



Managing Bearing Vines

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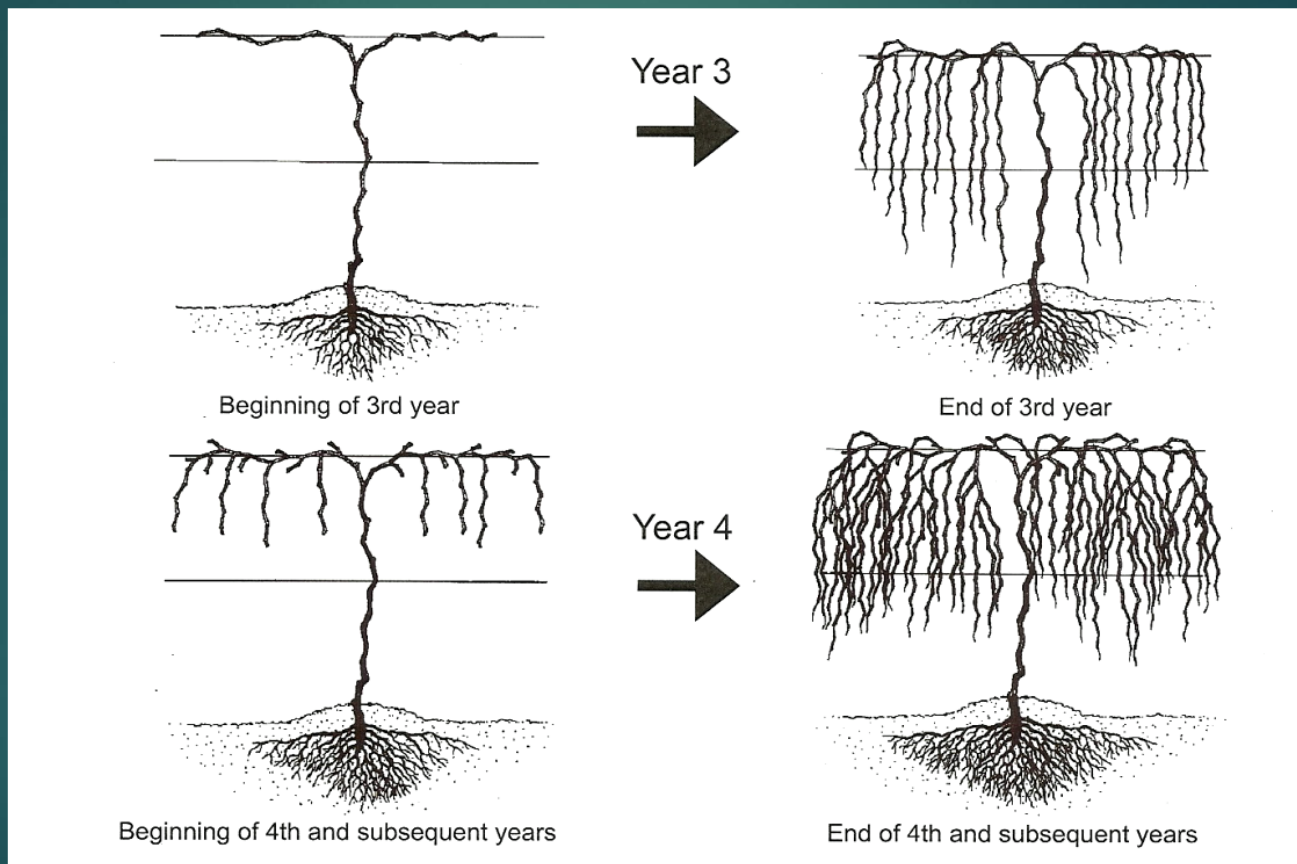
The first 2.5 to 3-years are relatively simple but now

- ▶ It is time to finally recoup some investment
- ▶ In year 3 do not fully crop your vines
- ▶ Follow this

Year	Crop
	% ¹
3	60
4	80
5	100

¹% is based on your projected yield in year 5. As an example, 5-tons per acre in year 5, would be 3 tons in year 3 and 4 tons in year 4.

Dormant Pruning – what to leave and what should go?



