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Vineyard Mothballing

Strategies for Successfully Taking Vineyards Out of Production

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Mothballing

- Term coined in early 2000s by Australian winegrape producers
- Formally defined as:

  Maintaining a non-producing vineyard with minimal, critical inputs to allow for a rapid return to production in the future

- In contrast to "Abandonment" which suggests no maintenance, inputs, or plans to return to production

Potential Approaches to Mothballing

Type I = No Harvest + Minimum Management

- Managed only to mitigate pest and disease pressure
- No consideration to recovery of vines during future return to production
- Little to no cultural practices, inputs, or chemical intervention
- No harvest of fruit

Type II = No Harvest + Management for Recovery

- Management is reduced but still addresses pests, diseases, and vine health
- Vines managed to be quickly brought back into production with minimal effort
- Cultural practices like pruning may continue; inputs may be reduced or eliminated
- No plans for harvest

Type III = Minimal Harvest + Reduced Management

- Management reduced as needed; extraneous practices eliminated first
- Vineyard is not managed for high yields but surviving fruit may be harvested

Risks of Mothballing

- Vine Health and Longevity
  - Significant stress on vines over multiple years
  - Can cause long-term damage to vines
  - May reduce the lifespan of the vineyard
- High Pest and Disease Pressure
  - Pests and diseases can proliferate beyond expectations
  - Can increase long term pest pressure going forward
- Nuisance vineyard and Abatement
  - Vineyard may become a "nuisance" to nearby farms
  - High pest pressure; reservoir for uncommon pests
  - Visual eyesore in highly-trafficked areas
- Poor Recovery
  - Vines may never recover to peak production
  - May take longer than expected to recover to acceptable cropping levels

Harder Than it Sounds

- We can't expect to return to production when we wish to without a long-term, low-input strategy

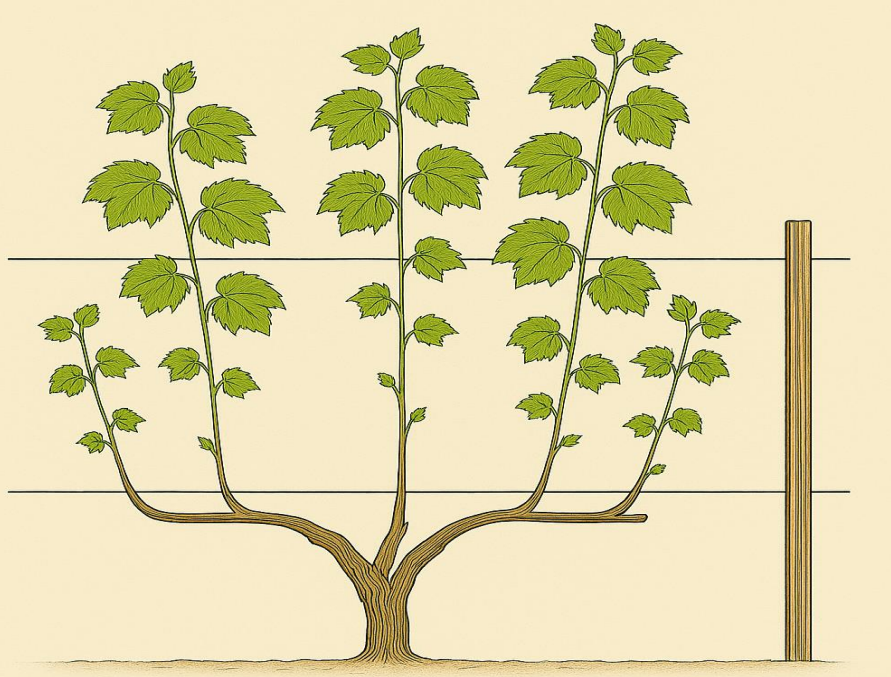
- Considerations when planning to mothball:
  - Vine physiology
  - Resource use efficiency
  - Pests and diseases
  - Site conditions
  - Target training and management when returning to production
  - Expected length of time vines will be mothballed
  - Minimum labor hours needed
  - Whether or not to still use some chemical controls

