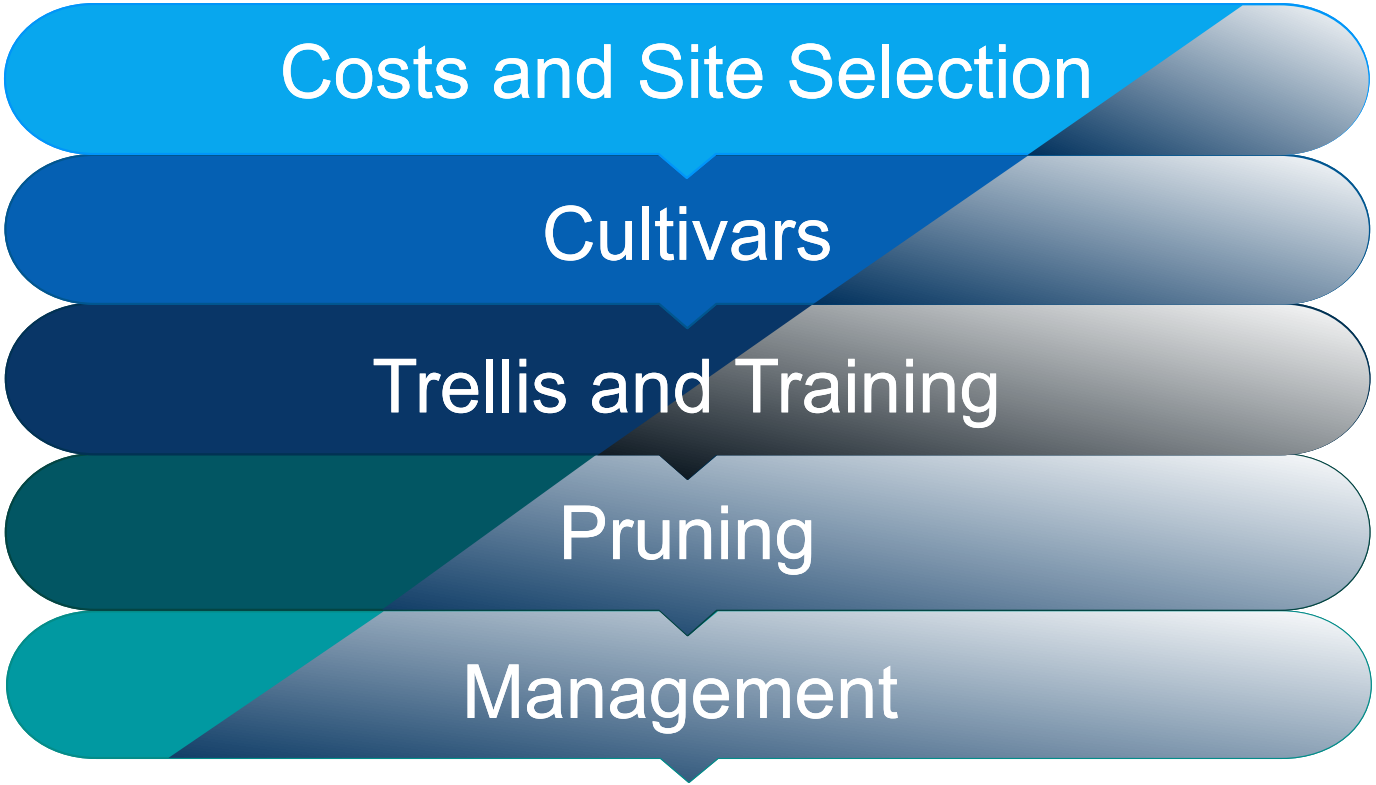
North Carolina Muscadine GRAPE Association

VIRTUAL MUSCADINE CONFERENCE 2021

Muscadine Production 101

Muscadine Production 101

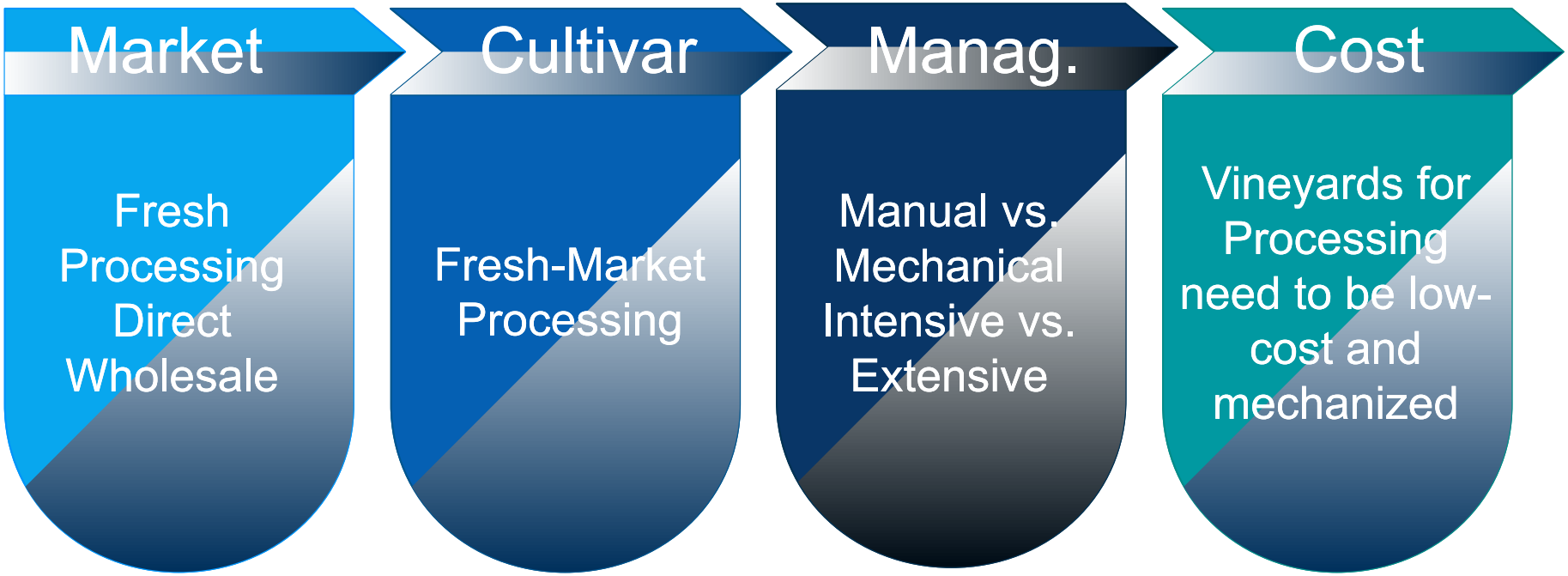
Mark Hoffmann, NC State University


Costs and Site Selection
Cultivars
Trellis and Training
Pruning
Management

Costs and Site Selection

How much costs a vineyard?

Costs and Site Selection



Costs: Know this first

Market	Management	Upfront Investment	Labor Demand	Returns /acre	Time Scale to profitability
Direct-to Consumer	Intensive + small (1-2 acres) + Food Safety	$	++	moderate	5-8 years
Whole Sale	Intensive + large + Food Safety	$$$	+++	High	7-10 years
Processing	Low-Cost, large scale, mechanized	$$	+	Low	5-10 years
Wine Sales	Low-Cost, mechanized, tasting room; Events;	$$$$	+++	N/A	7-10 years
Wine Making	Low-Cost, mechanized; Tasting Room, Events; Winery	$$$$$$	++++	N/A	10-12 years

Costs: The first 3 years

Year	Activity	Material	Material $/acre	Labor[1] $/acre	Total $/acre
0	Land clearing and leveling	Service[2]	$300–$3,000		
	Soil cultivation	Service[2]	$50–$300		
	Irrigation installation	Service[2]	$3,500–$6,500		
	Grape vines (ordering)	218 vines/acre *$10 per vine*	$2,180 -		$2,180
	Application of lime[3]	-	-	-	-
	Weed control	Strip spray with Roundup	$10	$28	$38
	Establishment of trellis system[4]	218 4"x8" posts *$8 per piece* 84 6"x8" posts *$12 per piece* 42 4"x4" timbers *$12 per piece* 3 rolls of 9" wire *$50 per roll* Anchors, Fasteners etc.	$1,744 $1,008 $504 $150 $200	$600	$4,406
1–2	Grape vine planting[5]		-	$1,080	$1,080
	Pest control	Pesticide applications	$20–$50	$72	$92–$122
	Training	Training on trellis (supplies include grow tubes, 6' bamboo stakes, orchard tape)	$436	$1,044	$1,480
	Pruning		-	$120	$126
TOTAL COSTS					**$13,246–$19,106**

Costs: Years 4+

Table 4. Projected estimate of costs per acre for the maintenance of a muscadine vineyard per year. Equipment costs are not included.

