Planting a Vineyard

Chris Milne

Dave Lockwood

Planning on Planting a Vineyard for Wine?

- Contact wineries in your area to:
  - Determine what they need & how much
  - Make them aware of your presence
- Talk with other sources (Extension, other growers) to determine potential for growing what is needed
- Spend time locating a site & preparing it
- Order vines from a reputable nursery

Notable Species of *Vitis include:*

- ***V. vinifera*** – European , native to the Mediterranean & central Asia
- ***V. labrusca –*** American species (aka “fox grape”), most recognizable variety is Concord
- **V. aestivalis** (Summer Grape) – native to eastern U. S., especially the Southeast (Norton/Cynthiana)
- **V. rotundifolia** (Muscadinia rotundifolia) – native to the southeastern U. S. from Delaware to the Gulf of Mexico

Ungrafted (own roots) vs. Grafted Grapevines?

Type of Grape	
Muscadine	ungrafted
American	ungrafted
French-American Hybrid	Most older varieties can be ungrafted, Consider grafted vines for Chardonel, Traminette
V. vinifera	All should be grafted

Vineyard Timeline

- **-1 years: Site selection & development (preplant)**
- **1st year: Planting, training, trellising**
- **2nd & 3rd year: Pruning, training**
- **4th year: 1st commercial crop**
- **5th year: Full Production**
- **Expected life of vineyard: ? (20+ years)**

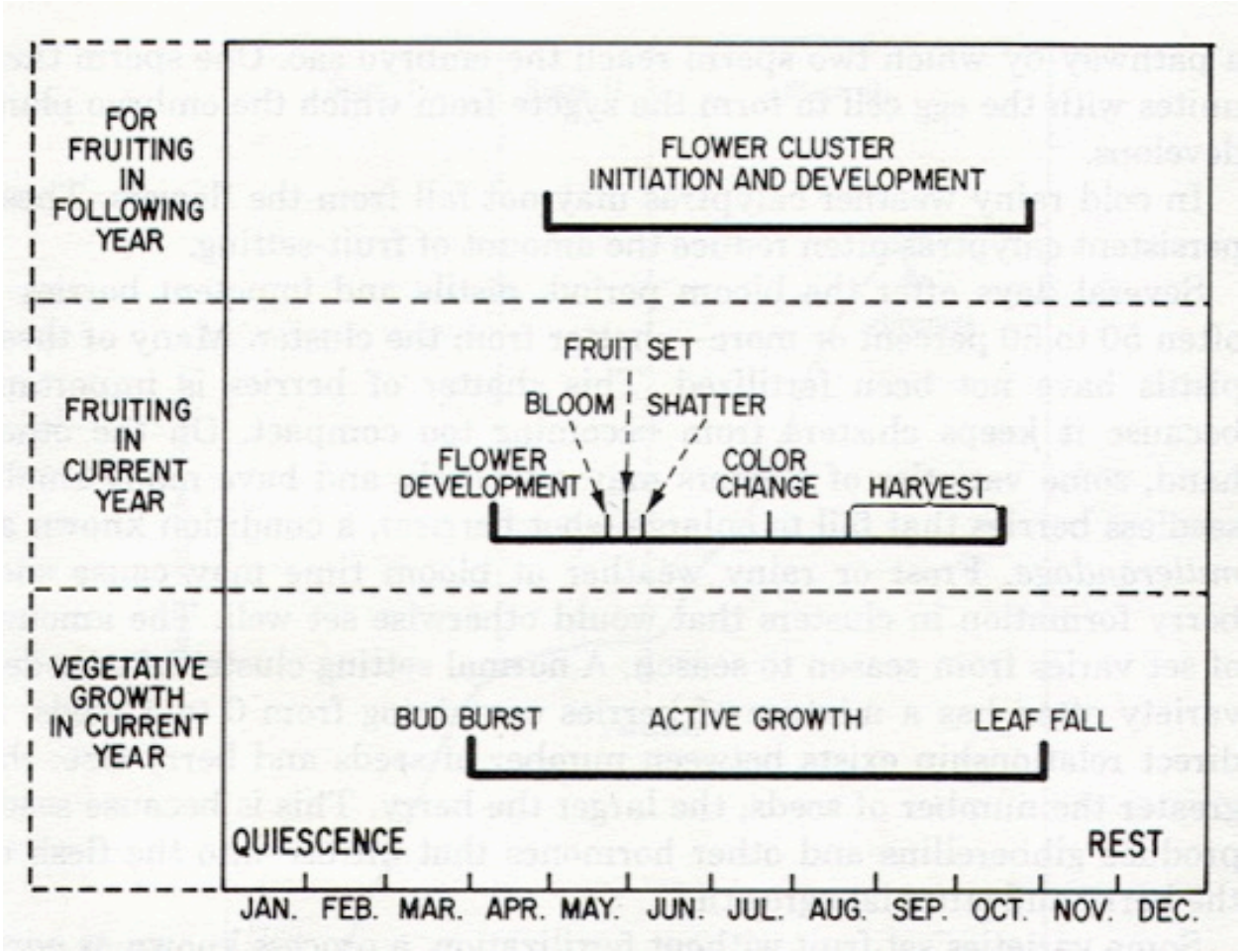
Average Grape Yields from Mature Vineyards

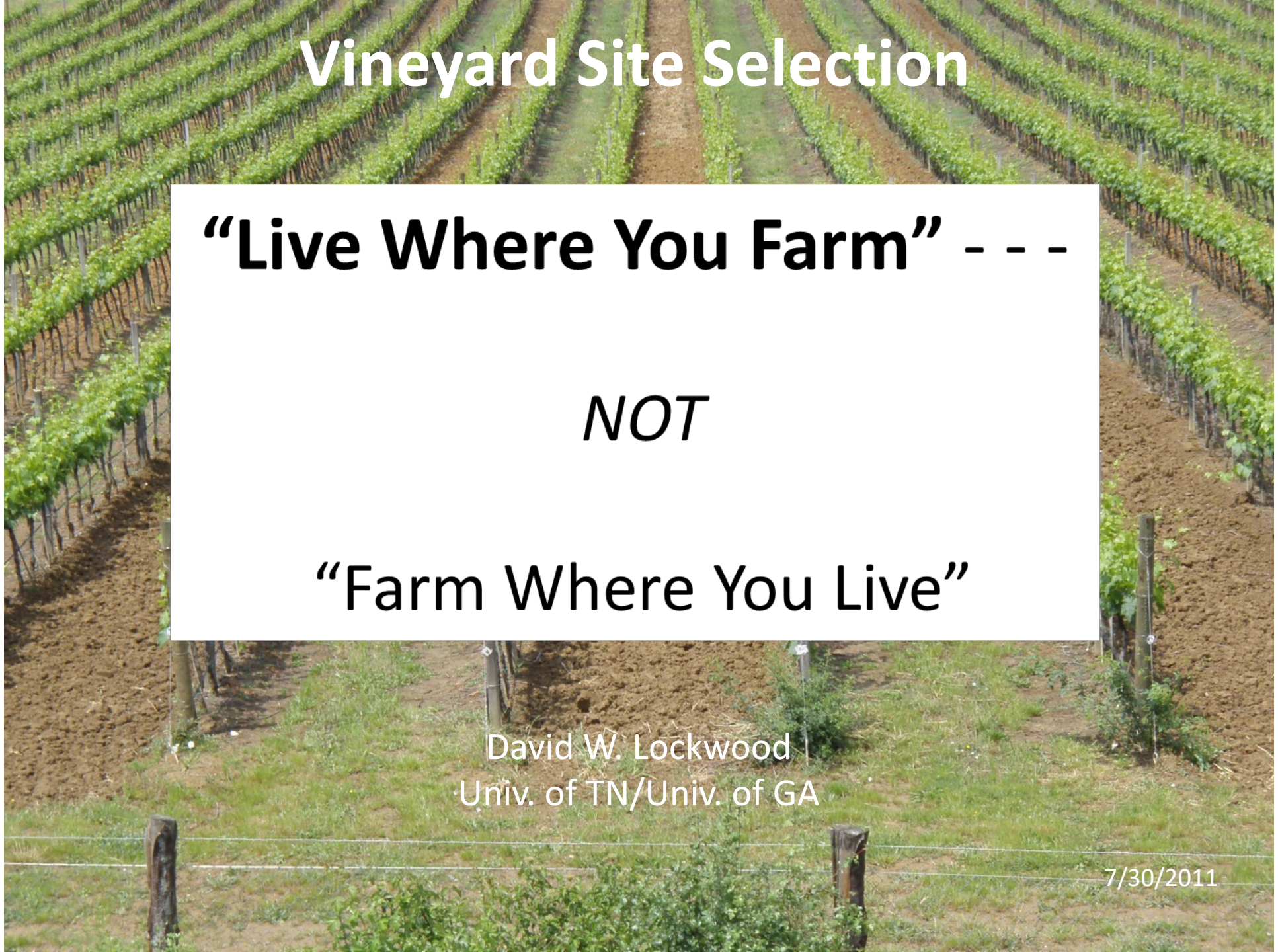
- **American bunch - 5 to 7 tons/acre**
- **French-American Hybrids – 3 to 5 tons / acre**
- **Vitis vinifera - 1 ½ to 2 tons / acre**
- **Muscadines - 7 to 8 tons / acre**

