



## Vineyard Pruning Workshop – March 19, 2022

- HCC V&E Viticulture Instructor – Candice Fitch-Deitz, [cfitchdeitz@highlandcc.edu](mailto:cfitchdeitz@highlandcc.edu)
- HCC V&E Enology Instructor – Nicole Clark, [nclark@highlandcc.edu](mailto:nclark@highlandcc.edu)
- HCC V&E Program Director – Scott Kohl, [skohl@highlandcc.edu](mailto:skohl@highlandcc.edu)
- HCC Fall 2022 Courses:
  - ENO116, W0, Intro Enology
  - ENO210, W0, Intro to Wine Microorganisms
  - VIN212, W0, Winter Vit Tech
  - VIN215, W0, Summer/Fall Vit Tech

# Workshop Goals

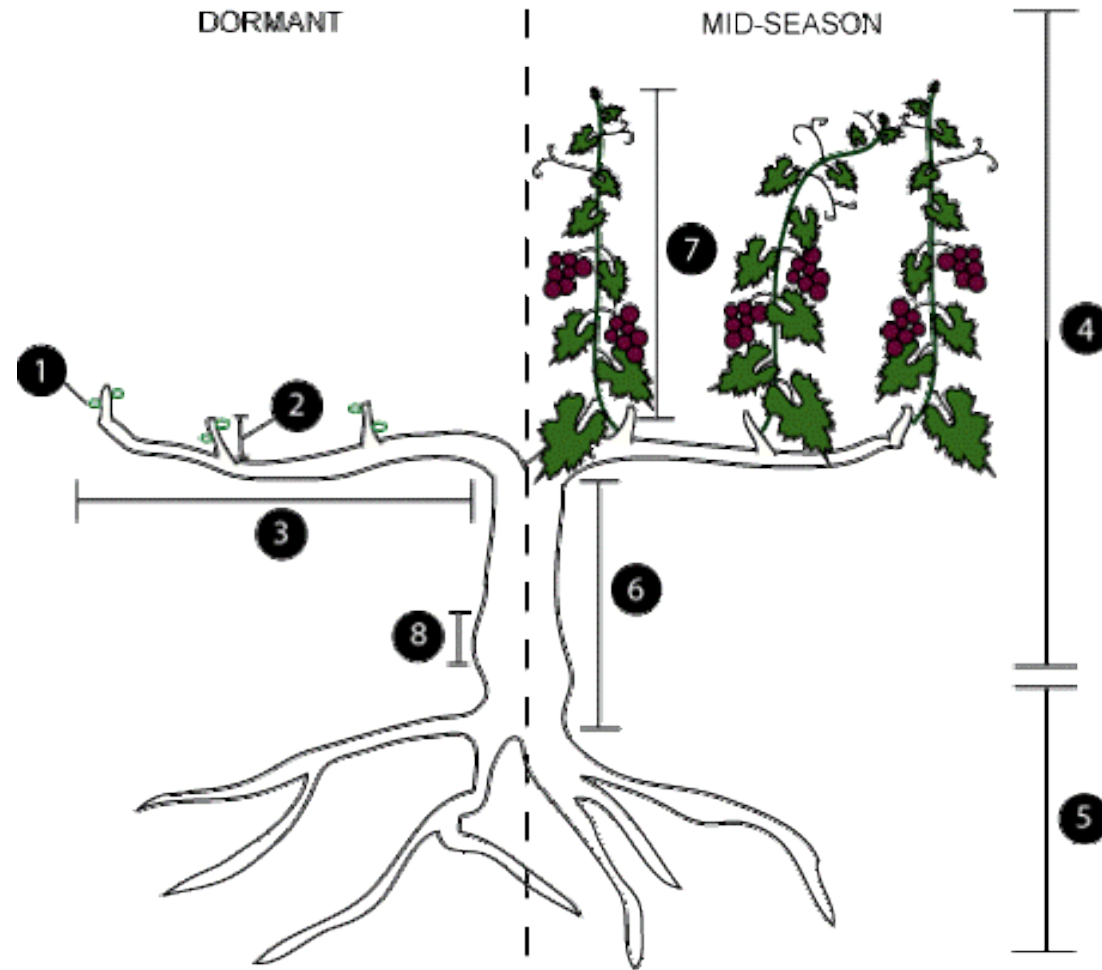
- Grapevine and Compound Bud Anatomy
- Why and When to Prune (2<sup>nd</sup> & 3<sup>rd</sup> Leaf Vines vs. Mature Vines)
- Pruning the two primary commercial vineyard systems:
  1. Head trained/cane pruned
  2. Cordon trained/spur pruned
- Trellis and training systems
- Balanced pruning
- Pruning equipment and supplies
- Learn by doing!

# Key Viticulture Goals of Growers

- Ripen grapes to optimal maturity
- Ripen wood to maximum maturity for cold hardiness
- Uniformity within and between vines
- Keep grapes free of pests (disease, insect, weed, vertebrates)