Fruitfulness

- % buds that produce flower clusters
- Fruitfulness determined in buds during the prior year
- Inflorescences may or may not initiate in each bud
- Fruit buds can through processes other than cold damage become unfruitful



“Bud”

- A “bud” occurs at each node on cane
- The “bud” composed of three “buds”
 - Primary
 - Secondary
 - Tertiary
- What is within the “bud”



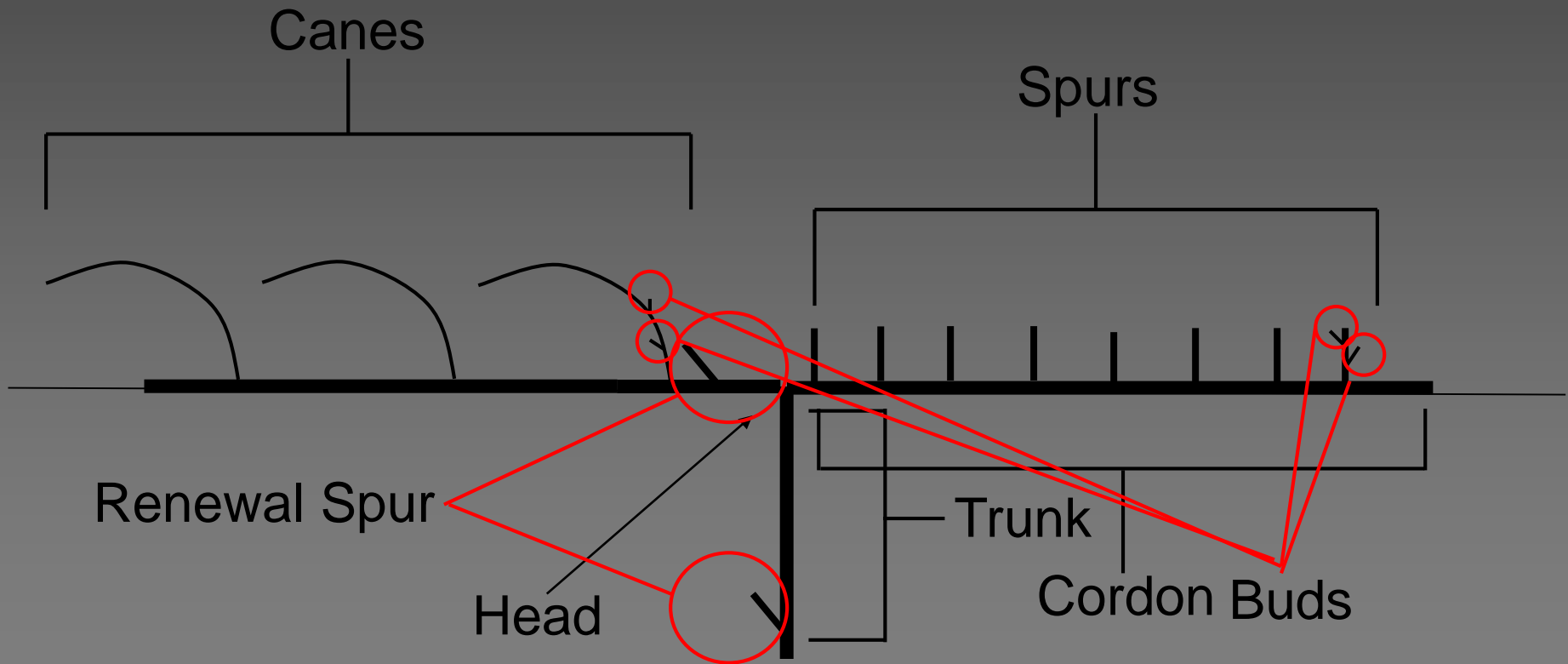
“Bud”

- In each bud is a 6 to 12-node compressed shoot with primordial
 - Leaves
 - Flower clusters
 - Tendrils.





