Master Gardener Program

University of California Cooperative Extension

SMALL HOME VINEYARDS - II

INTRODUCTION

University of California Cooperative Extension UC
MASTER GARDENERS OF NAPA COUNTY

Need more Information:

Help Desk
Monday, Wednesday, Friday
9:00 AM – 12:00 Noon
253-4143

E-mail: mastergardeners@countyofnapa.org

http://cenapa.ucdavis.edu

WEB SITE: WWW.IPM.UCDAVIS.ED Integrated Pest Management PEST NOTES

What questions do you have for us?

- How many have vineyards?
- How Big?
- What varieties?
- Where are they located?
- Are you aware of Integrated Pest Management (IPM)?
- Do you sell your grapes?

OUTLINE OF WHAT WE ARE COVERING TODAY

- INTRODUCTION
- CALENDAR OF EVENTS (AUGUST THROUGH JANUARY)
- BOTANY
- PRE-HARVEST
- VISIT VINEYARD
- LUNCH
- HARVEST
- POST HARVEST
- PLANNING FOR A NEW VINEYARD
- WINERY TOUR
- Q & A

CALENDAR OF EVENTS

CALENDAR OF EVENTS FOR VITICULTURE MANAGEMENT

- WEATHER
- THE VINE
- HARVEST
- VITICULTURE OPERATION
- PEST MANAGEMENT

ANNUAL GROWTH CYCLE

-------THREE INTEGRATED CYCLES-------

- VEGETATIVE GROWTH
- CLUSTER INITIATION
- FRUIT GROWTH AND DEVELOPMENT

ANNUAL CYCLE OF GROWTH

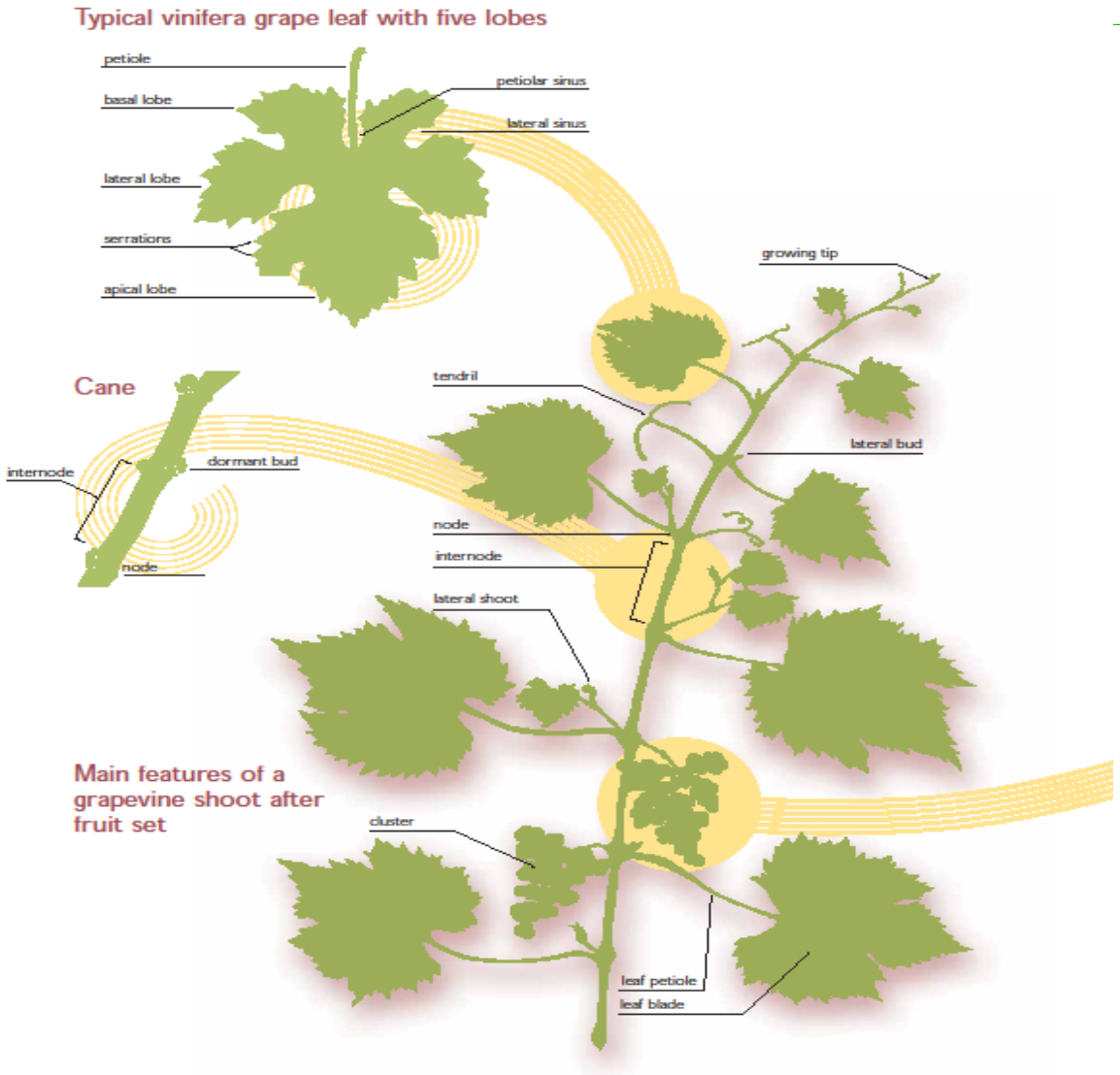
- FACTORS INFLUENCING GRAPE BERRY GROWTH