# Grapevine Structure

Spur pruned, bi-lateral  
Vertical Shoot Positioned



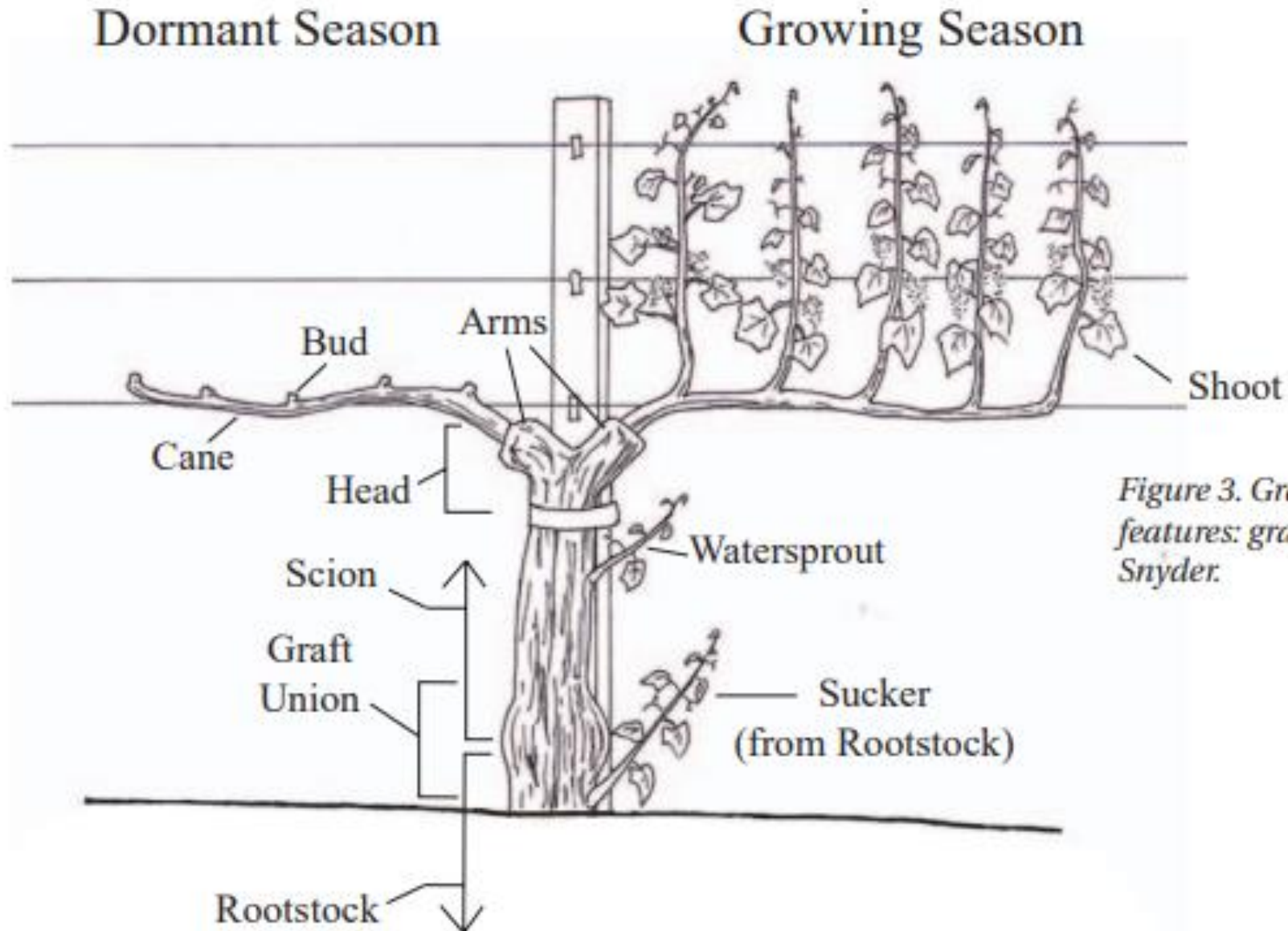
Key

1. Compound bud
2. Spur
3. Cordon
4. Scion
5. Rootstock
6. Trunk
7. Shoot/Cane
8. Graft union or crown

- Basal bud (on cordon)
- Node vs bud
- Lateral shoots
- See Pruning Terms Handout

