Growing your blend

2018 Georgia Wine Producers Conference

January 24, 2018

Cain Hickey

UGA extension

Why blend?

- Single cultivar does not have the desired:
  - <u>Composition</u>
    - Therefore, sensory features and microbial stability (i.e. pH)
    - Vintage-dependent?
  - <u>Name</u>
    - i.e. Hybrids, American cvs.

Why blend?

- Regardless of definition of “quality”, blending:
  - Increases wine quality
  - Increases wine complexity
  - Makes a good wine great
  - Makes two (three, four…) bad wines into a good wine

Vineyard considerations - “Growing Your Blend”

- CULTIVARS – greatest effect on sensory attributes (duh)
  - Clone?
- MANAGEMENT
  - Planting site (block, region)
  - Harvest decision
  - Canopy management
  - Crop thinning
  - Rootstock
- VINTAGE
- CASE STUDIES

cultivars

Why grow different grape cultivars?

- In the case of this talk…
  - *… to make wine blends*

- Differences in traits can be advantageous:
  - Phenology
    - Bud break (i.e. spring frost risk)
    - Harvest
  - Cold hardiness
  - Required inputs (i.e. disease tolerance)
  - Tonnage (quantity)
  - Fruit composition (quality)

Phenology

- “Hedging your bets”
  - Spring frost risk
    - Whites
      - earlier bud break compared to reds
  - Hurricane season
    - Whites
      - Harvested before wet weather arrives
- “Spreading your work”
  - Harvest work load
    - Reds
      - harvested later than whites

Relative Dates of Bud Burst of Selected Grape Cultivars

Cultivar	Time of Bud Burst (days)*
Chenin blanc, Chardonnay	0
Gewürztraminer, Viognier	1
Pinot blanc	2
Pinos gris, Pinot noir, Merlot	3
Petite Verdot, Tannat	5
Riesling, Cabernet Franc, Semillon	6
Grenache, Muscat Ottonel	7
Sauvignon blanc, Syrah, Tempranillo	8
Carignan, Marsanne	10
Counoise	13
Cabernet Sauvignon, Mourvedre	14
*Relative dates of bud burst based on 38 year average at INRA Vassal Station - Languedoc (ENTAV-INRA, 1995).	

Cold hardiness

- Differences in cold hardiness across genetically-distinct grapevine “groups”:

American cvs. (< -15°F)

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French hybrids (< -10°F)

>

vinifera (< -5°F)

  - Cabernets > Viognier, Merlot

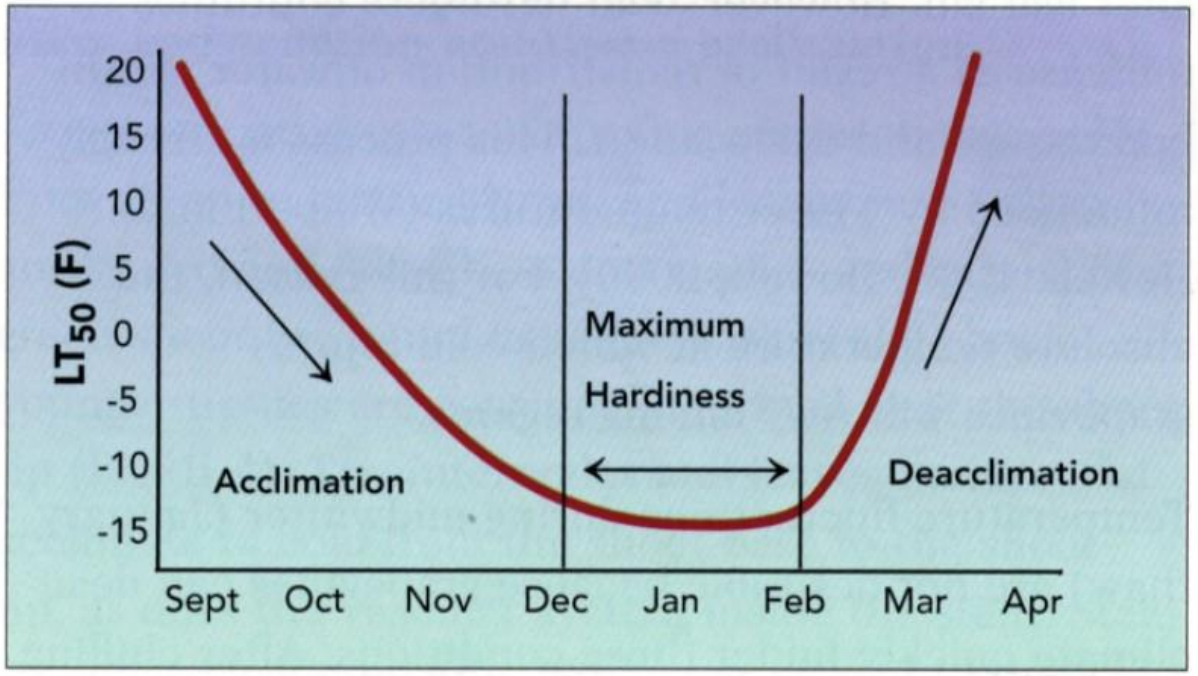


Figure 1. Vine Acclimation from Fall thru Spring

Does crop value exceed production costs?

- **Production costs:**
- *vinifera* bunch grapes

>

- Hybrid bunch grapes

>

- American cvs.

- **Crop value (per unit weight):**
- *Vinifera* bunch grapes

>

- Hybrid bunch grapes

>

- American cvs.

An independent grower will look at this differently than a vineyard/winery enterprise…

Required inputs
(mainly speaking about pesticides)

- Differences in required inputs:

vinifera

>

French hybrids

>

American cvs.

Tonnage

- **An extremely practical and economical consideration**

- High tonnage producers DO NOT have less favorable composition and wine quality potential

- Crop yield *can be* limited by trellis system employed
  - VSP vs. GDC

- Chambourcin, Chardonel, Vidal blanc, Norton

>

- Bordeaux reds
- Chardonnay, Sauvignon blanc, Albariño

>

- Viognier, Petit Manseng

Fruit composition

PRIMARY:

- Sugar
  - alcohol potential and RS potential
  - “hotness” and “roundness”
- Acid
  - astringency, structure
- pH
  - wine stability, color stability and intensity

SECONDARY:

- Aromatics
  - norisoprenoids, methoxypyrazines, terpenes, thiols
- Phenolics
  - Color (anthocyanins and co-pigments)
  - Mouthfeel (tannins and co-pigments)

Components of Red Wine Mouthfeel

The following is an outline of a presentation given at Wineries Unlimited, 2004, on v
mouthfeel issues. Additional information on this subject can be found under *Enology*
Notes.

