

Muscadine 101



Mark Hoffmann, NC State University



Muscadine Chores

Cultivars

Pruning & Renovation

How long does it take from
Site Preparation to first harvest?

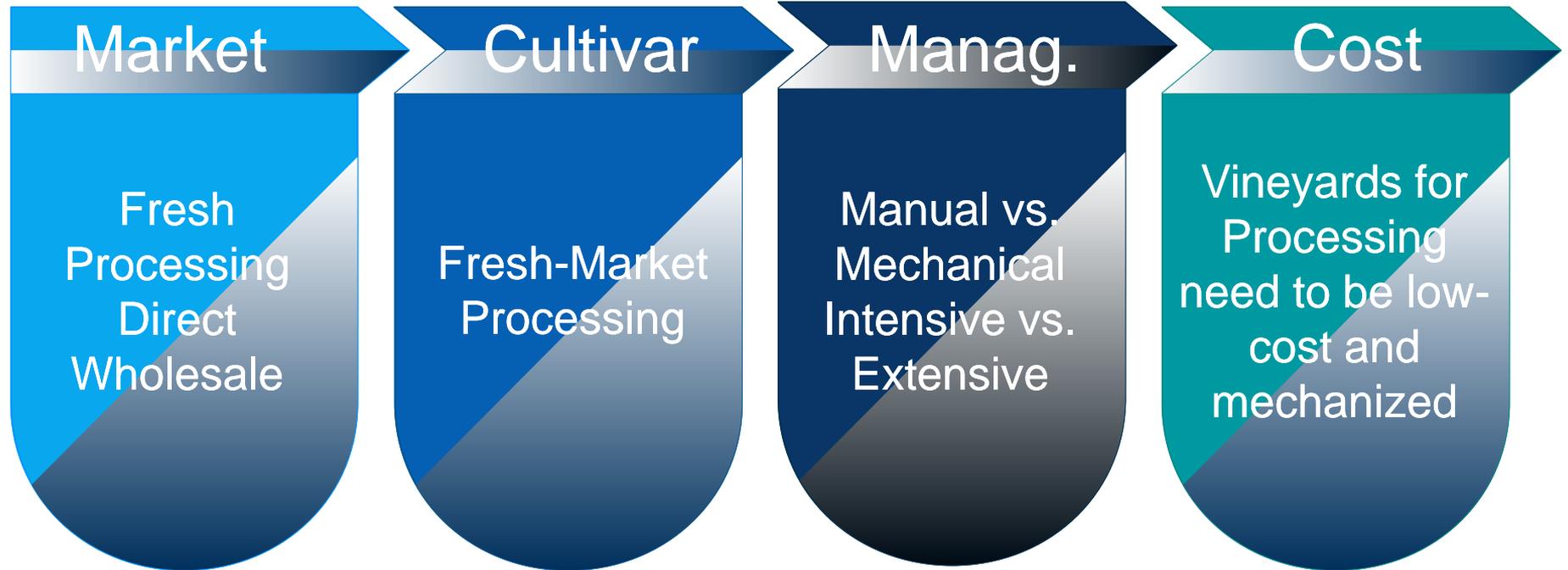
Year 1: Site Selection and Field Prep

Year 2: Planting and Trellis

Year 3: Establishment

Year 4: First (half) Harvest

How much does it cost?



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

Rule of thumb

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

\$25,000 to \$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!!!!!!!

It usually takes 7-10 years to be profitable.

So what needs to be in good shape
after 7-10 years?









How do we get to a good and healthy
Vineyard?

The four big ones

- Site Selection
- Correct training
- Correct pruning
- Good IPM



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

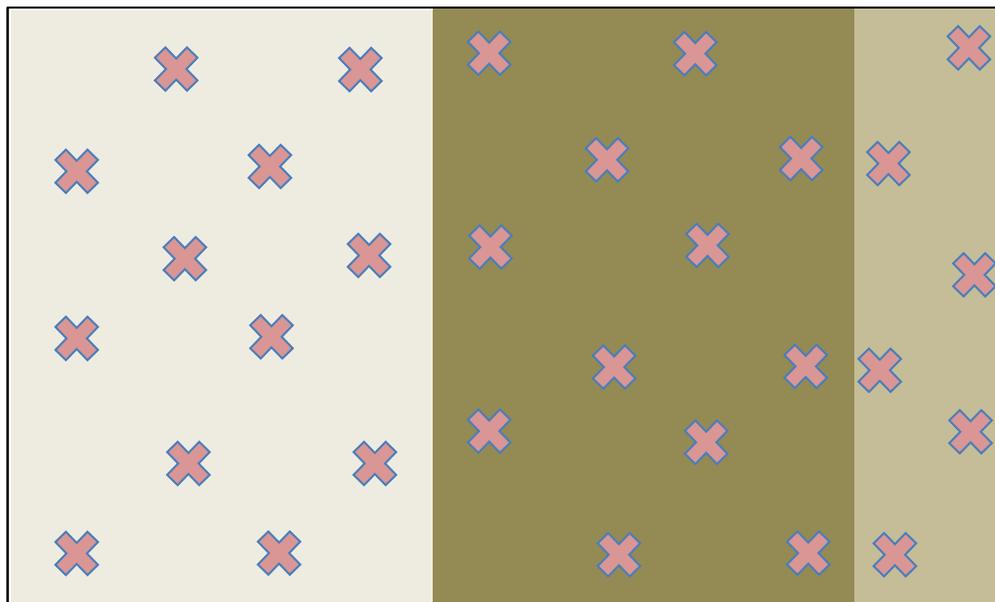
1. U-Pick: Easy access for cars; Parking Space; Space of Children/Activity?; Close to a road/busy neighborhood;
2. Processing: Easy access for heavy machinery; Turnaround space for heavy machinery; Even growth; Sturdy trellis and post;

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

3. Water Drainage

Photo Courtesy:
Connie Fisk



Standing Water is a red flag

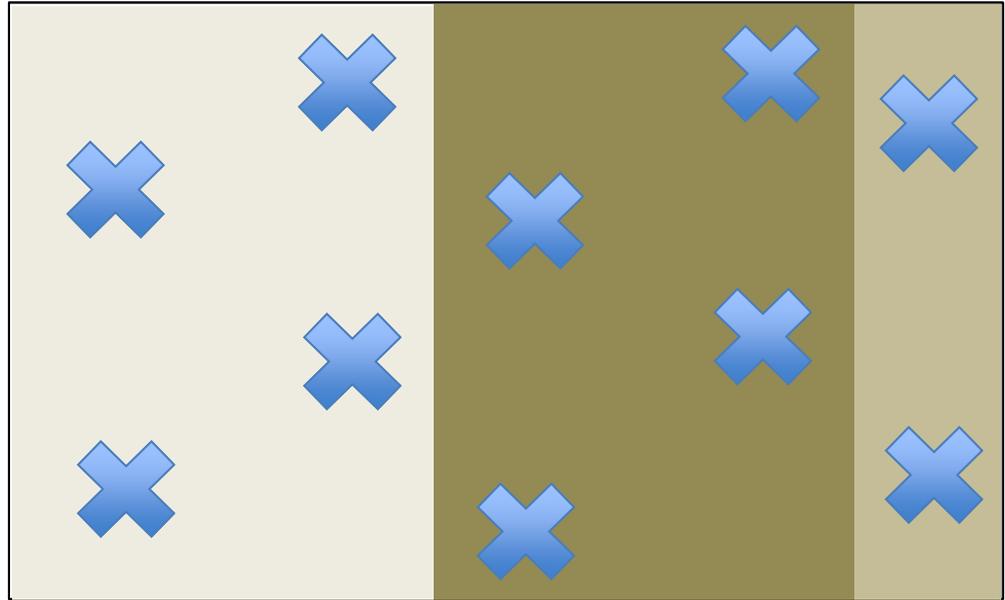
- Standing water or bad/no drainage will cause low growth and disease problems down the line. Don't plant!