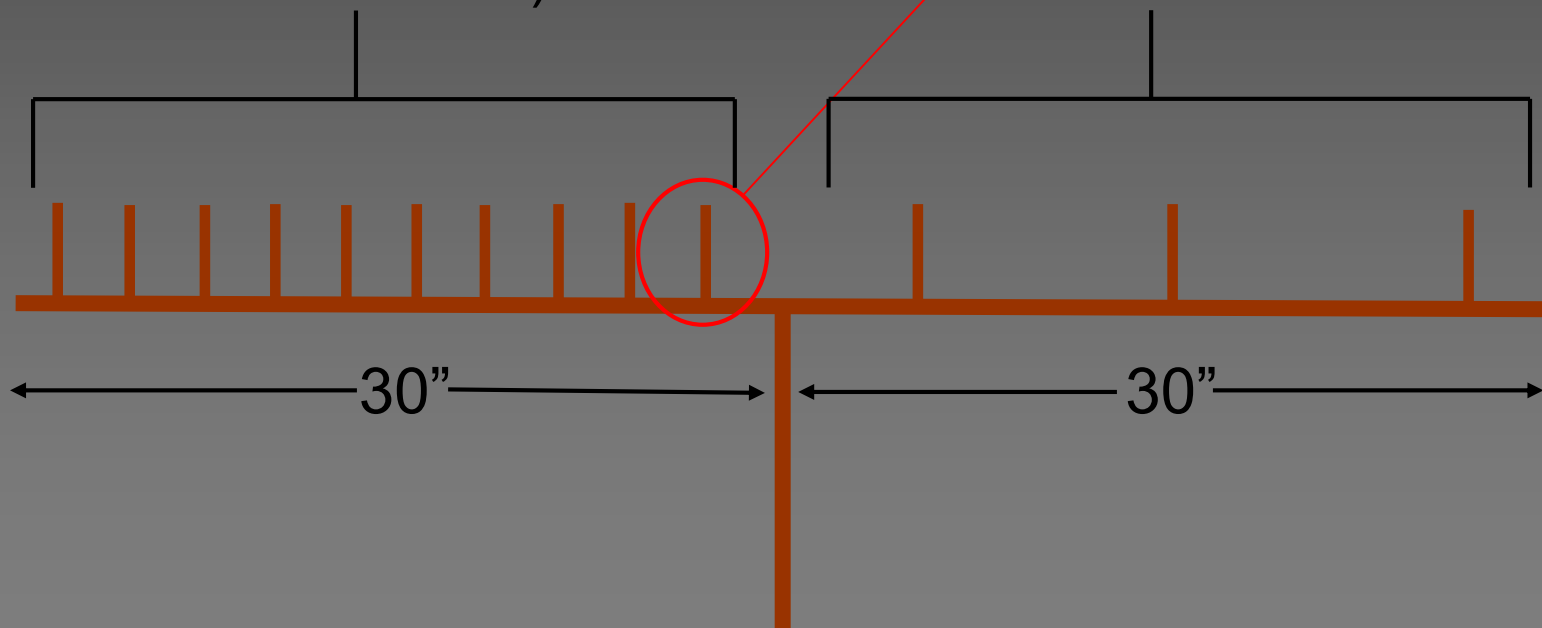
Grape Anatomy



How many Nodes?

VSP: 3 to 5 SHOOTS/FT

$(10 \text{ SPURS} \times 2 \text{ BUDS}) / 2.5 \text{ FT} = 8 \text{ BUDS/FT}$
 $(6 \text{ SPURS} \times 2 \text{ BUDS}) / 5 \text{ FT} = 2.4 \text{ BUDS/FT}$



How many Nodes?

To many nodes

- Reduced brix in fruit
- Reduced fruit pigmentation
- Reduced shoot/cane diameter
- Increased disease pressure
- Maturation of wood poor
- Increased winter Injury

To few nodes

- Vigorous shoot growth
- Increase internode lengths
- Reduced fruit set
- Increase in fruit shading
- Increase in number of “bull canes”
- Decrease in bud fruitfulness
- Reduced cold hardiness



How much fruit ?

3 to 5 shoots ft

- 4 ft cordon
 - 12 to 20 shoots
 - Each shoot = 2 grape clusters
 - 24 to 40 clusters
 - Each cluster 3.5 oz
 - 6.75 to 11 lbs per cordon
 - 2 cordons per plant
 - 13.5 to 22 lbs per plant
- 575 plants per acre
 - 2.9 to 4.8 tons per acre



Economics of the Vine

- 545 vines/acre
 - 10' row X 8' plant
- 15 lbs/vine
 - 8,175 lbs = 4.1 ton/acre
- ~3.5 oz/cluster
 - 70 clusters/vine
 - 3.6 lbs/bottle
 - 4 bottles (750 ml)/vine
 - 2,180 bottles/acre
- \$1,400/ton = \$5,740/acre
- \$14.00/bottle = \$30,520/acre



Training Systems

- Vertical shoot positioning (VSP)
 - Bilateral cordons 32 to 36” from ground
 - Catch wires above cordons
 - Shoot growth directed upward