Year	Activity	Material	Material $/ acre	Labor $/ acre	Total $/acre
3 and following	Pre-harvest cultural management[1] (fertilization, hedging, training, repairs etc.)	Fertilizer *$20/50lb*	$160	$240	$400
	Pest and weed management[2] (spray applications, mowing, debris removal etc,)	Pesticides *variable*	$200–$500	$480	$680– $980
	Harvest *Hand harvest*[3] *Machine harvest*[4]	-	-	 $1,800 $270–$720	 $1,800 $270–$720
	Post-harvest cultural management[5] (debris removal, pruning)	-	-	$600	$600
TOTAL COSTS	Hand-harvest Machine harvest				**$3,480–$3,780** **$1,950–$2,400**

[1]20 hours of labor/acre are estimated for pre-harvest cultural management.
[2]40 hours of labor/acre are estimated for pest and weed management.
[3]60 hours of labor/acre are estimated for one pass of hand harvesting grapes (three harvest events are estimated).
[4]Rates to rent mechanical harvester can vary.
[5]50 hours of labor/acre are estimated for pruning and other post-harvest cultural management.

Costs: Reminder

Rule of thumb

Investment into one acre of muscadine vineyard from establishment (Year 1) to first harvest (Year 4)

$20,000 - $30,000 / acre

Capital Expenditures

Pre-Pruning Equipment;

Mower;

Hedging;

Tractor with Cabin;

Airblast Sprayer;

Post Driver;

Mechanical Pruners

Harvest Equipment (Bins, contract with mech. Harvester)

Expenses

Pruning Labor

Harvest Labor

Labor for weed and canopy management;

Labor for disease/pest management;

Repairs on Machinery and Vineyard

Fuel/Oil/Taxes/Insurance etc.

Long-Term: Revenue > Total Cost

Make a business plan before you start

Set yourself goals

Be realistic!!!!!!!

Farming needs to be cost-effective;

If you lose money, more and more frustration will creep in

Risking the well-being of yourself, your family and loved-ones.

Site Selection

Questions?

1. Is the site suitable to your market needs?
2. Is the pH correct?
3. Water Drainage?
4. Air Drainage?

1. Market Needs

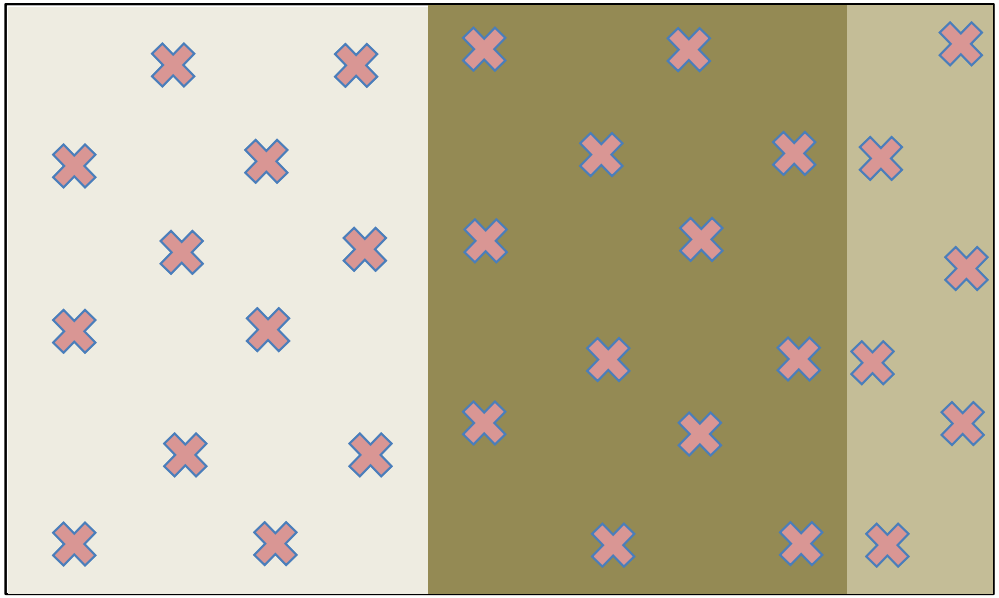
1. U-Pick: Easy access for cars; Parking Space; Space of Children/Activity?; Close to a road/busy neighborhood;
2. Processing: Easy access for heavy machinery; Turnaround space for heavy machinery; Even growth; Sturdy trellis and post;

2. Soil pH: 6.0-6.5

Soil sampling :

- **0-7 inches**
- **7-14 inches**

Summer before planting



Combined Samples 1 and 2 (0-7;7-14)

Combined Samples 3 and 4 (0-7;7-14)

Combined Samples 5 and 6 (0-7;7-14)

Adjust pH based on Soil Samples

Send soil samples to
www.ncagr.gov/agronomi/sthome.htm

Optimal pH: 6.0-6.5

Optimal P in soil 30 ppm of P

Adjust pH based on Soil Samples

Lime (not Gypsum)

Incorporate in the summer BEFORE posts and planting

3. Water Drainage

Photo Courtesy:
Connie Fisk

Standing Water is a red flag

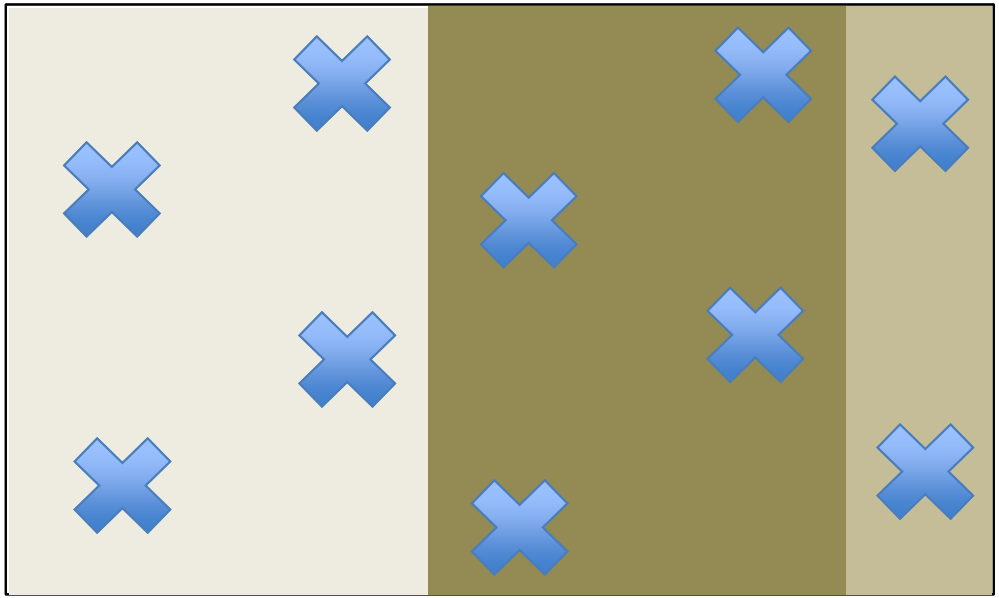
- Standing water or bad/no drainage will cause low growth and disease problems down the line. Don’t plant!