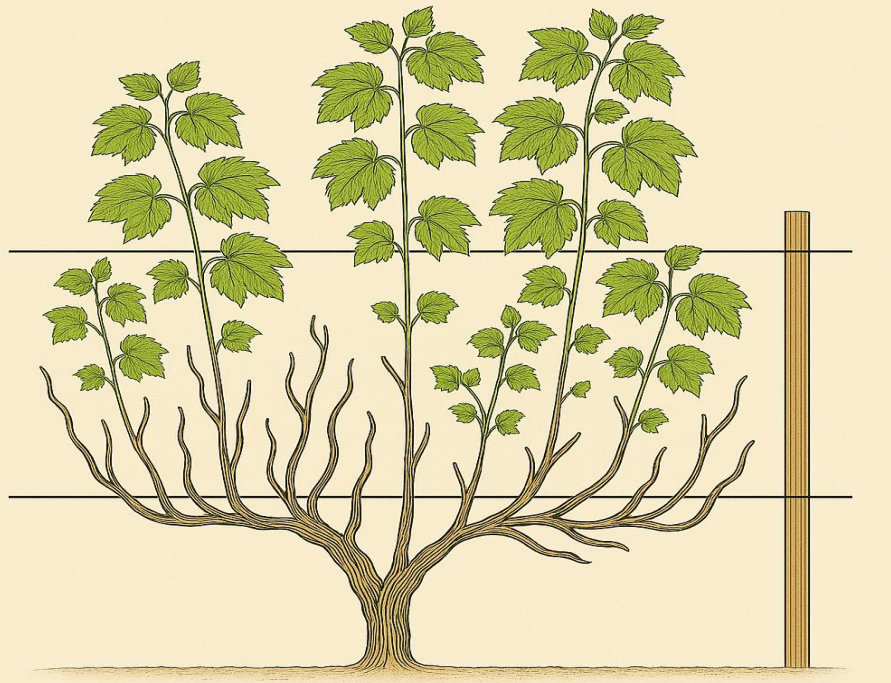
Mothballing Methods & Considerations

Vine Physiology

- To successfully mothball a vineyard, we should develop a plan around grapevine physiology and phenology

- Major considerations
  - Assume no harvest planned
    - Yield and quality will decline severely
  - To prune or not to prune?
    - Labor costs ~ Vine health
    - New buds vs. Latent buds when return to production occurs
  - Water use efficiency
    - Less water = less leaves
    - Less transpiration and photosynthesis
  - Plan for recovery





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Pruned Vine

New Dormant Buds

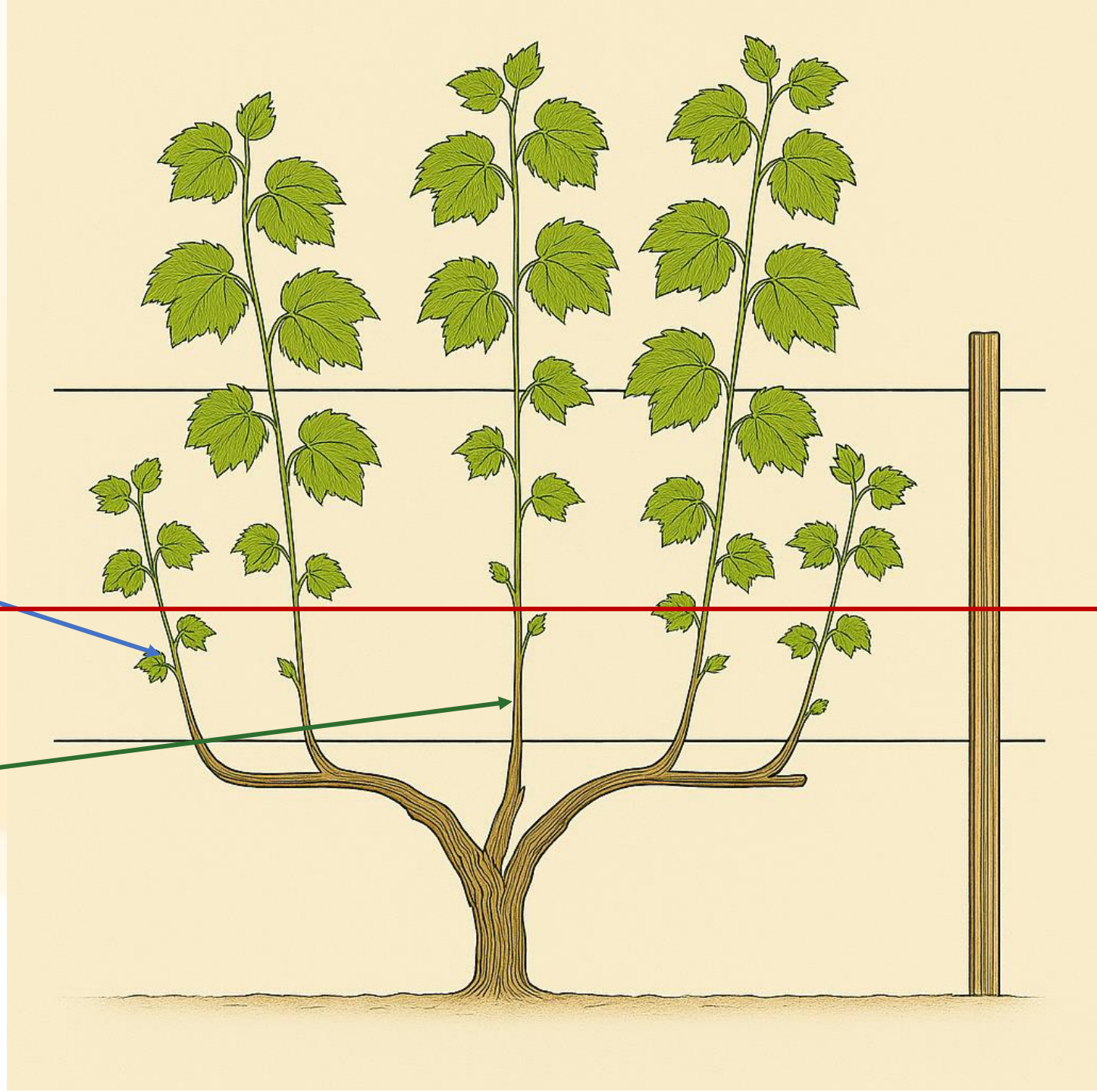
- Has primary bud
- More fruitful and healthy
- Most useful the year after they form