Evaluate Field with Auger

Evaluate field

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

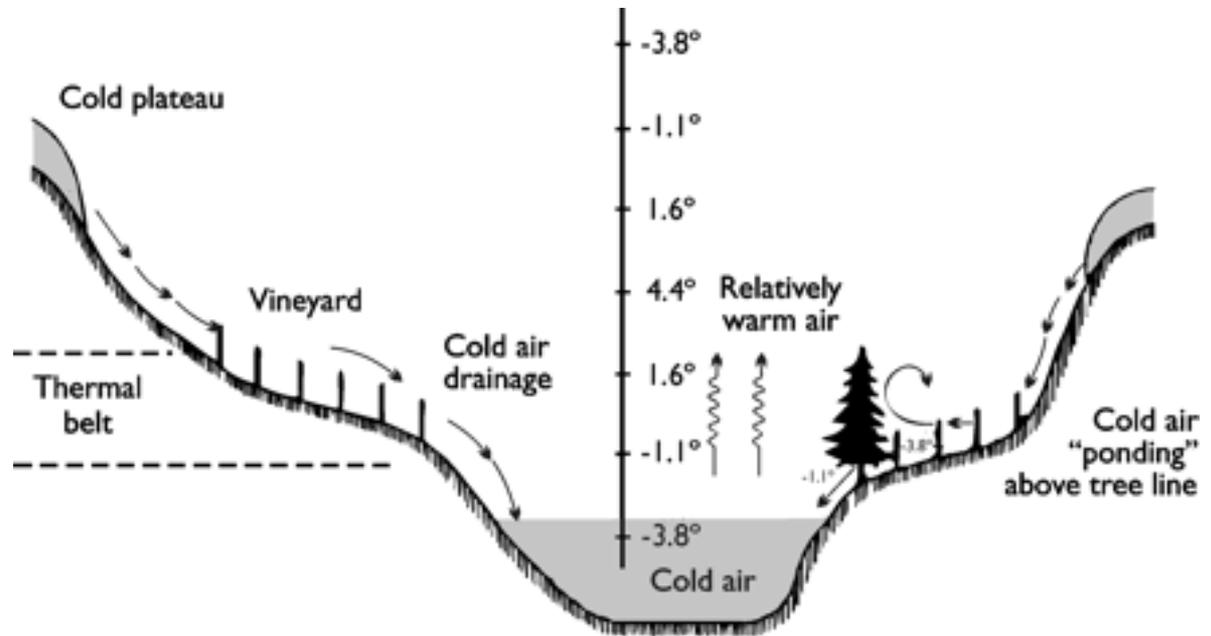
Summer before planting



4. Air Drainage

Evaluate field

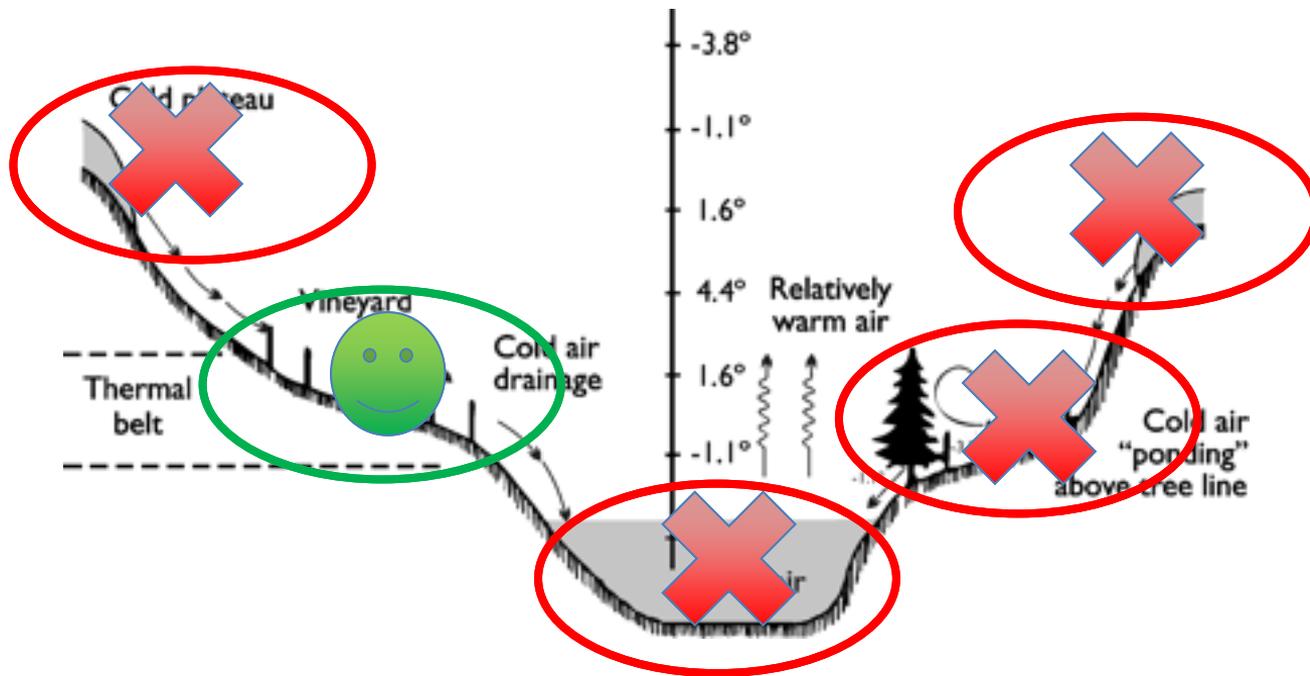
- Vineyards need two things:
- **Sunlight**
- **Air Drainage**



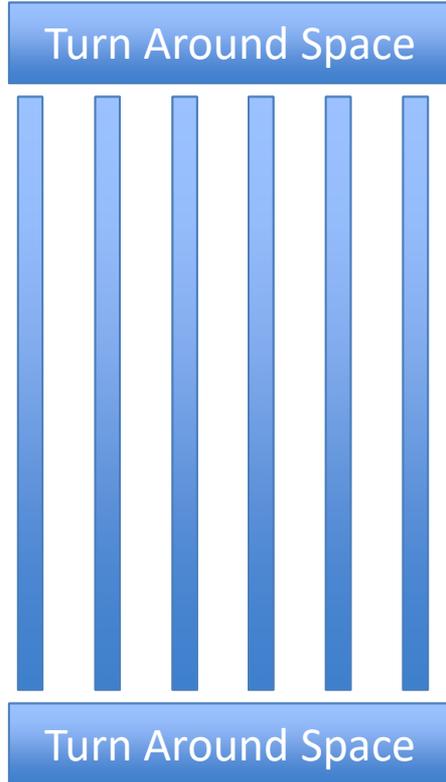
If planted in the wrong spot

Increased risk of:

- Dead plants
- Split Trunks
- Frost Damage



One more thing: Turn Around



Diseases, Weeds and Pests

Grape Root Borer!



Spotted Lantern Fly (potentially)



Stink Bugs and Beetles (fresh market)



Black Rot



Macrophoma



Colletotrichum



Cultivars

Photos provided by Dr. Patrick Conner, University of Georgia



Perfect



Female

- Wine/juice cultivars: high yields, high TSS (Brix), small berry size, and skin toughness.
- Fresh-market grapes need to be large, firm, with a dry picking scar.

Photos provided by Dr. Patrick Conner, University of Georgia



Table 2. Characteristics of evaluated muscadine cultivars. Seasonal fruit development can differ depending on location.

Cultivar	Type	Fruit Color	Fruit Size	Cold-hardy	Season
Wine and Juice					
Carlos	Self-fertile	Bronze	Small-Medium	+	Mid
Doreen	Self-fertile	Bronze	Small-Medium	+	Late
Magnolia	Self-fertile	Bronze	Small-Medium	+	Mid
Noble	Self-fertile	Dark	Small-Medium	++	Mid
Fresh Market					
Black Beauty	Female	Dark	Large	++	Early-Mid
Black Fry	Female	Dark	Large	++	Mid
Darlene	Female	Bronze	Large	-	Early-Mid
Early Fry	Female	Bronze	Large	-	Early
Fry	Female	Bronze	Large	++	Mid
Granny Val	Self-fertile	Bronze	Large	-	Late
Hall	Self-fertile	Bronze	Medium-Large	-	Early
Ison	Self-fertile	Dark	Medium-Large	-	Mid
Lane	Self-fertile	Dark	Medium-Large	-	Early
Late Fry	Self-fertile	Bronze	Large	++	Late
Nesbitt	Self-fertile	Dark	Medium-Large	-	Mid-Late
Oh My!	Self-fertile	Bronze	Medium, seedl.	?	?
Paulk	Self-fertile	Dark	Large	-	Mid-Late
RazzMatazz	Self-fertile	Pink/Red	Small, seedl.	-	All year
Summit	Female	Bronze	Medium	+	Early-Mid
Supreme	Female	Dark	Large	-	Mid
Tara	Self-fertile	Bronze	Medium-Large	-	Early-Mid
Triumph	Self-fertile	Bronze	Medium	+	Early



Male

Perfect

Female

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

What do you need to know before deciding on a cultivar?

- MARKET!
- Do a market analysis: What can you sell? Who are your customers? Where can you sell?
- If you grow for your own, ask on farmers markets the cultivar name
- There are some challenging cultivars

Common dark cultivars (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

- 'Lane' has moderate vigor, productivity.
- Self-fertile (can be used as pollinator); Early!
- 'Supreme' larger size, not cold hardy, good taste, female

Photos provided by Dr. Patrick Conner, University of Georgia



Common bronze cultivars (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

- 'Hall' has good vigor and productivity, doesn't overcrop.
- Better brix and flavor than 'Tara'.
- 'Triumph' excellent early producer!

Photos provided by Dr. Patrick Conner, University of Georgia



Fresh Market Muscadines

- Desired characteristics
 - Large fruit
 - Uniform skin
 - Dry stem scar
 - Edible skin
 - Firm flesh
 - Good flavor
 - 15% soluble solids or higher



Processing Cultivars

- 'Noble' – Small purple grape. Extremely vigorous and disease resistant. Holds juice color better than most muscadines. Poor fresh fruit value.

Photos provided by Dr. Patrick Conner, University of Georgia



Processing Cultivars

- 'Carlos' – Small bronze grape. Extremely vigorous and productive. Only good for juice.

Photos provided by Dr. Patrick Conner, University of Georgia



Seedless Cultivars (developed by Gardens Alive)

Razzmatazz



OhMy



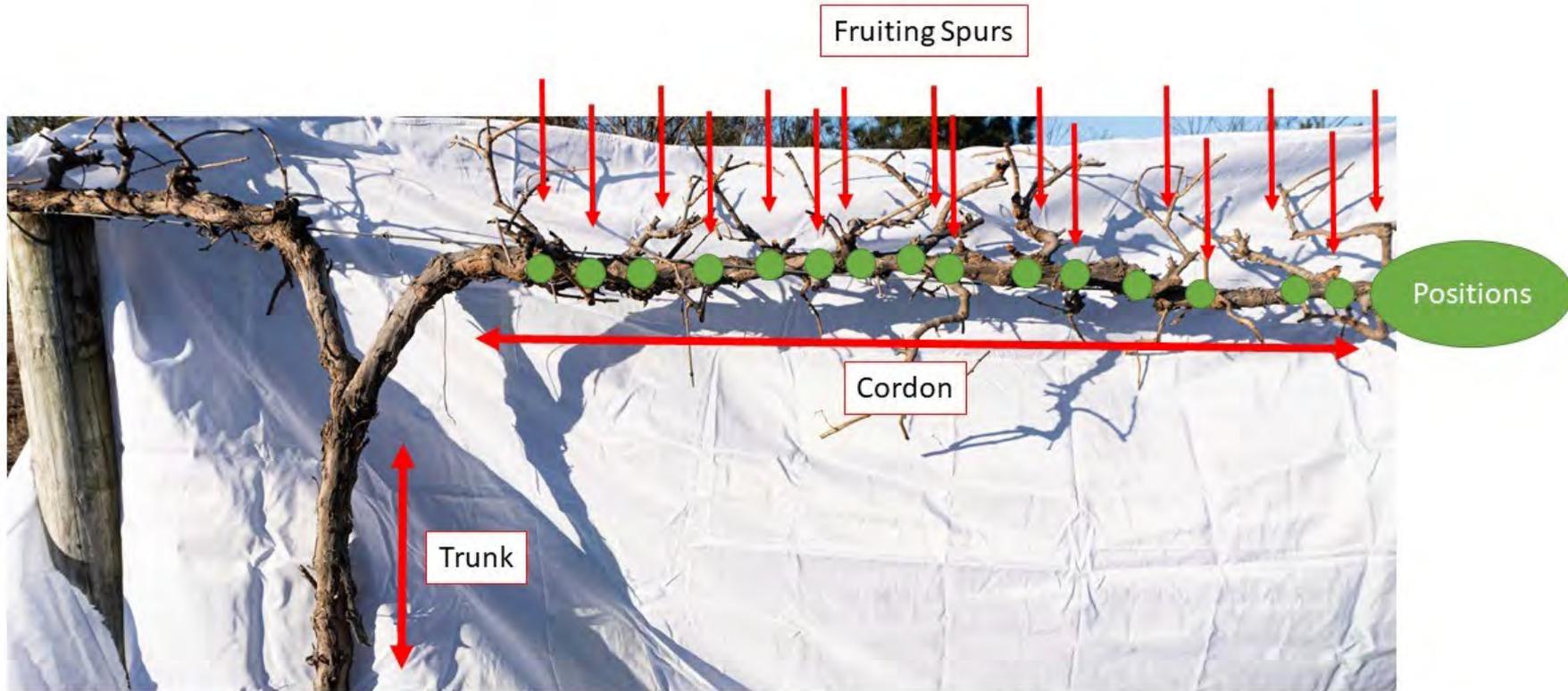
Pruning & Renovation

What are the goals of pruning?