Evaluate Field with Auger

Evaluate field

- For long standing water after heavy rain
- For hard soil layers in the upper **30-40 inches**

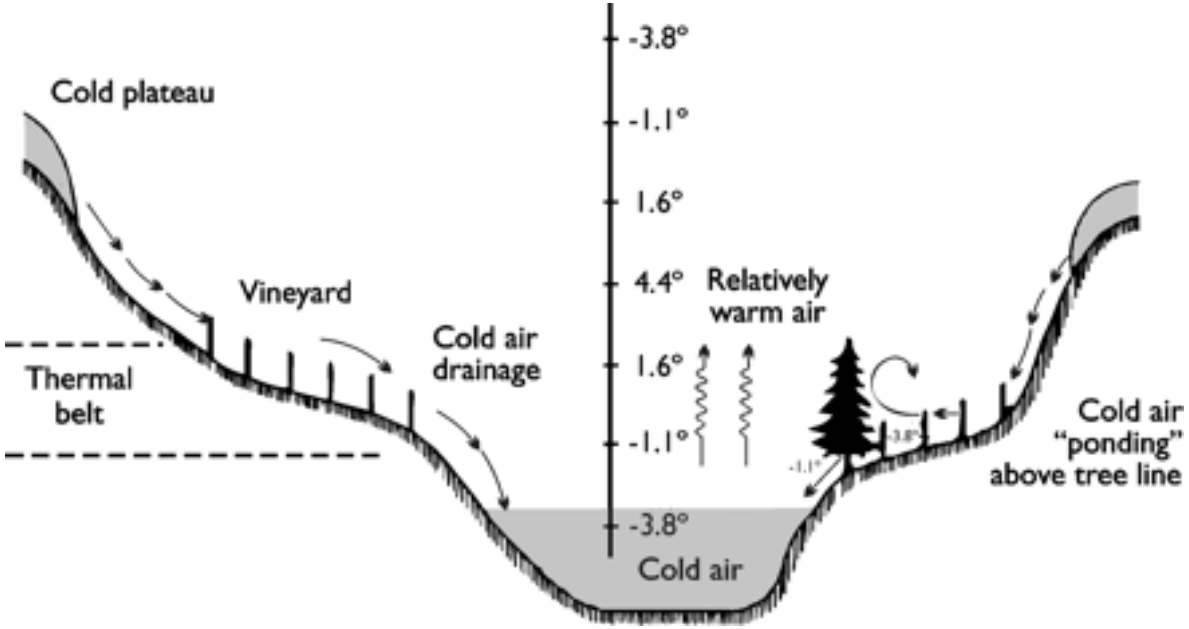
Summer before planting



4. Air Drainage

Evaluate field

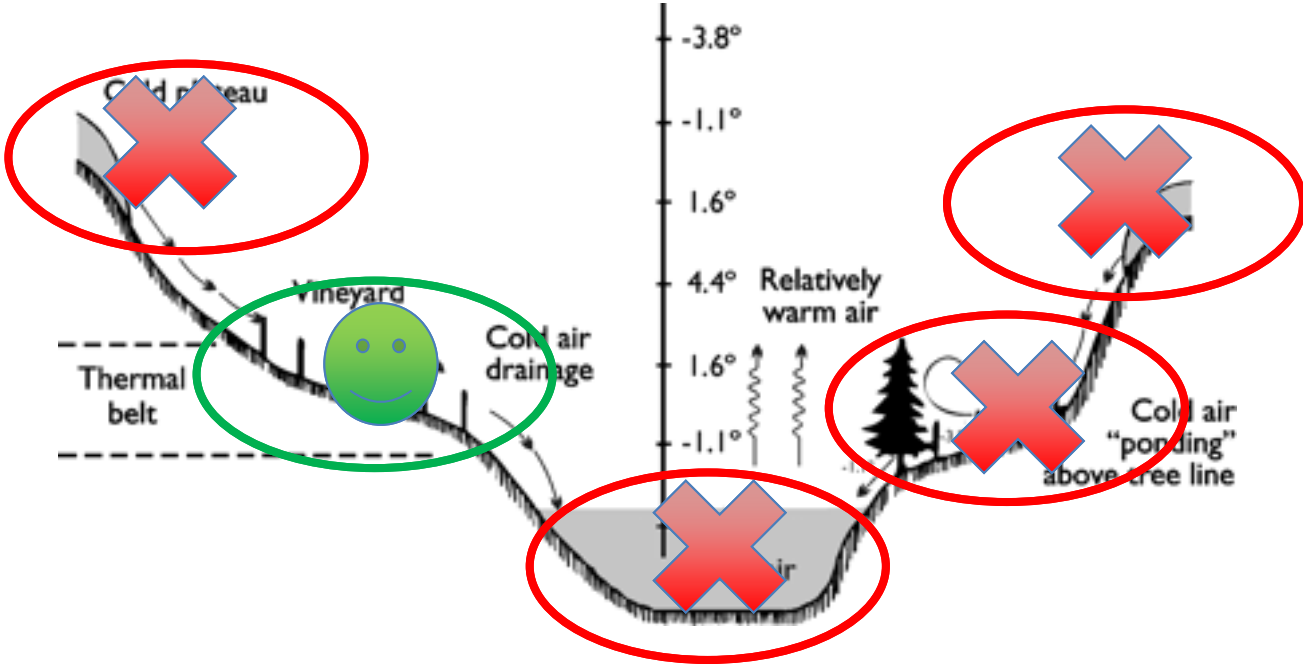
- Vineyards need two things:
- **Sunlight**
- **Air Drainage**



If planted in the wrong spot

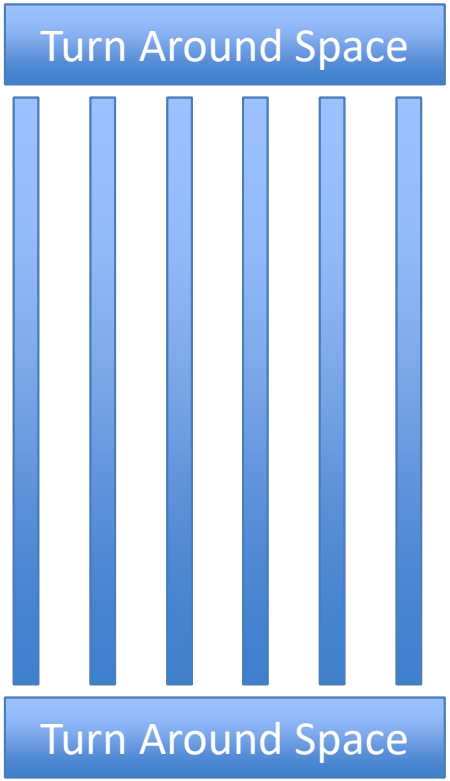
Increased risk of:

- **Dead plants**
- **Split Trunks**
- **Frost Damage**



One more thing: Turn Around

30 -40 ft



Cultivars

- Muscadine cultivars are either **female** or **self-fertile** (perfect flower)
- **Male muscadines are not used in commercial production, and are often not/less fruitful**
- All female cultivars need a self-fertile pollinator

Cultivars

Figure 2. Close-ups of male, self-fertile ("perfect"), and female muscadine flower clusters (photos by Patrick Conner).

4 | Muscadine Grape Production Guide for the Southeast

https://content.ces.ncsu.edu/muscadine-grape-production-guide

Don’t sell wine/juice cultivars for fresh consumption

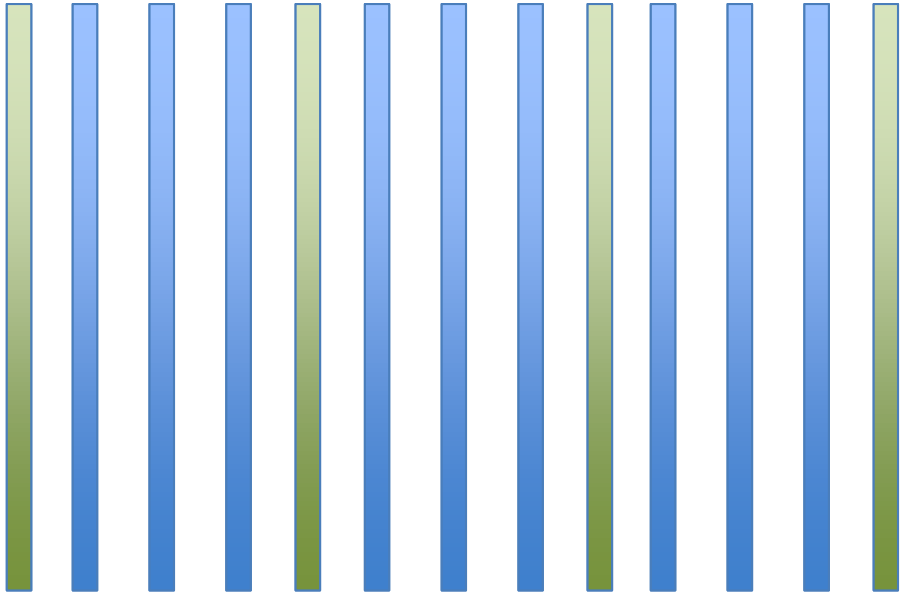
- **Wine/juice Cultivars:** High yields, high sugar, small berry size, wet picking scar, poor eating quality!
- **Fresh-Market**: large, frim, dry picking scar, high eating quality! Can also be used for wine/juice.