- GENETICS
- BIOPHYSICAL CONSTRAINTS
- ENVIORNMENT
- SOURCE/SINK RELATIONSHIPS
- WATER STRESS

BASIC BOTANY

- What factors effect growth and ripening
- Temperature and light influences
- Carbohydrate nutrition
- Understand irrigation, nutrition, ripening and fruit quality

Wine Grapevine Structure



Bloom

Botany

- *Transpiration* = water loss by plants through their stomata.
- *Evaporation* = Water loss from the leaf surface
- *Evapotranspiration* relates to the rate of water use. It includes the evaporation of water from the soil surface and the movement of water from the soil through the plant and out through the leaves.
- Vines are drought resistant plants. Water only when necessary.
- The best thing is to know your plants: make visual assessments

TRANSLOCATION

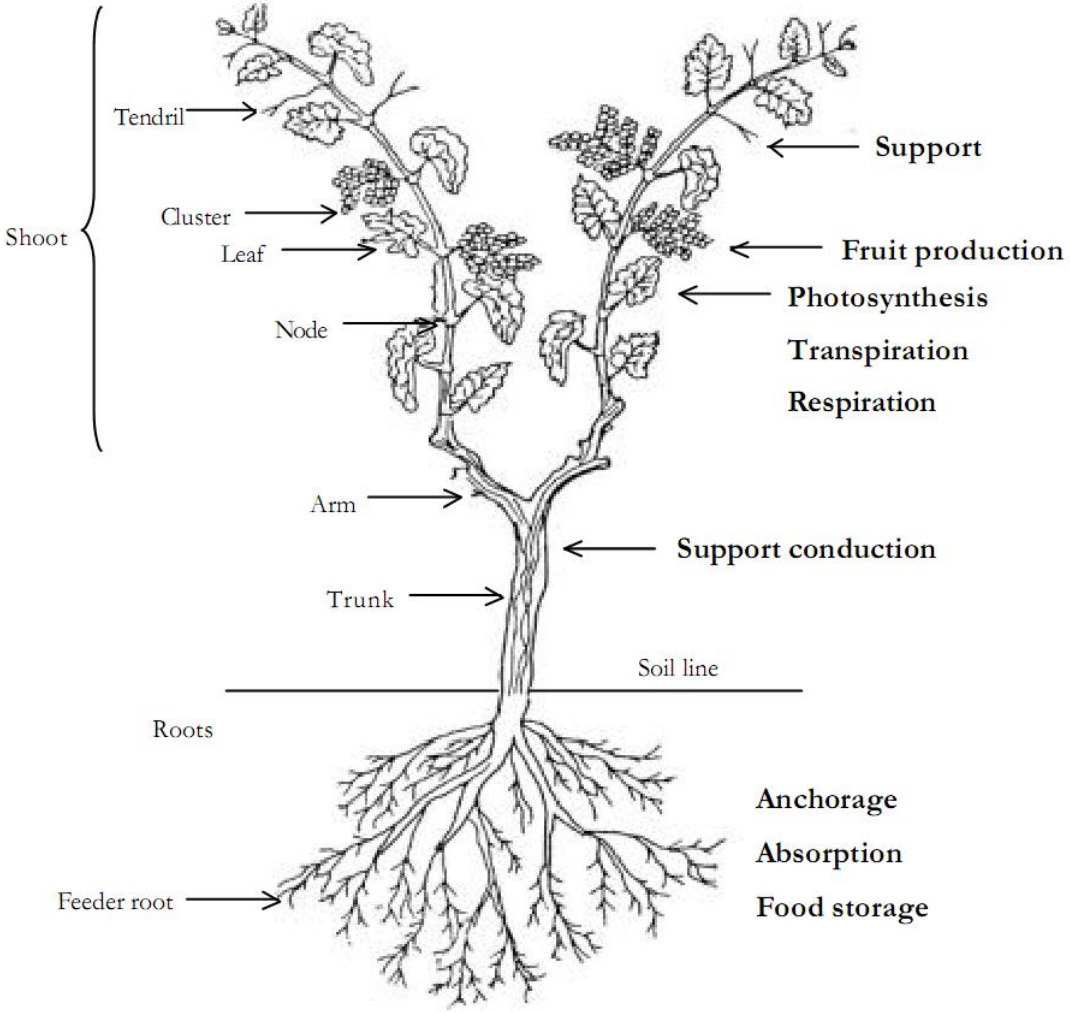
- Movement of carbohydrates, some nutrients and hormones in the plant
- Occurs in the phloem
- Phloem is made up of living plant cells
- Moves upward and downward in plant
- PHLOEM= FOOD
- Sinks- food goes where needed- leaves, berries, roots