Pruning Goals

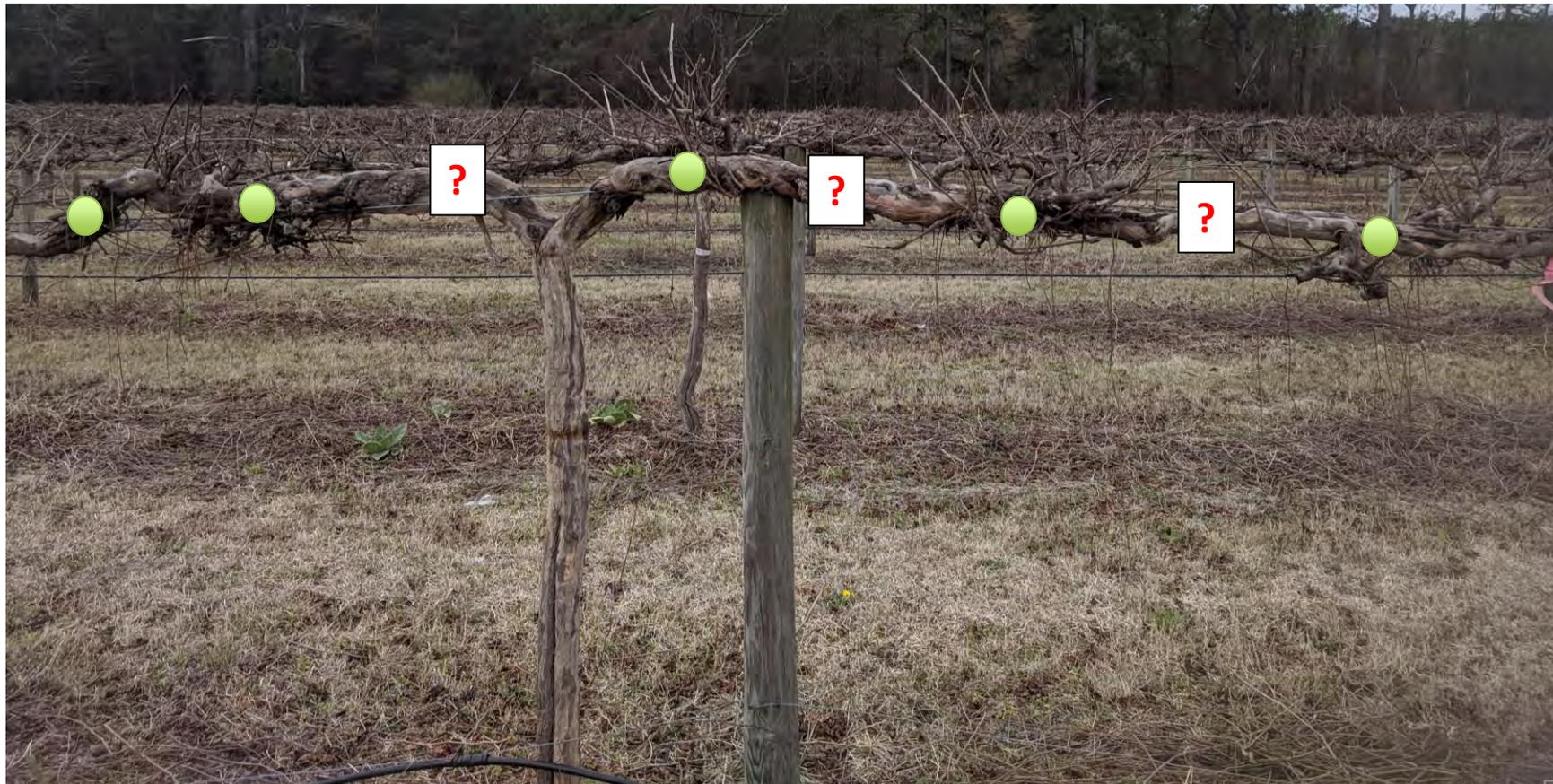
What are your main goals?

1. Longevity
2. Healthy Wood
3. Disease control
4. Yield



FAQ

- When to prune? **Dec to Feb/Mar**
- Pruning every year? **YES!**
- Pruning in summer? **NO** → Hedging
- Ideal planting space: 20ft vine spacing; 20ft post spacing; 11-12 ft row spacing;











Take away

- Let vine structure grow slowly
- Establish fruiting positions early and keep them!
- On a muscadine 3-4 fruiting positions per foot of cordon

Why is that important?

- Reduce desiccation
- Improve Water and Nutrient Flow in healthy wood
- Improve Carbon and Nutrient Storage in healthy wood
- Reduce impact of Grapevine Trunk Diseases

Reasons

- Cold damage or any other physical damage
- Wrong pruning and training!





