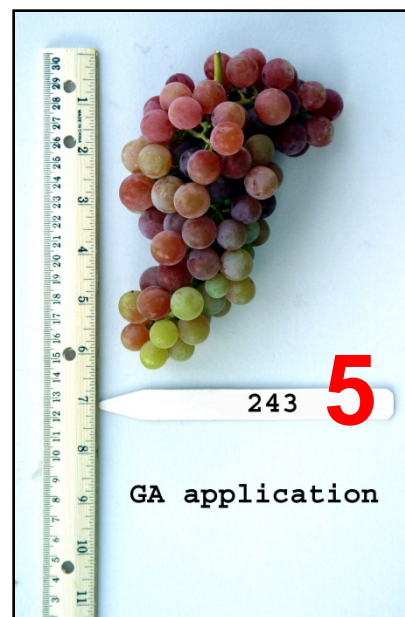
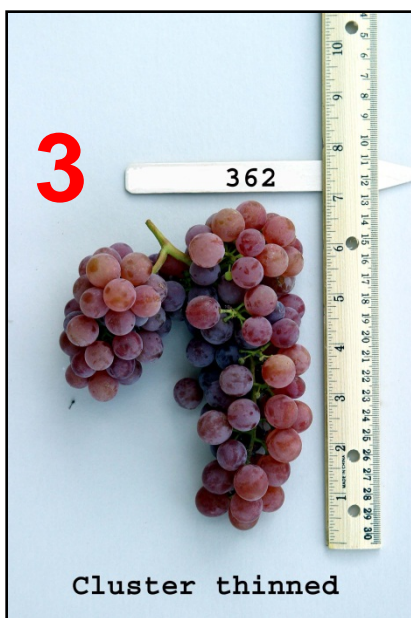
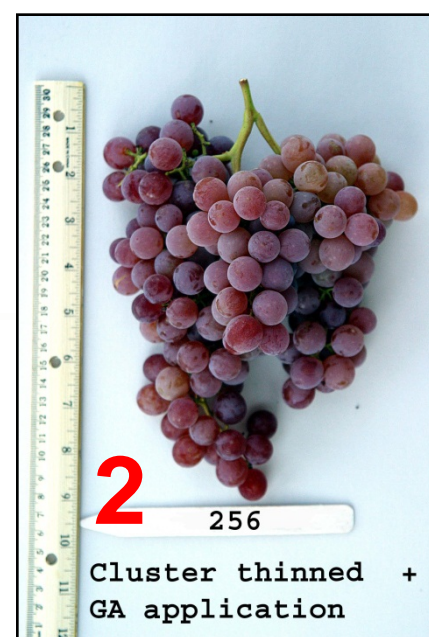
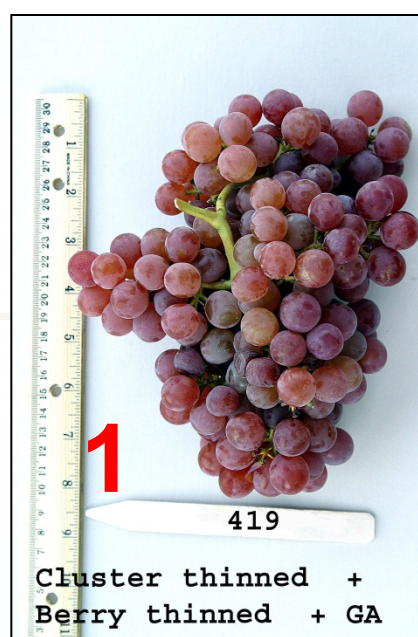
Source: Dr. Gail Nonnecke, Iowa State University

Consumer Surveys



Source: Dr. Gail Nonnecke, Iowa State University

Reliance Grape Consumer Preference for Berry Size



Source: Dr. Gail Nonnecke, Iowa State University

Any Questions?

- Upcoming events:
 - Table Grape Field Day at MU Southwest Center
- Contact information:
 - Patrick Byers
 - 417-881-8909
 - byerspl@missouri.edu