Low Fruiting Zone

- Uniform height for cluster management
- Easy to expose fruit and apply pesticides

Minimal Permanent Wood

- Pruning removes extra tissue
- Limits habitat for pathogens
- Allows for smaller pruning cuts rather than removal of large portions



Unpruned Vine

Latent Buds Needed for Return to Production

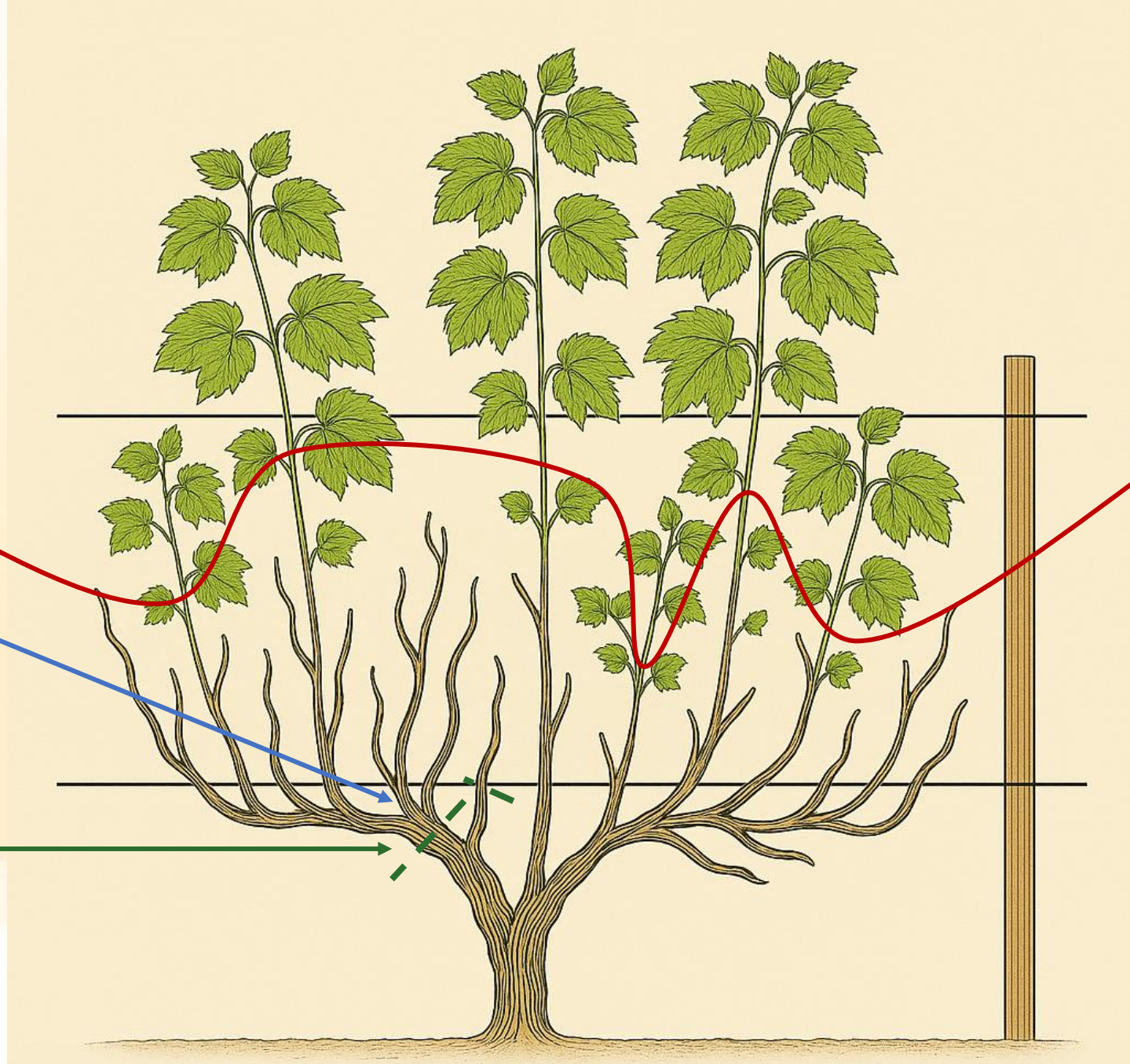
- Likely lacking primary bud
- Often has no cluster primordia
- Less strongly attached to permanent wood