Photo courtesy: Dr. Patrick Conner, University of Georgia

Female vs. Self-Fertile

Rule of thumb: 1:3 ratio

(self-fertile : female)



Dark Fresh-Market

Season	Cultivar	Flower type
Early	**Lane**	Self-fertile
Mid	**Supreme**	Female
Mid	**Ison**	Self-fertile
Mid	**Black Fry**	Female
Mid	**Paulk**	Self-fertile
Late	**Nesbitt**	Self-fertile

Bronze Fresh-Market

Season	Cultivar	Flower type
Early	**Hall**	Self-fertile
Early	**Triumph**	Self-fertile
Mid	**Tara**	Self-Fertile
Mid	**Fry**	Female
Late	**Late Fry**	Self-fertile

Processing Cultivars

Color	Cultivar	Flower type
Dark	**Noble**	Self-fertile
Bronze	**Carlos**	Self-fertile
Bronze	**Doreen**	Self-fertile
Bronze	**Magnolia**	Self-fertile

Photo courtesy:
Dr. Patrick Conner, University of Georgia

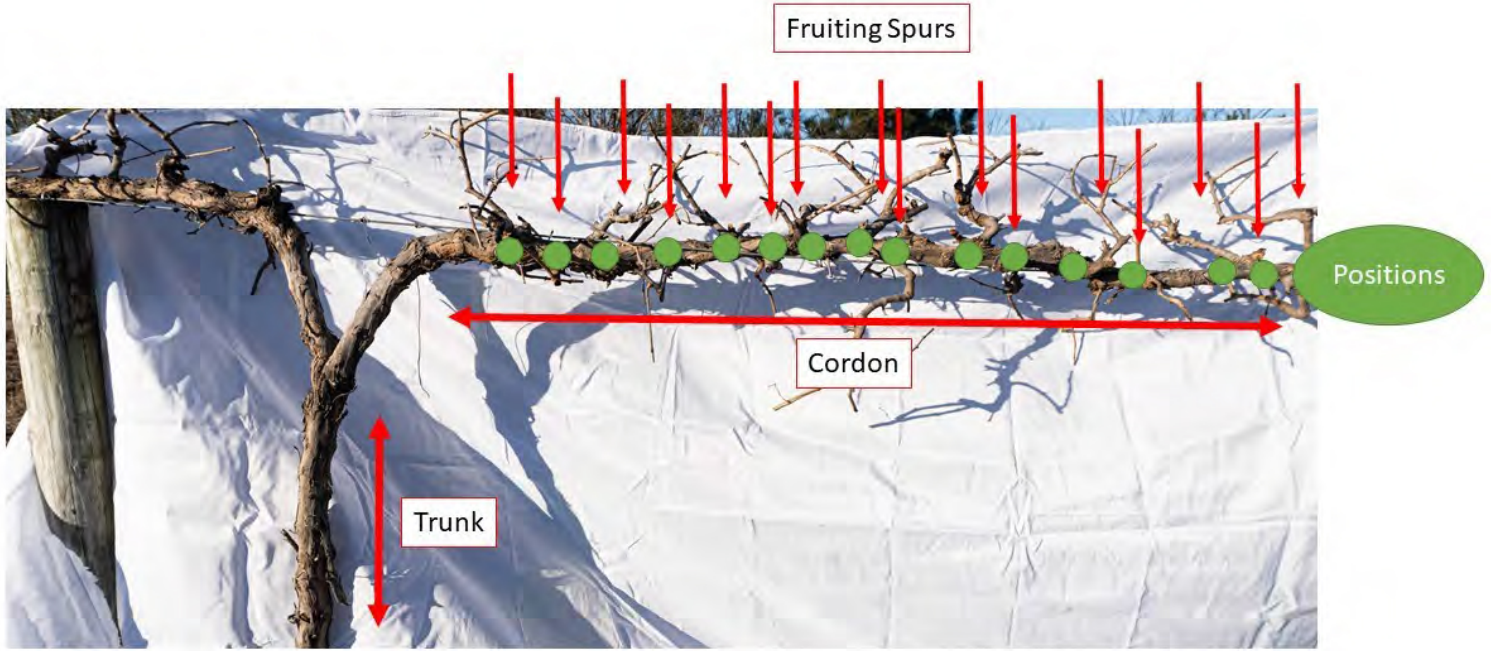
Planting Rules:

- Planting always in Spring of Year 2 after the last frost
- Alternative can be planted in Fall, but not recommended
- Young plants need frequent water and fertilizer
- Amount of water and fertilizer depends on soil type
- Clay/Loam soils: Less water/fertilizer than Sandy soils
- Min: 10-11 ft row spacing

Trellis and Training

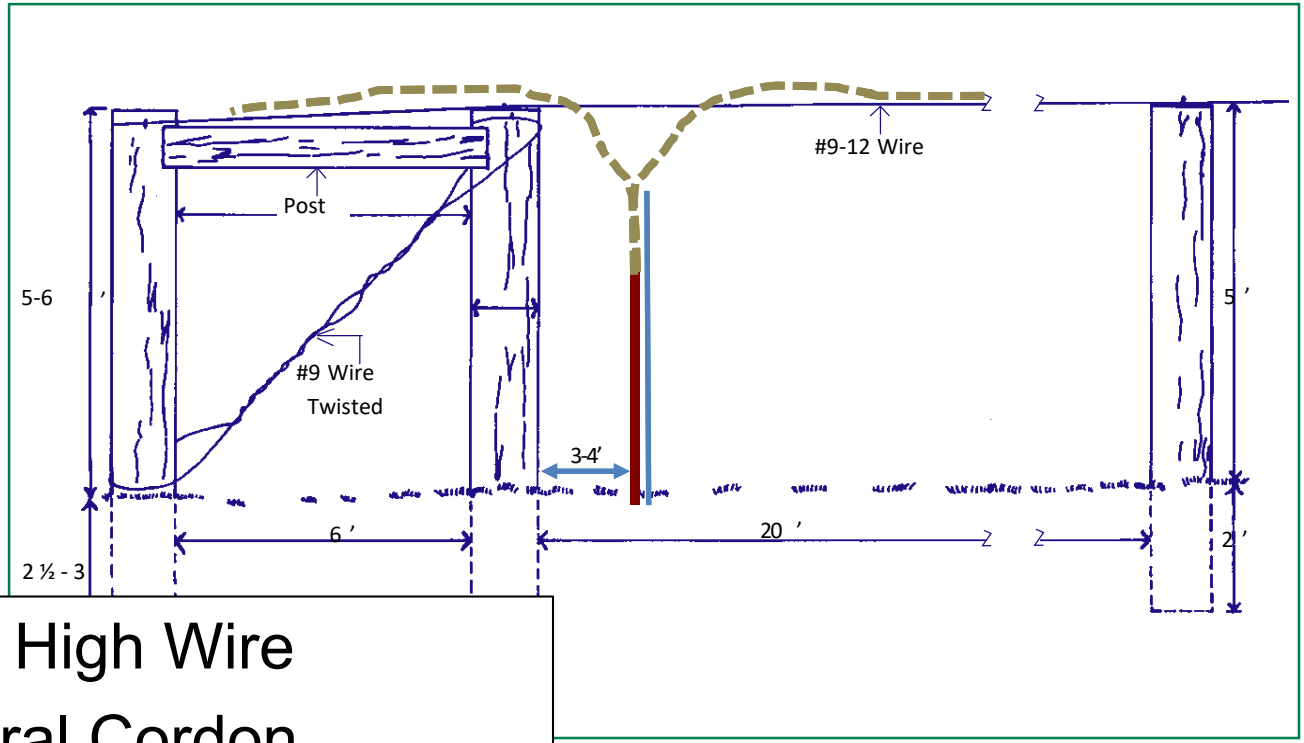
Photos by Emma Volk and Mark Hoffmann

Nomenclature



- Trunk: Structure from root system to wire
- Cordon: Arm along the wire
- Spurs: Structures established on positions along the cordon, bearing one-year old wood