The balance of mouthfeel components can be viewed as a wine quality measure.
Indeed, balance and harmony are two descriptors used to denote wine quality.

The importance of balance and harmony was certainly highlighted during the 2003 a
2004 grape growing seasons in Virginia.

Palate Balance Equation

Sweet	⇆	Acid	+	Phenolics
Carbohydrates Polysaccharides Ethanol		Organic acids		Skin, seed, and stem phenols Barrel phenols Enological tannins Volatile phenols

Zoecklein 2004

EX: Petit Manseng

Choosing cultivars to make blends

- Main consideration:
- WHAT DO YOU WANT TO PRODUCE (what is your market)?
    - Meritage blends
    - All-*vinifera* blends
    - Hybrid-*vinifera* blends
    - American-Hybrid-*vinifera* blends
    - Muscadine blends


https://doubleavineyards.com/chardonel

Must consider what each variety offers…

- Reds:
  - Chambourcin, Norton
    - tonnage/volume, balanced primary chemistry, color
  - Bordeaux reds
    - tannins, structure, color and aroma

- Whites
  - Chardonel, Vidal blanc
    - tonnage/volume, balanced primary chemistry
  - Petit Manseng
    - acidity and strong aromatics
  - Muscat Ottonel, Sauvignon blanc, Albariño
    - strong aromatics

- Sample “white blend” thought process:
  - Vidal blanc - tonnage and “balanced” primary chemistry
  - Petit Manseng - aromatics and acidity, but less tonnage

Think about the “robustness” across vintages

- Tried and true:
  - Chambourcin, Chardonel, Vidal blanc, Traminette, Petit Verdot, Cabernet franc, Petit Manseng, Norton
- More vintage-dependent:
  - Cabernet Sauvignon, Merlot, Viognier, Chardonnay, Malbec, Sangiovese, Tannat

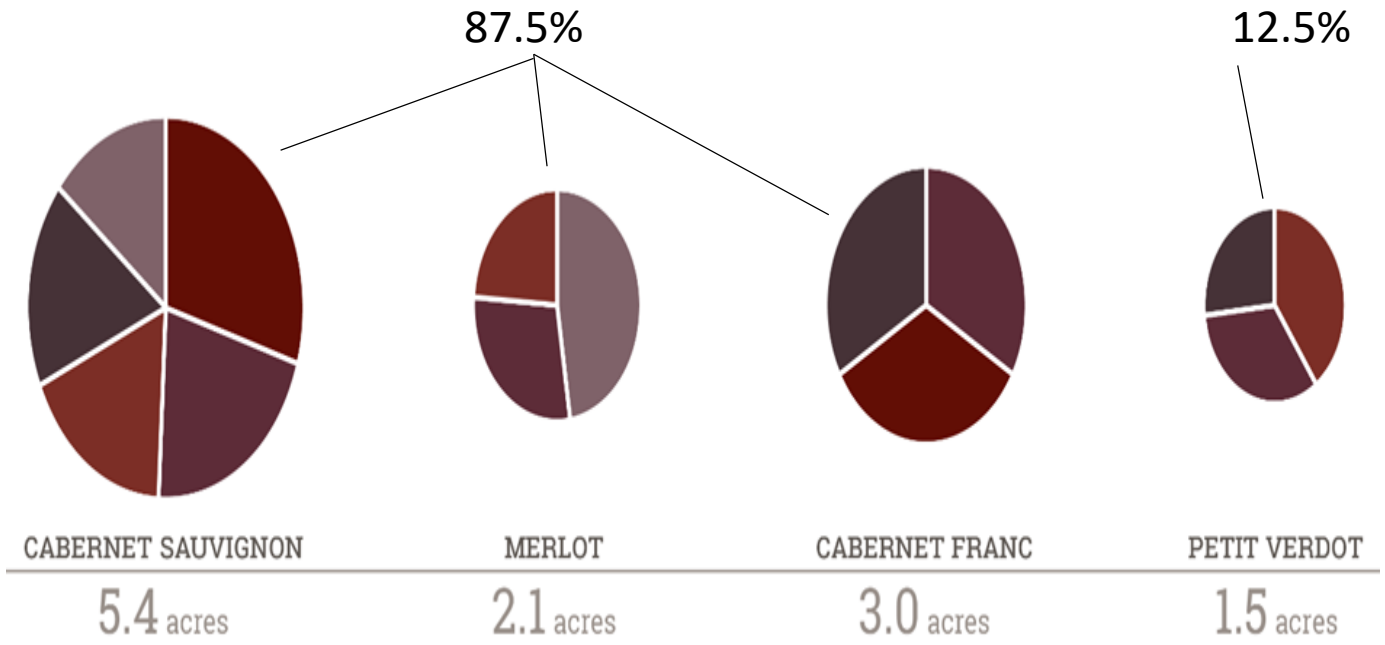
https://www.virginiawine.org/varietals/chambourcin

How much of each cultivar should I plant?

- Enough to:
  - Be a viable independent grower and/or not be “pesky” in winery
    - *At least* a half of an acre for blended cultivars
    - At least one acre for non-blended cultivars

Consider tonnage per acre (may need less acreage of high-yielding cultivars…)

- Meritage:
  - 80-85% (total) - Cabernet franc, Cabernet Sauvignon, Merlot
  - 15-20% - Petit Verdot



http://glenmanorvineyards.com/wine/hodder-hill/

What about clones?