High Fruiting Zone

- Fruit occurs at non-uniform heights
- Even if not harvesting, allows for variation in exposure and temperatures for pests/diseases

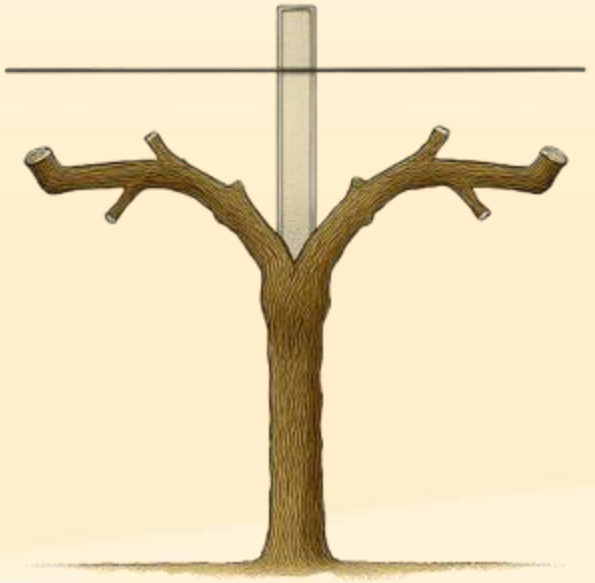
More Permanent Wood

- Unpruned shoots become lignified
- Provides excess habitat for pathogens
- Requires larger pruning cuts when bringing vines back into production



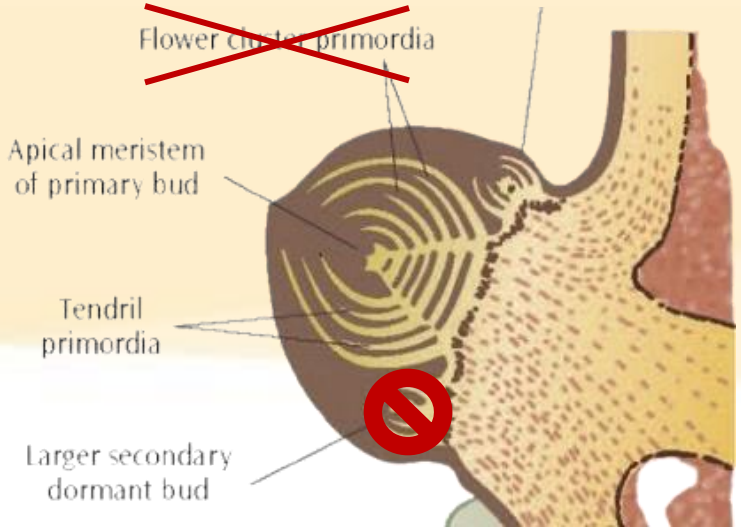
What about Converting to Cane Pruned?

- Common question:
  - What if I convert my vines to a head-trained, cane-pruned system to reduce the pruning demands for my vineyard?
- Viable if applied well
  - Must still prune vines back to the head each year
  - Likely wouldn't retain fruiting canes
  - Only retain renewal spurs to preserve growing positions
  - Similar to making a head-trained, spur-pruned vine
- Labor
  - Still requires labor hours for pruning
  - May require **more** labor hours than spur-pruning does



Resource Use Efficiency

- Most mothballed vineyards will receive little to no water or nutrient inputs
- In response, vines will reduce vigor
- Vine vigor ~ resource availability
  - Smaller canopy = less water demand
  - Changes root proliferation over time
    - Seeking resources at first
    - Less root growth in long-term
  - Cluster size decreases
- An already-healthy vine will be able to reduce its growth and reproductive output to match resource availability
  - It will be able to survive low resource availability by reducing vigor significantly



Labor Requirements

- Labor is often the most costly aspect of managing a vineyard

- Labor costs change between the mothballing approaches
  - Type I = Least labor needed
  - Type II = Moderate labor requirements
  - Type III = Fewer hours but still high

- Each approach has variation in how the objectives are achieved

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Labor Requirements Examples

- Type I: no harvest; minimal management $
  - Pest and disease control and/or
  - Livestock management
- Type II: no harvest; manage for recovery $$
  - Pest and disease control and/or livestock management
  - Standard pruning for training/trellising style
- Type III: minimal harvest; reduced management $$$
  - Pest and disease control
  - Livestock management
  - Standard pruning for training/trellising style
  - Canopy management
  - Irrigation management

Type I: No harvest – Minimal Management

- Only objectives are:
  - Limit pest and disease pressure
  - Keep the vines alive
  - Really "Storing the vines for later" strategy