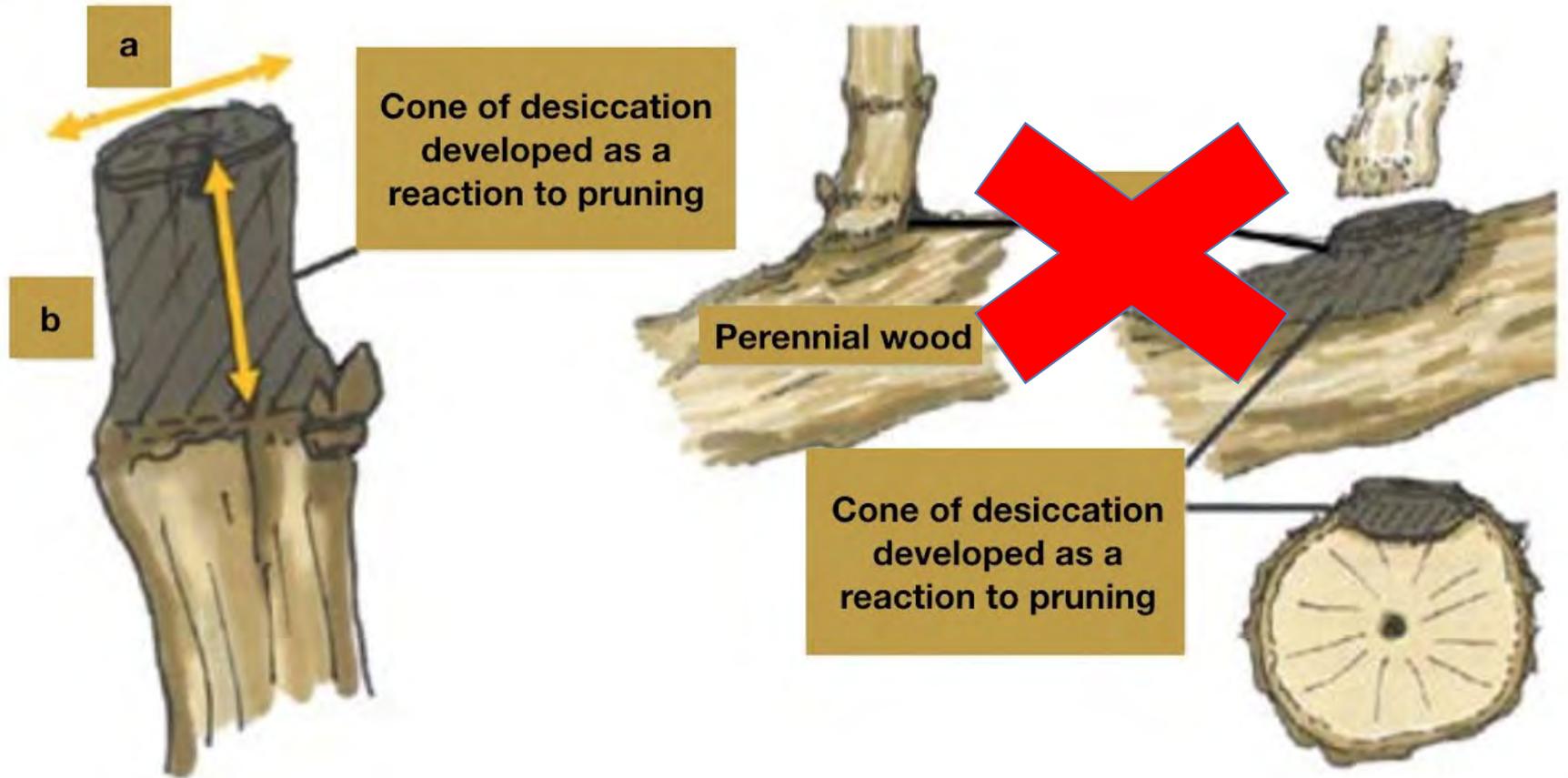






Grapevine do not produce a callus

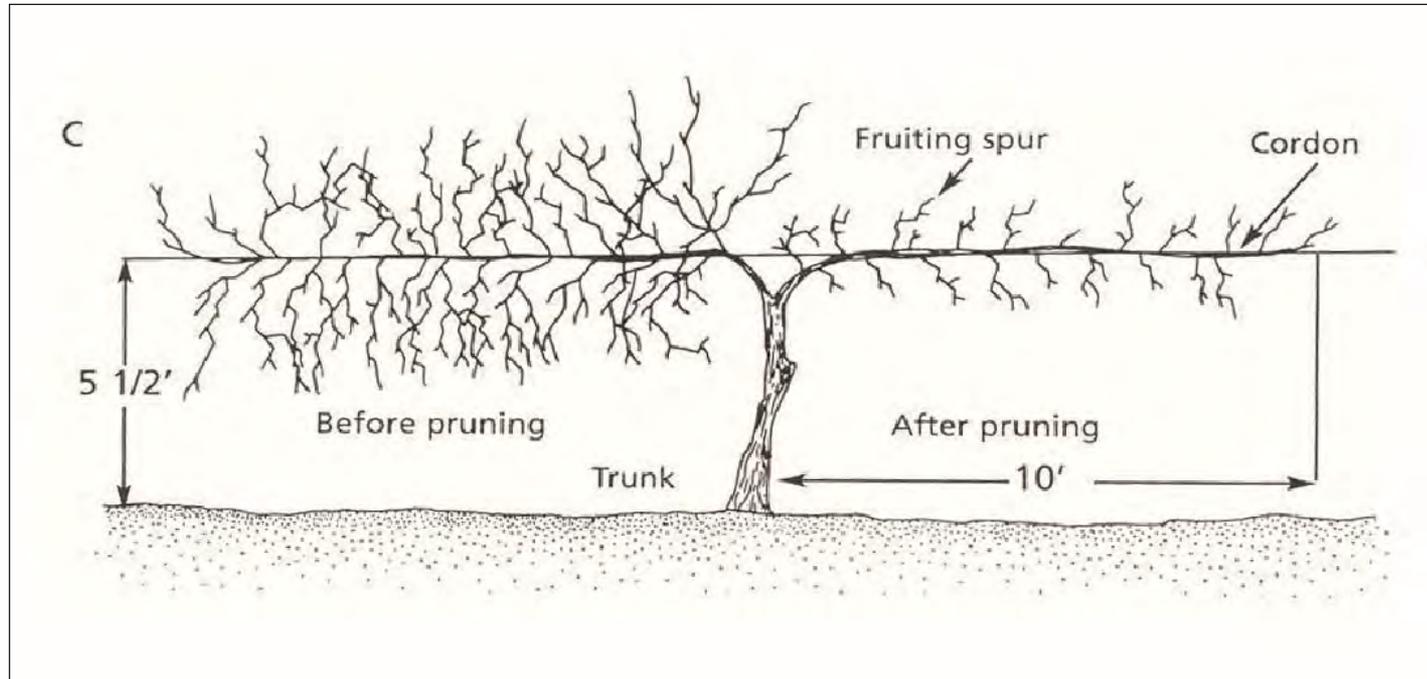
- Instead they produce an area of desiccated wood under the cut!
- **Close cuts to the cordon or spur:** Bring desiccation into the permanent structure.





Young Vines: Correct Training

First: Think about where your positions are



Correct position establishment



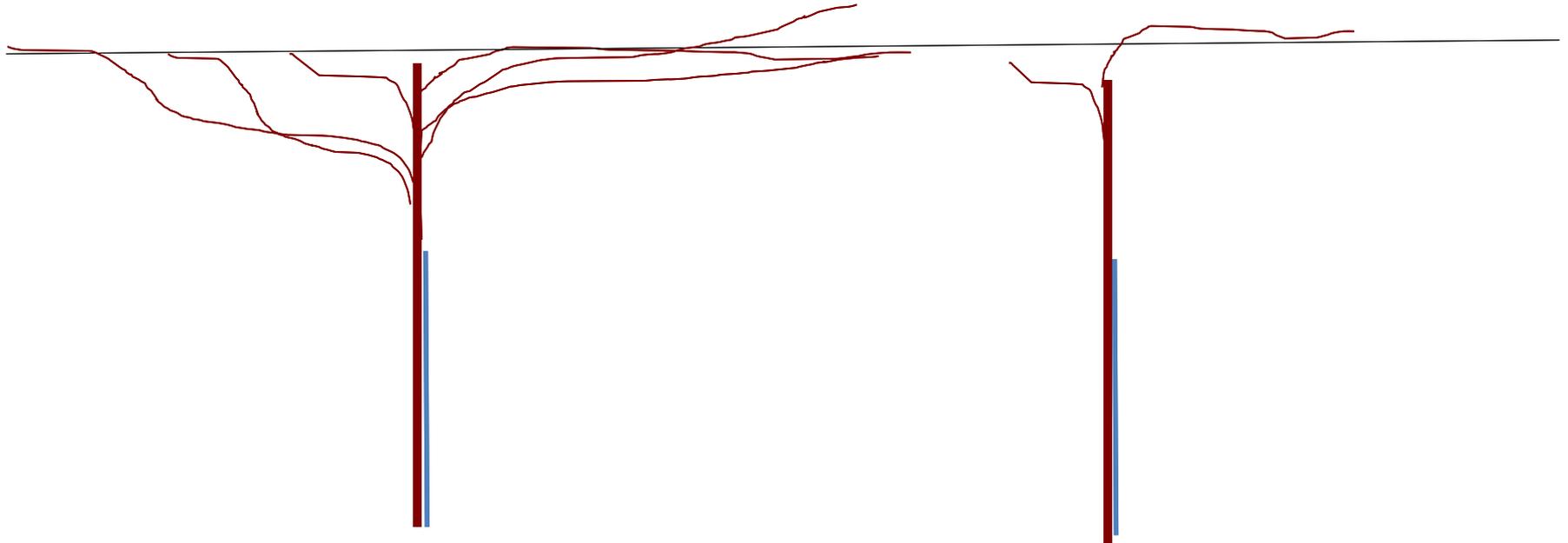
20 ft vine spacing, two 10 ft cordons

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-prune with trimmer
approx. 2-3 foot distance to cordon!
3-4 fruiting position per foot of cordon.**