TRANSPIRATION

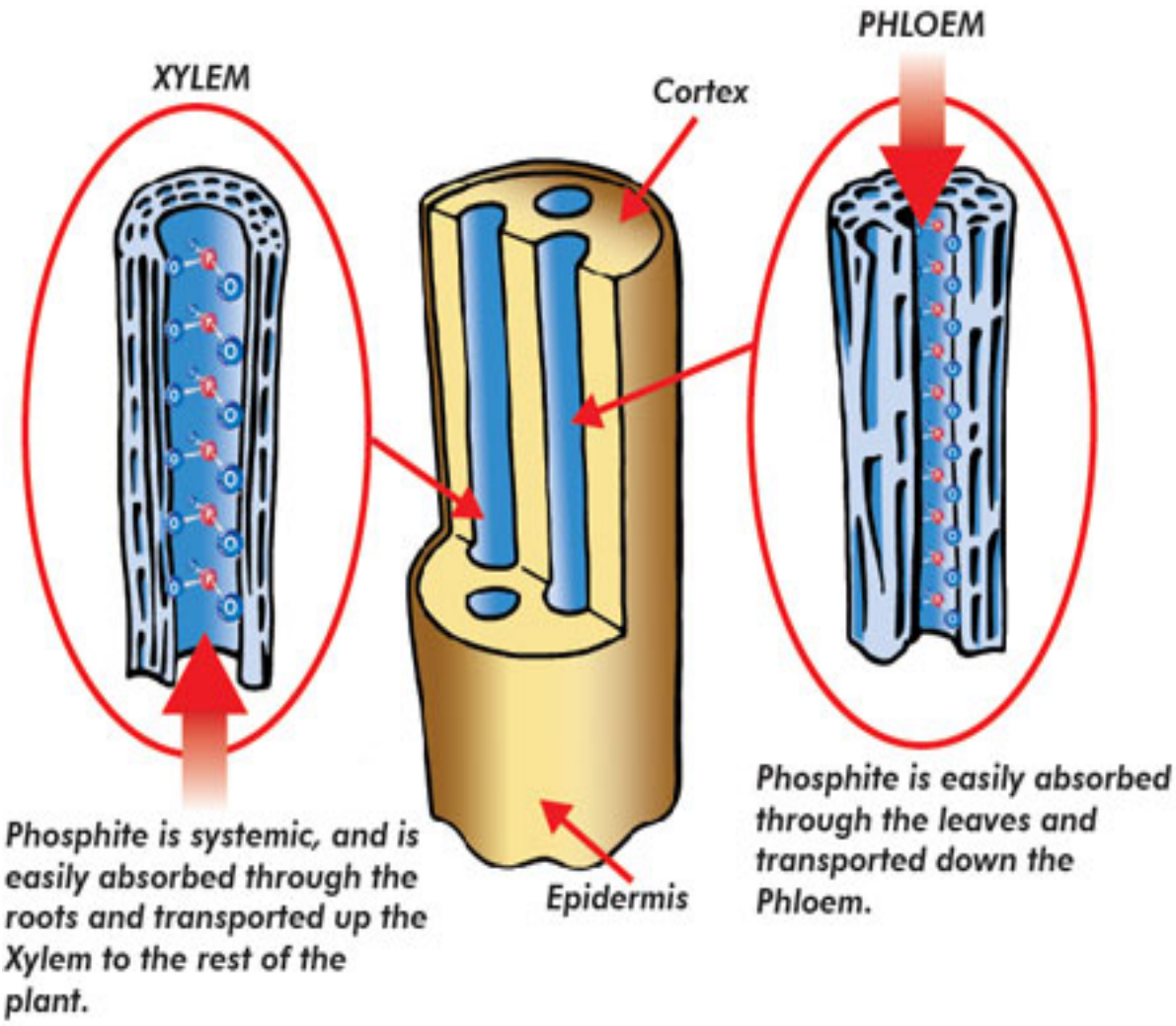
- Loss of water vapor from leaves
- Through microscopic holes called stomates
- Causes negative pressure (vacuum) and "pulls" water up through plant
- Pulls water from leaves to stems to roots to soil interface