How Much to Plant?

- Start small – especially for new growers
  - # of vines/variety depends on needs of the winery
- Juice yield per ton of grapes
  - Muscadines: 115 to 130 gallons
  - Bunch grapes: 130 to 180 gallons
    - Depends on type of grape & variety

Stages of growth & fruiting of a vinifera grapevine in an average year





Vineyard Site Selection

“Live Where You Farm” - - -

NOT

“Farm Where You Live”

David W. Lockwood
Univ. of TN/Univ. of GA

7/30/2011

Vineyard Site Score Sheet

- Accessibility
- Full sun
- Elevation (Relative)
- Slope – aspect, steepness, uniformity
- Soils
- Water – quantity & quality
- Wildlife
- Adjacent agricultural operations

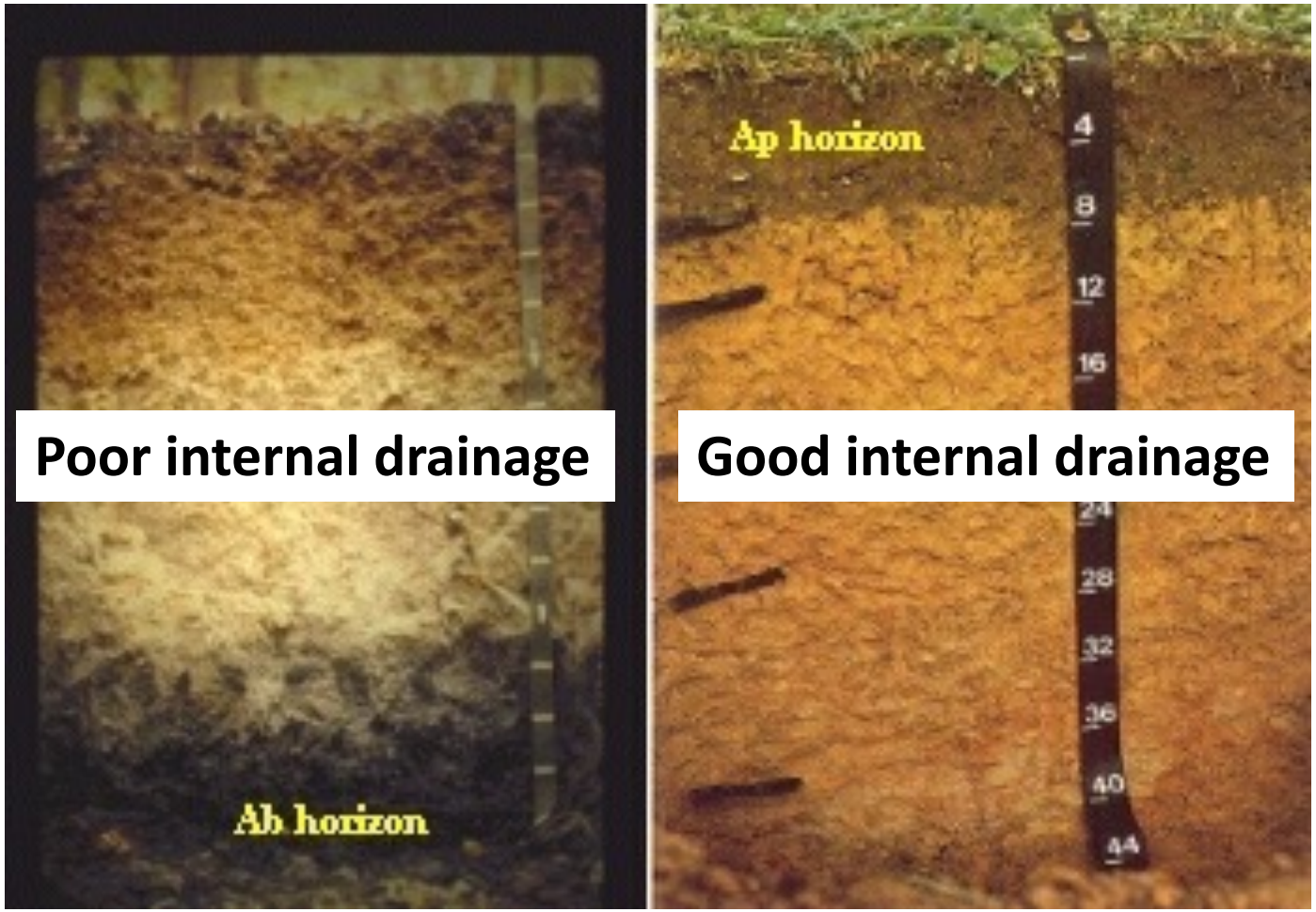
Soils for Vineyards

- Soil pH – 6.0 to 6.5
- Deep, Minimum rooting depth 30 to 36 in.
- Low to moderate fertility
- Organic matter content