- Eliminates the need for nearly all cultural practices
  - Pruning is not conducted
  - Canopy management practices are not applied
  - Inputs are reduced severely or eliminated totally
  - Reduces costs the most out of the various mothballing approaches

- Makes return to production very challenging
  - Requires a year of vegetative tissue recovery before vines can be cropped
  - Relies on older, latent buds for recovery

Pest and Disease Mitigation

- Fine line between a mothballed vineyard and an abandoned one
- Limiting pest and disease pressure to within expected ranges for a managed vineyard is key
- Approaches:
  - Only early season pesticide applications
    - Reduce pest pressure at the start of the season
  - Limit or eliminate inputs
    - Fewer inputs lead to less vigorous vines for pests/diseases (doesn't always apply, e.g., PD)
  - Livestock integration
    - Heavy grazing on cover and the vines can reduce habitat and food for pests/diseases

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Pest and Disease Mitigation

- Many pesticides are expensive
  - The most costly should be eliminated first
- Some pesticides can still be applied
  - Sulfur and oils are still viable components of pest and disease management
  - Apply early and in fewer overall applications
- Alternative Options (Livestock canopy grazing)
  - Livestock ~ canopy grazing eliminates pockets in the canopy prone to fungal growth
  - Increases airflow and light penetration
  - Can achieve acceptable pest control without chemical applications

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Inputs

- Reducing inputs not only saves on costs, but it can also decrease the suitability of the vine to pests and diseases

- Fewer inputs often leads to lower vine vigor and decreased reproductive success
  - This vine response decreases the habitat and resources for pests and diseases that rely on the vine for food or to complete their lifecycles

- Desert plants
  - Most desert plants grow slowly in their natural habitat because resources are scarce
  - In a greenhouse setting they grow much more rapidly and can be subject to higher fungal pressure

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Inputs

- When mothballing fertilization of vines in likely not necessary unless you still plan to harvest some of the fruit

- Irrigation should be reduced on a per-site basis and should account for soil ~ water interactions
  - Soils that dry down quickly in spring may still require some water inputs
  - Soils that retain water late into summer may not require irrigation at all
  - Some irrigation may be required to avoid vine embolism and permanent tissue damage

Cultural Practices

- In a Type I mothballed vineyard without plans for harvest, no cultural practices should be applied
- If planning to maintain vine health and structure, pruning would be the most necessary cultural practice in a Type II mothballed vineyard
- In Type III mothballed vineyards (salvageable harvest), pruning and minimal canopy management should be applied
  - e.g., leaf removal, raking, and suckering

Cultural Practices – Floor & Soil Management

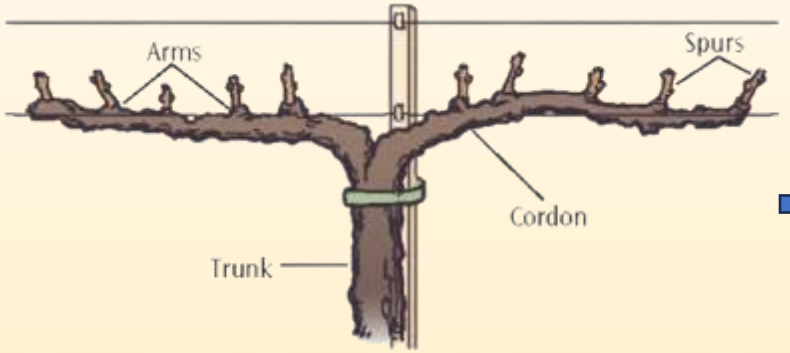
- In any form of mothballing, some floor management will be beneficial
- There's still a need for cover to limit erosion
- Planting self, re-seeding crops during last year of full management will help maintain cover of preferred species rather than weeds
- Mowing, tilling, and/or crimping becomes optional
  - Good to manage cover to limit overwintering habitat for pests that overwinter in leaf litter
  - Maybe a good time to switch to no till

Returning to Production

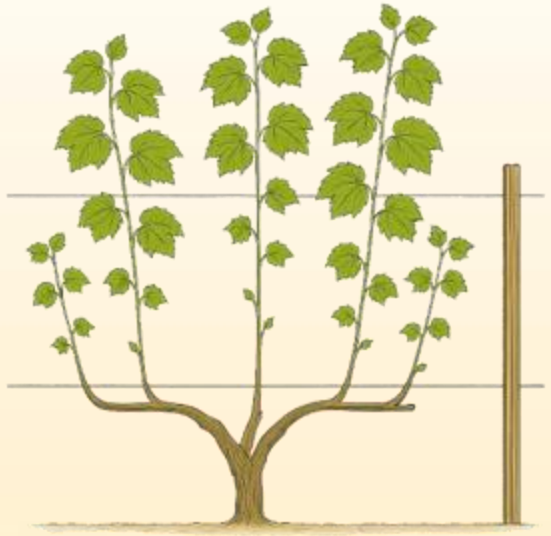
- You should consider your plans for returning the vines to production before designing a mothballing strategy