**only moves upward in the plant

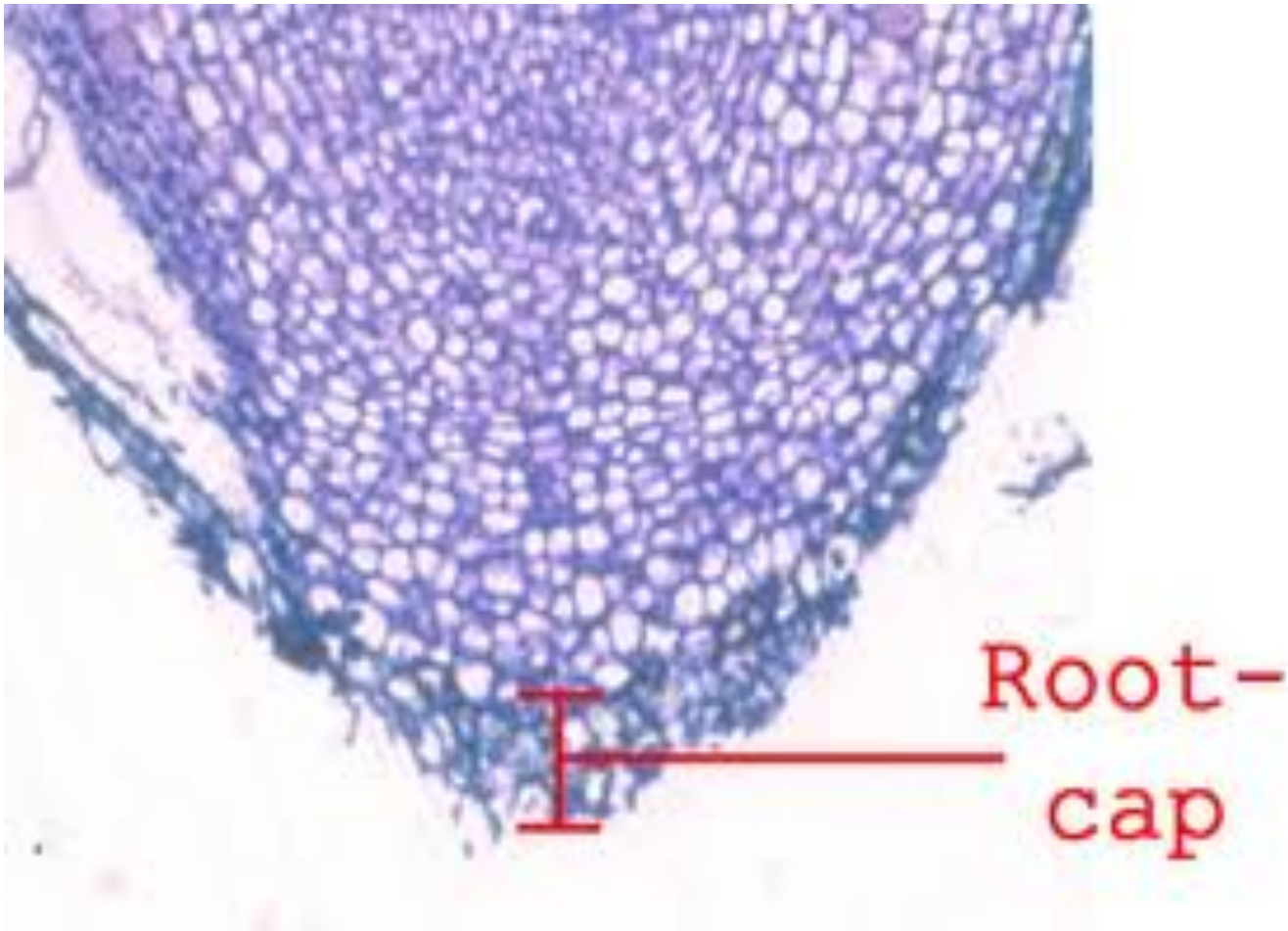
Vine


Shoot
Tendril
Cluster
Leaf
Node
Arm
Trunk
Soil line
Roots
Feeder root
Support
Fruit production
Photosynthesis
Transpiration
Respiration
Support conduction
Anchorage
Absorption
Food storage

Food Flow


PHLOEM
XYLEM
Cortex
Phosphite is systemic, and is easily absorbed through the roots and transported up the Xylem to the rest of the plant.
Epidermis
Phosphite is easily absorbed through the leaves and transported down the Phloem.

Root Growing Point



Photosynthesis

- *The process which enables plants to produce their own food*
- Energy from sun (light) is transformed into stored chemical energy (sugars, carbs)
- CO2 (carbon dioxide + H2O (water) in the presence of light and chlorophyll >>>>> simple sugars or carbohydrates + O2
- Only during daylight Influenced by :Light- Temperature- Water status(wind)