  < 3.5%
- Friable
- Good water supplying capacity,

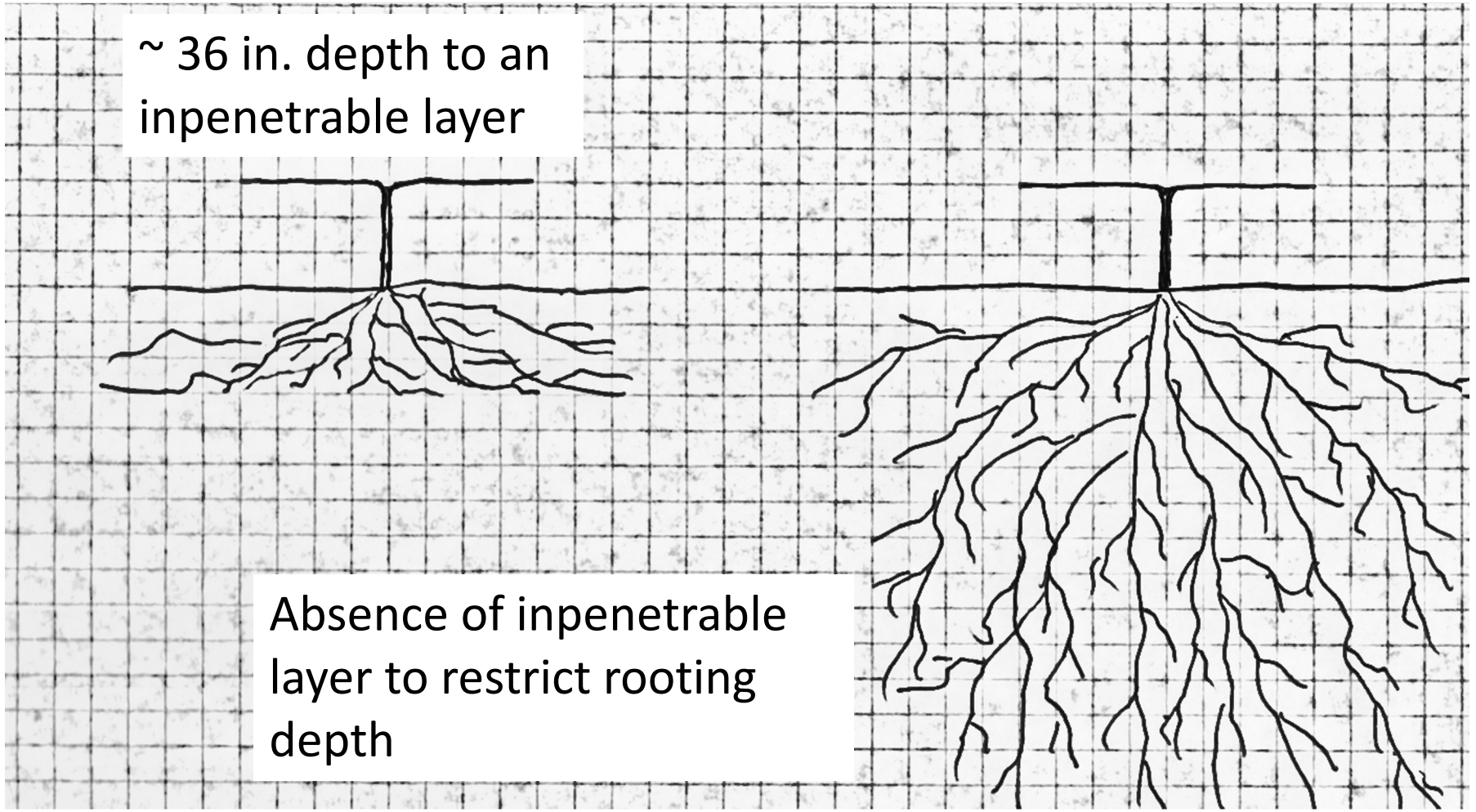
  but well-drained, both internally & surface

Soils for Vineyards



- Soil pH – 6.0 to 6.5
- Deep, Minimum rooting depth 30 to 36 in.
- Low to moderate fertility
- Organic matter content
- < 3.5%
- Friable
- Good water supplying capacity,
- Well-drained, both internally & surface
- Sandy loam, clay loam

Root Penetration



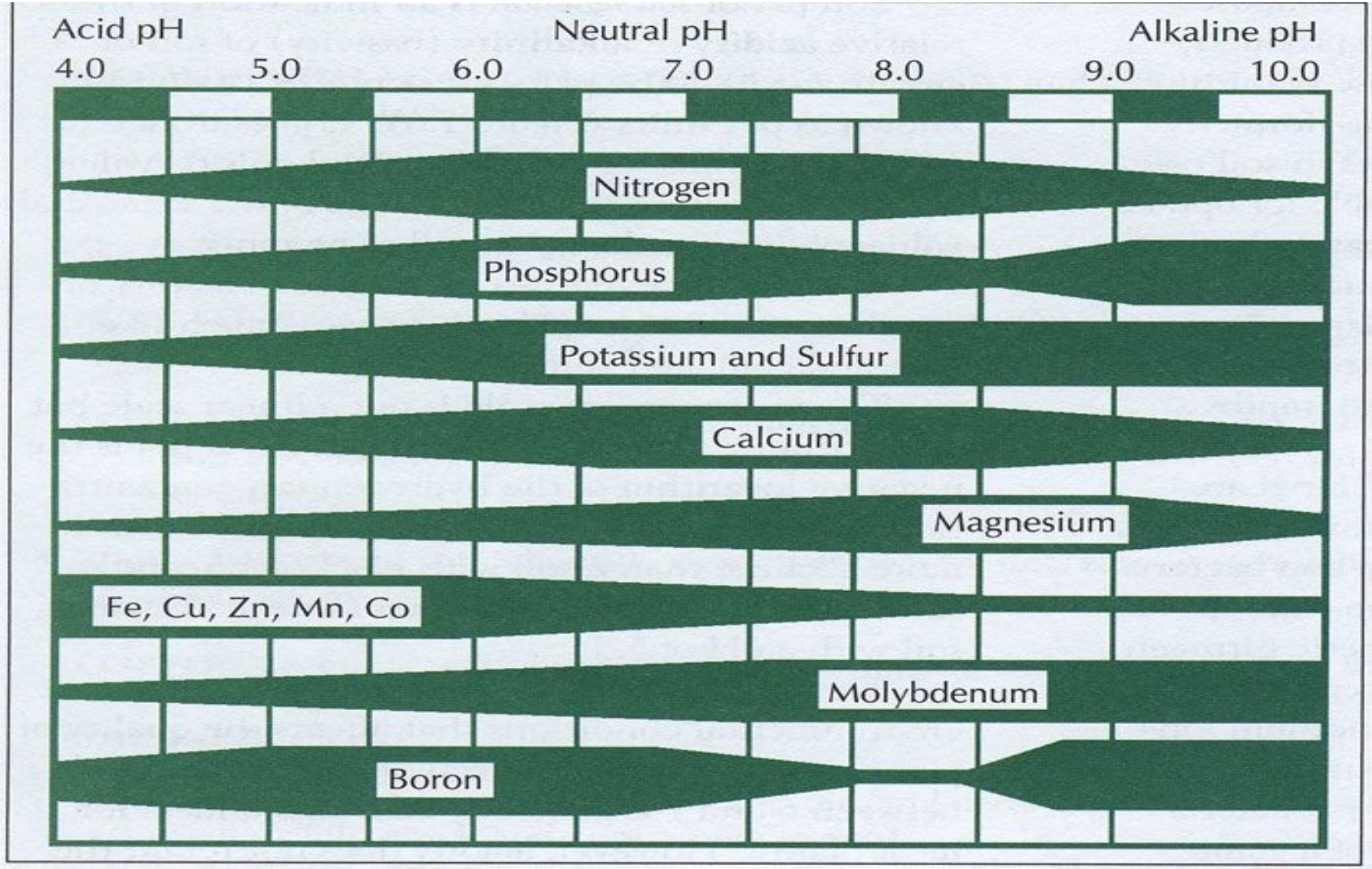
Site Preparation

- Soil testing
- Elimination of noxious weeds
- Remove barriers to good air drainage
- Address poor water drainage areas (if applicable)
- Remove wild/abandoned vines near the orchard site
- Establish desired vineyard floor cover

Taking Soil Samples

- Sample at 2 depths
  - Upper 8 inches
  - 8 to 16 inches
- pH
- P
- K
- Ca
- Mg
- Organic Matter

Effect of Soil pH on Nutrient Availability



Applying Lime & Phosphorus to Soils

Rate for upper 8”

+

Rate for 8 – 16” depth

= **Amt. to apply**

Disk or rototill (mixes lime with soil in upper 4 – 6”)

Plow to put amended soil at the bottom of the furrow

(for high lime rates, apply ~ 2/3 of total & incorporate, apply remaining amount & disk into topsoil)

!!!!!

