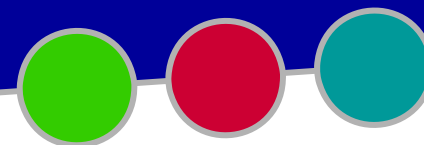


# Vineyard Layout



## Equipment, Materials, and Trellising

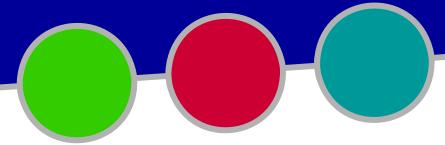
*Dr. Mercy Olmstead*



## Where to start?

- Have the land?
  - Has it been cleared?
- Have the equipment?
- Ordered the grapevines?
- Have tractors and associated implements?
- How do you lay out the vineyard?

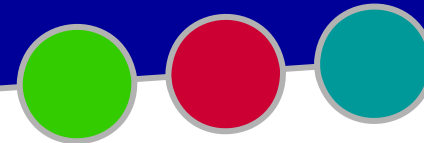




## First steps...

- **Vineyard orientation**
  - **Slope**
  - **Aspect**
- **Row orientation**
  - **E-W?**
  - **N-S?**
- **Row length**
- **Preplant decisions**
  - **Soil Testing**
  - **Fertilizers**

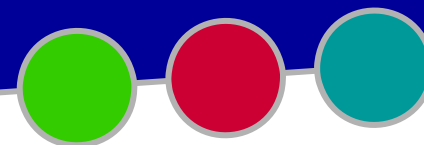




# Land Preparation

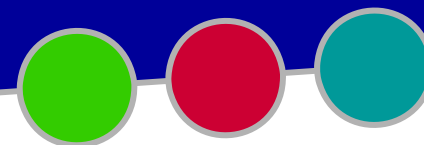
- Does it need leveling?
  - Fill in low spots
- Disking
  - Break up large clumps of soil
- Ripping
  - Hardpans due to thin layer of rock or limestone
  - Aeration into the root zone





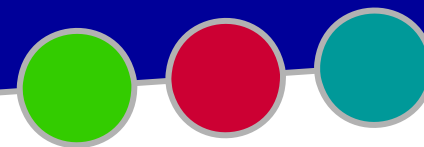
## Water drainage

- **Water runoff from rainfall – where does it go?**
  - **Grapes do not like ‘wet feet’**
  - **Consider a irrigation pond**
- **Soil erosion**
  - **Cover cropping to stabilize**
- **Limited drainage may make drainage tiles necessary**