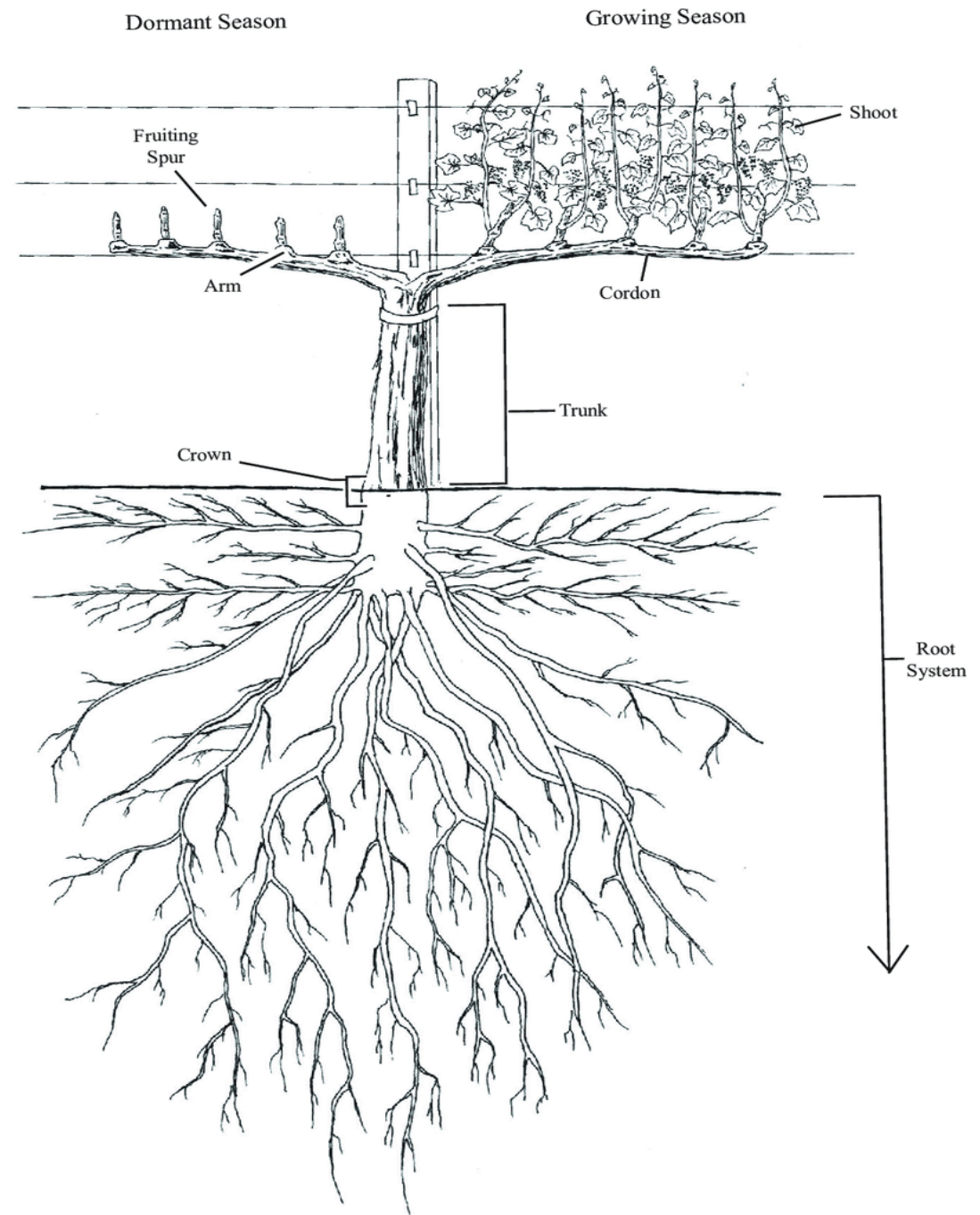


## Head trained/cane pruned

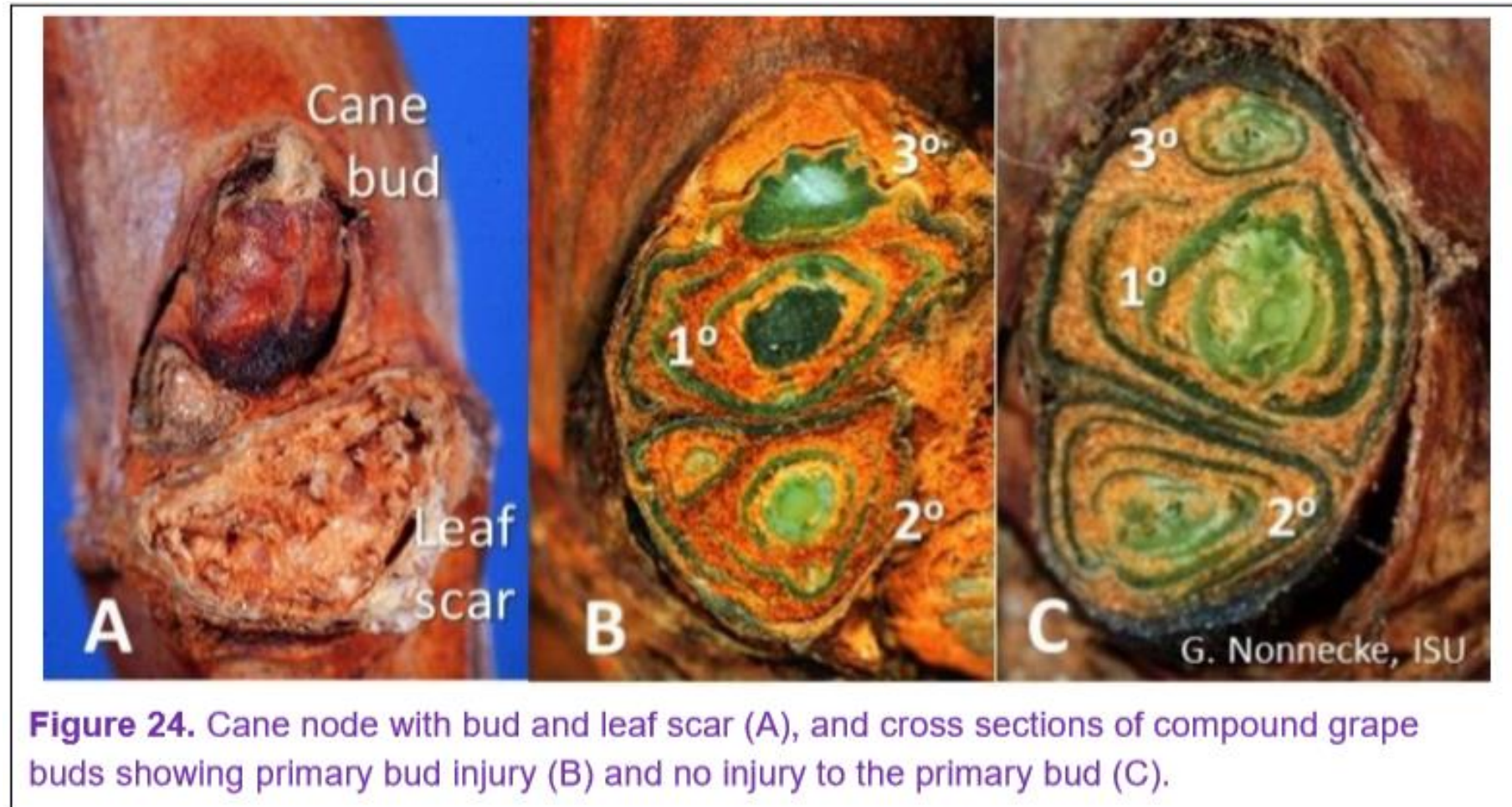


*Figure 3. Grapevine structures and features: grafted vine. Drawing by Scott Snyder.*

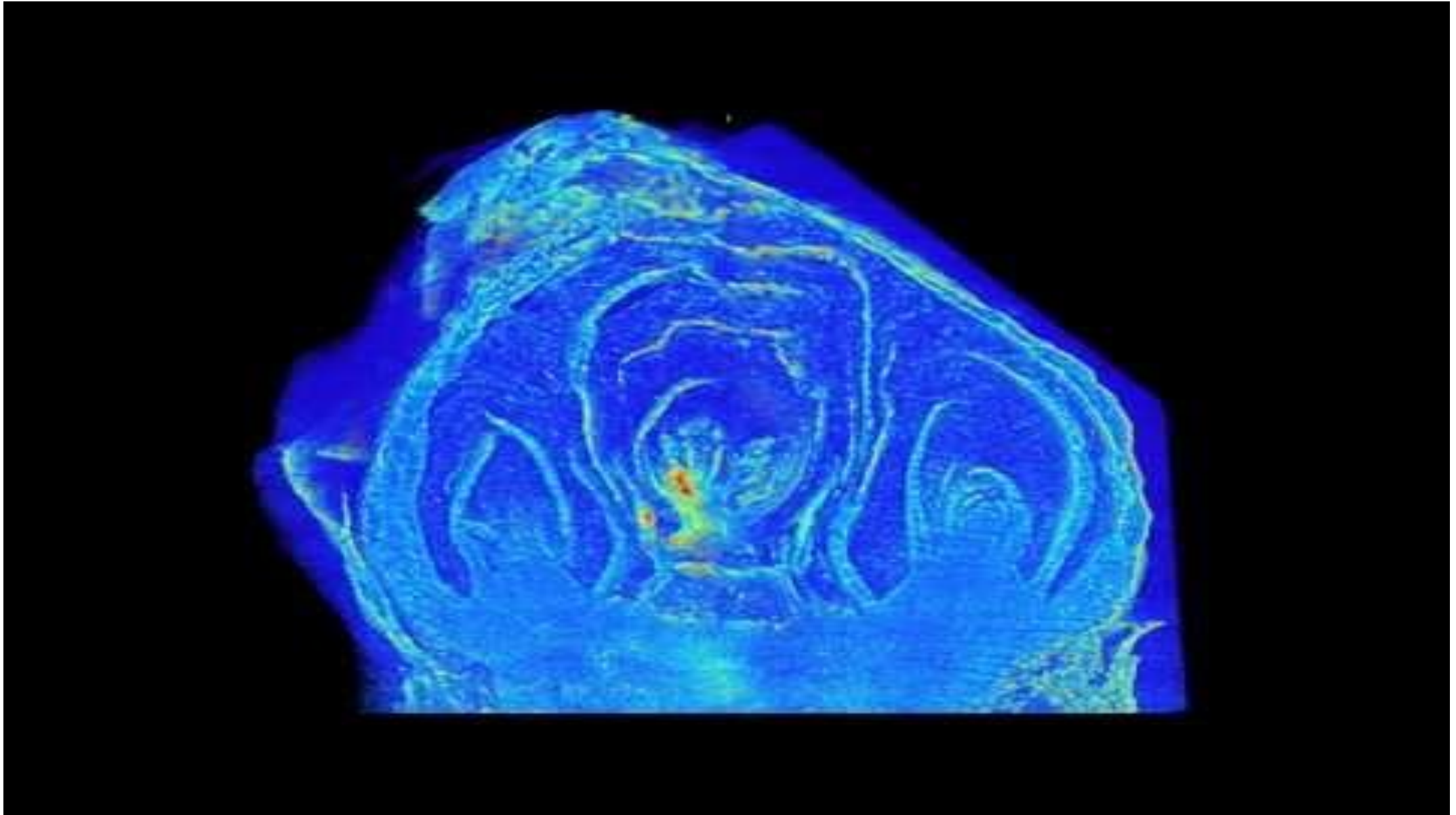
# Cordon trained/Spur Pruned Vine



# Compound Bud Anatomy







<https://youtu.be/AO4zR9wkwpl>

# Checking Buds for Freeze Injury

- Checking for bud injury –
  - Take 3-4 bud cuttings
  - Bring indoors for 24-48 hours before checking buds
  - Slice horizontally 3 times across the bud, beginning at the tip working inward toward the cane
  - Look for 3 green buds
- Leave additional buds for losses of 20% or more
- 50% or more bud loss, do not prune until full extent of damage can be determined
  - See Tables 26 & 27