- There is NO economically effective way to amend subsoil pH once the plants are in the ground
  - The same is true for phosphorus and, to a lesser extent, potassium

Field Layout

- North/south row orientation is most desirable if the field permits
  - Plant across slopes, regardless of orientation, to reduce soil erosion
    - The suggested floor management plan consists of a bare strip of soil down the row a minimum of 4 feet or more in width plus a sodded strip between rows for equipment support and to serve as a deceleration and diffusion strip for run-off water.
- Straight rows make trellis construction and maintenance easier.
  - Make the maximum length of the trellis about 300 ft. for ease of access and to allow for better air drainage

Row Orientation – Sloping Land

Across the slope

- Vineyard floor mgmt.
  - Bare strip under vines & mowed row middles
- Irrigation systems easier to design & operate
- More precision in pesticide applications
- >15% slope, sliding into rows
- >25% slope, roll-over threat

Up & down the slope

- Vegetation under vines to lessen erosion
- Superior air drainage
- Heavier, more powerful tractors needed to handle the hills
  - (4-wheel drive)

Slope

- Mild (2 to 5%) – increases air & water drainage
  - Flat fields may pose supplemental water drainage problems
- As slope increases, the erosion potential increases
- Slopes > 15% present a hazard in operating equipment
- Undulating slopes:
  - Difficulties in constructing & maintaining trellises & irrigation systems
  - Vast differences in soils:
    - Depth, drainage, fertility

Ordering Plants

- Order early to increase chances of getting the varieties, plant size and plant quality that you desire
  - Consider delaying planting and advance ordering if desired plants are not available
- Don’t cut corners on plant quality
  - Virus-indexed
  - Tissue culture

Grapes

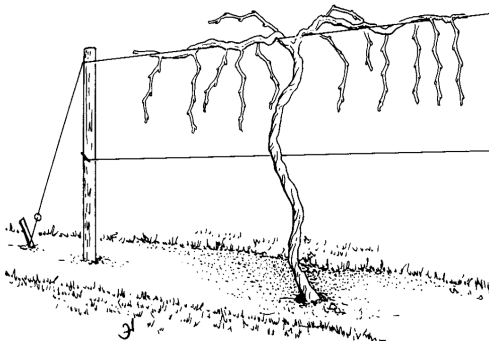
	American bunch	Hybrids	*V. vinifera*	Muscadines
Own-rooted or grafted vines	Own-rooted	Mostly own-rooted, some grafted	Grafted	Own-rooted
Vine spacing	8’ X 12’ = 454 vines/acre	8’ X 12’ = 454 vines/acre	6’ X 12’ = 605 vines/acre	16’ X 12’ = 227 vines/acre
Time from planting to 1st crop (years)	3 to 4	3 to 4	3 to 4	3 to 5
Time to full crop (years)	5	5	5	6 to 7
Anticipated annual yield	25 to 30 lbs/vine (5½ to 7 tons/acre)	15 to 20 lbs/vine (3½ to 5 tons/acre)	8 to 10 lbs/vine (2½ to 3 tons/acre)	60 to 70 lbs/vine (7 to 8 tons/acre)
Anticipated productive life	20 to 25 years	20 to 25 years	15 to 20 years	25 to 30+ years

Ungrafted (own roots) vs. Grafted Grapevines?

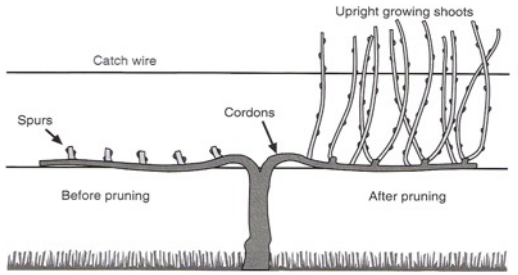
Type of Grape	
Muscadine	ungrafted
American	ungrafted
French-American Hybrid	Most older varieties can be ungrafted, Consider grafted vines for Chardonel, Traminette
V. vinifera	All should be grafted

Vineyard Training Systems -

- Which to use?
  - –Site specific
  - –Person specific
    - Use what works best for the location of the vineyard & for the people who will be doing the work.



High or Low Cordon?



High

- High Wire Bilateral Cordon, Umbrella Kniffin, Hudson River Umbrella, Geneva Double Curtain
- For varieties with a trailing/drooping growth habit
  - Labrusca types tend to have downward growth

Low

- Vertical Shoot Positioning, Lyre
- For varieties with an upright to semi upright growth habit
- V. vinifera tends to have upward growth

Functions of the Trellis

The trellis is a long-term investment. It should be built to last the life of the vineyard

- Support the vine and the crop
- Expose fruit and foliage to sunlight
- Open canopy to air movement and spray penetration
- Facilitate ease of vineyard operations
  - Pruning, thinning, pest control, harvest

The Trellis

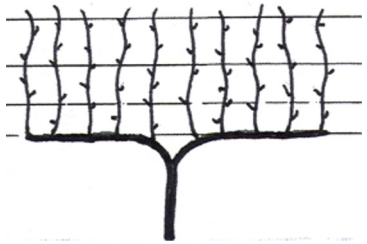
- Most expensive part of vineyard establishment
- Trellis should be designed to last the life of a vineyard
- Wood, metal or a combination for posts
- Wire tensioning is done from end posts
  - End posts should be larger (at least 4 in. top diam.)
    - 10 ft. posts with 3 ft. in the ground
    - Anchors to reinforce end posts
  - Line posts used to position wires at desired heights 3 in. top diam.)
    - 8 ft. posts with 2 ft. in the ground
- Wire: 12½ gauge high tensile for the load-bearing wire

Factors influencing training system & trellis design to be used in the vineyard

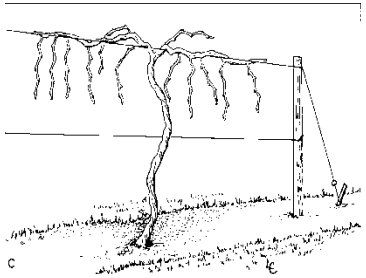
- Type of grape (Amer. Bunch, Fr. Amer. Hybrid, V. vinifera, muscadine)
- Vine spacing (inrow & between row)
- Row orientation
- Soil fertility
- Management capabilities
- Available labor (both the amount & capabilities)
- Establishment costs
- Equipment requirement
- Mechanization?