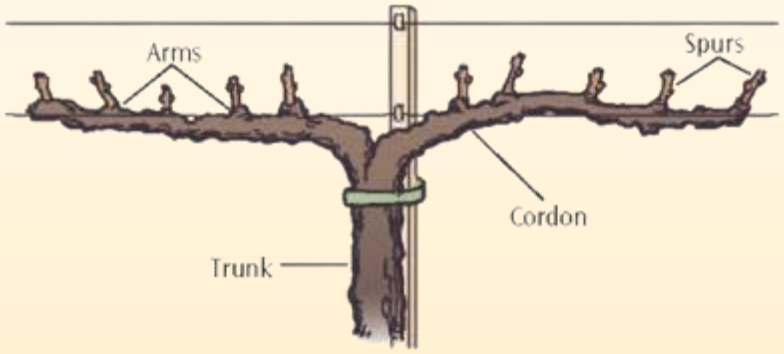
- Primary objectives upon return:
  1. Fruit production as soon as possible
  2. Healthy shoot growth in year 1
  3. Reestablishment of growing positions
  4. Limiting pest and disease risk
  5. Reintroduce inputs without vine vigor overcompensation

Normal vine pruning & regrowth



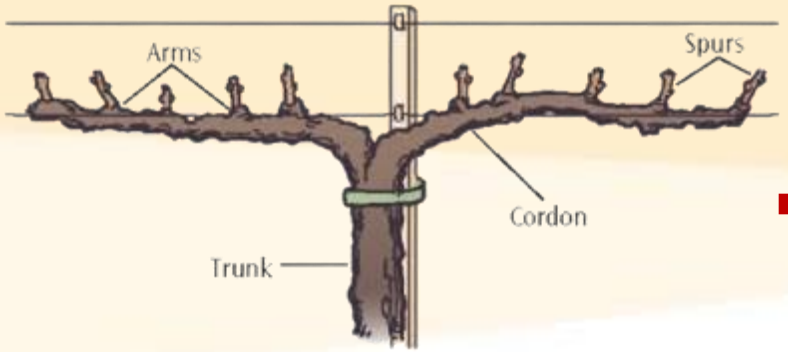
Bi-lateral cordon training with spur pruning



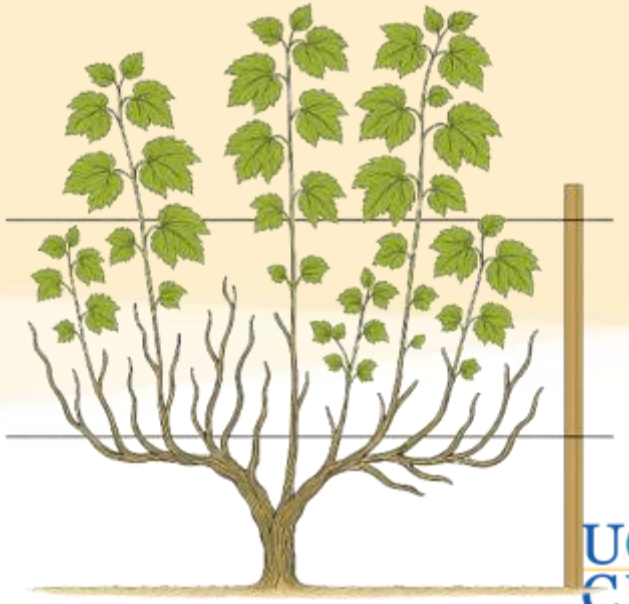


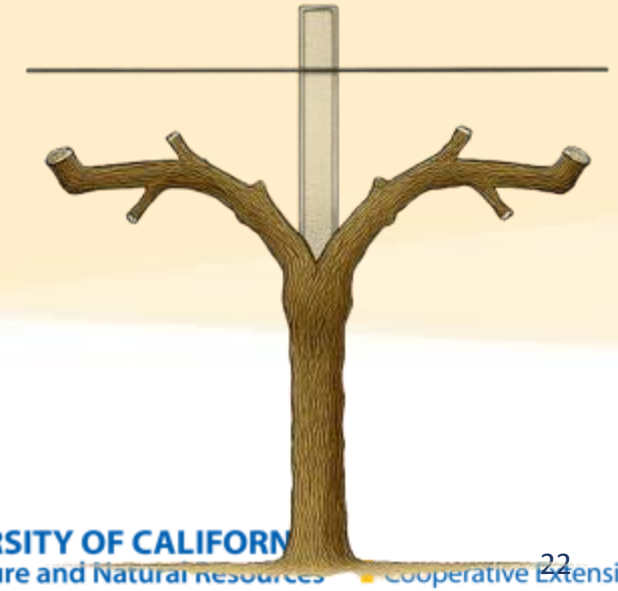
Bi-lateral cordon training with spur pruning