# New Vines

- Main goals of years 1 & 2 (maybe 3)
  - Establish a strong root system
  - Grow trunk and cordons to fill trellis wire
- Remove flowers/fruit so that nutrients go to the roots and shoots

# Year 1

- Tie the shoots upright to encourage straight growth
- Support:
  - Metal rods
  - Bamboo
  - Twine, tied to the base of the vine and then tied to the cordon wire
  - Ties placed every few inches for support, removed/replaced each growing season
- Encouraging straight trunks is vital for mechanization

# Pruning Young Vines

- Year 1 (dormancy directly following planting)
- Assess the plant to determine:
  - How much live wood is present
- If there isn't much live wood, restart the vine
  - Cut back to 2 or 3 buds, new shoots will grow from here
- If good amount of growth, choose 2 canes (these will become trunks)
  - Pencil size thickness, good color, no damage
  - Canes should arise as close to ground as possible (own-rooted), close to graft union
  - Cut off any other growth from the base of the vine



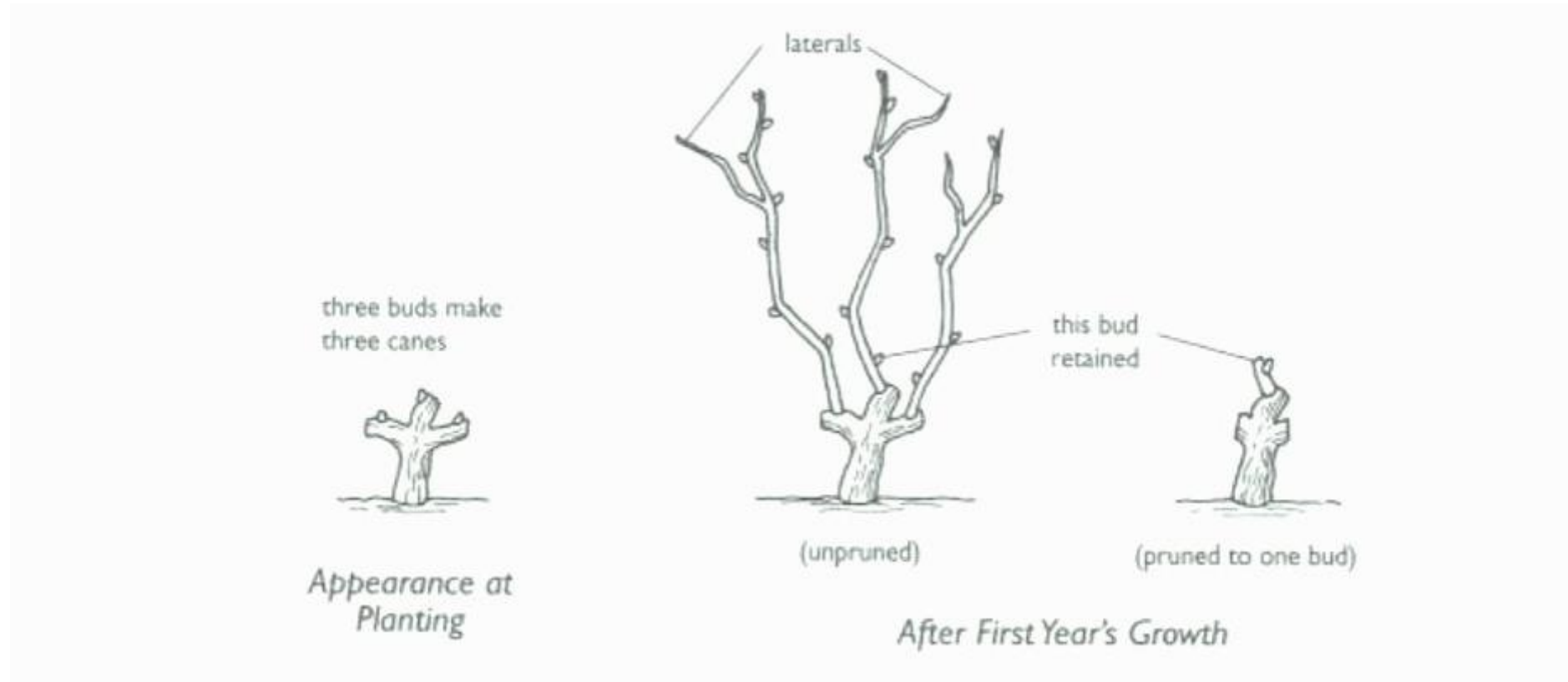
Graft Union

Shoots/canes/trunks

Rootstock



# Restarting the Vine



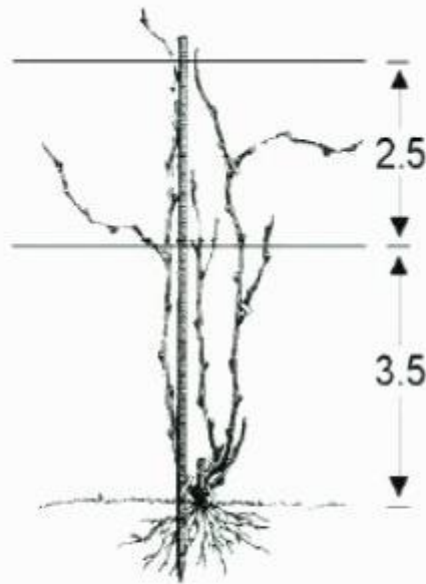


# Phase plan for young vines

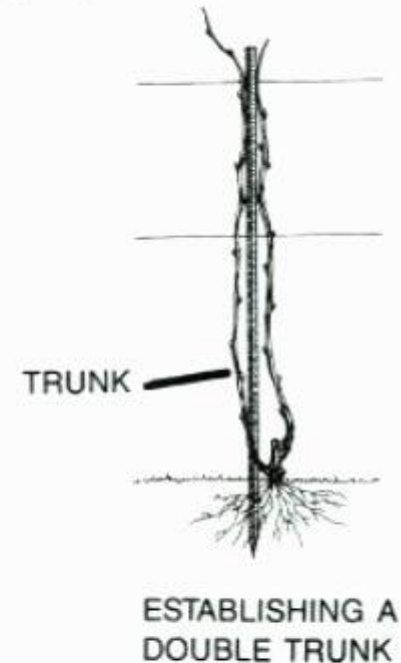
① At Planting



② First Season Growth



③ Beginning of Spring Second Season

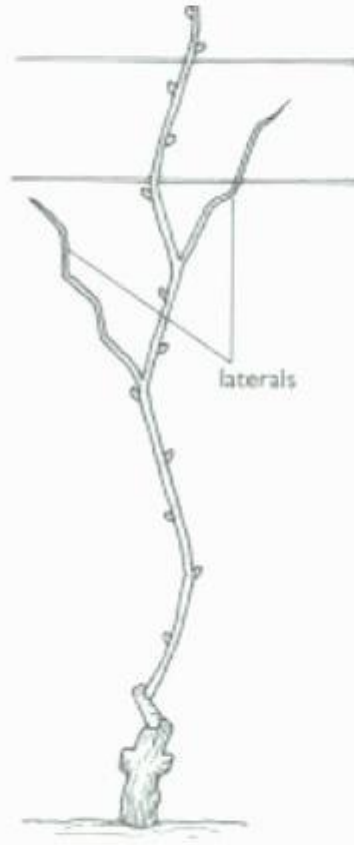


Great plan when there was lots of good growth in the previous growing season. First 'phase' is to establish your trunks.