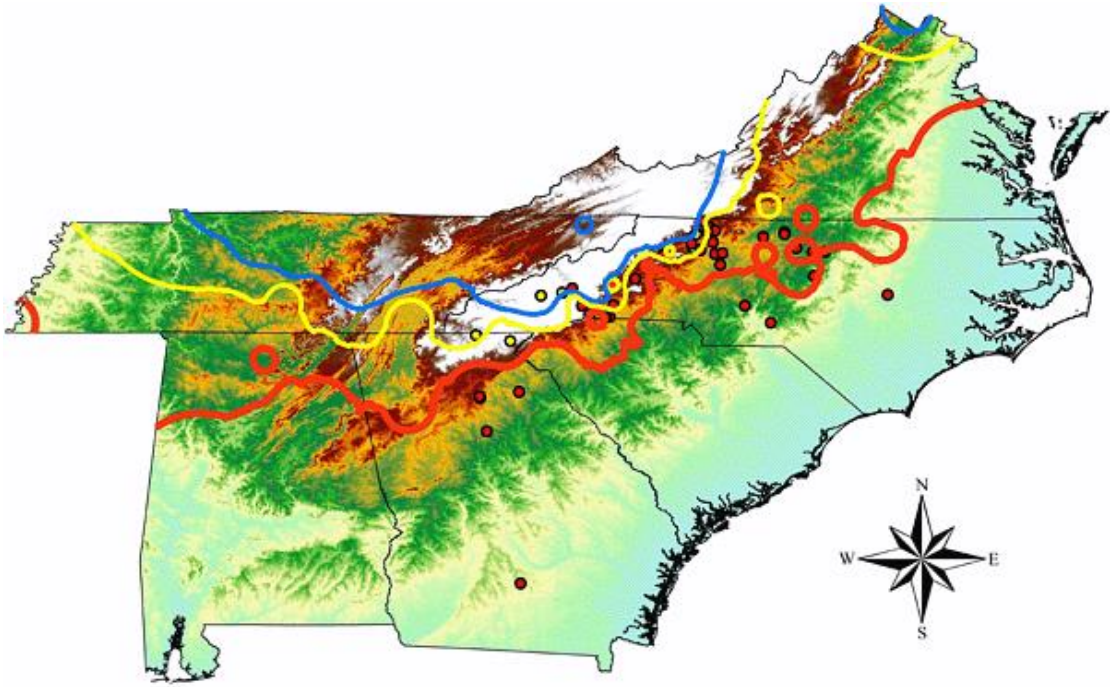
- **Clones are genetically-distinct**
  - High probability of differences in fruit composition (acids, sugars, aromas)

- Assumption (that is probably true):
  - Field blending of more than one clone creates a more complex wine.

  - “More complex” DOES NOT mean “more preferred”.

Two Cabernet franc clones in 2017					
	Soluble solids (Brix)	pH	TA (g/L)	Berry weight (g)	Crop yield (t/a)
214	22.8	3.66	3.66	1.47	4.6
327	22.4	3.72	3.53	1.55	4.6

Considering our regional climate trends…

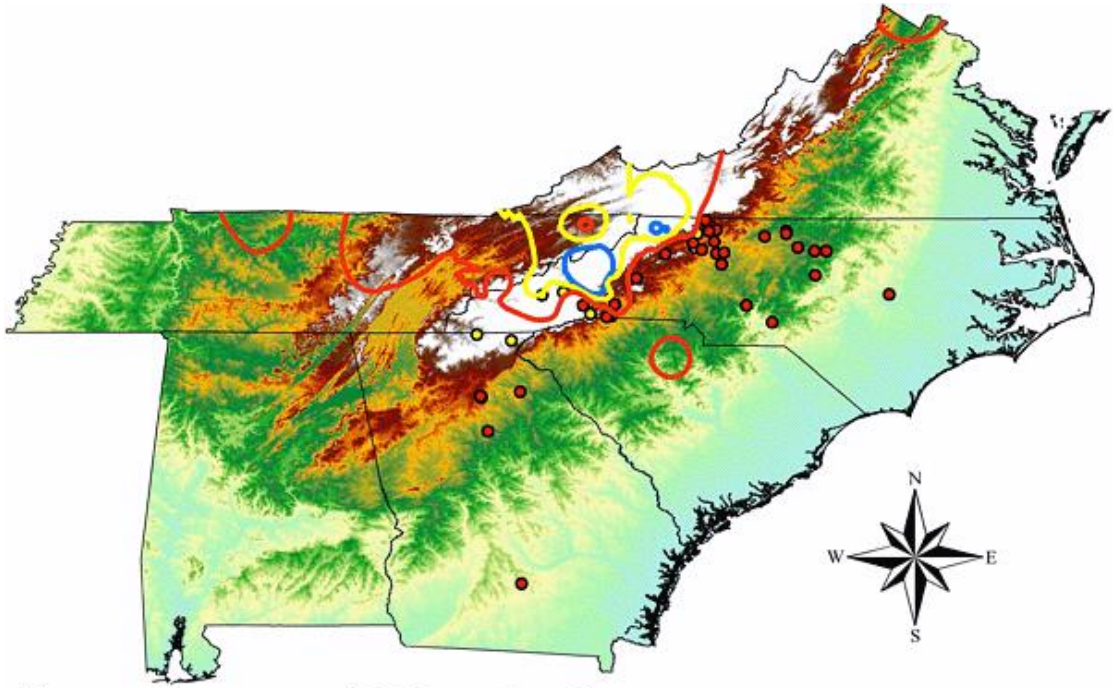


Temperature < or = -12.2C contour lines

1972-1997 (25-year average)

- 1 day (very high risk areas to the South and East)
- 2 days (high risk areas to the South and East)
- 3 or more days (moderate risk areas to the South and East and low risk areas to the North and West)
- Pierce's disease positive sites
- Pierce's disease negative sites

1972-1997



Temperature < or = -12.2C contour lines

1997-2005 (8-year average)

- 1 day (very high risk areas to the South and East)
- 2 days (high risk areas to the South and East)
- 3 or more days (moderate risk areas to the South & East and low to no risk areas within boundary)
- Pierce's disease positive sites
- Pierce's disease negative sites

1997-2005


management

Planting site

- Block
  - North- vs. south-facing
  - Slope vs. flat
    - Both of these situations could be used to increase complexity
      - From one or several varieties
- Region
  - Local climate as it relates to fruit composition
    - Cool/rainy – low sugar, high acid
    - Warm/dry – low acid, high sugar