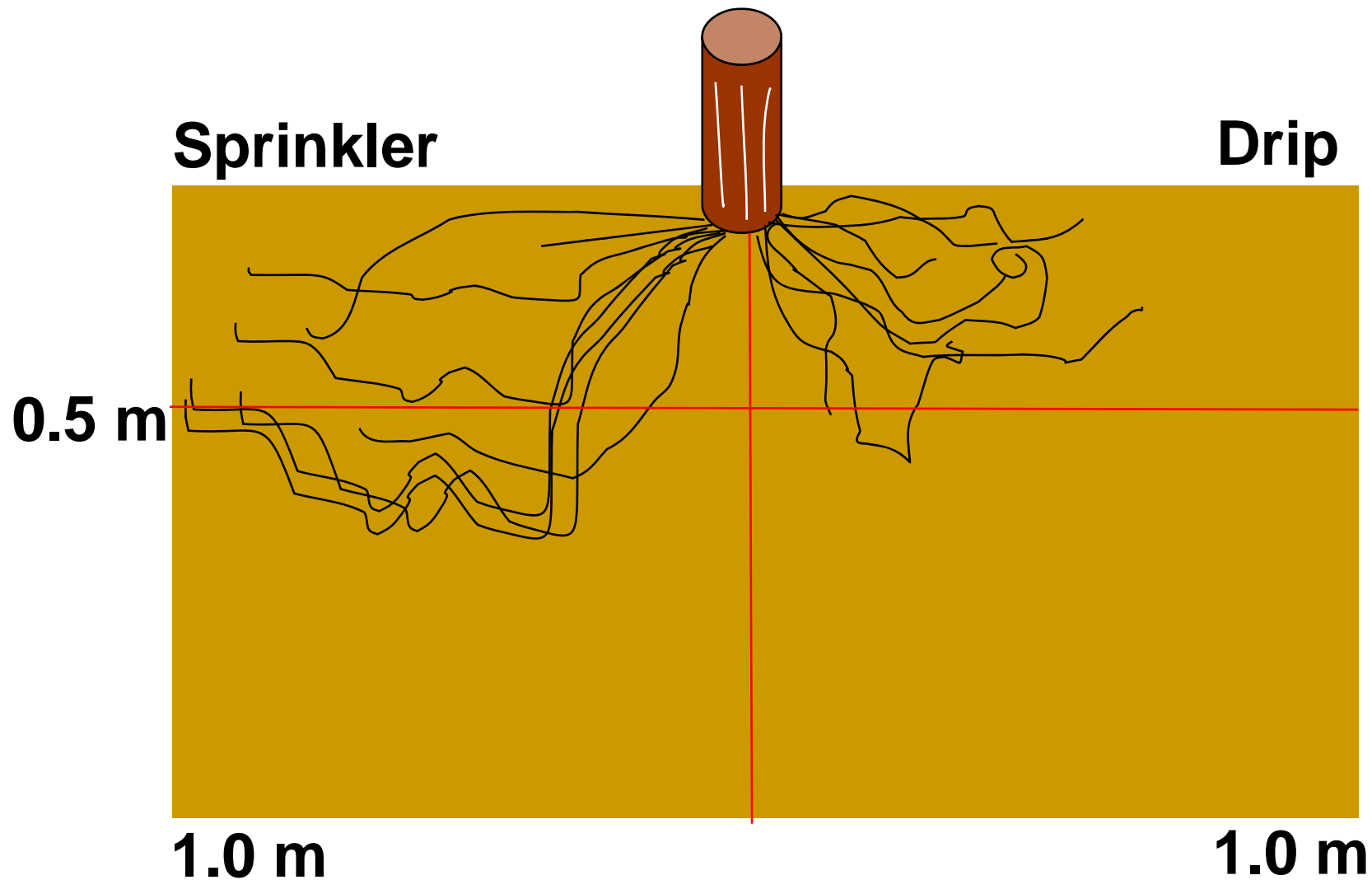


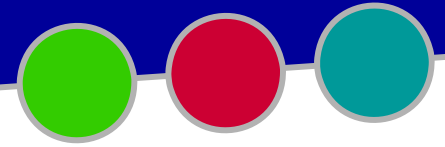
## Soil Depth

- **Make sure vines have a good rooting zone**
- **Most of vine roots concentrated in top 3 ft of soil**
  - **Capable of going to 20 ft**
    - As long as there is oxygen
- **Mostly dependent upon water source**
  - **Irrigated vs. non-irrigated**
  - **Drip vs. sprinkler**



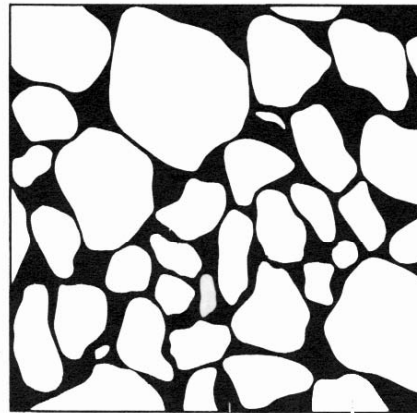
# Root Distribution

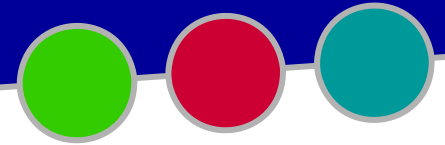




# Soil Characteristics

- Bulk density
- Water holding capacity
  - Buffer for water consumption
- Salinity issues
- pH issues