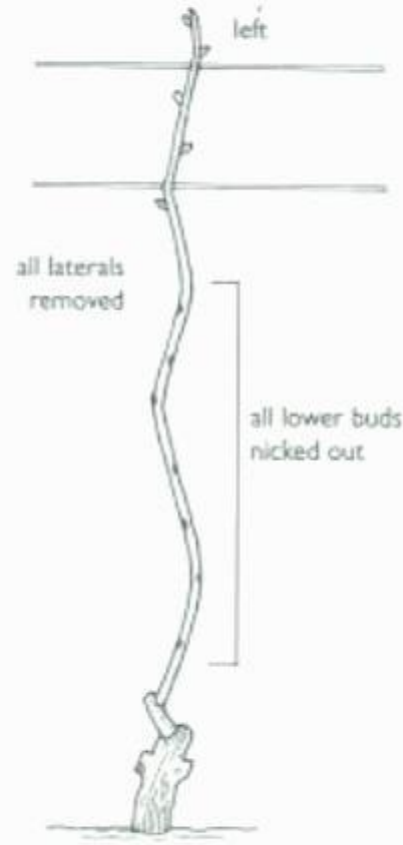
## Year 2 (or 3)

- Continue creating trunks and filling the trellis wire with cordons
- Use ties to keep the cordons secure and straight
- Allow cordons to fill-in the wire, cut growing tips to prevent overlap
  - This will encourage lateral growth (what will become spurs)
- Trim laterals back to create a renewal zone on cordons (spurs)

## Next dormant season



*Second Year's Growth  
from One Bud  
(unpruned)*

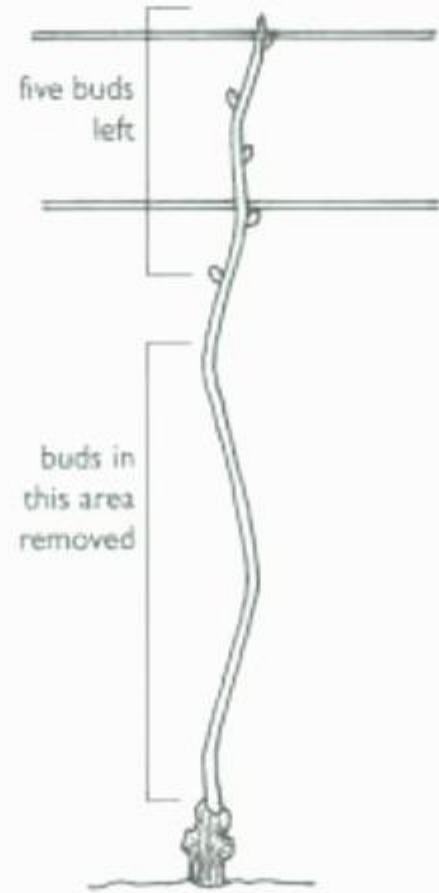


*Second Year's Growth Pruned  
(ready for a vigorous third year)*

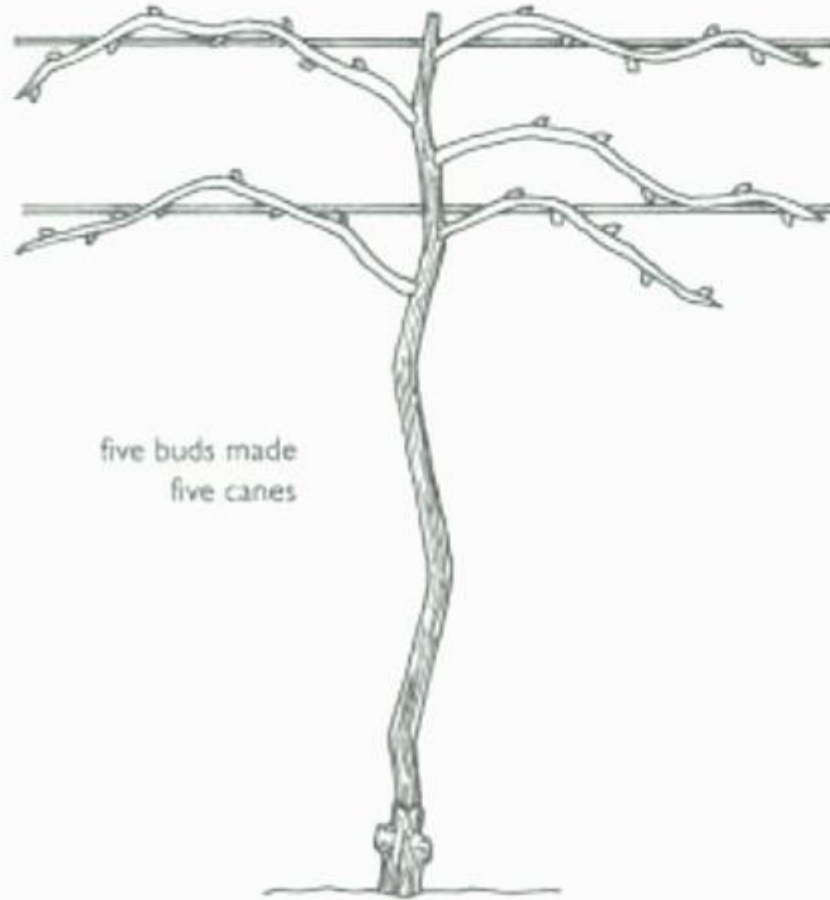
Again, depending on your growing season, this might occur in the 1st year or 2nd or 3rd!

The second 'phase' of establishing your vine is to create cordons.