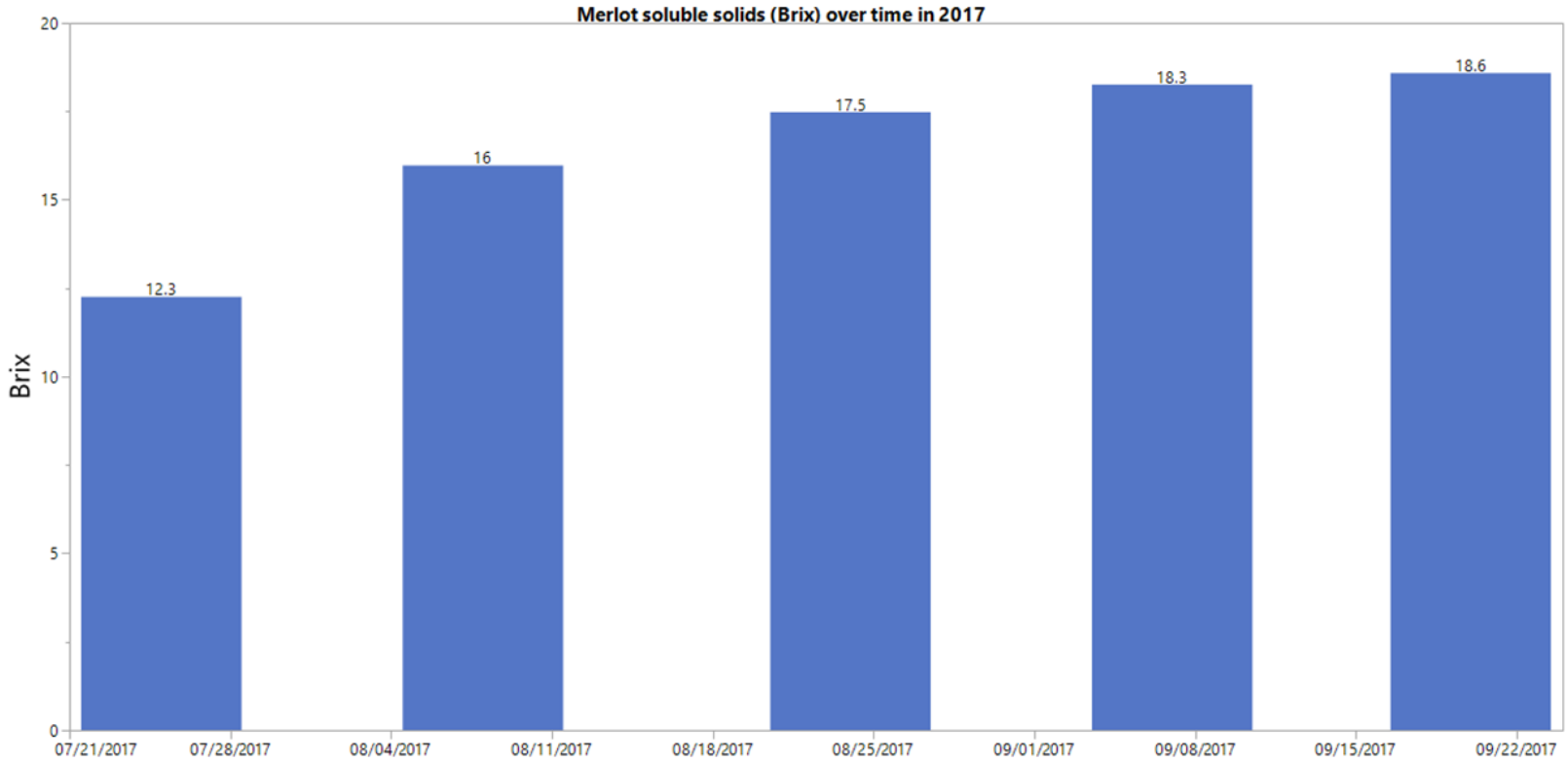
Harvest decision

- Blending allows some hedging of bets…
  - Can be “conservative” on some harvests
    - Merlot vs. other Bordeaux cultivars
    - Sauvgnon blanc, Blanc du Bois, Petit Manseng, Muscat ottonel, Albariño?
- Some metabolites are easier to adjust than others
  - Easy: Primary chemistry (sugar, acid)
    - Brix can be purchased at Costco
  - Difficult: aromatics, structural

Harvest decision – sometimes difficult to get “ideal” composition and low rot severity…

- 2016 vs. 2017
- Blanc du Bois

- Merlot



Canopy management – used to manipulate secondary metabolites

- Shoot positioning and hedging
  - Increasing exposed leaf area / limiting canopy shading
    - SHOULD increase sugar accumulation
- Fruit-zone leaf and lateral removal
  - Well-exposed fruit typically has more varietal character expression

Fruit-zone exposure

- Fruit-zone management can be used as a tool to change composition, and thus blending components

- Exposed:
  - Lower acidity, greater character, ability to hang if desired (lower rot)
- Shaded:
  - Greater acidity, less “hang-time” potential

Fruit-zone leaf removal – color and phenolics

Leaf removal and canopy side effect on berry weight and total berry phenolics and anthocyanins.

Treatment	Berry weight	TBA (mg/g berry)	TBP (au/g berry)
PB-NO	1.47 a	0.83 b	62.99 c
PB-4	1.37 a	1.00 a	78.45 b
PB-8	1.17 b	1.02 a	86.33 a
Canopy side			
EAST	n/a	0.94	75.75
WEST	n/a	0.95	76.11

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Fruit-zone leaf removal – acidity

Leaf removal effect on titratable acidity	
Treatment	**Titratable acidity (g / L)**
PB-NO	7.96
PB-4	7.42
PB-8	7.01