Trellis



- Single High Wire
- Bi-lateral Cordon
- Spur Pruning System

Photos by Emma Volk and Mark Hoffmann

One year old vines (planted in Spring)

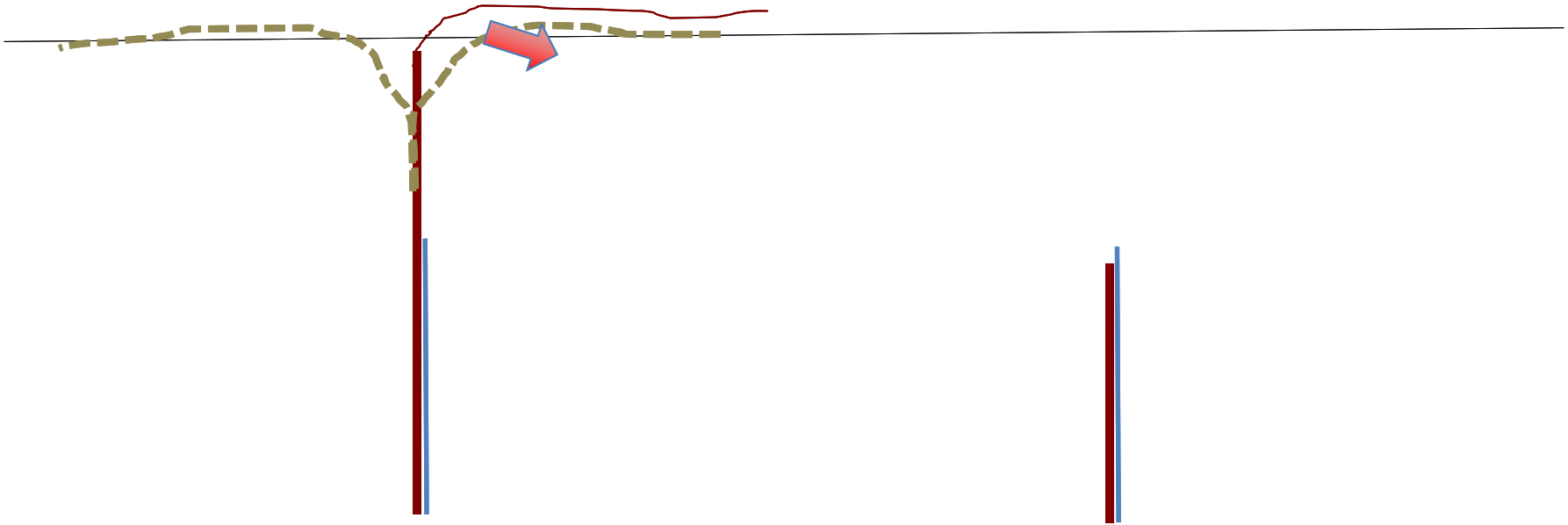
Good vigor

Weak vigor

One year old vines (planted in Spring)