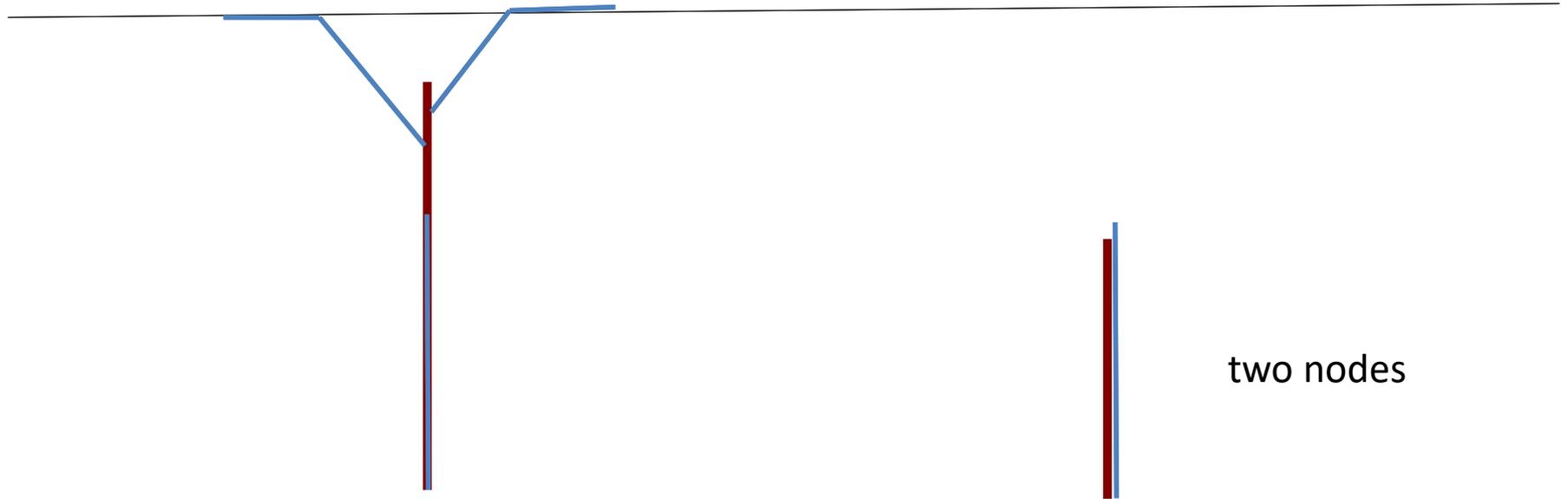
Very Strong Growth

Weak and Medium Growth

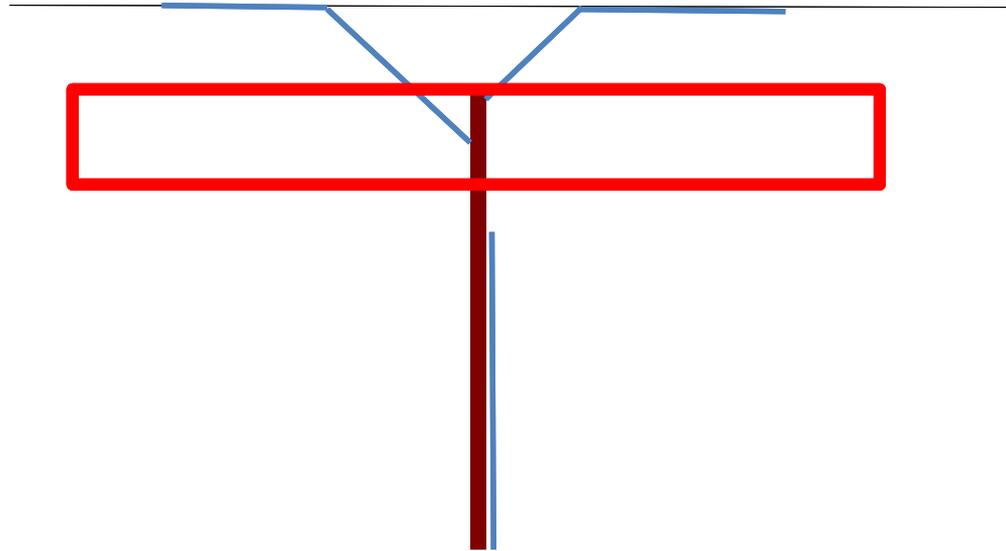


Very Strong growth

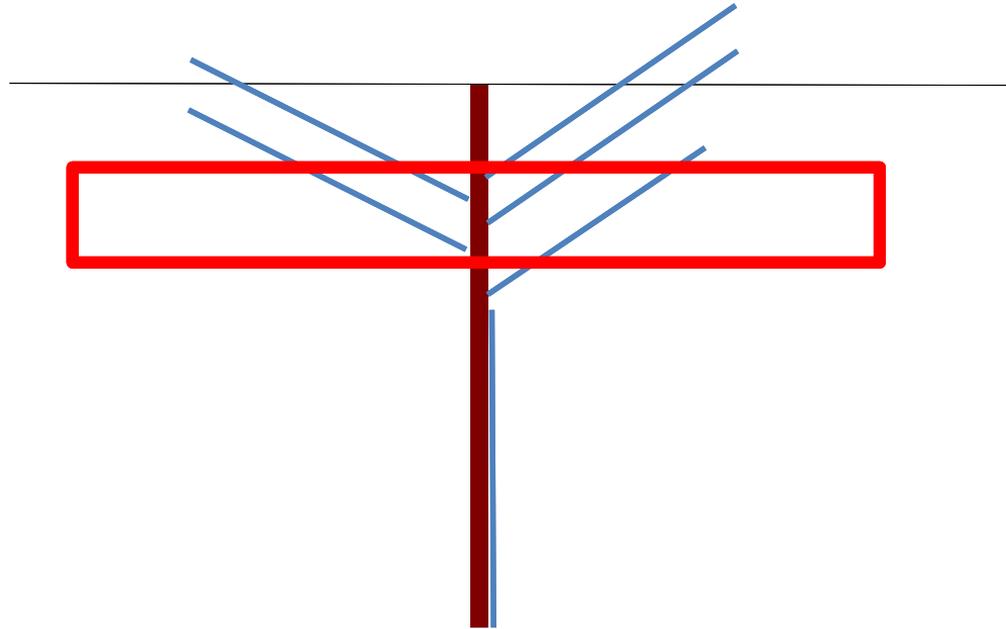
Everything else!



First way to do it

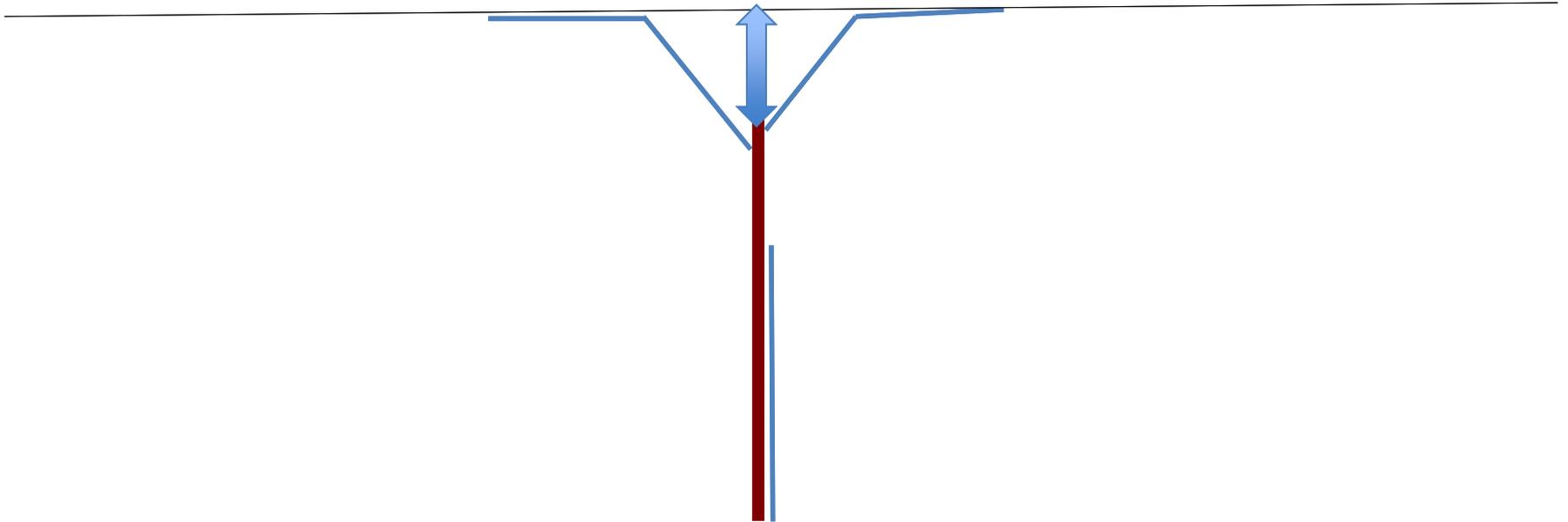


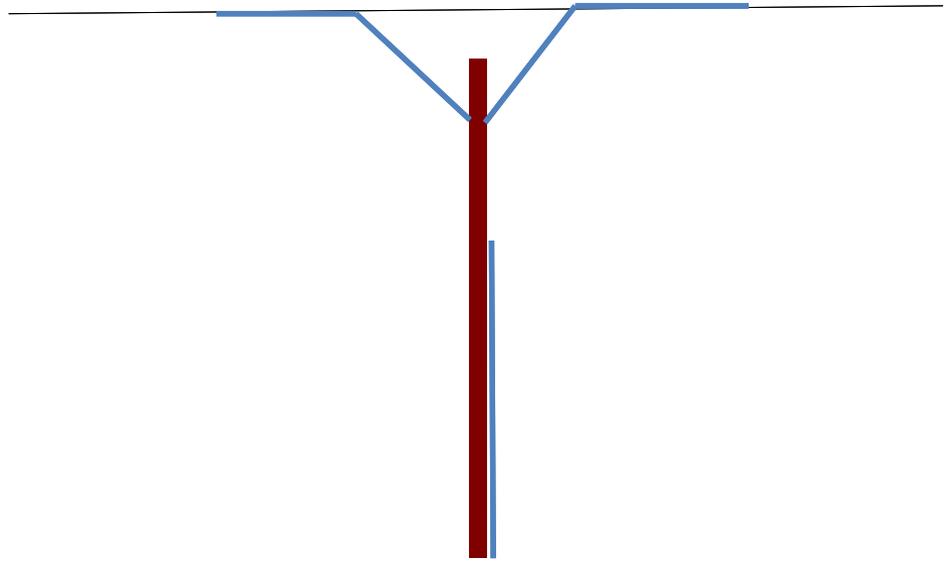
Another way to do it: push laterals

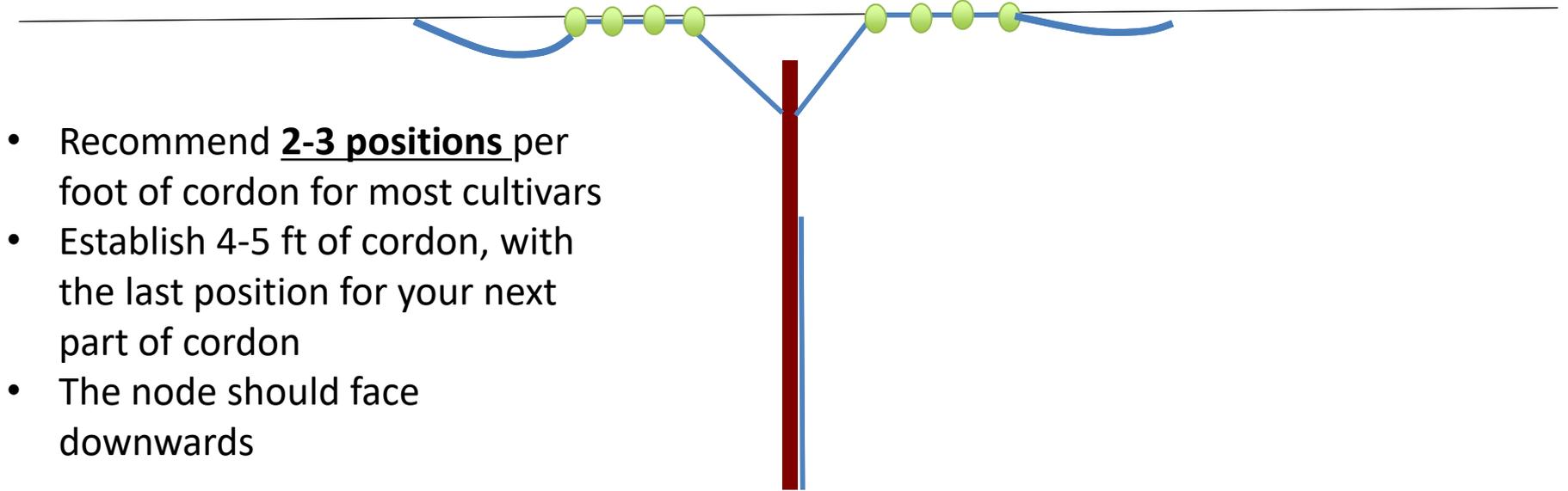


In any case!!!