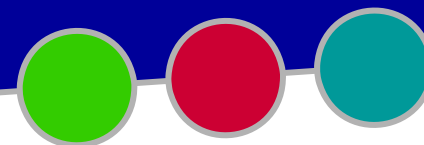


## Soil Testing

- **Was there a crop before?**
  - **May impact soil fertility**
- **Be sure to do a thorough sampling of vineyard site**
  - **Good mixture**
  - **Different soil depths**
- **Most labs have specific guidelines**
- **Find a list of analytical labs at:**

**<http://wsprs.wsu.edu/AnalyticalLabsEB1578E.pdf>**

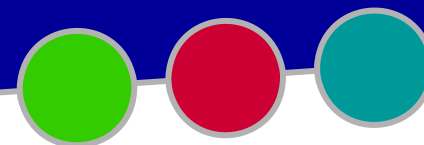




## Previous Cropping

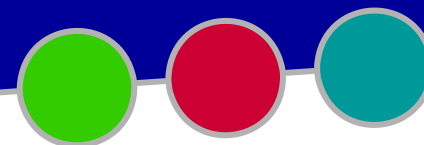
- What kind of problems?
  - Replant disease
  - *Armillaria*
  - Mainly with apples
  - Nematodes
  - Other soil borne pests
- May have to fumigate or incorporate a green manure before planting
  - Canola and other *Brassica* crops can reduce populations of nematodes





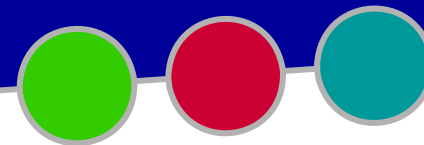
# Vineyard Layout

- **Row orientation**
  - **Cold air drainage**
  - **Prevailing wind direction**
- **Row length**
- **Make sure they are straight!**
  - **Equipment considerations**
- **Spacing between vines and between rows**
  - **Depends upon vine vigor**



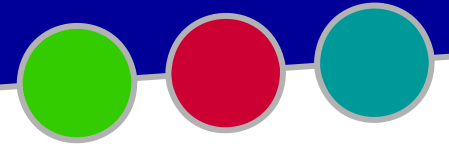
## Vine Spacing

- **Traditionally**
  - **6 x 8 ft (908 vines/acre)**
  - **6 x 9 ft (807 vines/acre)**
  - **7 x 10 ft (622 vines/acre)**
- **Depends upon trellising system as well**
- **Logistics of site?**
  - **Tractors/harvesters need to be able to get into rows**



