



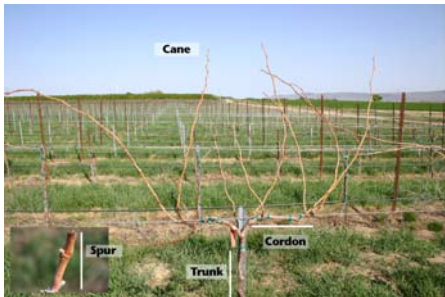
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Pruning for Crop Load Management
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January 27, 2007

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Vine Anatomy



Cane
Spur
Trunk
Cordon

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Vine Anatomy



Composite Bud
Node
Internode
Leaf Scar

Pruning Principles



- Pruning depresses growth
 - Removing plant parts decreases food production capability (carbohydrates)
 - Light pruning will allow for greater leaf area earlier, but higher crop

Vine Capacity

- Ability of vine to bear a certain crop load
 - Fixed each year
- Comprised of total growth of vine
 - Shoots, roots, leaves, crop
- Increases as vine size increases
 - I.e., Large vines = more fruit
 - Shoot number
 - Leaf area



Pruning Principles

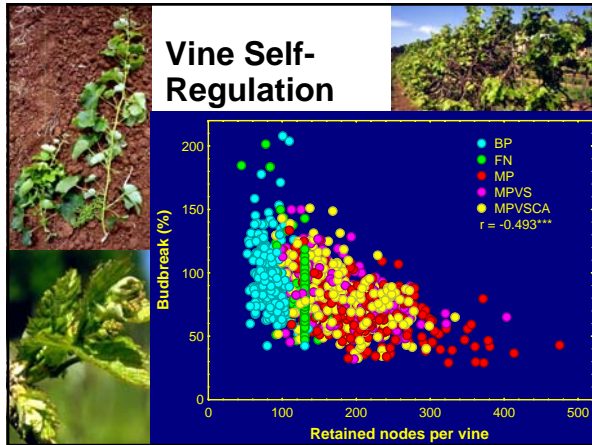


- Production of crop depresses vine capacity
 - Reduction in food for growth elsewhere
 - Carbohydrates/nutrients
 - Pruning can affect crop for couple years into future
- Fruitfulness varies with shoot vigor
 - Vigorous shoots = low fruiting capacity
 - Sink/source continuum

Pruning Principles



- Vines can self-regulate
 - Natural state
 - Too much shoot growth + heavy crop load = dropped fruit
 - Heavy crop load + poor shoot growth = poor quality fruit or shatter
- Keep in mind when pruning
- Balance growth with desired crop load
 - Communicate with winery



Pruning Goals

- Establish and maintain vine to facilitate movement in the vineyard
- Produce good quality fruit
- Select nodes that produce fruitful shoots
- Regulate the number of shoots and thus berry/bunch size
- Regulate vegetative growth



Pruning Goals

- Need to get good light penetration
 - Fruit bud initiation
- Air movement through canopy
 - Disease incidence
 - Penetration of pesticides/fungicides



Pruning for Vegetative Balance

- All plants maintain a 1:1 balance
 - Shoot growth
 - Root growth
- Vigor control important on deep soils
 - Severe pruning results fewer, more vigorous shoots
 - Fewer nodes = distributes vigor to balance root growth



Node Positioning

- Some varieties not as fruitful at basal nodes
 - Sultana
 - Others?
- Fruitful bud = has one or more inflorescence (flower) to produce bunches
 - Bunches per shoot
 - Influenced by environmental factors when initiated (previous June/July)
 - *Light into canopy interior*



Node Positioning

- Cane or long pruning solves problem
 - Be careful to not induce apical dominance
 - Budburst prevents basal bud burst
- Shoot distribution
- Watershoots
 - Non-count shoots that are less fruitful – arise from cordon or trunk



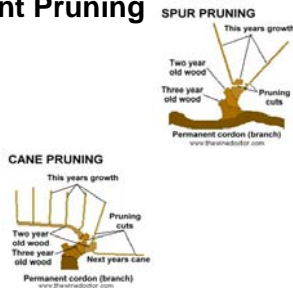
Timing

- Growers should prune between leaf fall and budbreak
 - Late February/early March for most growers due to hard freeze concerns
 - Leniency on West side of state
- Delay of budbreak is possible with late pruning
 - Protection from environmental conditions



Dormant Pruning

- Technique depends upon trellis system
- Many are spur-pruned systems
- How many to leave?
 - How fruitful is vine?
 - How vigorous is vine?
 - Downward shoots = less vigorous