VISIT VINEYARD

PRE-HARVEST

Integrated Pest Management

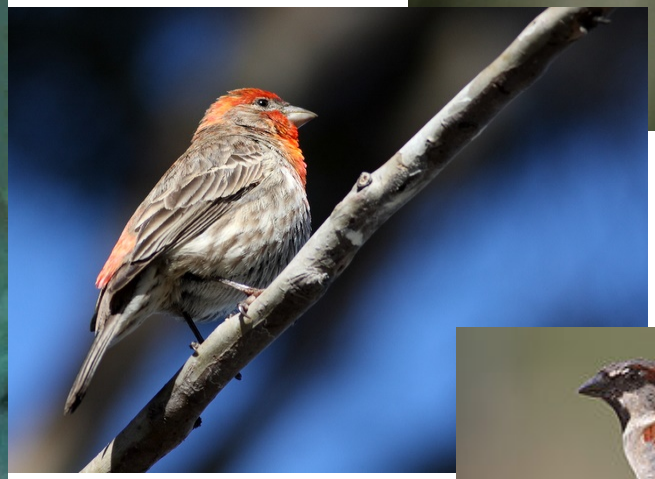
Integrated Pest Management (IPM)

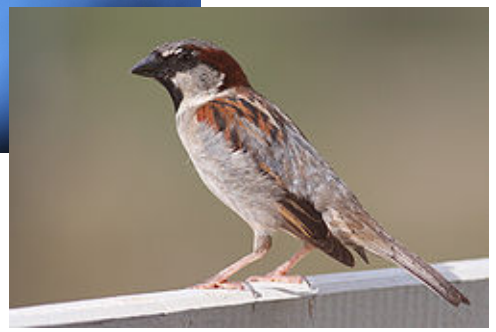
- Prevention
  - Correct plant in correct place
  - Maintain tree & garden health (correct watering, fertilization, pruning, and sanitation; balanced eco-system)
- Minimize and Target Intervention

Vertebrate pests

Vertebrate pests

- Birds
  - COVER THE AREA





Vertebrate pests

- Deer Proof the area

  Chicken Wire on Ground

Grape Disorders and Invasives

Grape Disorders

Red Blotch

Leafroll

Sharpshooters

Eutypa

Pierce's disease

Invasives

European Grapevine Moth

Grapeleaf Skeltonizer

Irrigation

How Much

Know your microclimate

- Each vineyard can be very different in location (climate), soil-water capacity, vigor and trellis design.