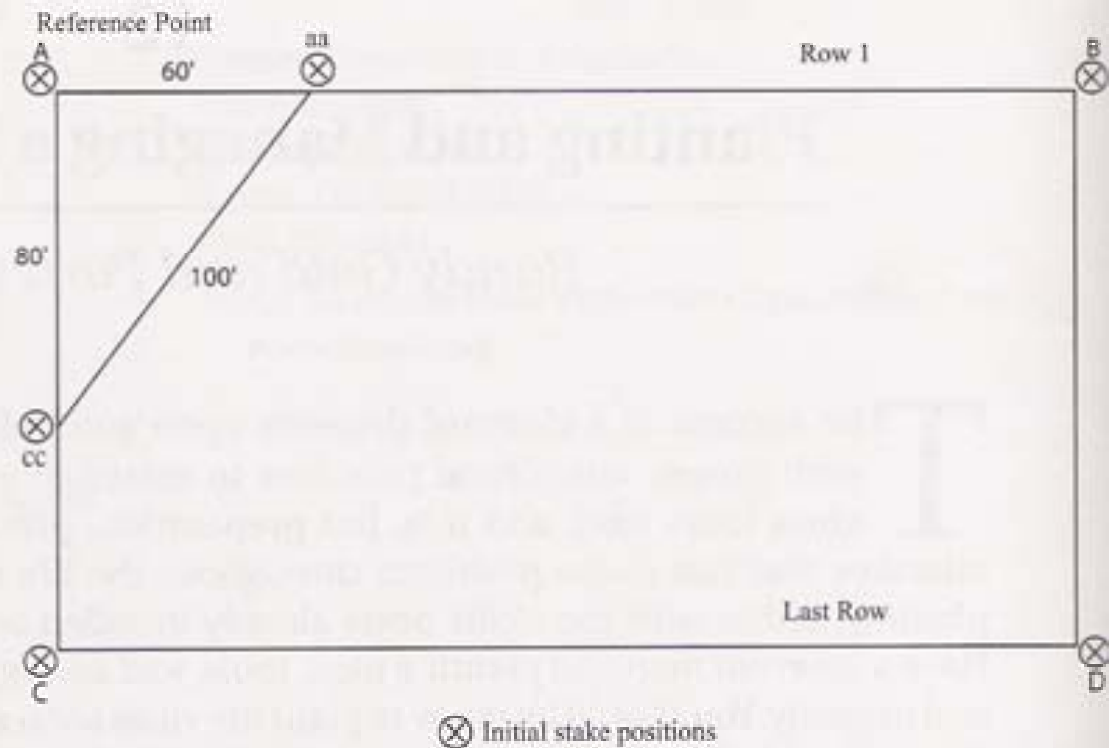
## Vine Spacing

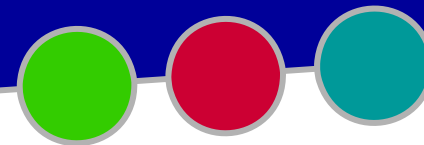
- **Site vigor**
  - **Low**
  - **Medium**
  - **High**
- **Can plant closer to reduce vigor (increase competition between vines)**
- **Spacing may vary from 3-10 ft between vines**



# Vineyard Layout

Figure 1. Method for laying out a rectangular vineyard block.

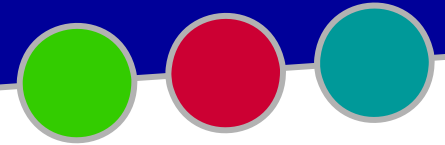




# Vineyard Blocks

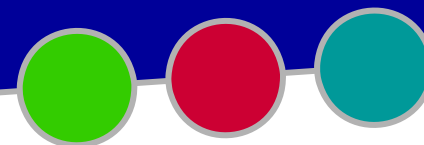
- Small sections of vineyard
- Separated by:
  - Soil type
  - Mesoclimate
  - Variety
  - Training system
- Eases efficiency of differential management





# Trellising Considerations

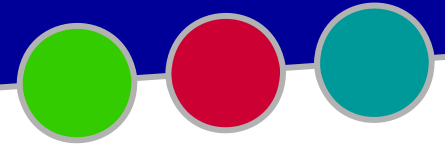
- Ripe fruit
- Variety vigor
- Need just for support?
- Training and pruning system
  - Cordon
    - Spur
    - Cane
  - Head
    - Spur



# Training Systems

- **Cordon trained, spur-pruned**
- **Cordon trained, cane pruning**





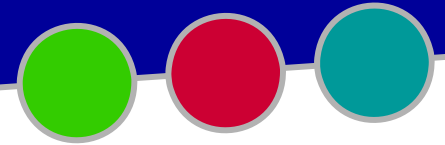
# Training Systems

- **Head training, spur pruned**
  - Free standing system
  - Goblet
  - Traditional European system



*Ohio State University Extension*

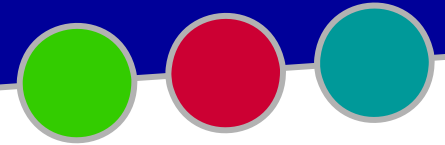




# Trellis Design

- Which one is right for me?
- Questions to ask:
  - Typical sunlight exposure?
  - Air movement?
  - Variety vigor?
  - Soil type?
  - Irrigation?
  - Pruning – hand or machine?