Two-Dimensional Trellises

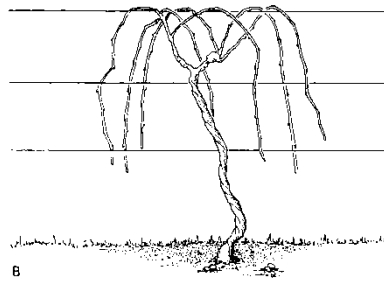
VSP



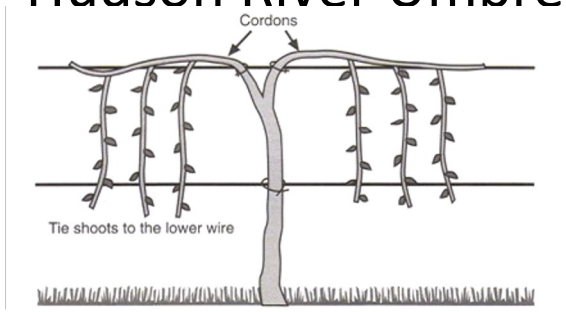
High wire bilateral cordon



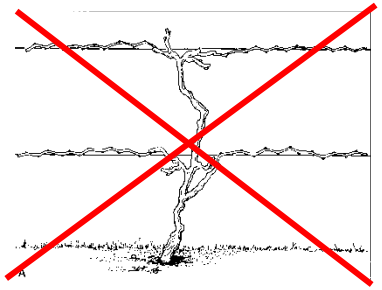
Umbrella Kniffin



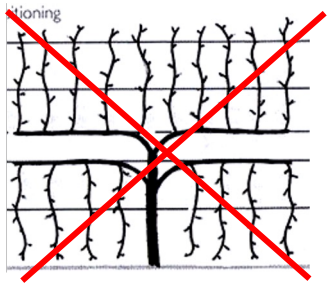
Hudson River Umbrella



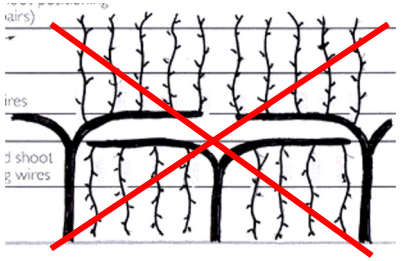
4 Cane Kniffin



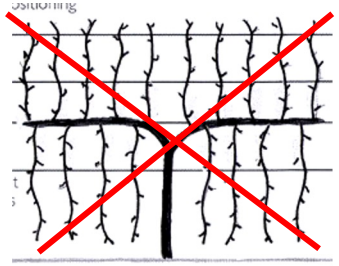
Scott Henry



Smart Henry

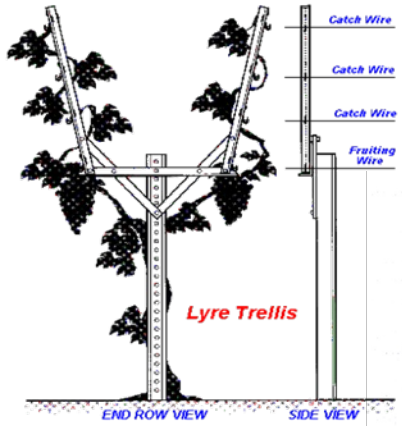


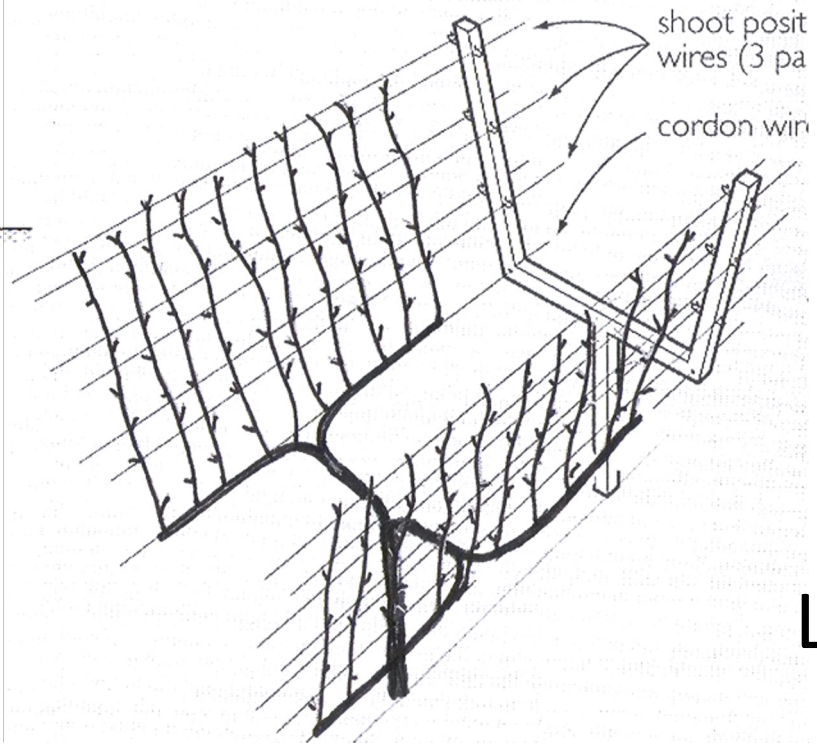
Smart Dyson

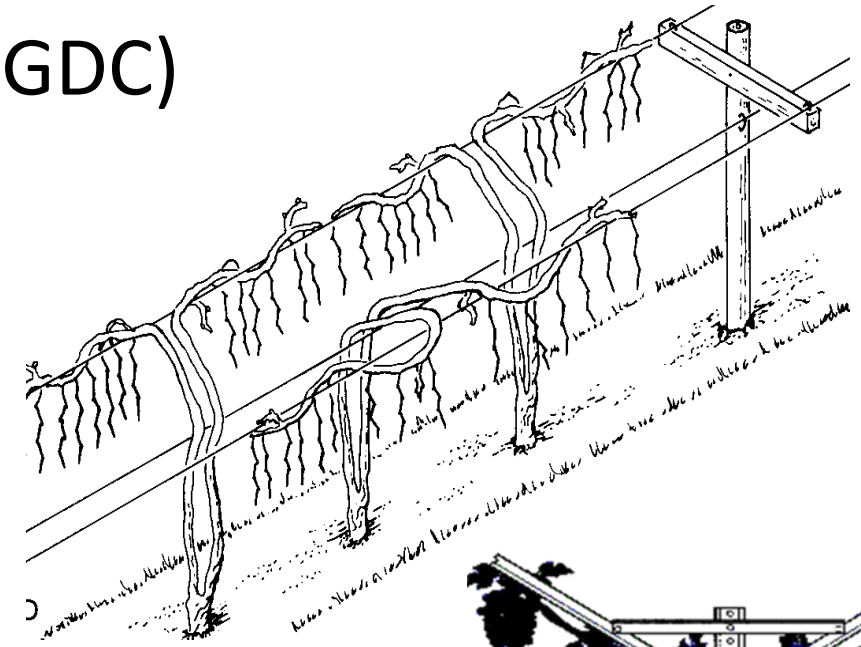


Three-Dimensional Trellises

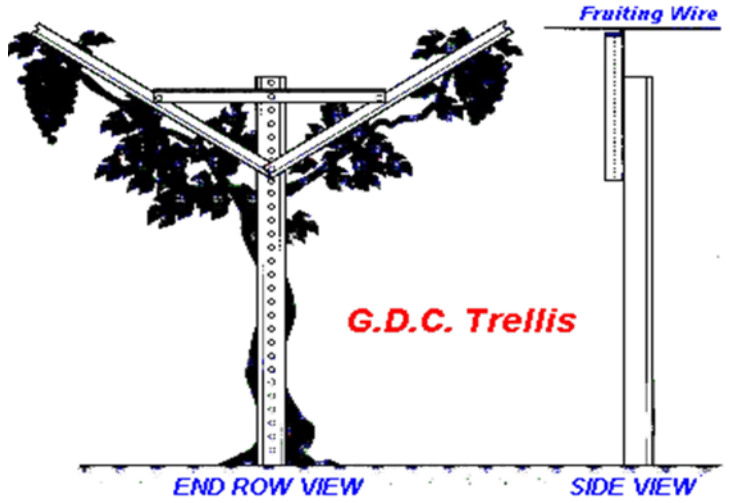
Geneva Double Curtain (GDC)







Lyre



Training

- Positions the fruit-bearing wood and other vine parts on the trellis
- Normally completed by the 3rd yr. of growth.
  - Except for renewal of damaged parts or system conversion
- Should uniformly distribute canes or spurs within the vine's row space to:
  - Facilitate management
  - Promote high fruit yields & quality (light interception)