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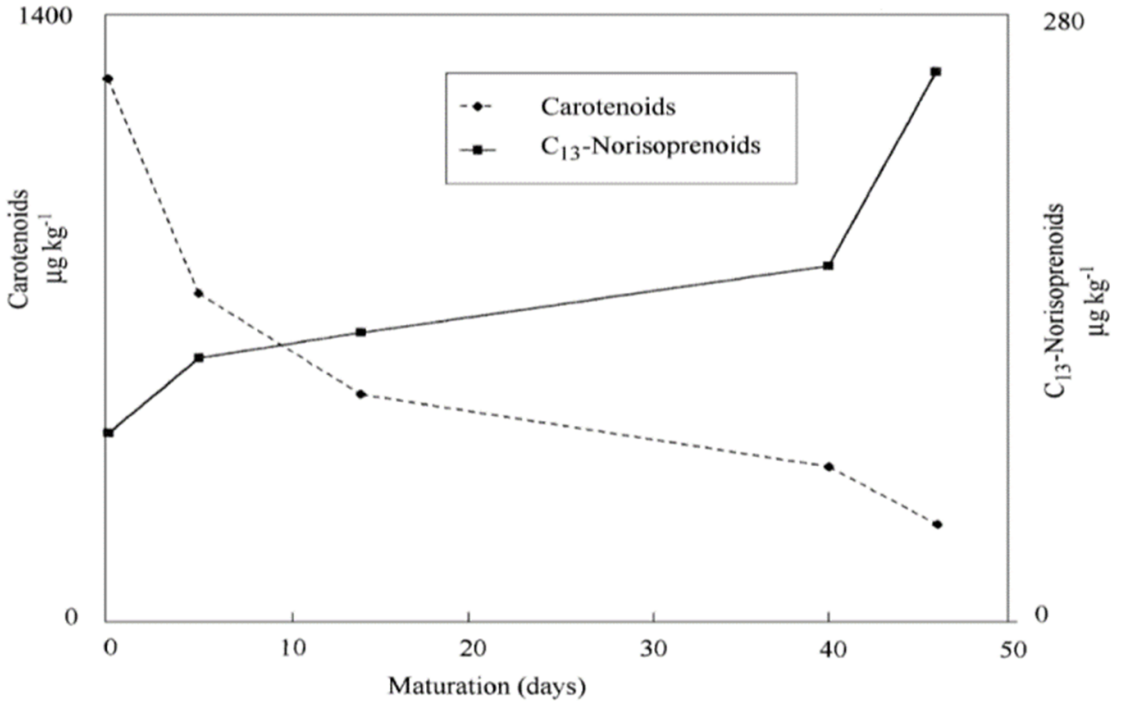
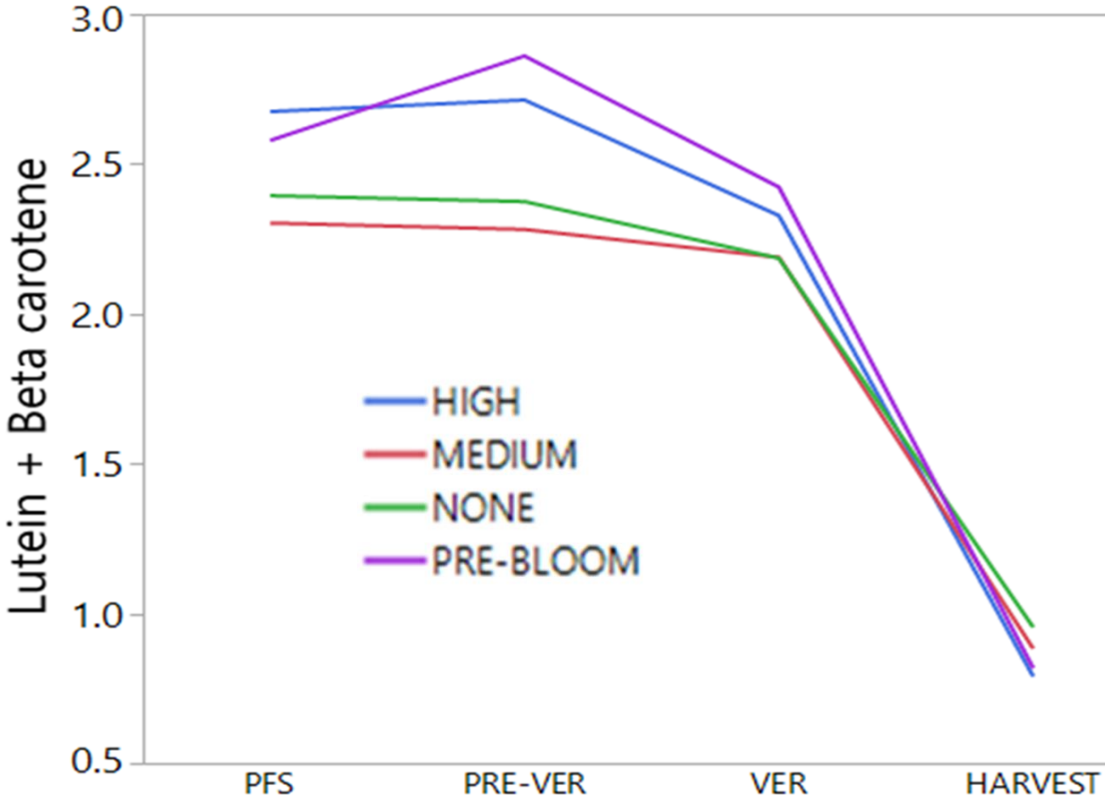
Fruit-zone leaf removal - acidity

	TA (g/L)	Tartaric	Malic	Citric
NO	10.11 a	4.38	5.74	0.39
PFS-4	9.02 b	4.43	5.43	0.41
PFS-6	8.50 b	4.35	4.96	0.36

Fruit-zone leaf removal – aromatic potential





Varietal character (Russ Moss, EWE 2017)

Summary

The following increases (SENSORIALLY-POSITIVE) varietal-specific aromas with a few exceptions:

- Water stress
- Higher juice YANs
- Adequate vine nutrition
- Botrytis
- Drying of fruit
- Heat
- Sunlight