Good vigor

Weak vigor



Two year old vines

Good vigor

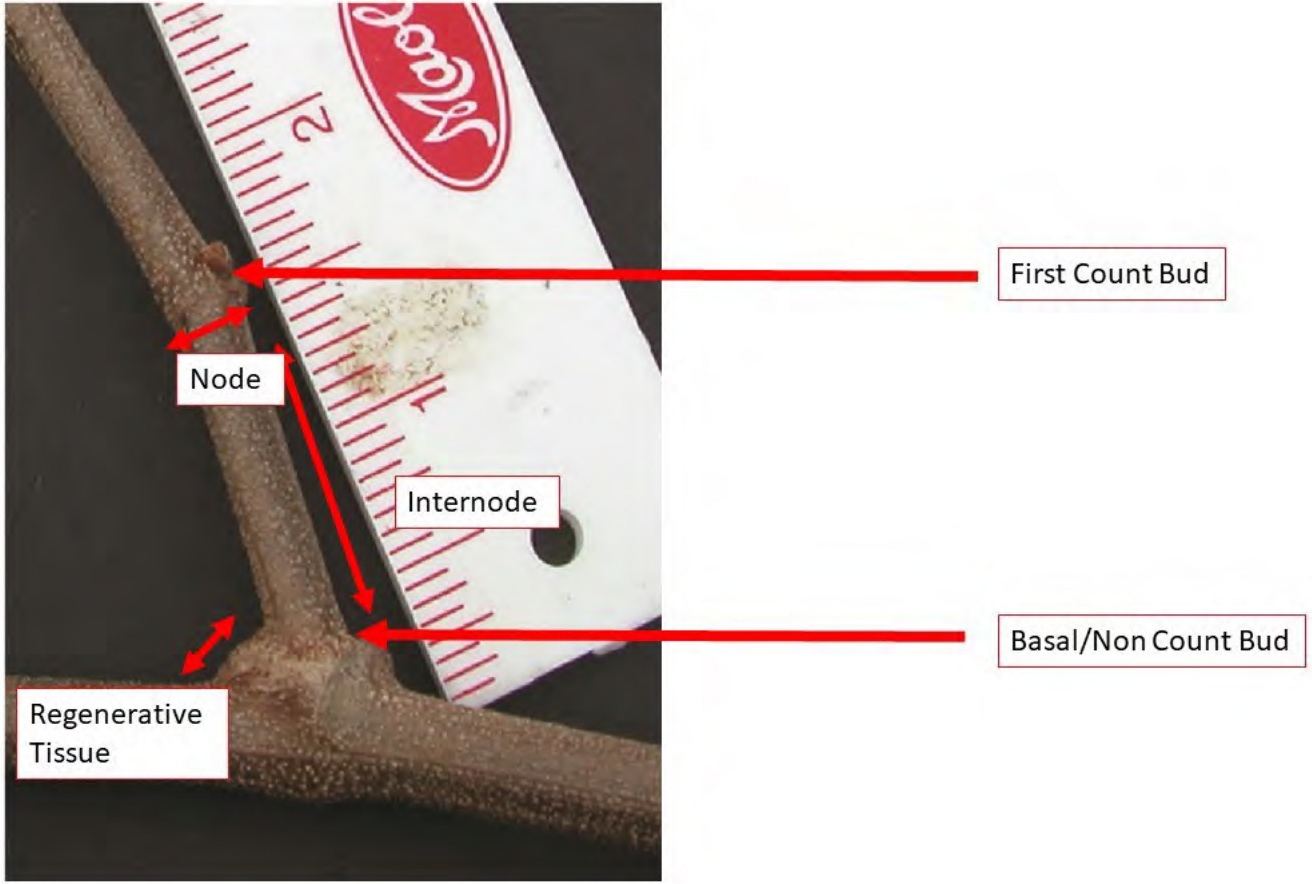
Weak vigor

Two year old vines

Good vigor

Weak vigor

Pruning


First Count Bud
Node
Internode
Basal/Non Count Bud
Regenerative Tissue

Pruning Basics

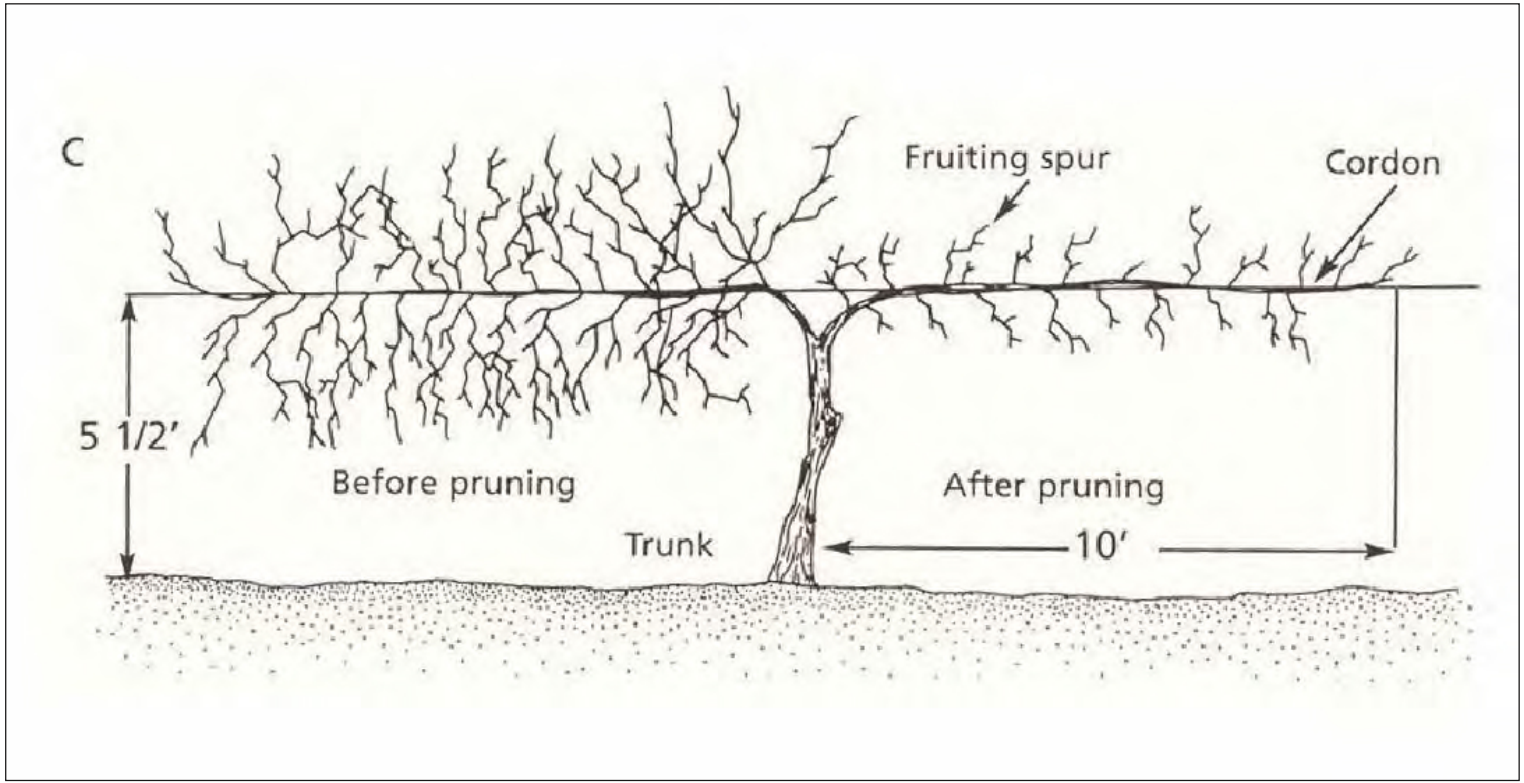
Vigor	Number of buds/foot of cordon	Number of buds/vine (20ft)	Typical Cultivar Examples
++	30-40	600-800	Carlos, Noble
+	20-30	400-600	Supreme

- PRE-HEGE!!!!
- Avoid long spurs
- Stay close to the cordon
- Healthy wood is brown, pencil thick.
- Nodes are about 2 inches apart

Photo Courtesy: Barclay Poling

Manual Pruning Tools

Pruning Basics



Poling et al. (2016)