Factors Affecting the Choice of a Training System

- Growth habit (erect vs. drooping growth habits)
- Cold hardiness (cordon train cold tender varieties)
- Fruitfulness of “base buds” & “count buds”
  - Cordon systems not advised for low fruitfulness varieties
- Adaptability to mechanization (cane pruning & unusual divided canopy systems are not advised for mechanization
- Ease of use of equipment
- Cost effectiveness

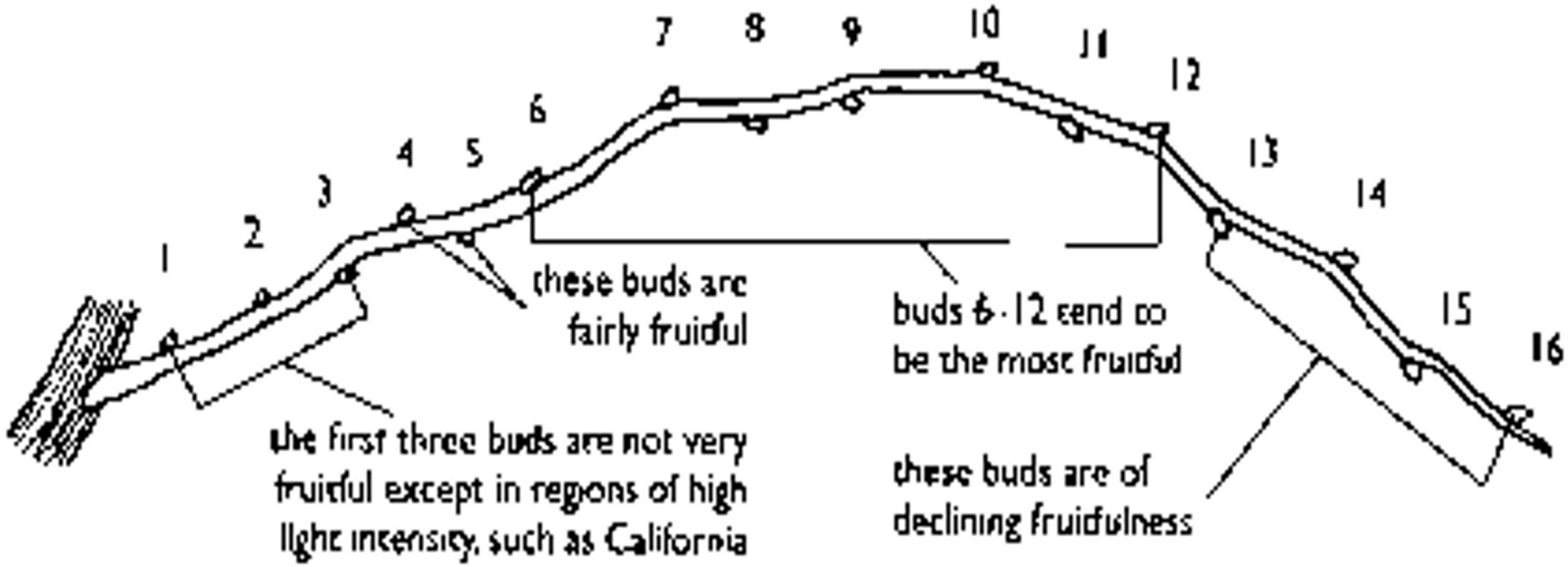
An Acceptable Training System Will:

- Promote maximum sunlight exposure to leaves & clusters
- Warm clusters (sugar accumulation, acid degradation, & biosynthesis of flavor compounds in cool areas
- Create a desirable microclimate within the canopy, especially in the renewal region
- Minimize shoot crowding & leaf to fruit shading
- Promote uniform bud break
- Avoid undue competition among vines

Types of Pruning

- Cane Renewal Pruning:
  - Use where the most fruitful buds are further away from the base of the cane (5th to 7 buds)
  - Spur Pruning:
    - Use where the basal few buds tend to be the most fruitful
      - 2nd to 4th buds
      - The bud at the base of a cane is seldom fruitful & is not included when making bud counts

Cane Renewal: Mid-Cane Bud Fruitfulness

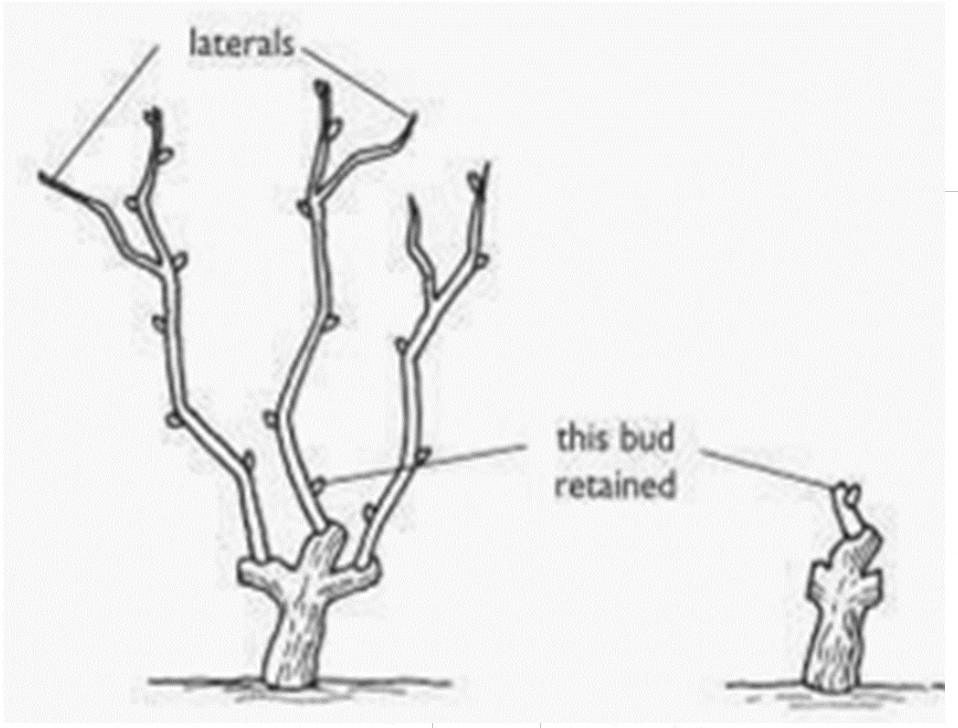


Fruitful Buds in a Typical French Hybrid Cane

Pruning At Planting

- **At planting (trunk development)**
  - Remove all shoots except one
  - Prune remaining shoot to 2 buds
  - Tie a string from the trellis wire to the base of the new plant for trunk training

    OR
  - Drive a stake next to the vine for trunk training
  - During summer, loosely secure 1 shoot to string or stake