# Cordon Development Phase



*Future Trunk Ready for Second  
or Third Year's Growth* **Develop A Trunk**

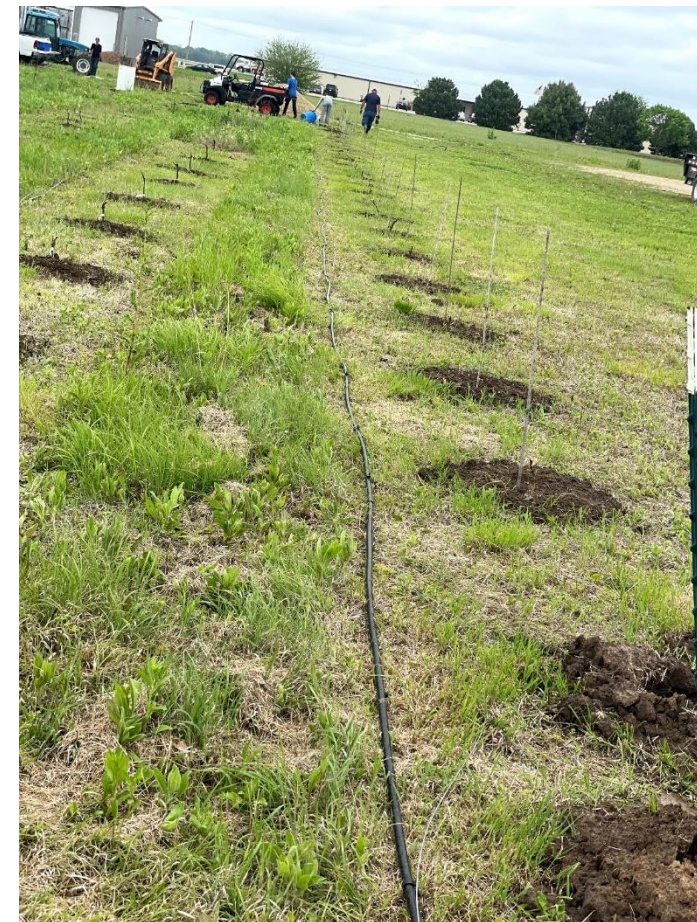


*Same Trunk After a Season's  
Growth, but Before Pruning*

# Years 4 and Beyond

- Vines have filled in the trellis space, cordons are fully established
- Ready for a crop
- Crops 1 & 2 should be controlled so that the root system can still continue to develop
  - If vines have struggled to grow, do not allow fruit development until year 4
  - Crop size should be proportional to vine health and size
  - A strong root system must sustain the vine a lifetime





Research Vineyard Planting Day May 19, 2021



July 28, 2021





September 30,  
2021





- Military Trail Vineyard
- Traminette planted 2014
- Rabbit damage
- New vine growth from the roots (own-rooted)

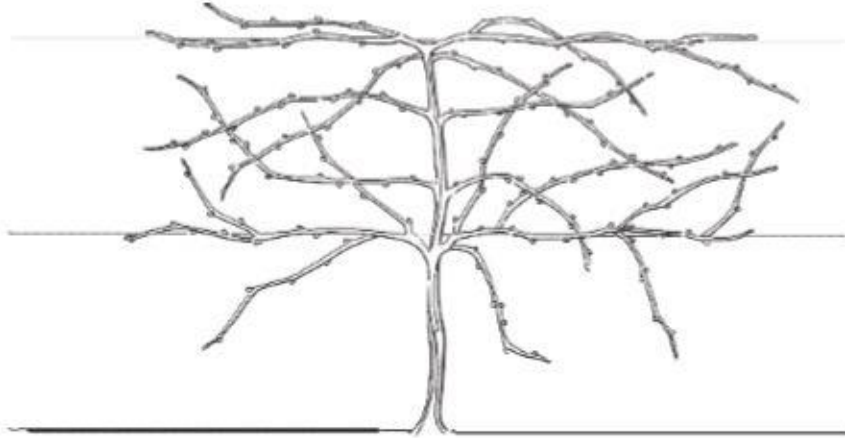




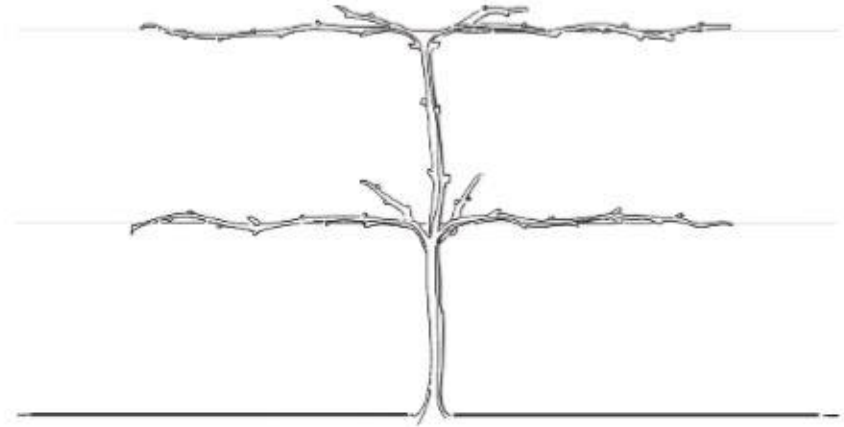
- Military Trail Vineyard
- Traminette planted 2014
- Rabbit damage
- New vine growth from the roots (own-rooted)
- 3 successful seasons of growth
- Moving fruiting wire down to 5 feet