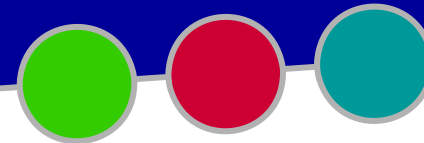




## Additional Questions...

- **Will it rot or rust?**
  - **Good question in this area!**
- **Are end posts secure?**
- **Are you managing an organic vineyard?**
  - **Will affect choice of trellis materials**
- **What is the cost?**
- **Does cost correlate with management?**





# Bilateral Cordon

- Cordon, spur-pruned system
- Large portion of *vinifera* industry
- Well suited to areas with abundant sunlight

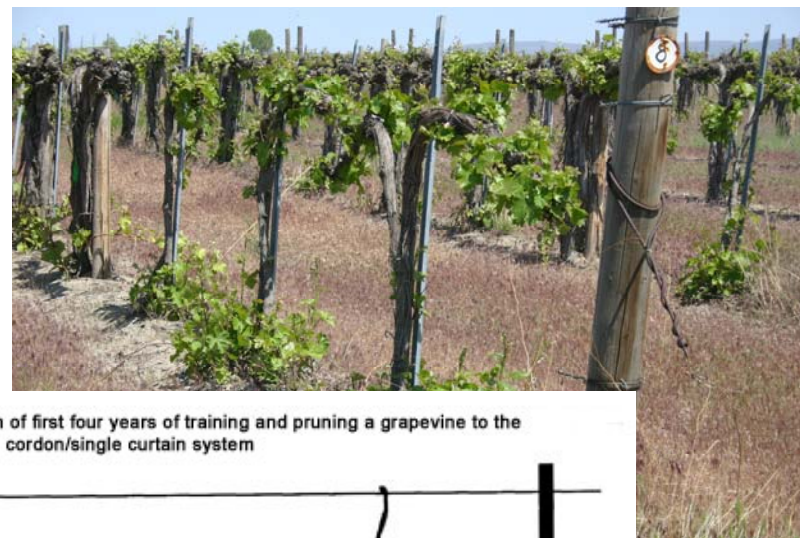
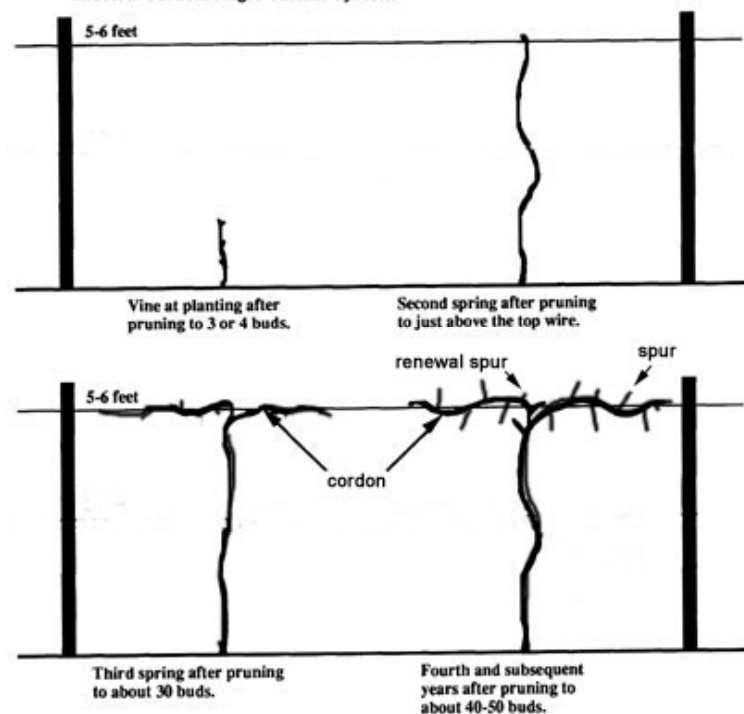
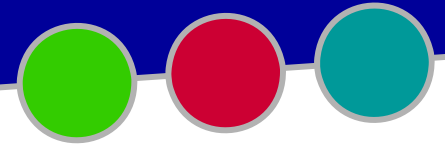