5-7 Inches distance to wire







- Recommend **2-3 positions** per foot of cordon for most cultivars
- Establish 4-5 ft of cordon, with the last position for your next part of cordon
- The node should face downwards







Photos by Emma Volk and Mark Hoffmann

Take Home

- Weak vines have to be trained differently than vines with strong growth
- Split 4-6 inches below wire
- Establish your spur positions from the very beginning
- **Plant close to the post**
- Remove some weight from the wire

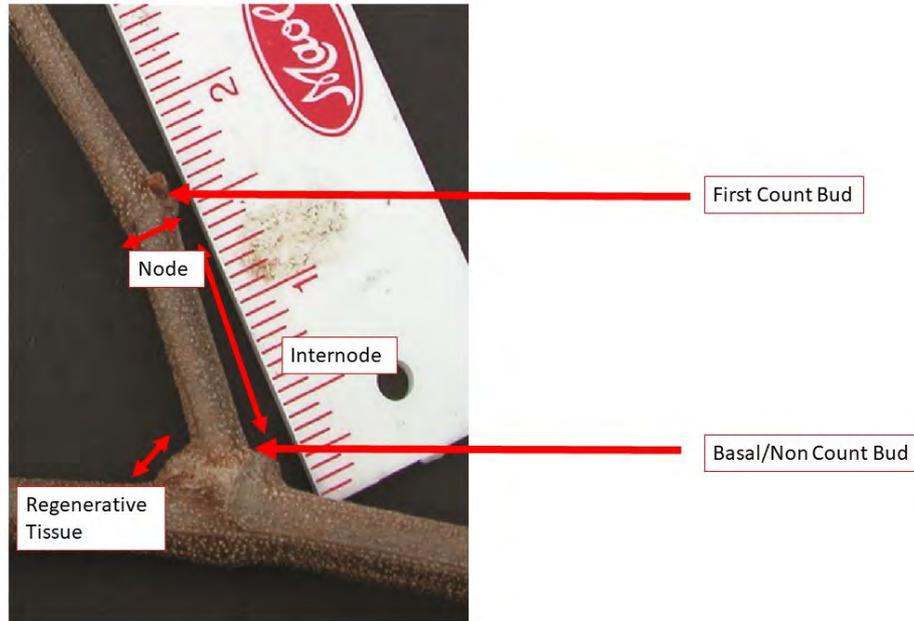
FAQ

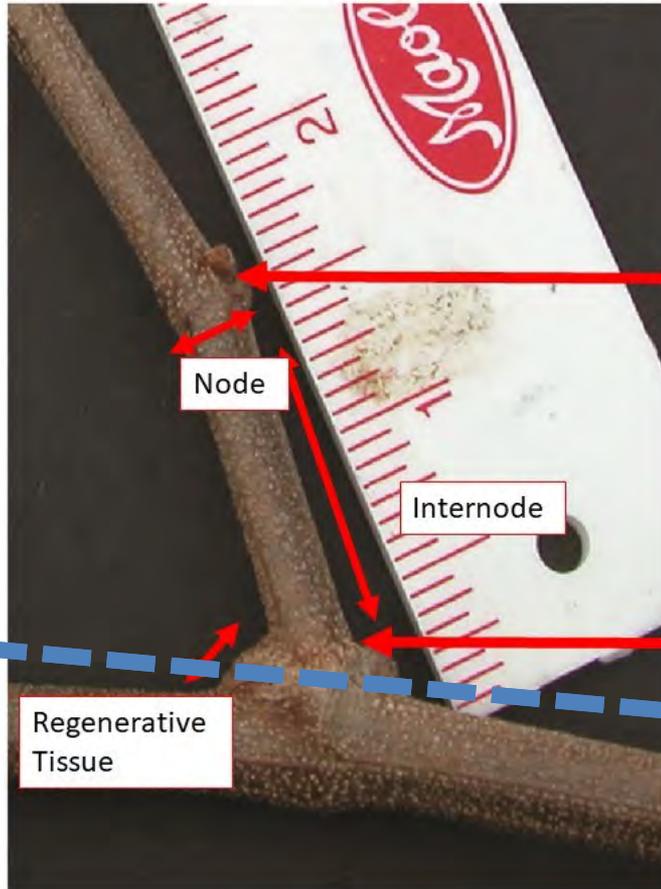
- Disease risk of cordon is put on the wire? **NO**
- How many vines per post? **One post per vine**
- How many cordons are trained over the post? **One**
- Wrap or hang the cordon? **Hang**



Pruning

How to make the correct cut?





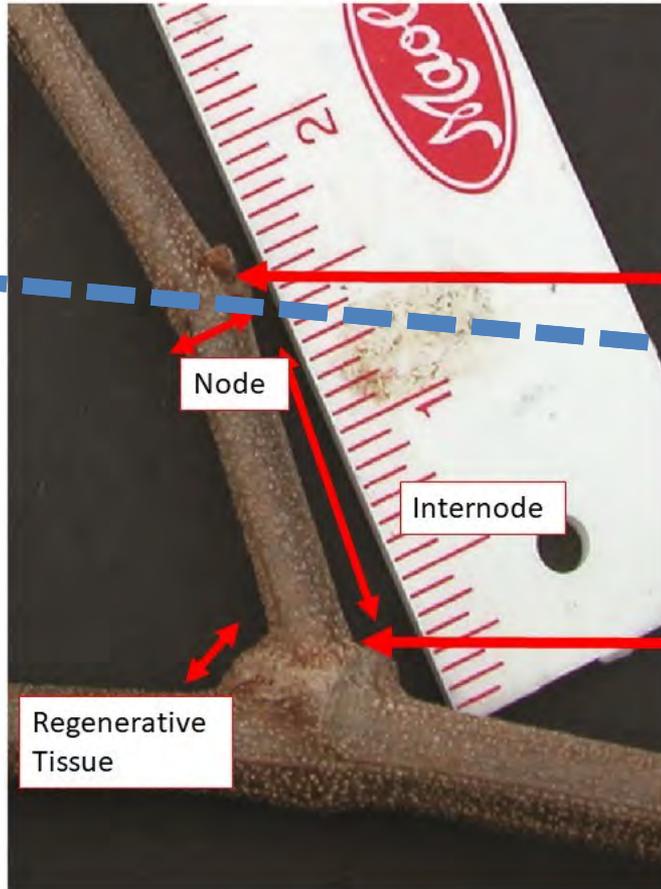
First Count Bud

Node

Internode

Basal/Non Count Bud

Regenerative Tissue



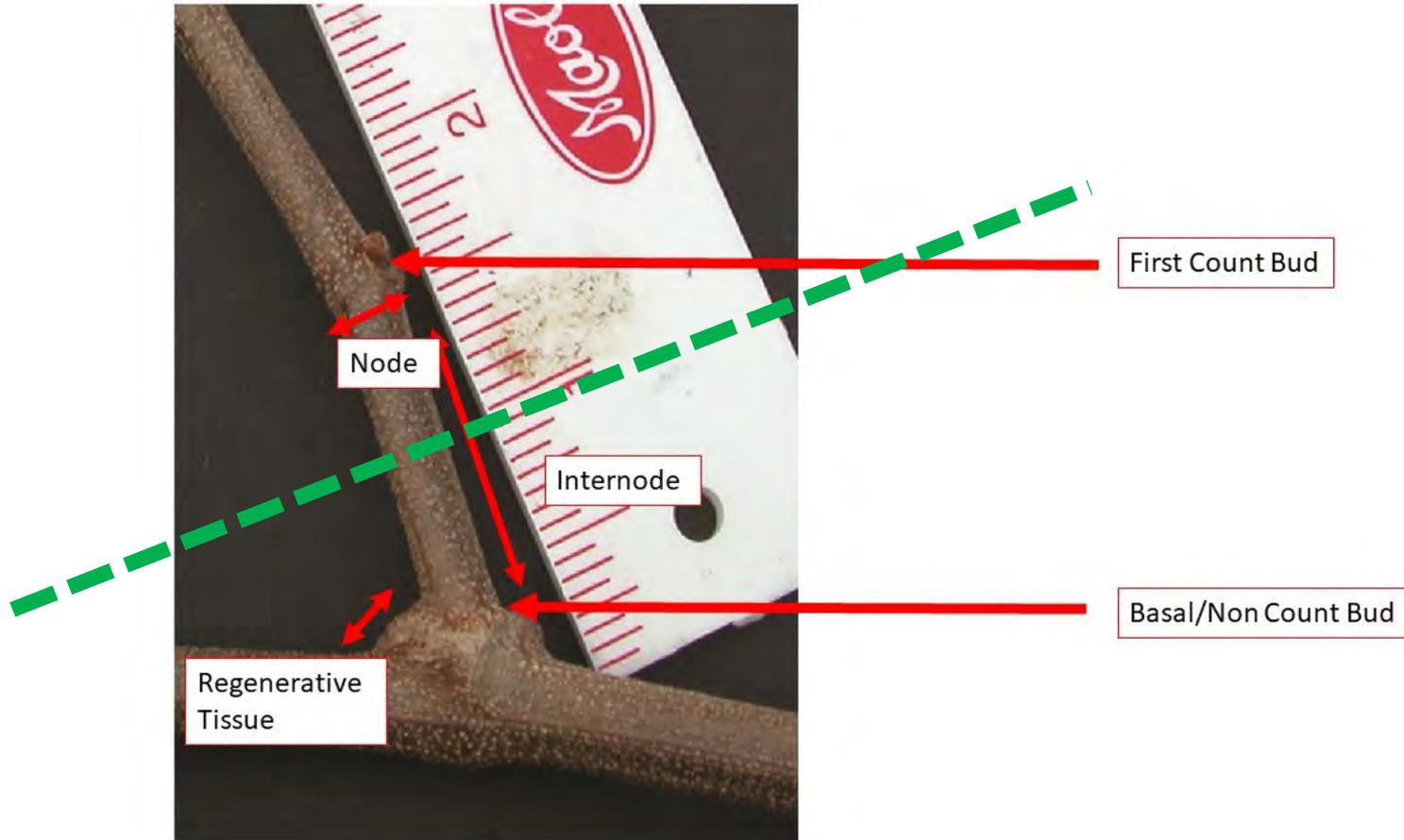
First Count Bud

Node

Internode

Basal/Non Count Bud

Regenerative Tissue



FAQ

What is good wood for spur and cordon?