## Cane or Spur Pruning?

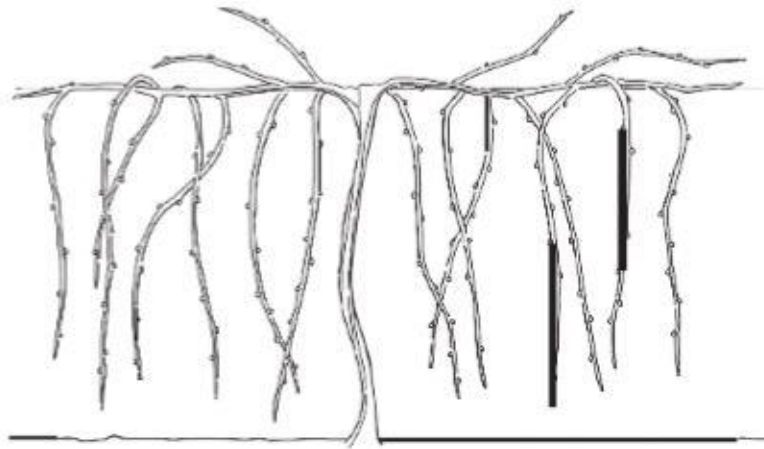


*Before*

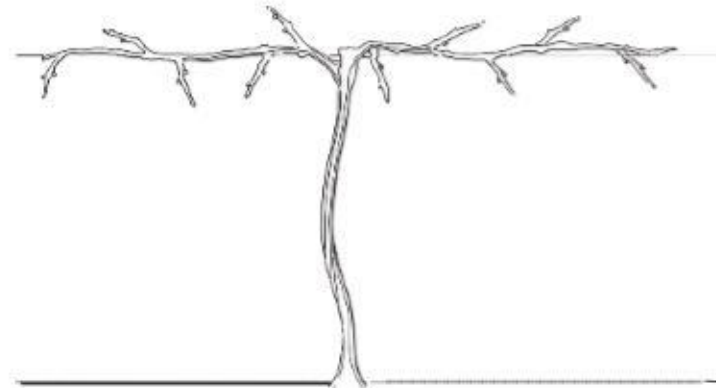


*After Pruning*

**Figure 23A.** Pruning Mature Vines to Canes.



*Before*



*After Pruning*

**Figure 23B.** Pruning Mature Vines to Spurs.

# Trellis Systems

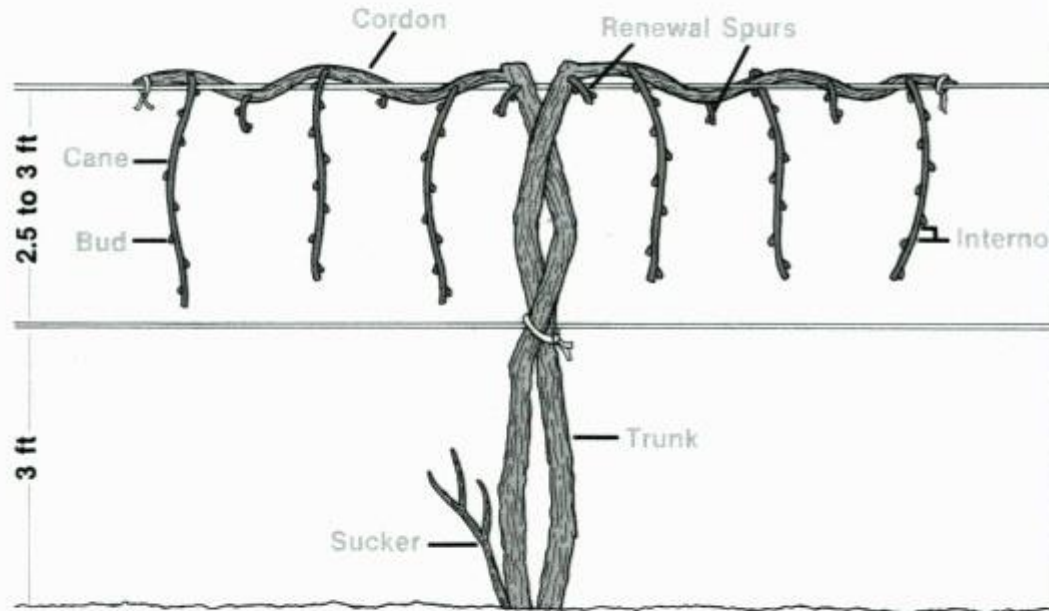
(structure that supports the vine)

- Matching the vine training system and trellis system to the growth attributes of the varietal is crucial for good canopy management practices and the overall ease of growing the vines.
- High Wire Systems
  - Single Bilateral Cordon
  - Geneva Double Curtain: 2 parallel wires
  - Watson Training System: High wire with parallel wires
- Low Wire Systems
  - Vertical Shoot Positioning (VSP): low bilateral cordon
  - Scott Henry: vertically split canopy
  - Smart-Dyson: alternate every other shoot, some up and some down



# Trellis systems - high wire

## Hudson River Umbrella Trellis System



High bilateral cordon trained











# What NOT to do!



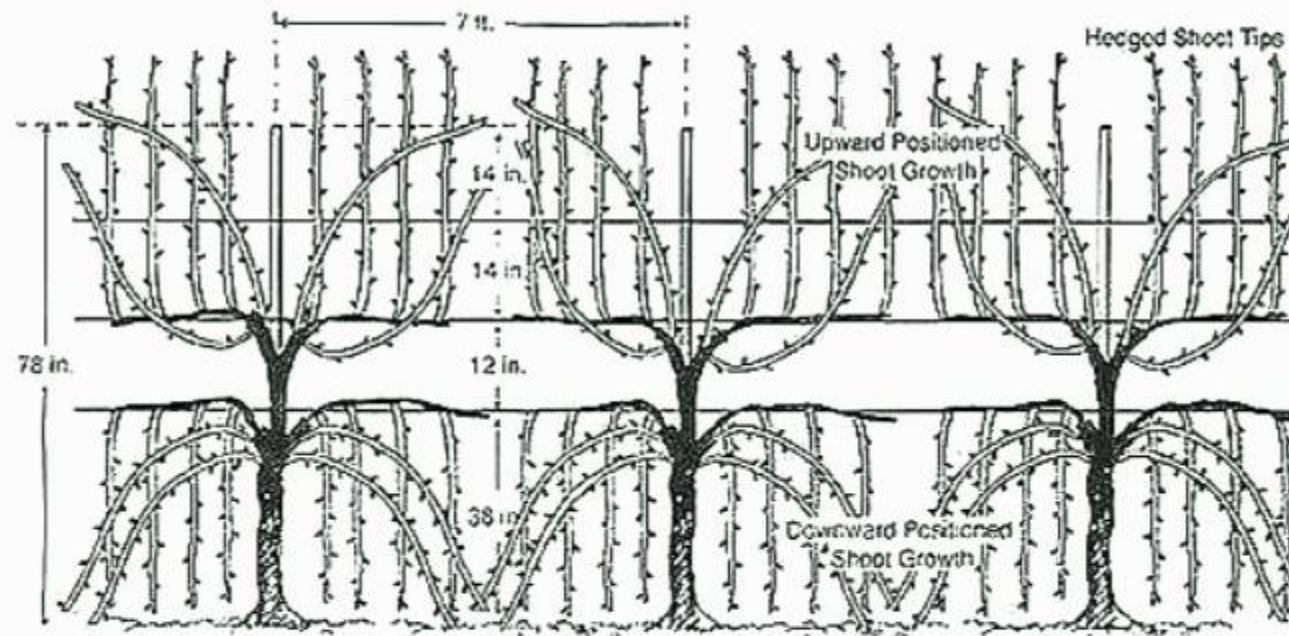






# Trellis Systems - low wire

## Scott Henry Trellis



Basic Scott Henry Trellis System



Low bilateral cane pruned, divided canopy

# Trellis Systems - low wire



Vertical Shoot Positioned “VSP”

Single Curtain

Cordon trained, but could also be head trained





Planted  
2014

Continuous  
Rabbit  
damage

Fence built  
Fall 2018

1<sup>st</sup> harvest  
2019  
(comparable  
to 3<sup>rd</sup> leaf  
growth and  
harvest)













Planted  
2011





# Why Prune?

- Eliminate wood that is dead, broken, or diseased
- Removal of old, non-fruitful wood
- Spur new growth (shoots come from 1-year old wood)
- Optimize location of fruiting zone
- Open the canopy for sunlight, air, and spray penetration
- Easier canopy management
- Control the size of the vines







# When to Prune

- Dormant pruning
  - After leaf fall when wood is hardened off for the winter
- Pruning will accelerate budbreak
- Delay pruning as late as possible but generally completed before spring growth occurs
  - After 1<sup>st</sup> of the year, mid-winter
  - Encourage rapid healing of pruning cuts to lessen likelihood of disease
  - Lessen frost damage, budbreak occurs at terminal end of cane
  - Double prune (long prune, then follow up with final pruning at/near budbreak)



# How to Prune

- Manual: hand pruners, hand saws, and loppers
- Semi-mechanized: pneumatic or electric pruners
- Mechanized: tractor mounted devices
  - Pictured at right: Pellenc Pre-Pruning tractor mounted unit
  - There is a difference between pre-pruning machines and leaf pruning machines that can be used during the active growing season
- Labor