Fruit exposure is an important tool to increase aromatics

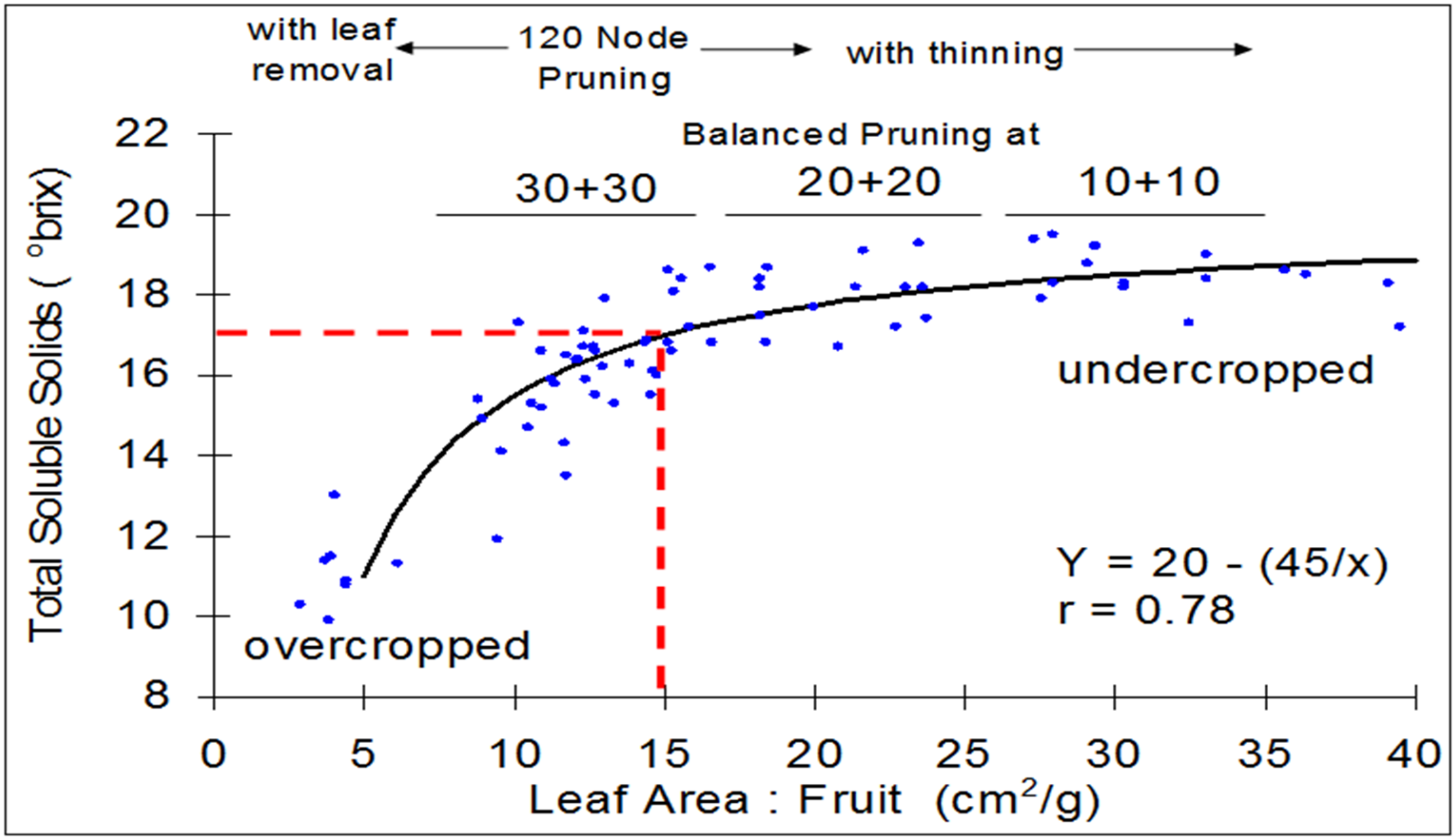
Fruit zone leaf removal vs. clone effect

Two Cabernet franc clones in 2017					
	Soluble solids (Brix)	pH	TA (g/L)	Berry weight (g)	Crop yield (t/a)
214	22.8	3.66	3.66	1.47	4.6
327	22.4	3.72	3.53	1.55	4.6

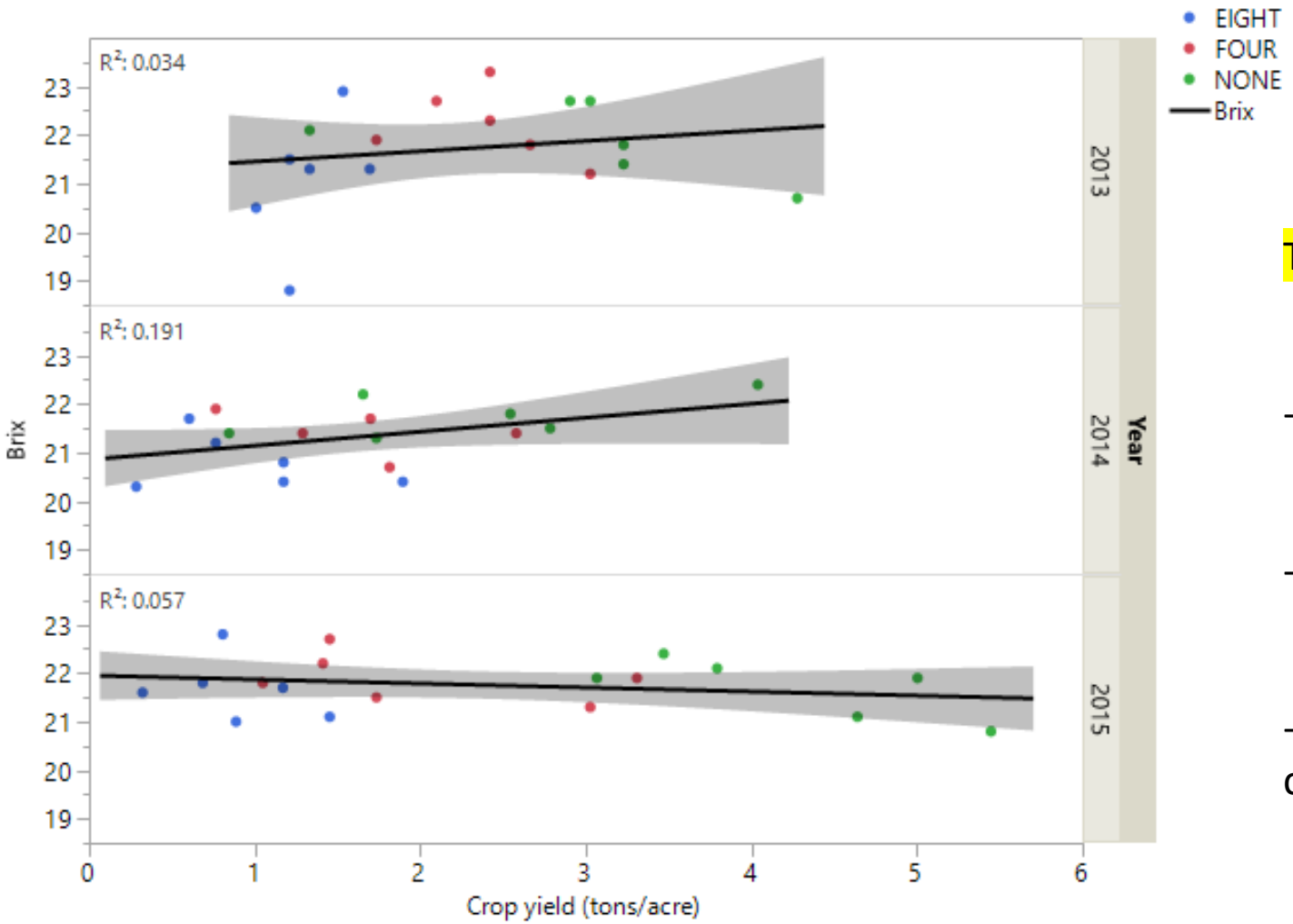
Leaf removal effect in Cabernet franc clone 214 in 2017					
	Soluble solids (Brix)	pH	TA (g/L)	Berry weight (g)	Crop yield (t/a)
NO	22.9	3.66	3.77 a	1.50	4.6
PB-SIX	23.1	3.70	3.50 b	1.45	4.4
PFS-SIX	22.5	3.61	3.71 ab	1.45	4.8