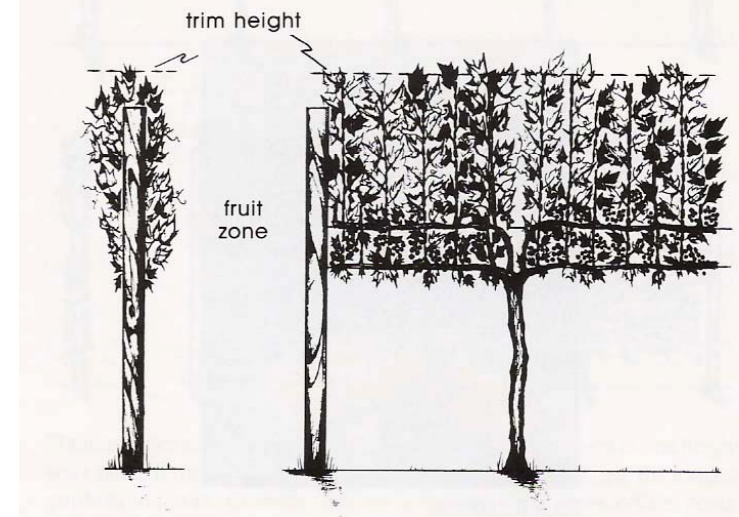
Diagram of first four years of training and pruning a grapevine to the bilateral cordon/single curtain system

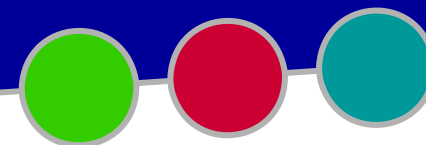




# Vertical Shoot Positioning (VSP)

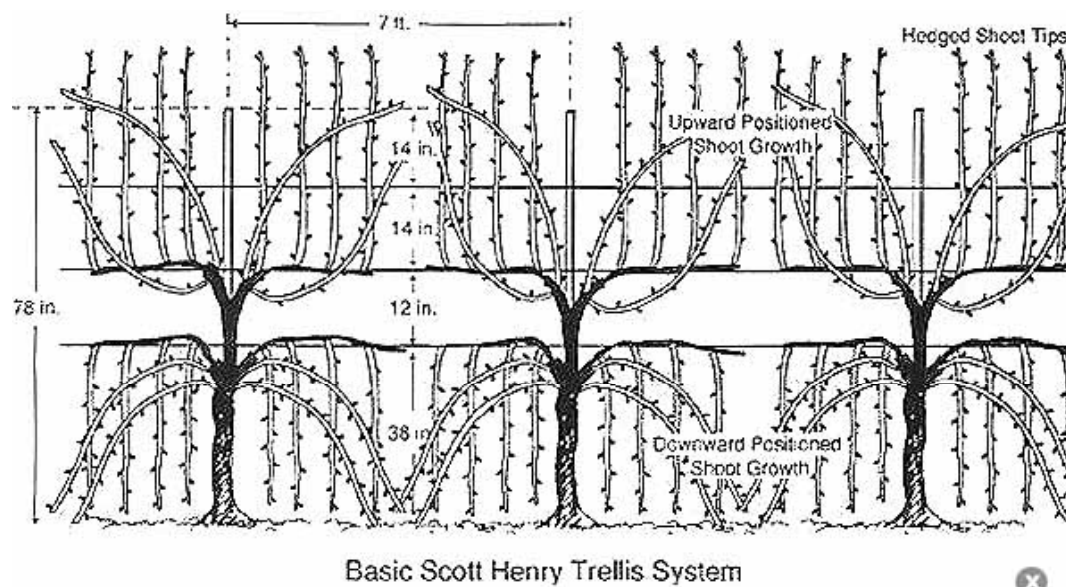
- **Advantages:**
  - **Good air circulation for high risk areas**
  - **Sun exposure for fruit development**
  - **Easy hedging to reduce vigor in late summer**
- **Height of fruiting zone can be adjusted lower**