Pruning Basics

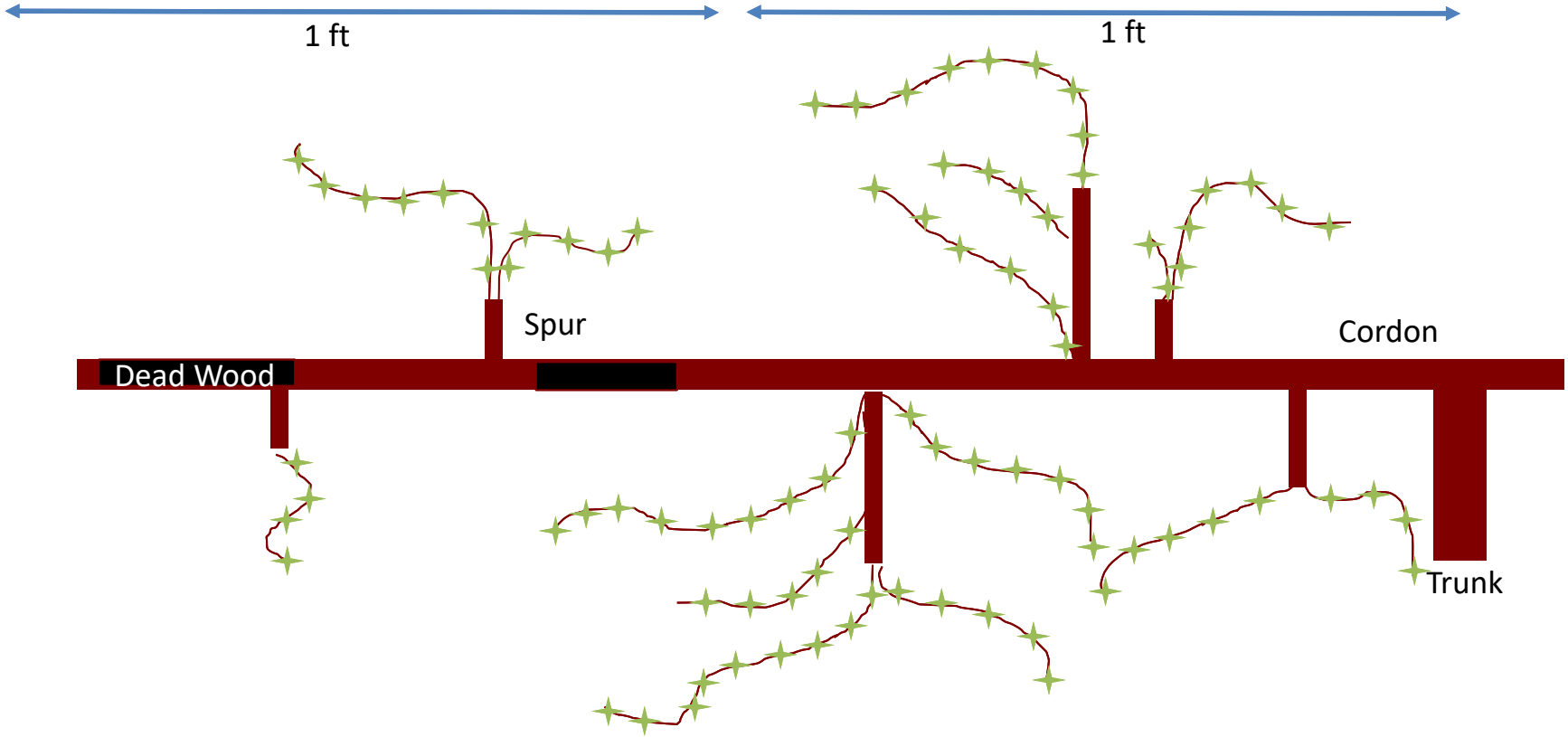
1st STEP:
Assess the vigor of the vine

The more vigor, the more buds you will have to keep

2nd STEP:
Evaluate the structure of the vine

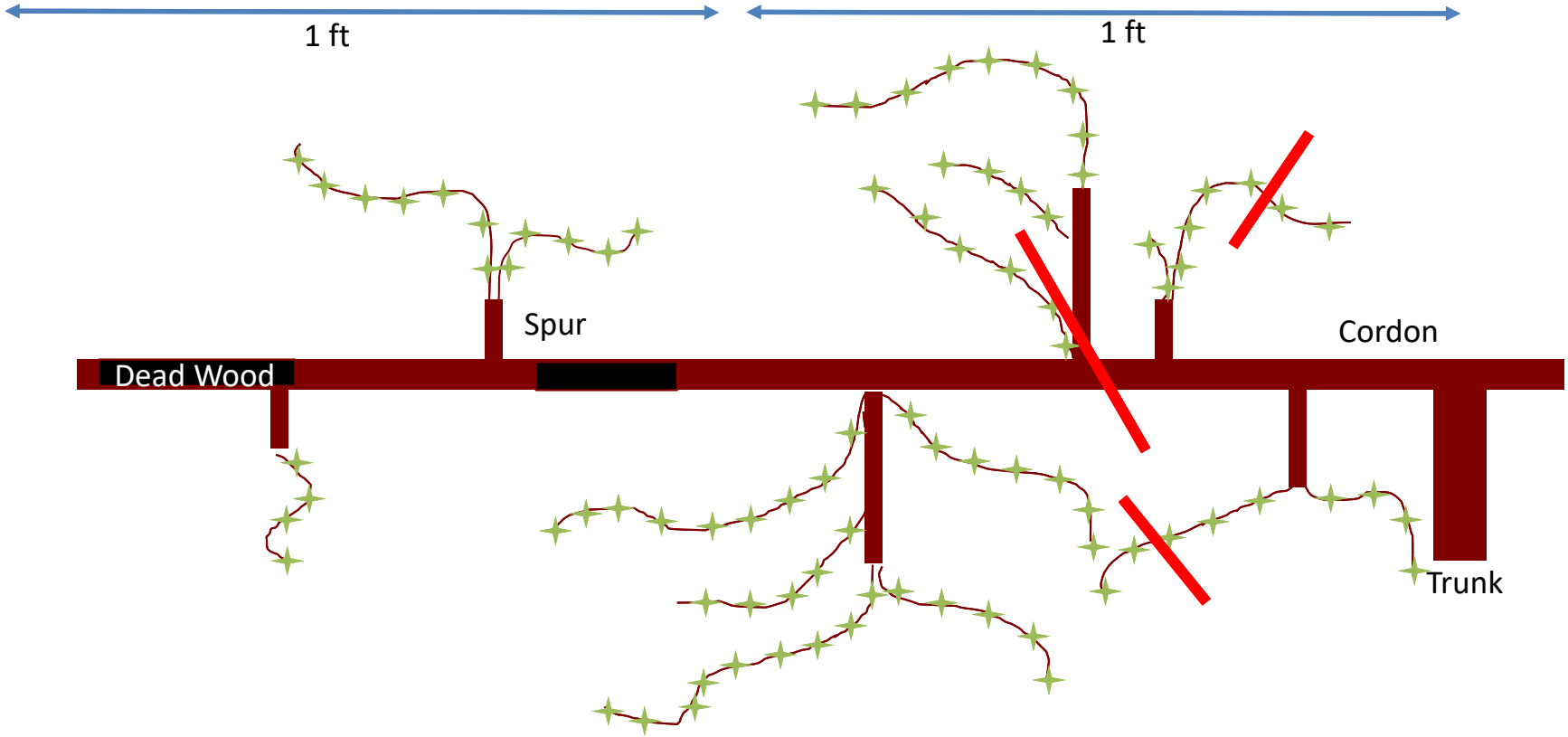
Do you need to cut off old wood? Replace Spurs? Replace a Cordon?

Pruning Basics



25 buds/foot

Pruning Basics



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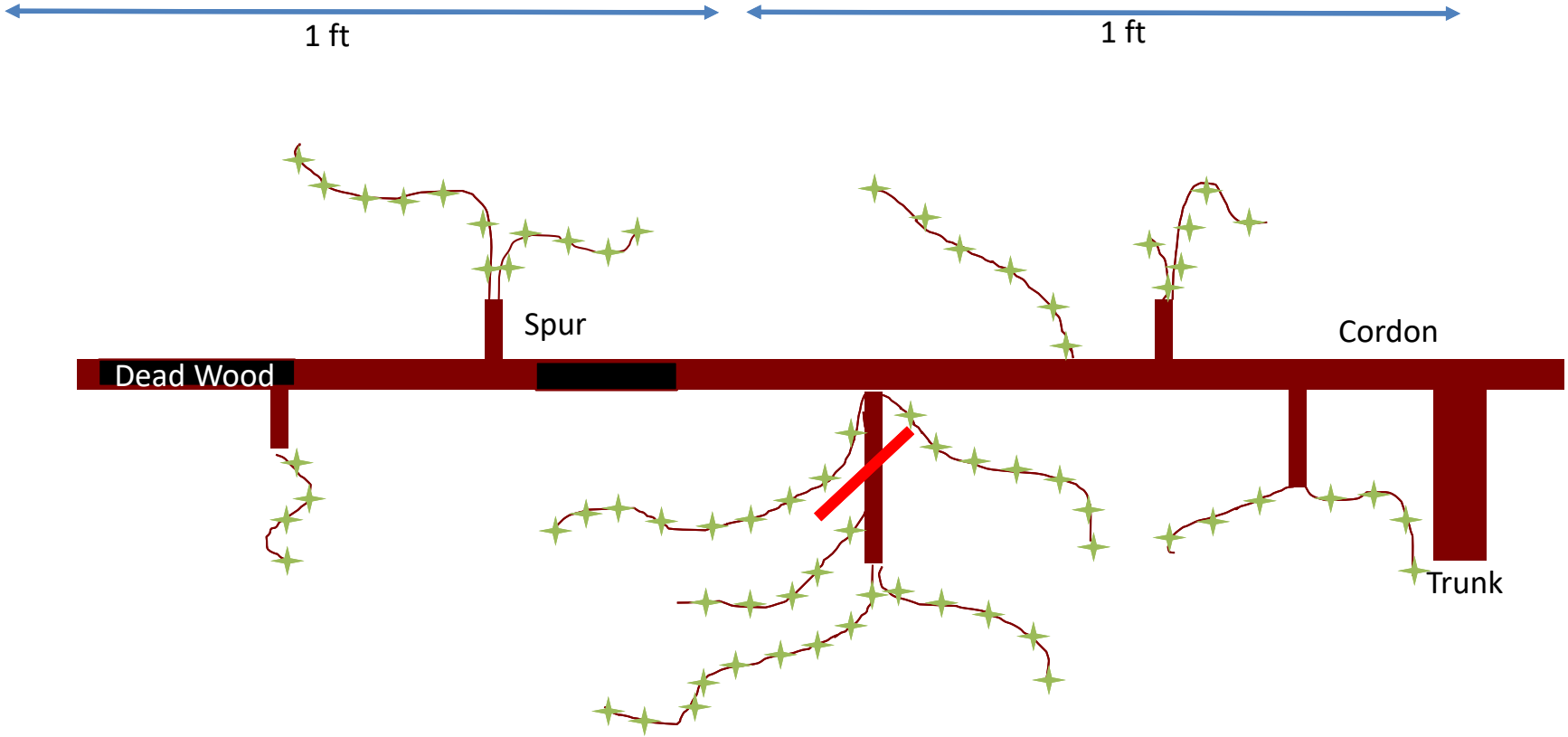