Photo credit: <http://vinetechequipment.com/>







# What to Keep for Balanced Pruning

- Prune canes from vine
- Weigh canes
- Use Pruning Formula for specific variety (generic formulas ->)
  - Purdue
  - See also, Mike White's Pruning Cheat Sheet
- Note: hybrid varieties have more clusters per shoot & shoots per count node

Grape Variety	Pruning Formula	Cluster Thinning
American	30 + 10	No
French Hybrids	20 + 10, 15 + 5	Yes/No/Maybe
New Hybrids	20 + 20?	Yes/No/Maybe
Vinifera	20 + 20	Yes/No/Maybe

Note: for spur pruned vines  
leave 5-6 nodes when pruning  
to find pruning weights

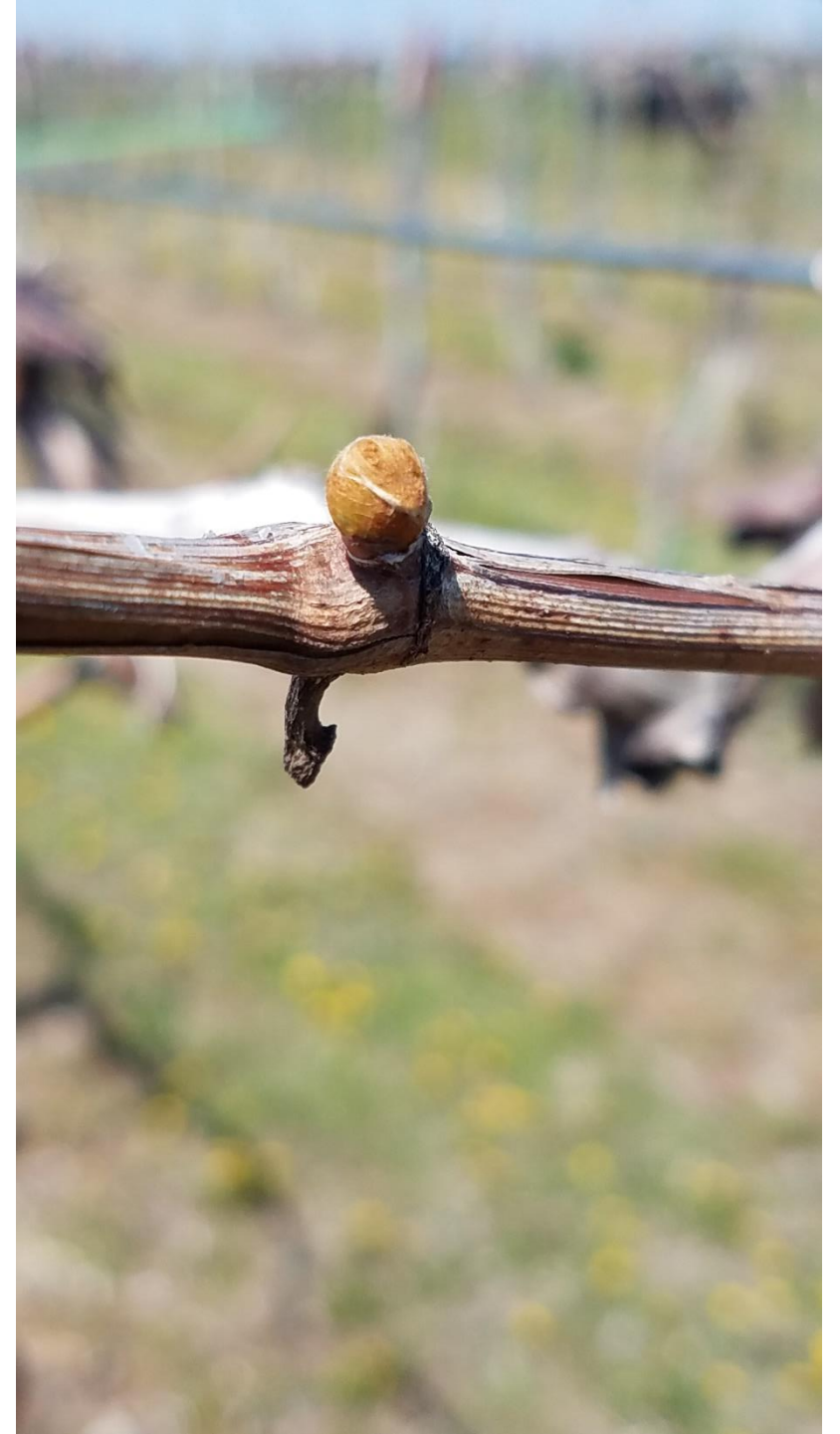
# Pruning Formula Example

- Chambourcin
  - $20+10$  maximum nodes 50
  - Pruned canes weigh 2.5 pounds
  - For the first pound of canes leave 20 nodes
  - For each additional pound leave 10 nodes
  - $20+10+5=35$  nodes total left on the vine for the current growing season



# Spur and Node Positioning

- **High Wire Systems**
- Spurs or nodes pointing down
  - Single wire – lower 180 degrees
  - Double curtain – outer 90 degrees
- **Low Wire Systems**
- Spurs or nodes pointing upward
  - Upper 180 degrees



# Trunk Disease (once established it stays)

- Recommendations
  - Use disease free plants (inspect for streaking or pitting)
  - Prune as late in the Spring as possible
  - Do not prune after rain events
  - Double prune (early pruning, then 2<sup>nd</sup> round close to bud break)
  - Keep plants from becoming stressed (water, nutrient, etc.)
  - Bring up renewal trunks or cordons
  - Remove pruning debris or collapsed plants from the vineyard
- HCC practices: renewing diseased trunks/cordons, clean pruners with peroxide between each vine/cut, fungicide applications at bud break (Topsin M), delayed pruning, reduce stress on the plants



Vine exhibited:

low yield

blank wood

Water sprout utilized as a  
new trunk (as close to ground  
as possible)

Encourage top growth of  
cordon to fill trellis wire 6-8  
feet





1 season  
of growth

New trunk  
and  
cordon

Tip out  
cordon to  
encourage  
lateral  
shoot  
growth  
(future  
spurs)





Vine succumbed to trunk  
disease over several  
growing seasons





Vine collapsed during  
the growing season  
and succumbed to  
trunk disease

Generally seen when  
fruit is on the vine  
during a hot period of  
time





# Pruning Notes

- Make all cuts closest to the bud that is being cut from the plant
  - Leaving the internode piece long allows for this area to dry out and not the bud
  - Cutting too close to the retained bud may cause drying and bud death
- For spur pruned vines leave 5-6 nodes when pruning and weighing canes
- Cut suckers and unnecessary canes flush with the trunk/cordon
- Be careful not to cut the trellis wires!
- Wear protective eye wear

# Acknowledgements

- Highland Community College V&E Staff and Interns
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- University of Minnesota
- University of Tennessee
- Washington State University
- Viticulture and Enology Science and Technology Alliance (VESTA)



# Thank you



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