A Vineyard Is NOT Forever

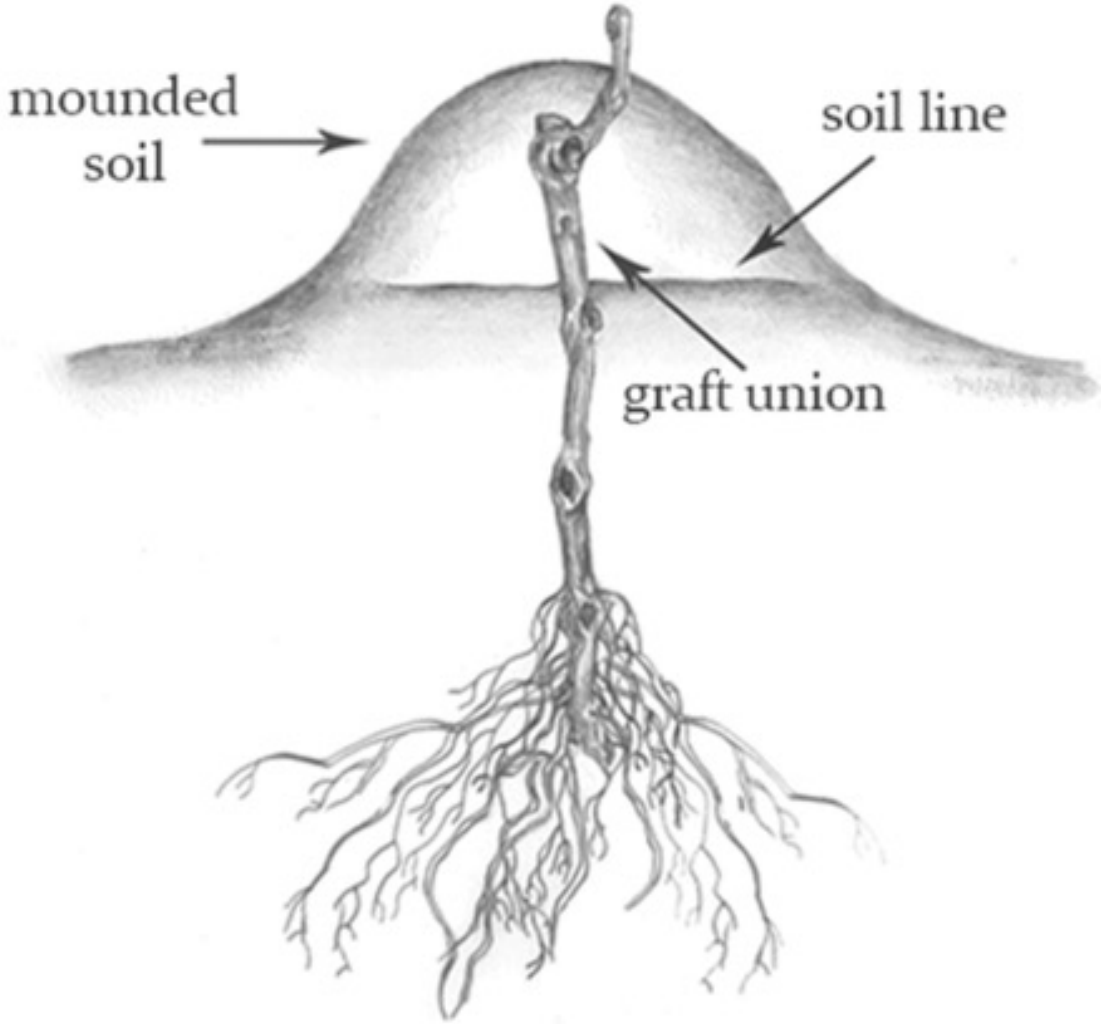
- Change in customer demands
- Introduction of superior varieties
- Emergence of new pest problems
- Weather-related issues
- Deficiencies in the cultural program

When to Plant Grapevines?

- In most of the U.S., the best time to plant grape vines is very late winter or early spring, if irrigation is available. To ensure the highest quality vines and a specific cultivar or rootstock, order vines from a reputable nursery [1] in the summer or early fall prior to planting in spring.

https://grapes.extension.org › planting-grapevines

Planting a Grafted Vine



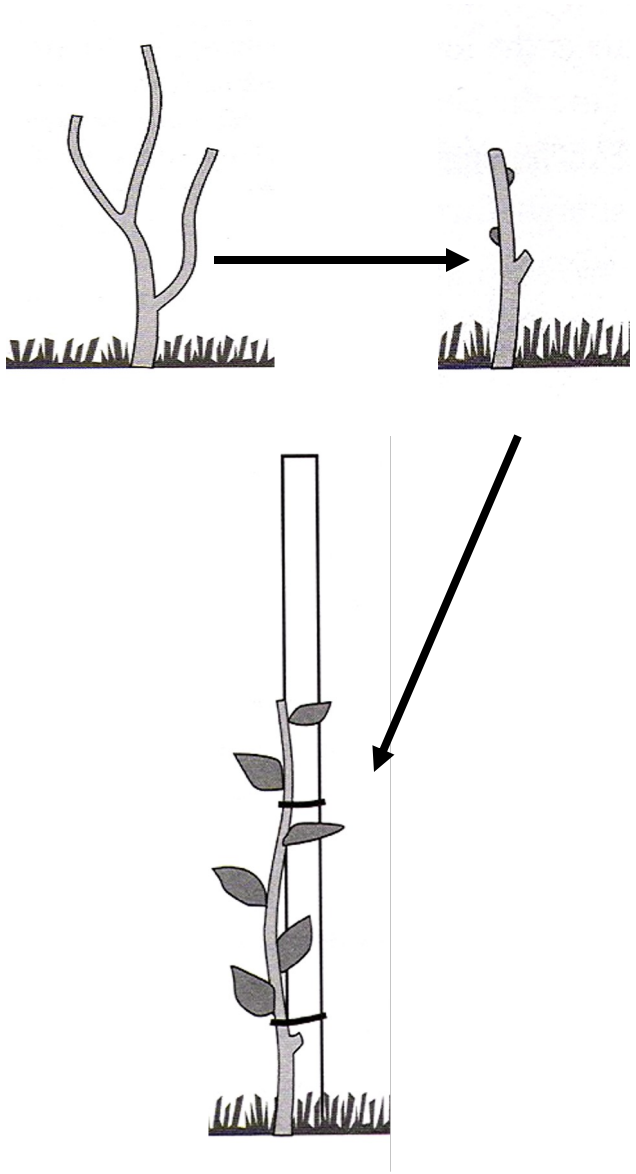
- Graft union 2 – 3” above soil line
- Hole for plant 1.5 – 2 times the diameter of the root system
- Spread roots
- Cover graft union with soil to protect it & harden it off
- Remove mound once growth starts

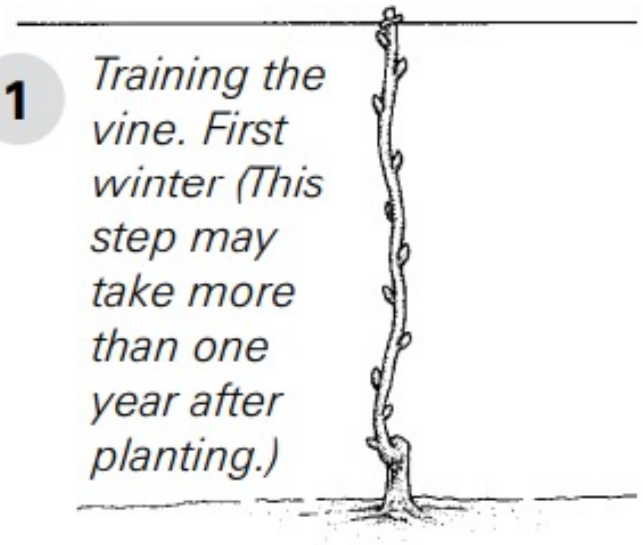
Double A Vineyards

Pruning At Planting

- **At planting (trunk development)**
  - Remove all shoots except one
  - Prune remaining shoot to 2 buds
  - Tie a string form the trellis wire to the base of the new plant for trunk training