Spur Pruning

- Cordon-trained, Spur pruned
 - Cordon is permanent
- Spurs:
 - Leave 2-3 bud spurs
 - Spaced about one pruner length apart
 - Pick healthy wood, pencil-sized in diameter

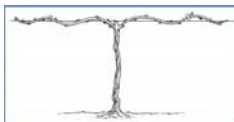
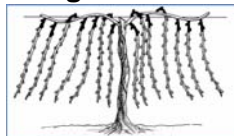
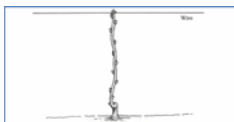


Spur Pruning

- Spacing along cordon
- Choose spurs with:
 - Firm wood with brown periderm
 - Healthy buds
 - Round in cross section
 - At least pencil diameter
- May need to replace cordons
 - Disease
 - Cold damage



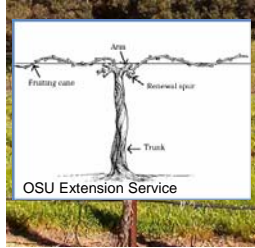
Spur Pruning



Pictures courtesy of OSU Extension, EC1305

Cane Pruning

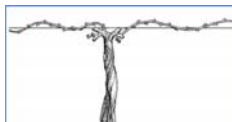
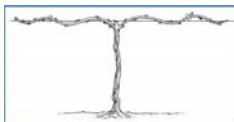
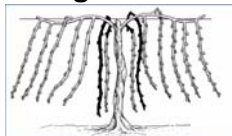
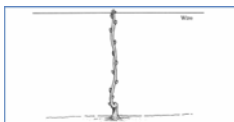
- No permanent cordons
- Two to four shoots from the previous season's growth pruned back to one to two buds.
- Produce the shoots that will become next season's canes.
- Avoid apical dominance



Cane Pruning

- Identify fruiting canes for next year
 - Those with good sunlight exposure
 - Close to trunk
- Firm wood with brown periderm
- Healthy buds
- Round in cross section, short internodes
- Well-positioned on arm

Cane Pruning



Pictures courtesy of OSU Extension, EC1305

Other Types of Pruning

- Mechanical Pruning
 - Set to fixed node (e.g., Concord grapes)
 - Large acreages
- Minimal Pruning





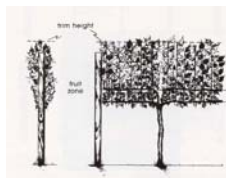
'Golden Rules' of Pruning

- Manage canes, spurs, and renewal spurs to get good shoot positions
- 15 buds/lb of pruning weight
- Positions – no cross-row shading
 - Function also of trellis design
- Leave 5 shoots/ft of canopy



Training Vines

- Several different training systems to choose from
- Consider:
 - Vigor
 - Soil type
 - Sun exposure/aspect
 - Slope
 - Variety
 - Air movement
 - Irrigation



Crop Load Management

- Multiple ways to affect crop load
- Easiest is pruning
- Things to consider:
 - Trellis system
 - Training system
 - Variety
 - Climate



Double Guyot Trellis System

Yield Components

Component	Determined During	Management Options
Vines/acre Nodes/vine	Planting Winter Pruning	Density/Trellis design Pruning Level
Shoots/node Clusters/shoot	Budbreak Cluster initiation	Pruning level Nutrition, Canopy mgmt
Flowers/cluster Berries/cluster	Budbreak Fruit set	? Irrigation, nutrition, temperature
Berry Weight	All season	Irrigation, nutrition

Crop Load Management



- Choose fruitful buds for pruning to reduce crop load
- Know what your target bud count should be
 - Spur-pruned systems = 30-40 buds per vine
 - Cane-pruned systems = ~ same + renewal spurs
- Balance the fruit and vine growth

Level of Pruning

- **Techniques:**
 - **Balanced pruning**
 - Older method
 - Weigh prunings
 - Certain number of nodes retained per weight of prunings
 - E.g., 10 buds for the 1st lb., and then 10 buds for each lb. thereafter (10 + 10)
 - Varies with variety – do the research
 - **Ravaz index**

Ravaz Index

- Indicates vine balance
 - Need pruning weight
 - Need last year's yield
- Total Yield
Pruning Weight
- <5 = undercropped
- >10 = overcropped



Level of Pruning

- **Pruning weight**
 - Richard Smart – 0.3-0.6 kg/m (0.2 – 0.4 lbs/ft)
- **Shoot or cane weight**
 - **Index of vigor**
 - Approximately 20-40 g (0.7-1.4 oz)



Summary

- Pruning can depress or invigorate vines depending upon severity
- Be sure to choose good positions for upcoming year
- Keep vines in balance
- Regulate node number for fruit quality
- Choose pruning level appropriate for site and variety