Recovery from Mothballing

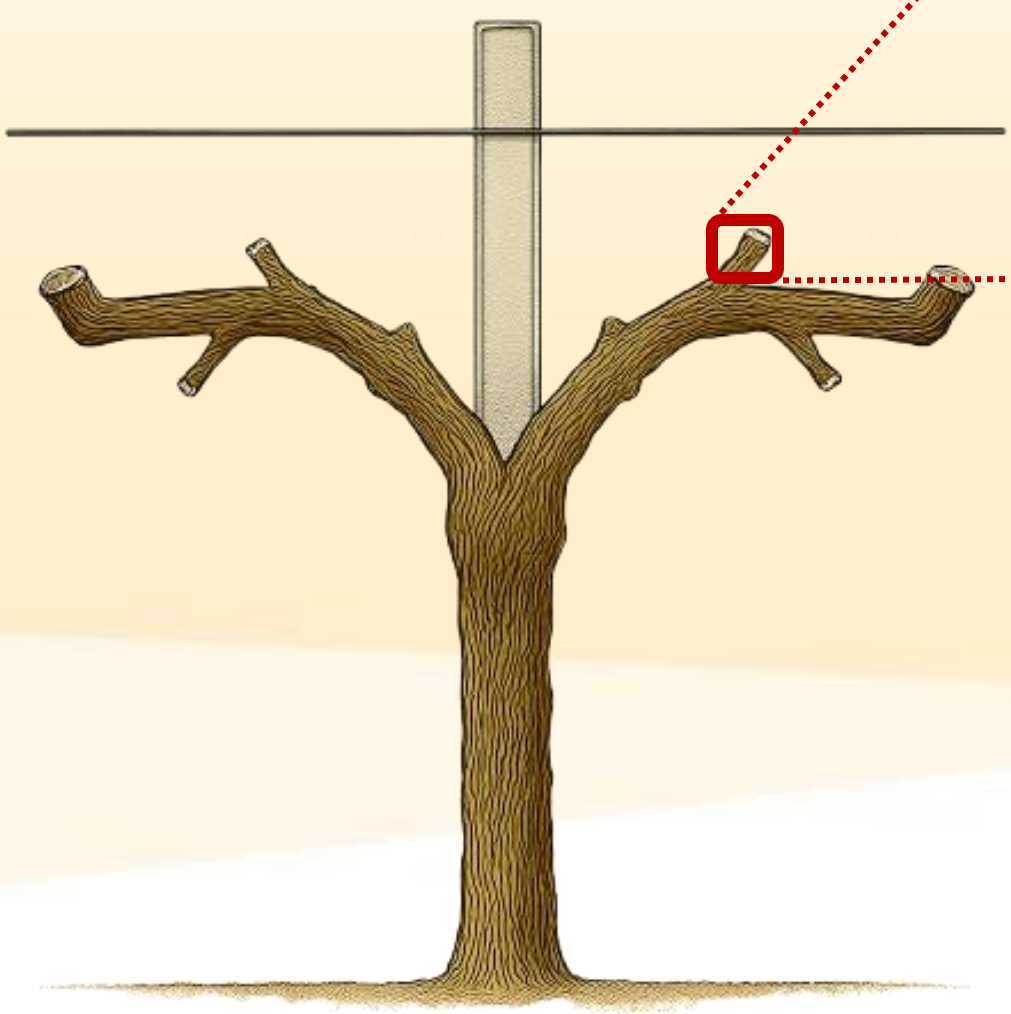


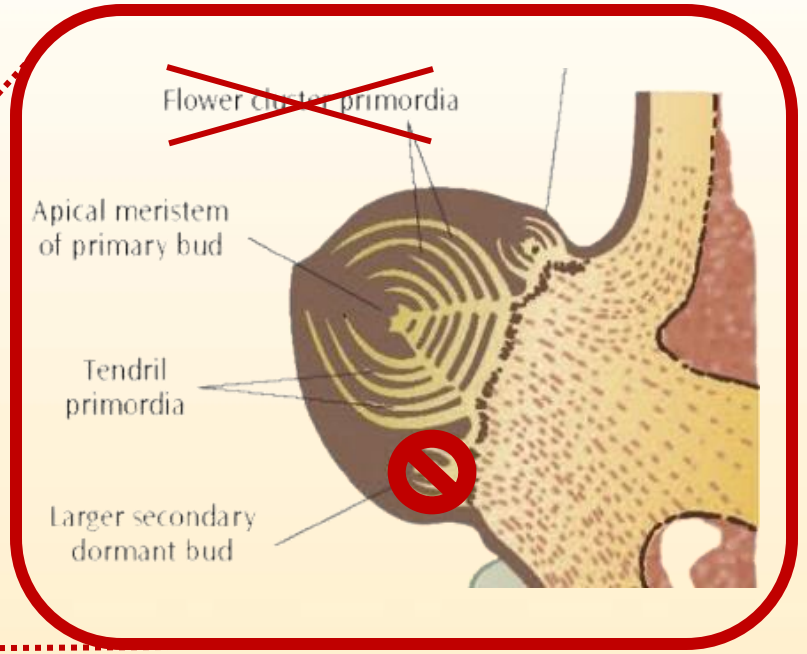
Bi-lateral cordon training with spur pruning