- High Wire
 - Bilateral cordons 66 to 72” from ground
 - Shoots combined downward



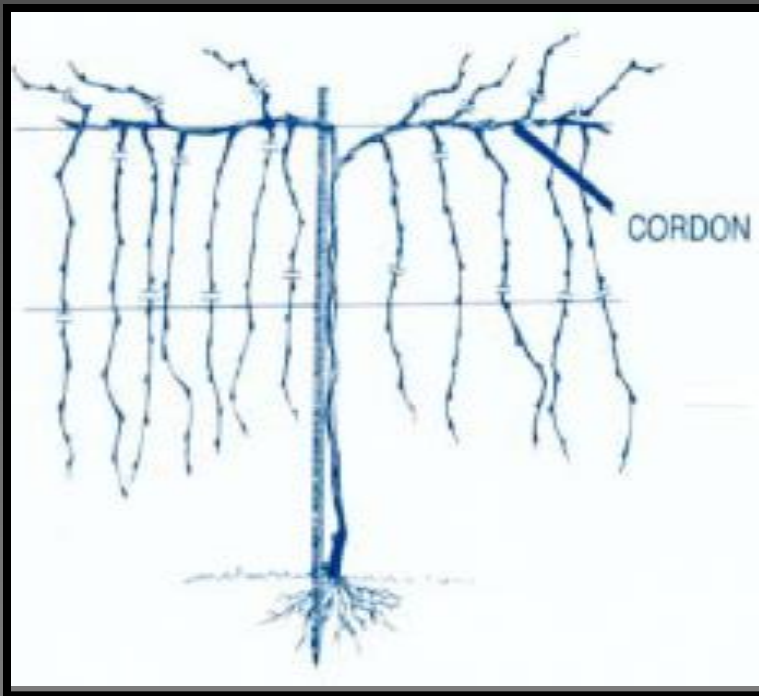
Training Methods

Low-Cordon Vertical Shoot Positioning



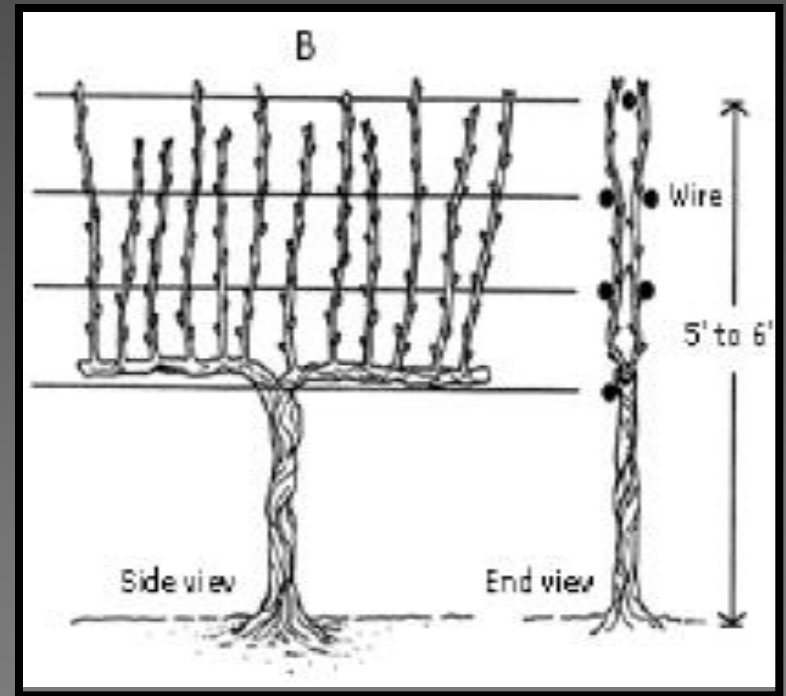
Training Methods

High Cordon



Use for trailing
grape cultivars

Low Cordon

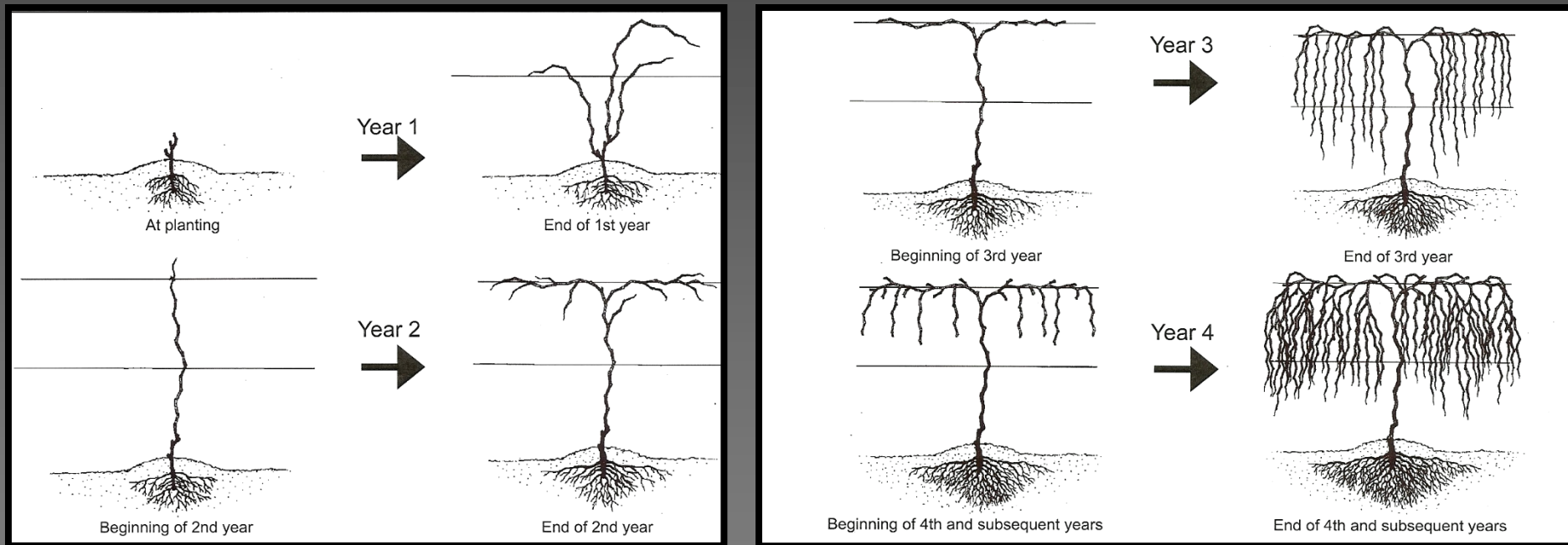


Use for upright
grape cultivars



Pruning and Training

Initial Pruning from planting to fruiting



High Bi-Lateral Cordon
Relies on downward combing of new growth



Balanced Pruning

Vegetative growth is in proportion to fruit load to ripen the crop

- Dormant pruning is first step in balancing the vine
- Amount of pruning is based on vine vigor



Balanced Pruning

Step 1: Quantifying Vine Vigor

- **Weight of one-year cane pruning's**
 - **Roughly prune vine leaving extra buds**
 - **Weigh cane pruning's**
 - **Apply pruning formula**



Balanced Pruning

Pruning Formulas

Grape Type	Formula
American	30+10
French Hybrids	20+10, 15 +5
New Hybrids	20+20
European (Vinifera)	20+20



Example Balanced Pruning

Pruning Formula: 20 +10

20 count buds for first pound of canes and an additional 10 count buds for each additional pound of canes

Cane weight = 1 lb: 20 count buds

Cane weight = 2 lb: 30 count buds

Cane weight = 3 lb: 40 count buds



Problems with Balanced Pruning

Hybrid Grape Cultivars Typically

Multiple shoots from count buds

Multiple clusters per shoot

Alternative

5 to 6 shoots/ft of vine

Calculate number of clusters needed for yield

Cluster thin and or shoot thin

Spare parts are good to have around



Balanced Pruning

Bring your experience to the vineyard

Pruning Formulas

- **Grape cultivars perform differently based on vineyard site**
 - **High vigor sites**
 - **Low vigor sites**
- **Each vine is an individual**

After pruning a few vines using balanced pruning – you become calibrated



Pruning and Disease Management

Remove old dead wood from grapevine

- **Cordon Renewal**
- **Trunk Renewal**
 - **Own rooted versus rootstock**
- **Liquid Lime Sulfur Application Timing**
 - **Bud swell**



Large Pruning Cuts



Large Pruning Cuts

Avoid large pruning cuts until early summer

Large cuts and trunk diseases

- *Botryosphaeria* spp.
- *Eutypa lata*
- *Pestolotiopsis*
- *Phomopsis viticola*