- 1) Internodes are 2-4 inches long
- 2) Wood is at least pencil thick
- 3) Wood has golden brown color

Manual

- ❖ Very labor intensive
- ❖ Best control of yield and disease
- ❖ **fresh-market: YES**
- ❖ A very well trained person: 10-15 min per vine
- ❖ A trained person: 20-30 min per vine

Often limiting factor in winter on larger acreage farms

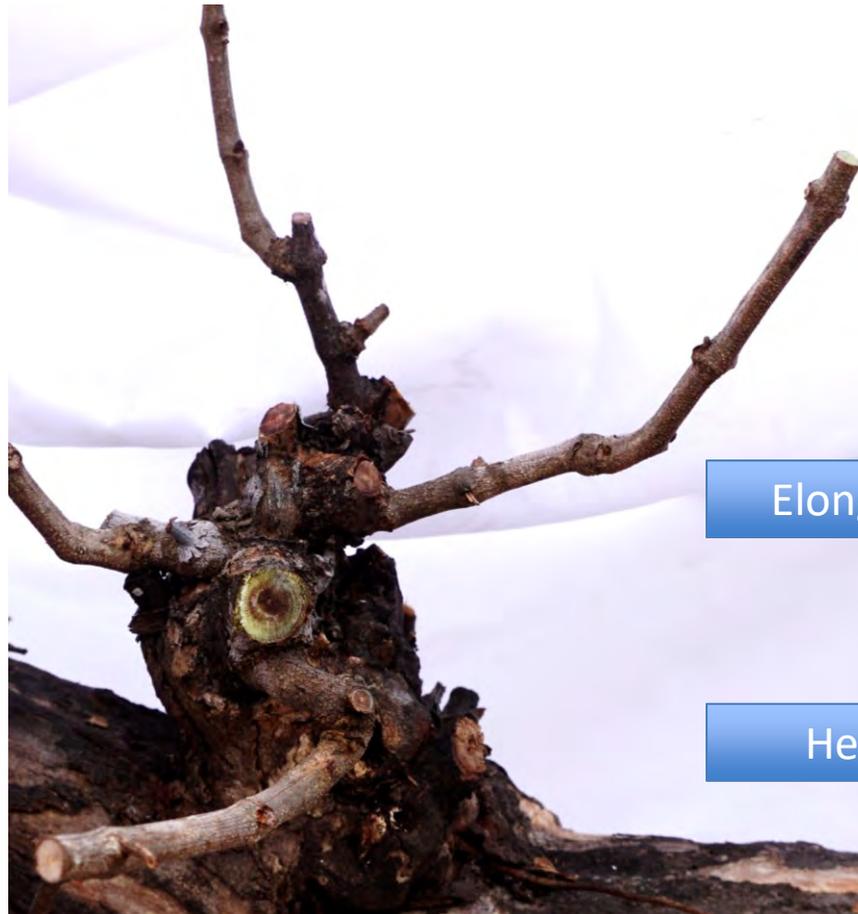
Mechanical

- ❖ Less labor intensive
- ❖ Lower control of yield and disease
- ❖ **fresh-market: NO**
- ❖ Has to be done on a rotation with manual pruning (2-4 years) -> Vineyard renovation!!!
- ❖ Often used in large acreage processing vineyards (Carlos, Noble, Doreen, Magnolia)

Higher initial costs (for machinery)

Rotate between Mechanical and Manual

- ❖ Disease control
- ❖ Crop management
- ❖ Vineyard longevity
- ❖ **DEBRIS IS GRAPES (Wood) can lead to damage in processing machinery (press bladder!).**





Elongation Zone

Head Region

You always have an elongation zone (spur)

You don't always have a head region

AVOID develop a head on top of a spur.











Take Home

- Pruning helps to limit growth of spurs
- In the second year after spur position keep three one year old shoots
- Grow the two lower shoots as your spur
- Utilize the basal bud tissue of the spur

FAQ

Three easy ways to remember how to prune:

- 1) **Don't let spur grow into space.** Imagine a helmet around your spur. The helmet grows every year a little bit, so does your spur.
- 2) **Never cut through a bud**
- 3) **Always leave wood for wound healing**



Vineyard Renovation

Vine Renovation

- Any time we cut more than just one-year old wood, we 'renovate' a vine.
- Most common 'mode of action'.
- Vine Renovation means: **YOU WILL LOSE YIELD!**