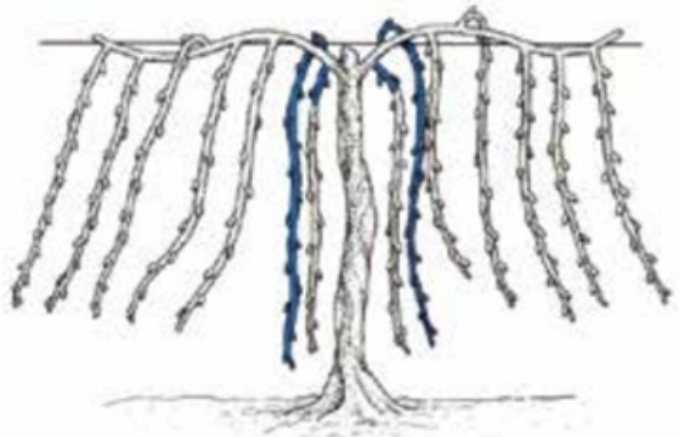
    OR
  - Drive a stake next to the vine for trunk training
  - During summer, loosely secure 1 shoot to string or stake



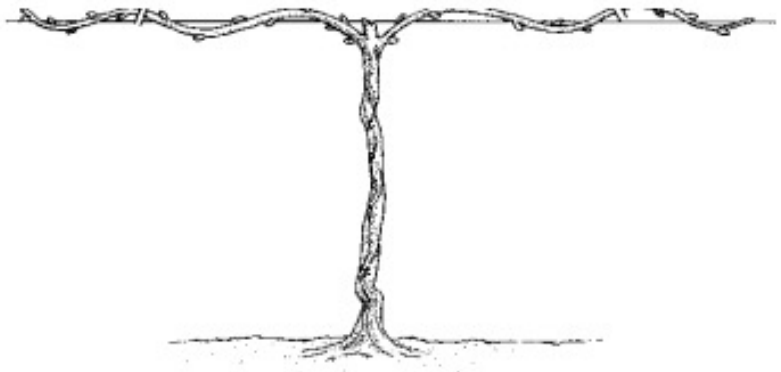


1 *Training the vine. First winter (This step may take more than one year after planting.)*

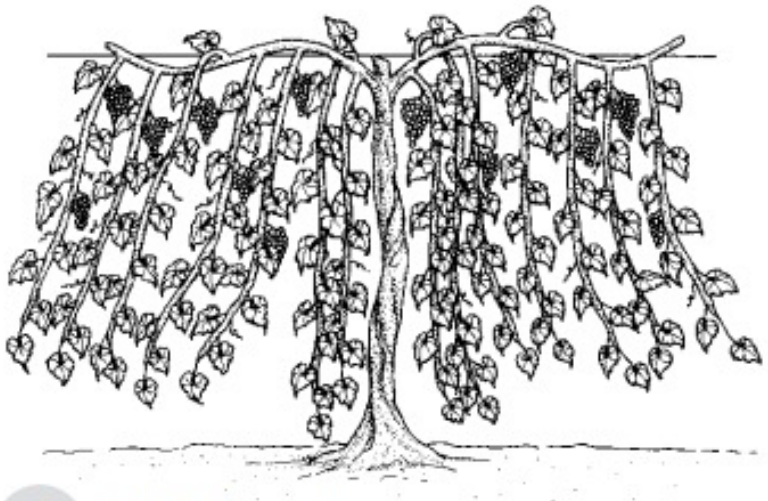
2 *Second growing season. Double lines show pruning cuts*



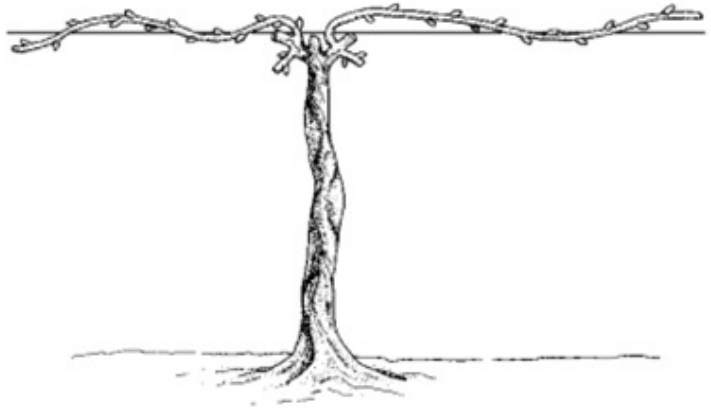
5 *Third winter before pruning. Shaded canes will be retained for next season's fruiting wood.*



3 *Second winter. Double lines show pruning cuts*



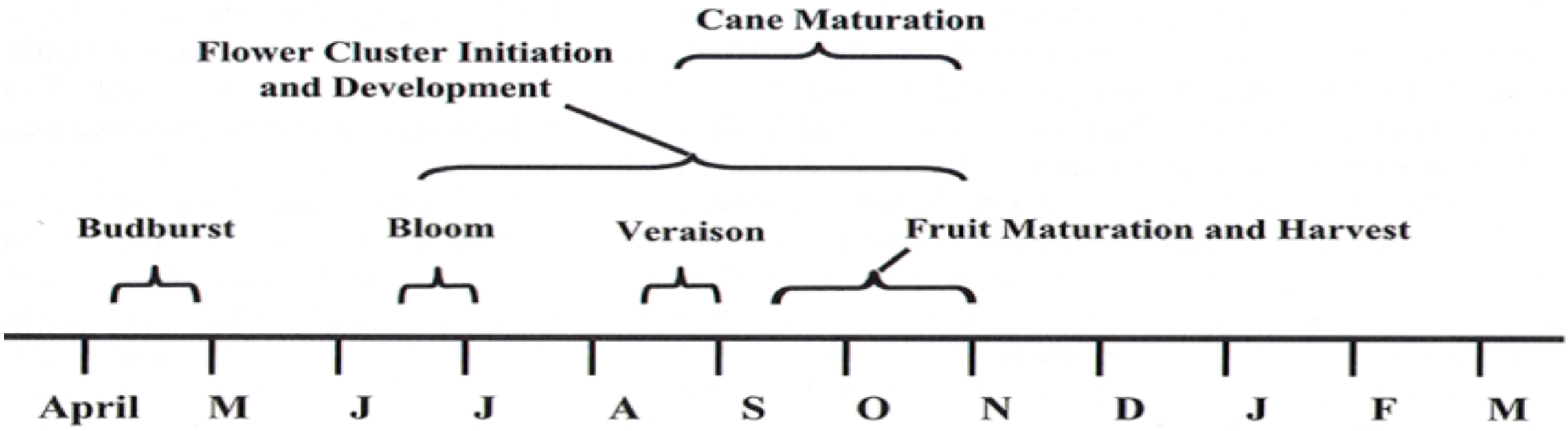
4 *Third growing season*



6 *Third winter after pruning.*

Jeremiah Vardiman

Grapevine Growth Cycle



Vitis aestivalis, the summer grape, native to the Eastern United States, especially the Southeastern United States

Vitis berlandieri, native to the southern North America, primarily Texas, New Mexico and Arkansas. Primarily known for good tolerance against soils with a high content of lime, which can cause chlorosis in many vines of American origin

Vitis labrusca L., the fox grapevine, sometimes used for winemaking and for jam. Native to the Eastern United States and Canada. The Concord grape was derived by a cross with this species

Vitis riparia, the riverbank grapevine, sometimes used for winemaking and for jam. Native to the entire Eastern United States and north to Quebec

Vitis rotundifolia (syn. *Muscadinia rotundifolia*), the muscadine, used for jams and wine. Native to the Southeastern United States from Delaware to the Gulf of Mexico

Vitis rupestris, the rock grapevine, used for breeding of Phylloxera resistant rootstock. Native to the Southern United States

Vitis vinifera, the European grapevine. Native to the Mediterranean and Central Asia.