Time of pruning, size of wound and wood age all play role in infection

Wound susceptibility declines at high temperatures



Pruning and Sanitation

First: always have sharp pruning shears. Sharp shears make clean cuts that heal quickly compared to rough cuts

**Removing cane prunings from the vineyard if practical
If going to this effort take the next step and destroy the prunings**

No need to sterilize pruning shears

Remove old cluster rachises and mummy berries



Pruning Timing

What to prune first should be prioritized based on a grape cultivars susceptibility to winter cold injury

1. Prune American cultivars first
2. Prune cold tolerant hybrids (Vignoles, Seyval, Norton)
3. Prune cold sensitive hybrids (Vidal, Traminette, Chambourcin)
4. Prune Vinifera that are less winter cold sensitive, Cabernet Franc
5. Prune Vinifera that are more cold sensitive

Use your experience to decide as vineyard to vineyard variation will play a role



Pruning and You

Remember that you grow with your vines. Each year you learn something about your vineyards growth and production. Apply that knowledge as you prepare to prune your vines

Select sentinel vines in your vineyard

Quantify dormant cane weights

Quantify cluster weights and numbers

Quantify crop load



Barrel Pre-Pruner







The spurs, cordons, and trunk are often referred to as permanent wood

- ▶ Spurs die
- ▶ Leaving blind wood on the cordon, blind wood does not produce fruit
- ▶ Trunks often become infected with trunk diseases
- ▶ Vine renewal should be part of your vineyard management plan
 - ▶ A new trunk should be brought up from the vine crown every 10 years
 - ▶ Removing trunk diseased grapevines more often results in maintaining the productivity of the vineyard

Growth Stage	Fungicide	Disease
½-1-inch shoots, 3-5-inch shoots, 8-10-inch shoots followed every 7-10-days until fruit set	Mancozeb (1.5 lb per 25 GPA early in season. Increase rate and volume as vines grow	Phomopsis , black rot and downy mildew
Immediate pre-bloom, bloom and 2 to 3 times more at 10-14-day intervals	Mancozeb plus DMI or a strobilurin Rotate fungicides	Black rot , Phomopsis, and downy and powdery mildew
Bunch closure	Capta, Ziram, phos acid plus DMI or strobilurins or combos	Downy and Powdery mildew on foliage
Post veraison	Pristine	Rots
Post harvest	Mancozeb	Downy mildew

Basic Spray Program

Why You need to write a pesticide Disease Management Plan

- ▶ Save money
- ▶ Reduce risk of pest being selected for resistance to pesticide
- ▶ Be ready for pest outbreak
- ▶ Peace of mind
- ▶ Avoid phytotoxicity



















Remember the Birds

















Basic Calendar

Month	Phenology	Task
January	Dormant	Dormant Pruning
February	Dormant	Dormant Pruning
March	Dormant	Dormant Pruning
April	Bud break	Disease management begins, shoot thinning
May	Flowering	Disease management, flower thinning, cluster thinning
June	Berry touch	Disease and Japanese beetle management
July	Berry growth	Disease and insect management. Bringing up new canes for trunks, removing cordons, removing unproductive vines

Basic Calendar cont.

Month	Phenology	Task
August	Veraison	Disease management. Harvest some cultivars
September	Harvest	Disease management. Harvest some cultivars
October	Harvest	Disease management. Harvest some cultivars
November		Fermentations complete
December		Vacation?

Sensory and Fermentation Workshop

- ▶ Take the time and invest as much effort in learning more about the grape and wine industry
- ▶ Learn from winemakers, academics, industry professionals
- ▶ Grape production goes hand in hand with wine production
 - ▶ The vintage often determines what type of wine will be made
 - ▶ Winemakers make the type of wine based on the grape chemistry and flavor profile

Final Thoughts

- ▶ You never know if your site is correct until you plant a grapevine
- ▶ Grape vines are like children, when young they run rampant, as they progress into their teens the troubles continue then finally as they enter adulthood they finally mellow
- ▶ You made mistakes what can you do?
 - ▶ Grafting new cultivars
- ▶ Paperwork in the form records are your friend
- ▶ Balancing a vine
- ▶ You need an understanding of winemaking to produce good quality grapes
- ▶ I hope you don't mind but 2-week vacations are a thing of the past

Romancing the Vine