Leaf removal effect in Cabernet franc clone 327 in 2017					
	Soluble solids (Brix)	pH	TA (g/L)	Berry weight (g)	Crop yield (t/a)
NO	22.2	3.68 b	3.78	1.60	5.0
PB-SIX	22.8	3.76 a	3.29	1.54	4.2
PFS-SIX	22.1	3.72 ab	3.51	1.49	4.5

Crop thinning – will change leaf area: fruit weight…
… and Brix levels… *maybe*



Crop yield vs. Brix



Take home on Crop yield vs. Brix:

--Don't shoot yourself in the foot

--Set your crop by shoot thinning

--Crop thin when necessary (i.e. touching clusters)

Trellis – especially re: tonnage

- The most ubiquitous trellis system – VSP
  - Easy
  - Cost effective
  - Limits
    - Fruit production confined to single, linear zone
    - Leaf area confined between two tight catch wires

Rootstock choice

- Rootstock effects on crop yield and fruit composition
  - Likely indirect effects of
    - water and nutrient translocation
    - fruit set and berry weight
    - and canopy architecture

Rootstock effect in Cabernet Sauvignon, 2010-2016						
	Crop yield (kg / vine)	Pruning weight (kg/m)	Brix	pH	Anthocyanins	K+
101-14	3.96 b	0.95	23.11	3.40 a	38.31	2.81 a
420-A	3.86 b	0.89	22.75	3.33 b	35.65	1.18 b
Riparia	4.72 a	0.81	23.11	3.38 a	37.09	2.37 a

vintage

field and winery blending

Vintage effect on blending

- Eastern US has some dramatically different vintages…
  - Different cultivars used to blend
  - Different proportions of same cultivar
- Do you blend to?:
  - make the best wine ever produced
  - “save” a vintage
  - make balanced wines
- Non-vintage blends
  - 2010 vs. 2011 in Virginia
  - 2016 vs. 2017 in northern Georgia

	Harvest date	Brix	pH	TA	Rot	Color	Phenolics
2010	Sep 10	25	3.42	5.39	NONE	39.8	31.3
2011	Oct 10	21	3.41	5.47	LOTS	38.7	33.2

Considerations for field vs. winery blending

- Field:
  - Extensive pre-planning required
    - differences in harvest date and phenology, both impacted by vintage
  - Maybe best reserved for clones
  - Less “control” than winery
  - Interplanting missing vines with different cultivar
    - Consider phenology differences

Considerations for field vs. winery blending

- Winery:
  - Bench blending is a “reserved tool” to craft and create final wine
  - Can use several different cultivars
  - Post-fermentation vs. pre-bottling
    - Pros / cons?

case studies

Meritage blend

Hodder Hill (Glen Manor, VA)

Varietals

2009 *63% Cabernet Sauvignon, 25% Merlot, 6% Petit Verdot and 6% Cabernet Franc*

2010 *69% Cabernet Sauvignon, 21% Merlot, 10% Petit Verdot*

2012 *64% Cabernet Sauvignon, 18% Merlot, 14% Petit Verdot, 4% Cabernet Franc*

https://www.virginiawine.org/governors-cup-2012/awards#Gold

Hybrid-*vinifera* red wine blend
Three Captain's Red (Zephaniah, VA)

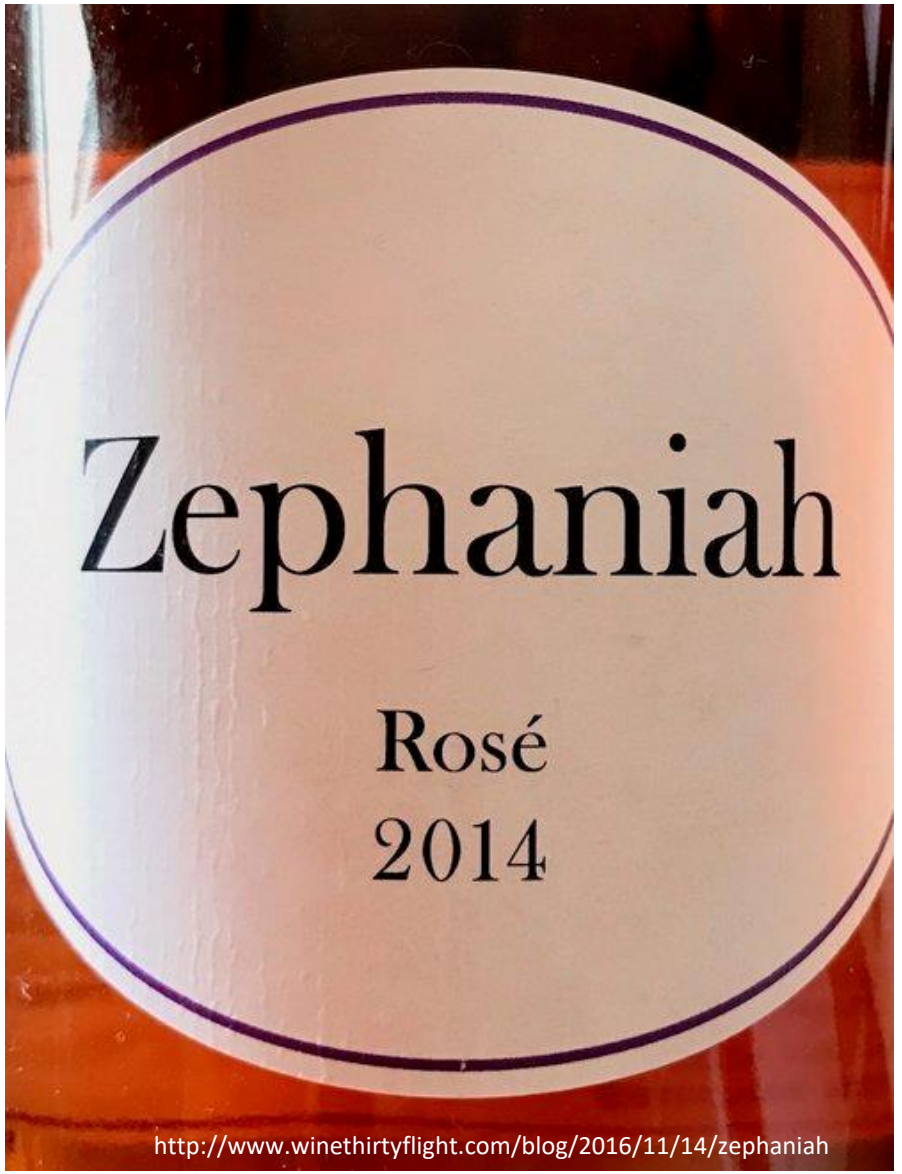
- Chambourcin (45%)
  - ~8-9 tons / acre
  - High wire
- Cabernet franc (45%)
  - ~6-7 tons per acre
  - Ballerina
- Cabernet Sauvignon (10%)
  - ~4-5 tons per acre
  - VSP