Scenario one

Antlers that need to be rejuvenated

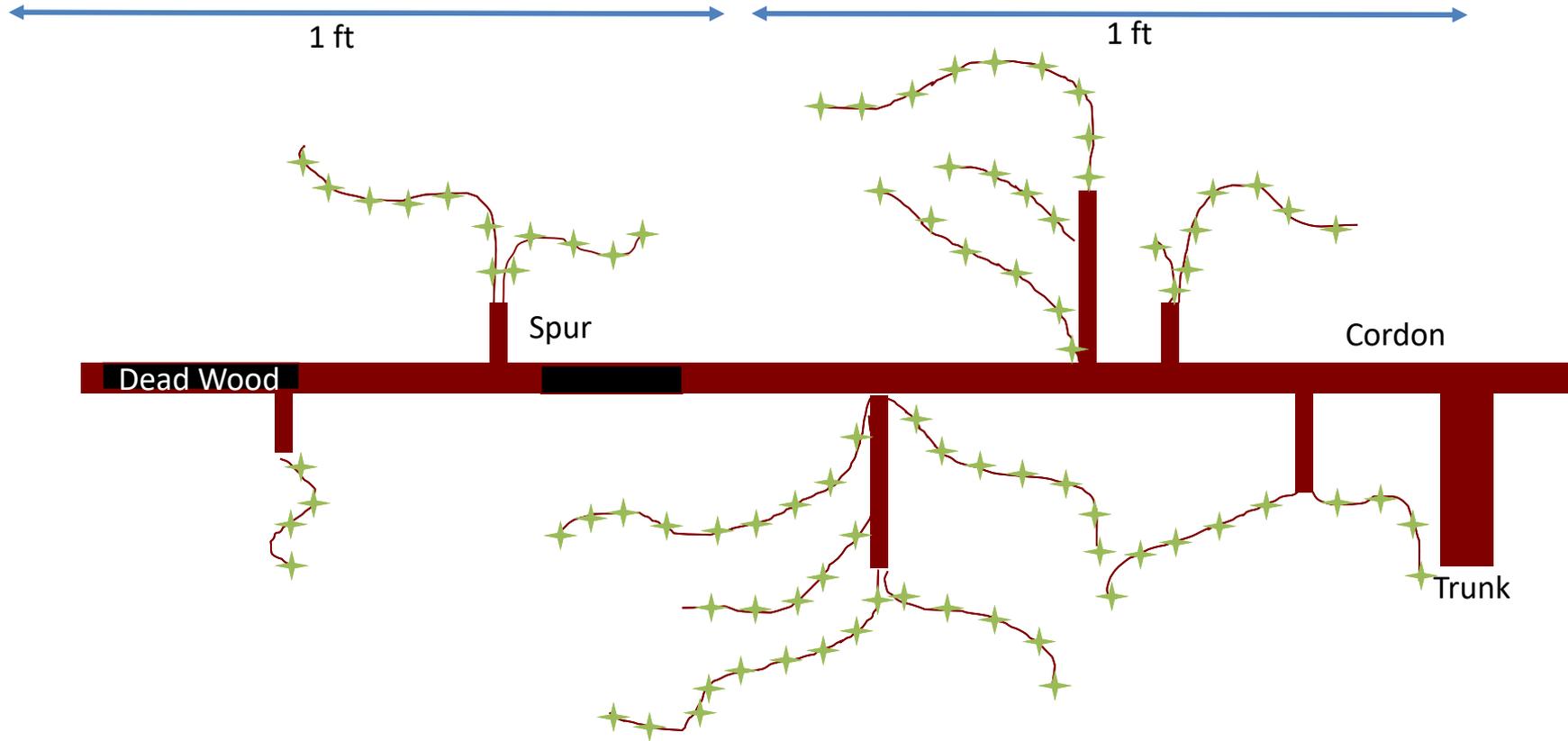


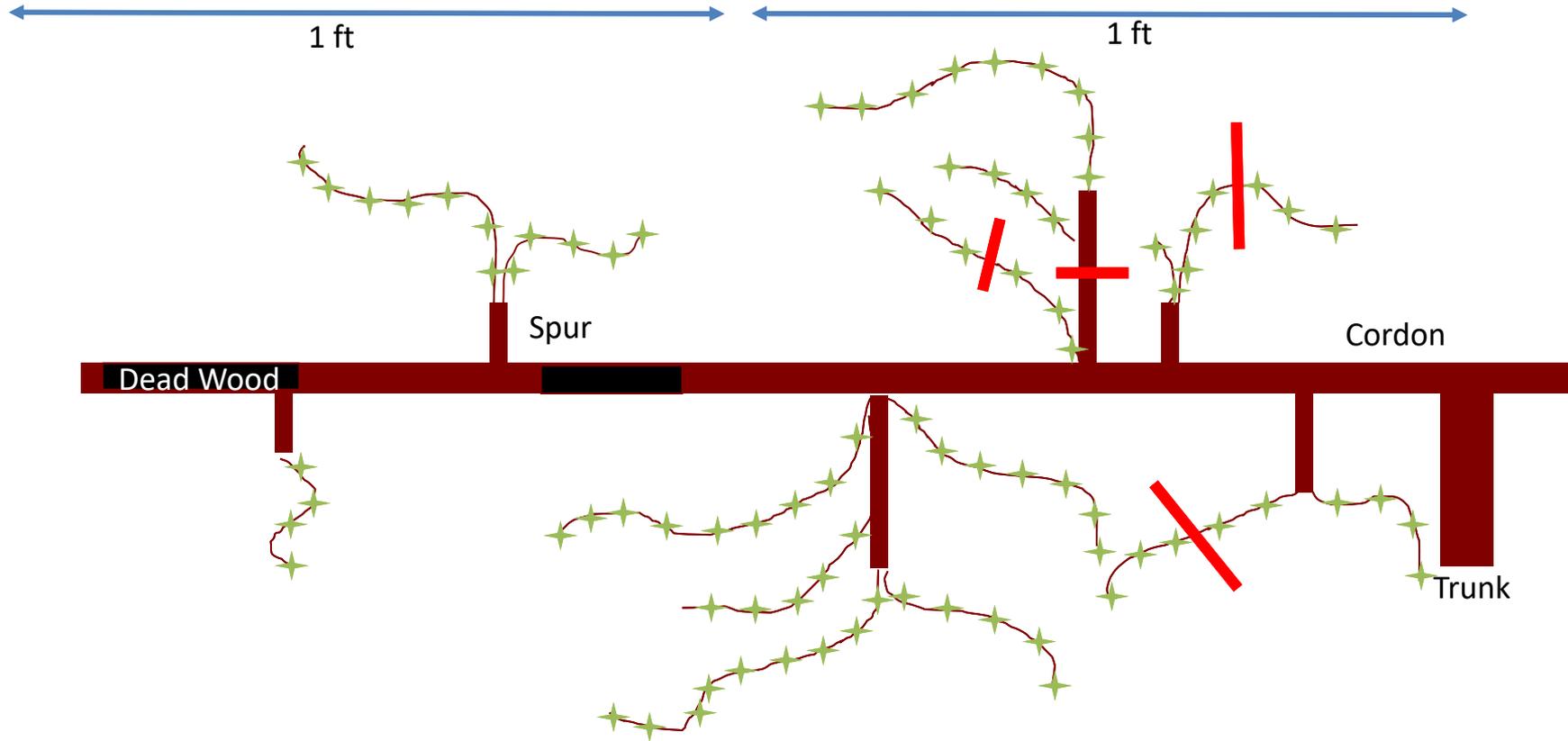


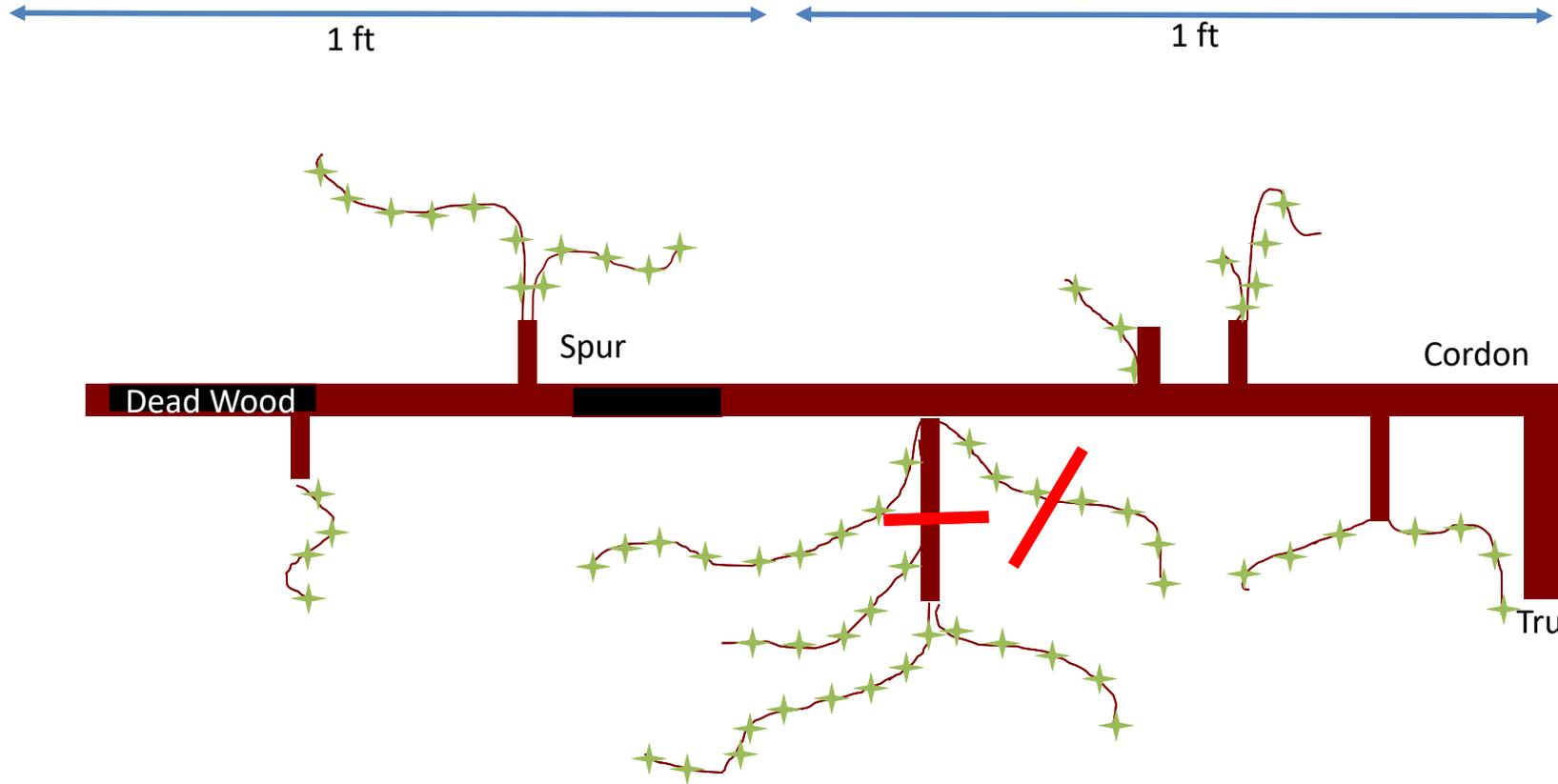
- Do it with the entire vine: You are forcing the vine to push dormant buds for new positions
- You WILL lose yield!

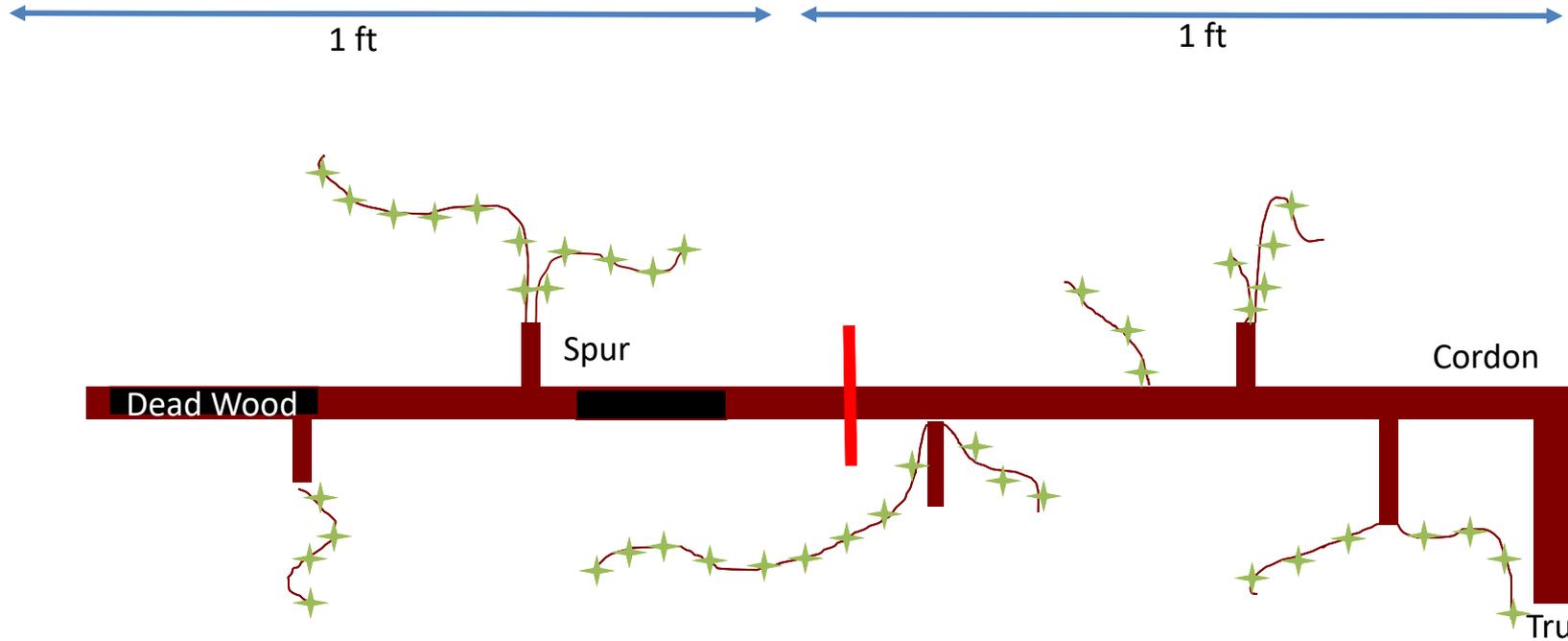
Scenario Two

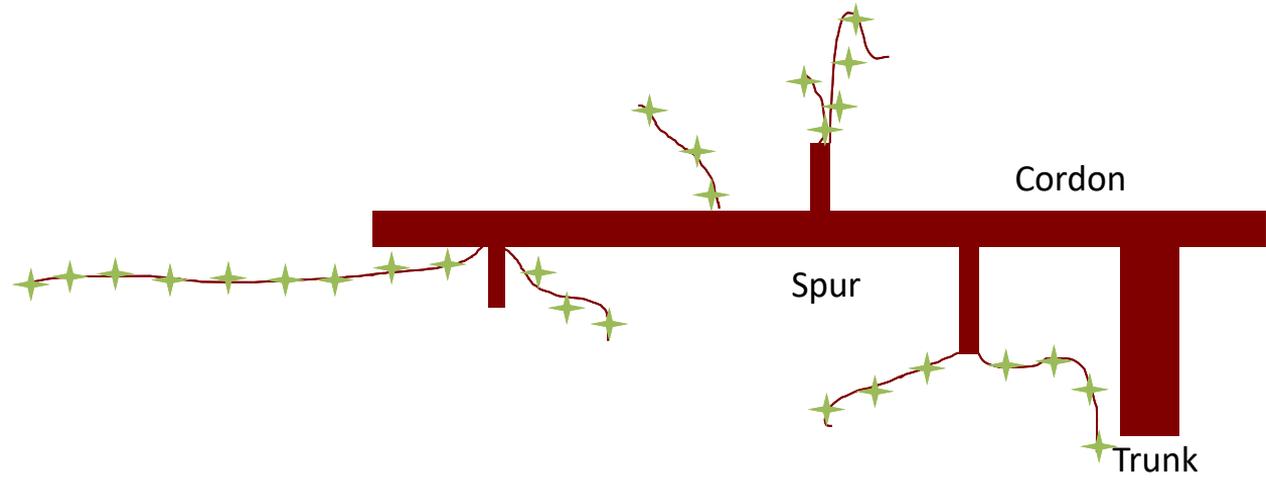
Renovating part of the cordon











Removing dead wood and fruit is important

- In many cases, vine renovation cuts are important to remove dead wood
- However, the goal is eventually not to make a lot of those large cuts

Take Home

- Long-term goal is to keep healthy permanent wood
- Spurs can grow slowly when pruning close to the cordon
- Make cuts in a way to keep wood healthy (give it 'space' to heal)
- Mechanical pruning is a good option, if rotated with manual pruning as good as possible.





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

<https://smallfruits.org/>

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

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