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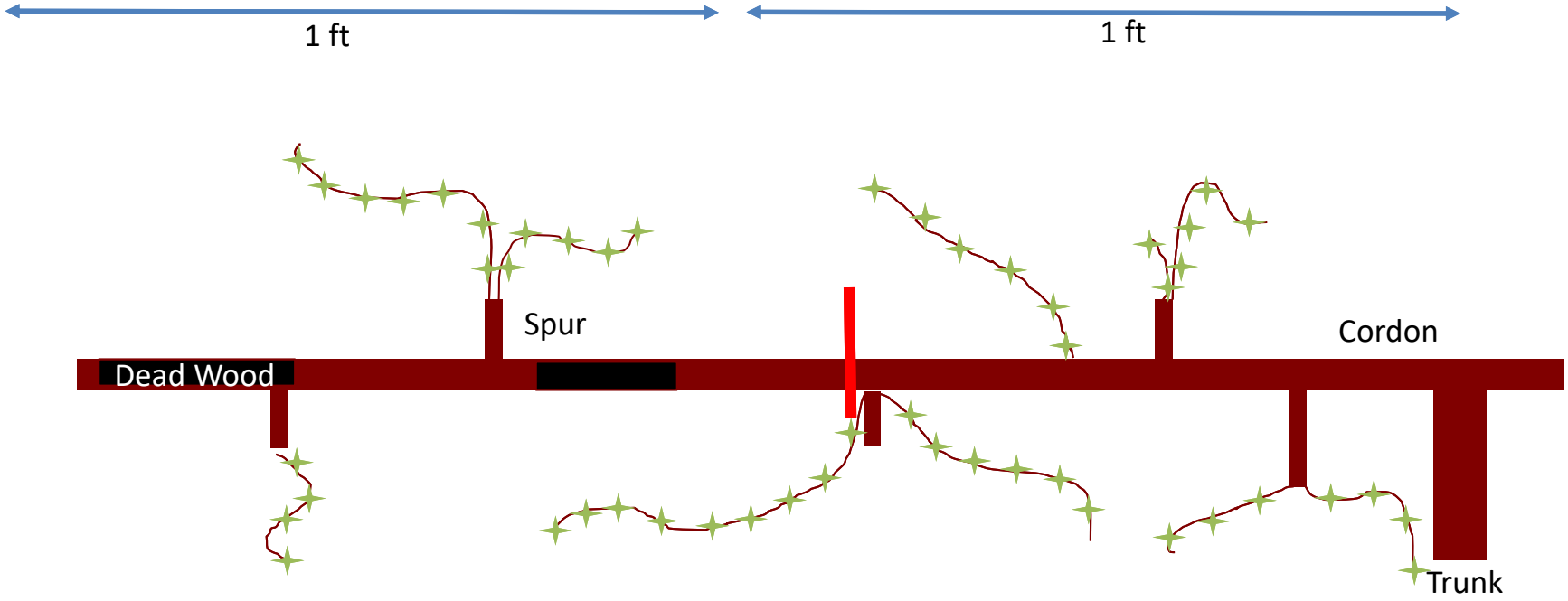
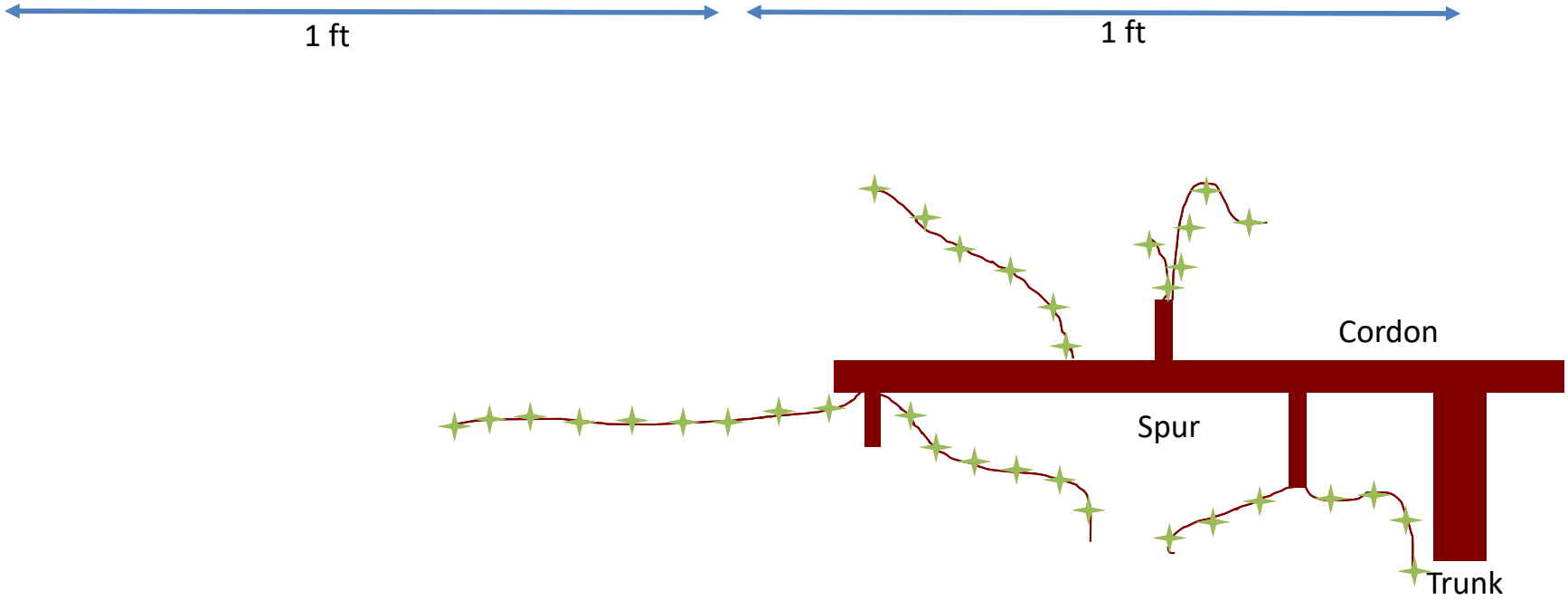




Following year

Now, forget this again

- The aim in any vineyard is to **maintain and keep the permanent wood**
- In the best case scenario: prune only one-year old wood until renewal of a spur

Pruning Basics

Photo Courtesy: Mack Johnson, NC Cooperative Ext.

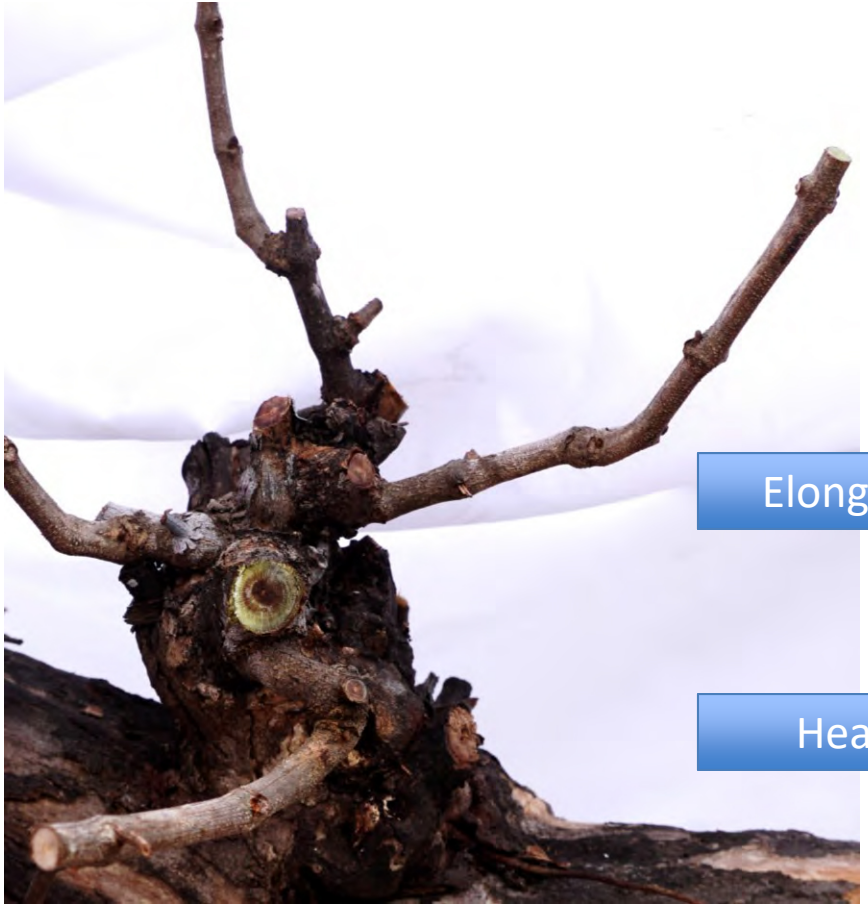
Pruning Basics

Video by Emma Volk and Mark Hoffmann

Pruning Basics

Photos by Emma Volk and Mark Hoffmann

Pruning Basics



Head region on the top

Pruning Basics

Photos by Emma Volk and Mark Hoffmann

Management

- Labor and cost Intensive: Pruning AND Harvest
- **If wine/juice production: Use mechanical harvest and mechanical pruning (in rotation with manual pruning)**
- Weed Control (chemical and mowing)
- Cultural: Fertilizing, Hedging and Skirting
- Disease Control

Winter (Nov-Feb)

- Pruning and Sanitation
- Any trellis work (replacement, strain, etc.)
- Any post replacement
- Any repairs on drip system (if necessary)
- Dormant sprays

Spring (Mar-May)

- Early disease control
- Planting/Replanting
- Fertilization
- Weed control: Herbicides under vine
- Weed control: Frequent mowing
- Put vine-shelter (‘grow tubes’) back on the new plants

Summer (Jun-Jul)

- Disease control
- Scout for Root Borer
- Pest control if necessary
- Last Fertilization
- Weed control: Herbicides under vine and Mowing
- Hedging before Harvest
- Skirting (knee high) when growing to the ground

Summer/Fall (Aug-Sep)

- Disease control
- Scout for Root Borer
- Pest control if necessary
- **HARVEST: watch REI and PEIs**
- Weed control

Fall (Oct-Nov)

- Disease control
- Make sure that all fruit are off the vine → Disease!
- **Take off vine-shelter (grow-tubes) after harvest**

Resources

https://grapes.ces.ncsu.edu/

https://smallfruits.org/

https://content.ces.ncsu.edu/muscadine-grape-production-guide

Thank You

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