Hybrid-*vinifera* white wine blend
Steamship White (Zephaniah, VA)

- Chardonel
- Chardonnay
- Whole cluster-pressed Cabernet Sauvignon

Hybrid-*vinifera* rosé
Rosé (Zephaniah, VA)

- Bled Chambourcin
- Bled Cabernet franc



http://www.winethirtyflight.com/blog/2016/11/14/zephaniah

Hybrid-*vinifera* white wine blend
ZUSA (Crane Creek, GA)

- Gruner Veltliner (75-80%)
- Traminette and Riesling (20-25%)

http://heelsfirsttravel.boardingarea.com/2016/06/30/best-north-georgia-winery/

American-*vinifera* red wine blend
Hellbender Red (Crane Creek, GA)

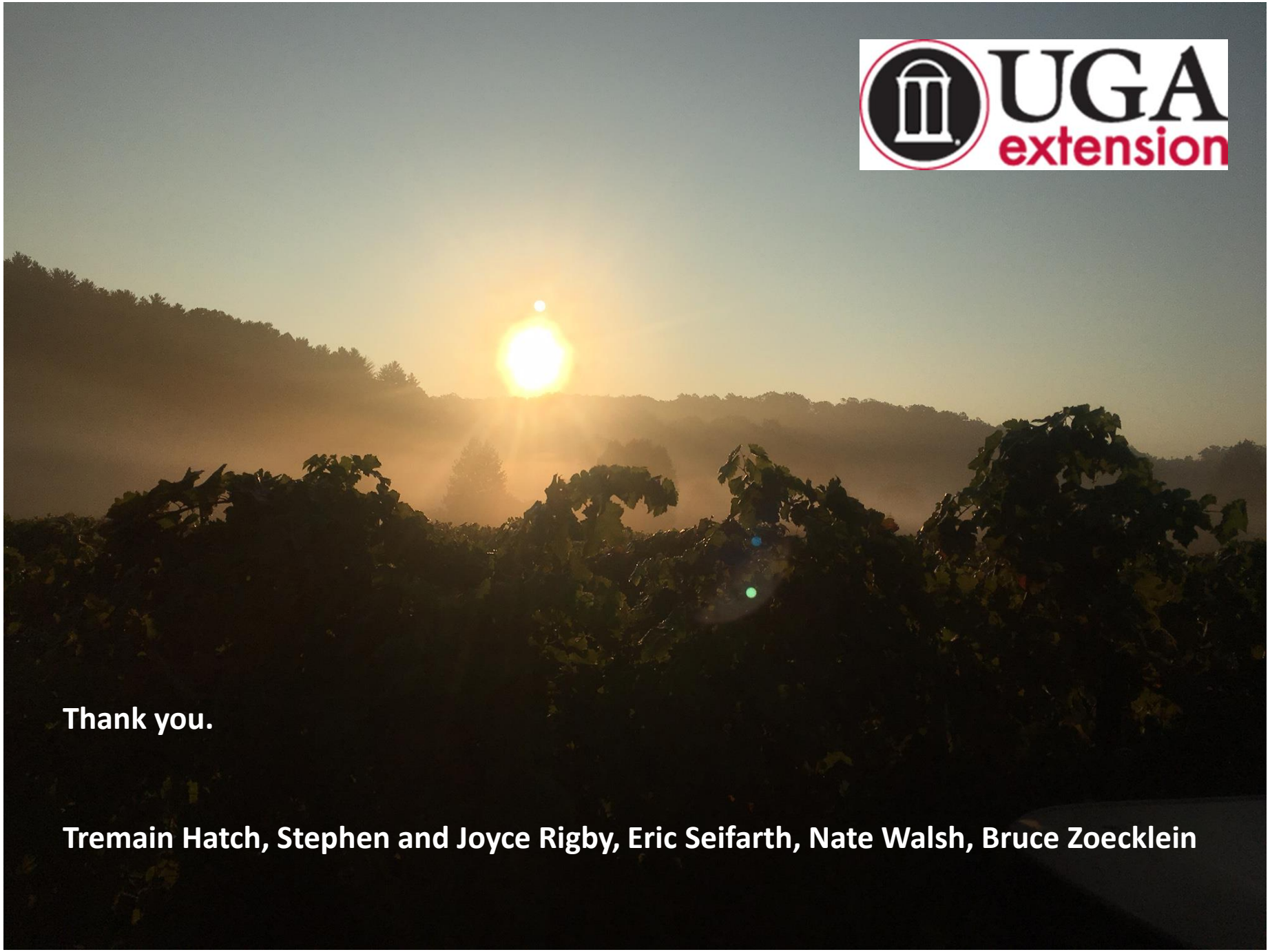
- Norton (~80-85%)
- Cabernet franc (~15-20%)

- Age for 3.5 years in American oak
  - Attenuates Norton astringency
    - Could use fining agents… may knock some of the desired attributes from Norton

Take home

- Know your market
  - It’s fiscally responsible
- Target blends that satisfy you
  - More importantly, satisfy customers
- Choose cultivars wisely
  - that allow you to make targeted blends
  - that work well in our challenging region
  - That balance tonnage and composition
- Use tools (site selection, management practices) to further dial in the desired composition from your blending components
  - Fruit zone management has greater impact on compositional attributes than crop thinning.

UGA extension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Thank you.
Tremain Hatch, Stephen and Joyce Rigby, Eric Seifarth, Nate Walsh, Bruce Zoecklein