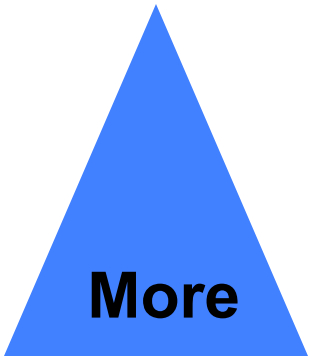
Production Goals

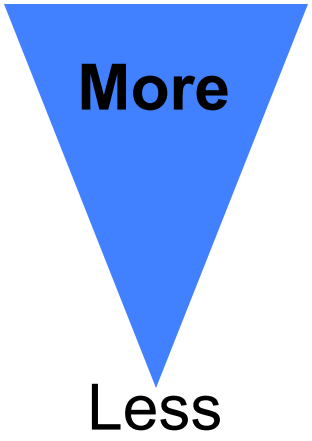
- Variety and wine program to which the fruit is destined.

Know your soil

Soil Texture affects water-storage capacity

Textures	Holding Capacity	Irrigation Needs
Sandy	Less	More
Loamy		
Clayey	More	Less





How Much

New Vines – First Year

Soil Type	First Six Weeks	Second Six Weeks	Remainder of Season
Sandy	1.5 Gals/per Day	1.5 Gals/2nd Day	1.5 Gals/3rd Day
Loamy	1 Gal/ per Day	1 Gal/2nd Day	1 Gal/3rd Day
Clayey	.75 Gal/per Day	.75 Gal/2nd Day	.75 Gal/3rd Day

How Much

New Vines – Second Year

Soil Type	June 1* - Six Weeks	July 15th until October
Sandy	1.5 Gals/3rd Day	2.5 Gals/5th Day
Loamy	1 Gal/3rd Day	2 Gal/5th Day
Clayey	.75 Gal/3rd Day	1.5 Gal/5th Day

* Start time can vary based on rainfall

When

Scheduling

- When we talked about irrigation for this workshop
  - It depends on:
  - the weather
  - the soil
  - the spacing
  - the rootstock….

When

Veraison to harvest

- Irrigate to maintain canopy, but not encourage growth
- Too much water can deprive roots of oxygen
- Encourages bunch rot give a vegetate flavor to the fruit from too much canopy

When

Excessive shoot growth recognized by-

- Large leaves
- Long internodes
- Excessive lateral shoot growth
- Don’t Stress vines –Shriveling and yield reduction
- Consider watering to “hang” the fruit until ripe

Post Harvest

- Irrigate to maintain the foliage for carbohydrate accumulation during the fall.
- 4-8 hours. Drip irrigation

- DO NOT water when the plants are dormant

Canopy Management

Canopy Management

It is all about Balance

Shape, Orientation, Location of shoots and Leaves

Canopy Management

What Affects Balance

Vegetative Growth

Fruit Production

Canopy Management

General Crop Load Indices

- 8 Leaves per cluster
- 10 – 14 cm^2 leaf area – gram fruit weight

Canopy Management

Know your microclimate, Orientation to the afternoon sun

- When to Start
  - ✓ Just Prior To or at bloom
  - ✓ Increase light on the bloom
- During rapid shoot growth
  - ✓ Suckers
  - ✓ Water spouts
  - ✓ May need additional leaf pulling
- When to stop
  - ✓ Start of Veraison
  - ✓ Prior to Harvest

Crop Thinning

Over cropping

- *Over cropping = having too much fruit on the vine to ripen*
- *Balance of the canopy to the fruit enough canopy for photosynthesis to ripen the fruit*
- *Too much vegetation can result in undesirable flavors in the wine.*

Crop Levels and Thinning

BUNCH THINNING

- In August after veraison (coloring) is about 75% take off any bunches that remain primarily green