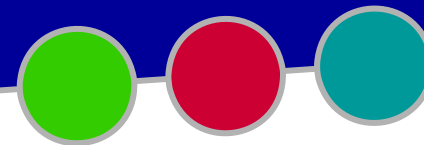




# Scott-Henry Trellis System

- Developed in Oregon
- Well suited to overly vigorous varieties
  - Positioning shoots down helps to decrease vigor
- Labor intensive
  - Difficult to train shoots down
- Good fruit quality
  - Both tiers





# Geneva Double Curtain

- **Divided canopy**
- **Better sun exposure**
- **Wide rows**
- **Good for high vigor varieties**
  - **Shoots are pointed down**
- **Increase number of shoots**
  - **Increased yield**

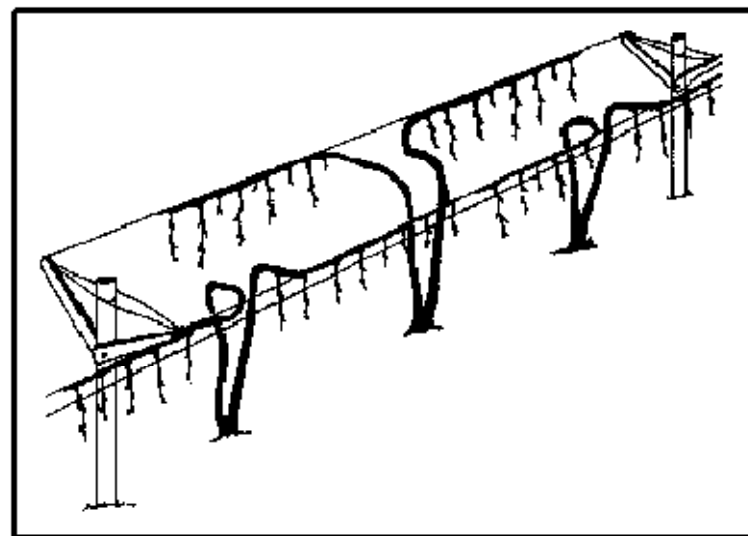
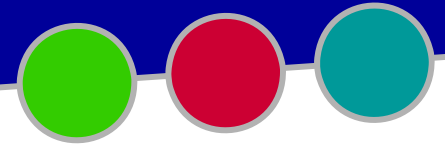


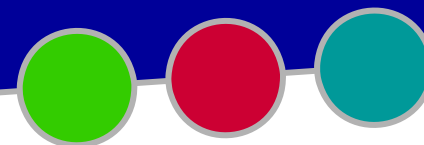
Figure 1. Geneva double curtain training system



## Other Trellis Considerations

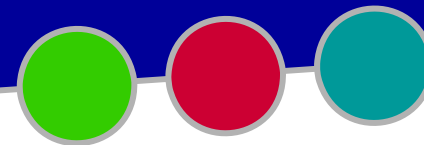
- End posts
  - Very important...support entire trellis system
  - Don't be cheap!
- T-posts
  - Scattered throughout the row
- Drip lines
  - Irrigation will require a wire below canopy
- Wire tighteners





## Planting

- **Best if planted in late winter/early spring**
  - **In fall, may not harden off properly**
- **Can use a v-plow**
  - **Be sure to break up soil on sides to avoid glazing**
- **Auger to dig hole**
  - **Again, break up soil before planting**
- **Don't trim roots**
- **Be sure to settle soil around plant**



## Summary

- **Consider Climate**
- **Land Preparation**
- **Soil Testing**
- **Water Drainage**
- **Vineyard Row/Spacing**
- **Laying out the Vineyard**
- **Trellising Systems**