Vine Recovery



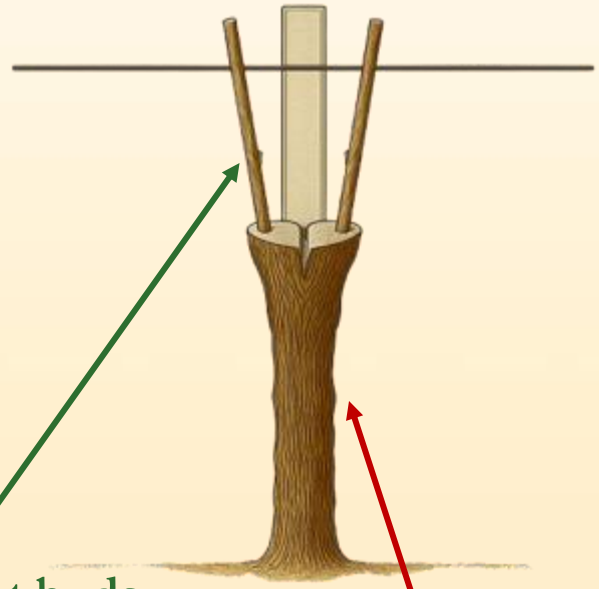


Latent Buds

- We will rely on latent buds to restore the fruiting positions
- These were formed > 1 year ago
- They are often less fruitful and less well attached than 1 year old buds
- We need these to grow to replace pruning wood in the first year of recovery

Top working for vine recovery

- You can also retrain the vine from the head by top-working the scion
- This can reduce the need for relying on latent buds that may or may not provide quality pruning wood
- Also allows for a new scion variety to be grafted onto the vine if market demands change when the vineyard is being brought back into production
- This will still take 2+ years to reach full cropping production



Young dormant buds

- 1 year old
- More fruitful than latent buds

Previously mothballed trunk

Challenges with Return to Production

- Relying on latent buds to replenish pruning wood means the resulting shoots may be weakly connected to the cordon/trunk
- Latent buds may not be fully developed prior to budbreak; This could lead to shoots with fewer leaves & clusters, poor bud development, etc.
- Latent buds may not grow at all when needed for return to production
- Return to full-potential yields may not be possible or take several years
- The likelihood of running into these challenges will likely be affected by variety and possibly rootstock

Example Timeline to Return to Production

Year 1 – Return to Production

- Winter – Heavy pruning back to ideal latent buds
- Spring – Intensive shoot thinning to 2-4 shoots per side
- Spring – Fertilize and irrigate to increase vine vegetative vigor
- Summer – Allow selected latent shoots to grow without fruit (remove crop)
- Summer/Fall – Dormant preparatory fertilization

Year 2 – Replace Permanent Growing Positions

- Winter – Prune remaining shoots to two-bud spurs
- Spring – Fertilize/irrigate and train new shoots as cordons
- Summer – New shoots can be allowed to crop (≈ 50% cropping capacity)
- Fall – Proceed as normal for pre-mothballed vineyard management

Year 3 – Return to Full and Regular Production

What We Don’t Know

- Long-term impact on vine health and productivity
- Differences in successful methodology by cultivar/rootstock
- Is it economically viable in the long run?

Some Other Good Tips

- If you plan to move your vineyard into mothball management, talk to your neighbors
  - Some county Agriculture Commissioners have the authority and responsibility to abate vineyards considered abandoned and a risk to nearby agriculture
  - Talking to your neighbors can reduce the risk of your vineyard being reported as abandoned
- Plan out your return to production before you mothball
  - Try to decide how thoroughly you want to mothball the vineyard based on your plans to return it to production
  - Don't expect to return to full production in one year if you applied the most minimum management during the mothballing

Summary

- Mothballing vineyards should be applied with a clear goal and return to production timeframe in mind
- There can be numerous approaches to mothballing vineyards; a mothball plan should be developed to match your site conditions.
- Recovery of vines is not guaranteed and may have long-term impacts
- Some level of management is necessary to avoid vineyard abandonment risks (e.g., pest proliferation)
- Communicate your plans with neighbors and growers nearby that may be impacted or at risk if mothball management doesn't go as planned

Sources

You can find this presentation at:

1. https://ucanr.edu/sites/chenlab
2. Speaker Presentations

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