Crop Levels and Thinning

HARVEST

Berry Development

Stages of berry development

	Stage I	Stage II	Stage III
Flowering →	Green berry growth →	Arrest of green growth →	Veraison

Stages of veraison

HARVEST

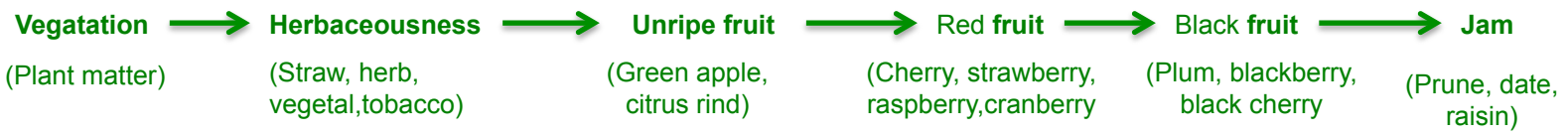
Stage I	Stage II		Stage III	Stage IV
Sugar/water accumulation →	Arrest of phloem transport →		Dehydration →	Raisining
	(Arrest of berry flavorant synthesis)			
		(Deterioration of berry flavorants)		

Berry Ripening Characteristics

- Sugar Levels – Brix
- Acidity (TA)
- pH
- Specific Flavorants

TA decreases as pH increases

How does it taste



Evolution of flavorants in Cabernet Sauvignon

Discuss goals with your winemaker

Brix Testing

- When
  - At visual signs of veraison
  - Weekly, Mornings at the same time
- Sample Size (Berries)
  - 150 – 250+/Acre per harvest/varietal block
- Collection Method
  - Zip-seal “baggy”
  - Select most berries from bottom of clusters (back and front)
  - Shaded clusters and sunny sides of rows
  - Every 5/10 vines
  - Leave berries whole, keep cool

Brix and pH Testing

- Process sample
  - Crush berries
  - Knead the grapes
- Assess berry seeds
  - Bright green changes to light brown
- Refractometer exersize
- Maintain records
  - Growing notes

Brix and pH Ranges

	Brix	pH
Red Grapes	23% - 25%	3.3 – 3.5
White Grapes	22.5% - 24.5%	3.1 – 3.3

Discuss goals with your winemaker

Harvest Tools

POST HARVEST

Erosion and Sediment Control

Purpose

- Reduce and slow down runoff
- Stabilize hillsides
- Protect riparian sites and water quality

Napa County

- Erosion control plan >5% grade
- Review county requirements

Methods

- Straw
- Waddles
- Sediment curtains
- Cover crops
- Mulch

Compost and Mulch

MULCHING

Compost and Mulch

Mulch is not tilled in

- Erosion control
- Moisture content improved

Compost

Compost is tilled in to

- improve porosity
- add microorganism diversity
- slow release of nutrients
- apply 3-4 tons /acre

Cover Crops

Purpose

- Erosion Control
- Soil health, provides nutrition
- Aeration
- Weed Management

TYPES

- Resident vegetation “weeds”
- Reseeding Winter Annuals
- Perennials
- High Biomass Mixes

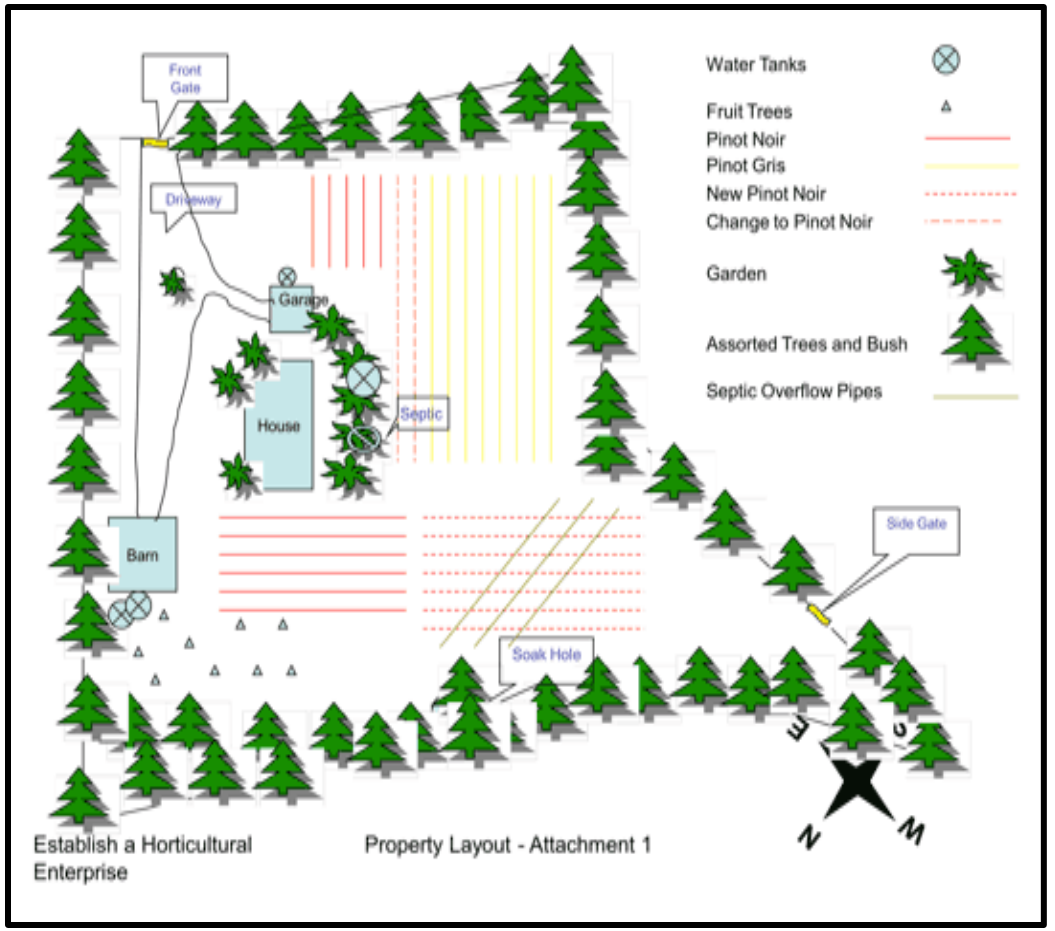
BEFORE YOU PLANT YOUR VINEYARD

Site Evaluation

- ✓ Site Size – *estimate your production*
- ✓ Sun Exposure – *the key to getting maximum flavor*
- ✓ Water Accessibility & Availability – *hand watering vs. drip*
- ✓ Soil Drainage – *grapevines do not like we feet*
- ✓ Air Drainage – *necessary to avoid frost*
- ✓ Wind – *moderate is key*
- ✓ Aspect – *orientation of a slope*
- ✓ Microclimates – *warmer or cooler areas within your site*
- ✓ Soil Test – *fertile soil isn't always the best*
- ✓ Water Test – *know what's in your well*

Determine Layout and How Many Grapevines Can be Planted

- ✓ Vineyard Layout – *survey your site noting primary benchmarks*
- ✓ Row Orientation – *south or southwest facing is best*
- ✓ Row & Plant Spacing – *tighter may be better*
- ✓ Row Length – *don't get boxed in*
- ✓ Scale Drawing
- ✓ Vineyard Production



Identify, Understand and Quantify the Costs to Plant Your Vineyard

- ✓ Site Evaluation – *soil & water tests*
- ✓ Permits – *required if planting 5% slope/ ½ Acre*
- ✓ Site Preparation
  - ✓ *Labor*
  - ✓ *Equipment rental*
  - ✓ *Fertilizer & amendments*
  - ✓ *Trellising*
  - ✓ *Irrigation*
  - ✓ *Pest control*
- ✓ Tools & Equipment
- ✓ Planting – *bench grafts or green potted*

Grapevine Varietal, Clone & Rootstock Selection

- ✓ Varietal – *warm or cool climate*
- ✓ Clone – *consider planting more than one*
- ✓ Rootstock – *may need more than one*
- ✓ Ordering – *do it as early as possible and include extra vines – you'll need them later*

Identify, Understand and Quantify the Time Commitment Required

- ✓ Site Evaluation – *occurs in winter or spring prior to when you want to plant*
- ✓ Site Preparation – *occurs in the fall*
- ✓ Pre-Planting – *occurs in late winter to early spring*
- ✓ Planting – *occurs in spring to early summer*

Post Planting

VISIT WINERY

Closing Q&A