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Growing and Producing Table Grapes in the Prescott Area



Richard Peterson
Cielo Azul Farm & Vineyard
Chino Valley, AZ

Presentation Overview

- **The Basics of Getting Started**
 - Climate, Soil and Site Selection
 - Selecting Grape Varieties
 - Propagating, Planting, Irrigating, Fertilizing
 - Trellising
 - Harvesting
 - Grape Pests (Animals, Insects, and Weeds)
- **Summary & Review**
 - Cielo Azul Vineyard Case History

The Basics

Wine Grapes vs. Table Grapes

WINE GRAPES	TABLE GRAPES
Vitis vinifera (European heritage)	Vitis labrusca (American heritage)
Seeds (i.e., wine flavor and structure)	Seedless (or seeded)
Thicker Skins (i.e., more tannins)	Thinner Skins
Higher Sugar Content (22-30% sugar)	Lower Sugar Content (10-15% sugar)
More Acidity	Less Acidity
Vines Tolerate Poorer, Rocky Soils	Vines Need More Fertile Soil
Spur Pruning	Cane or Spur Pruning
Lower Yield (10 lb per vine)	Higher Yield (up to 30 lb per vine)

The Basics of Vine Structure

Trunk/Cordons

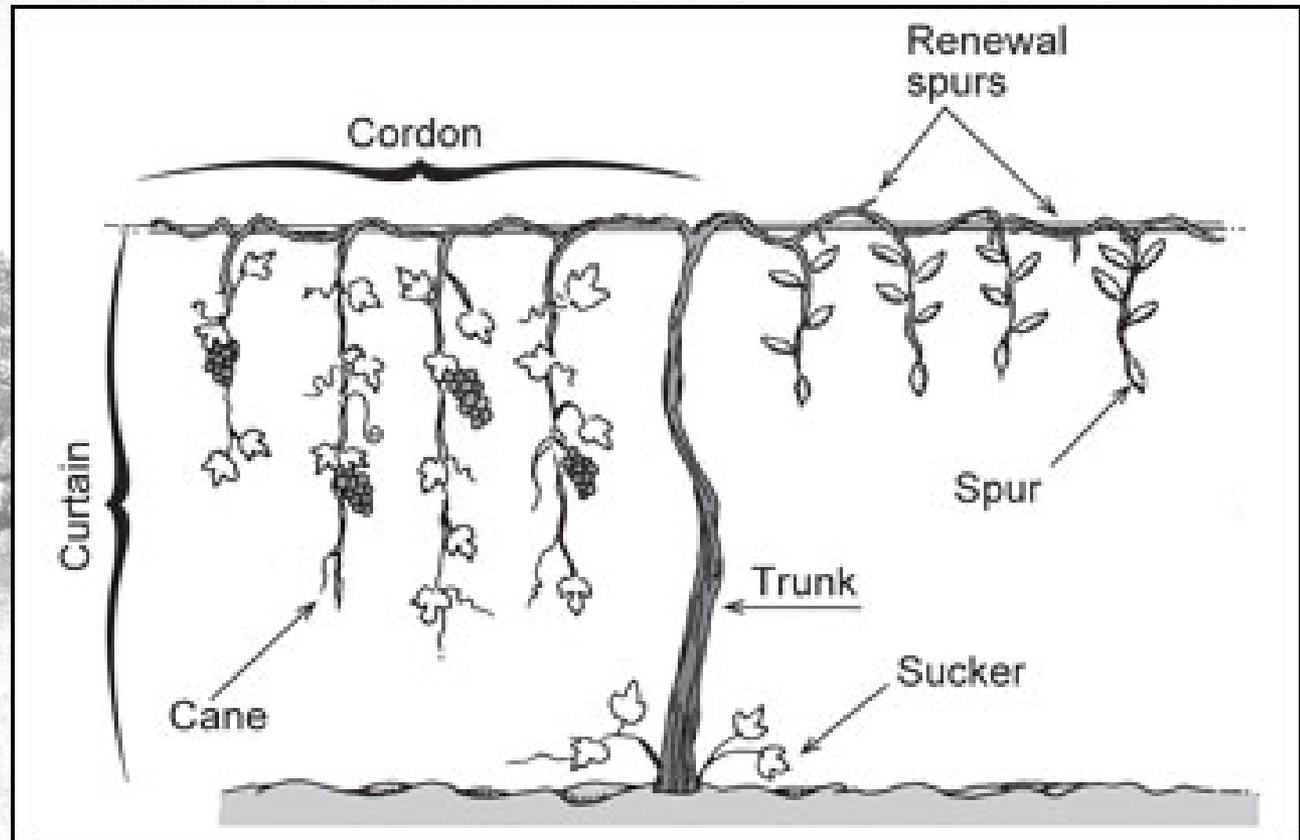
Nodes/Buds

Shoots/Canes

Spurs

Renewal Spurs

Suckers



Getting Started

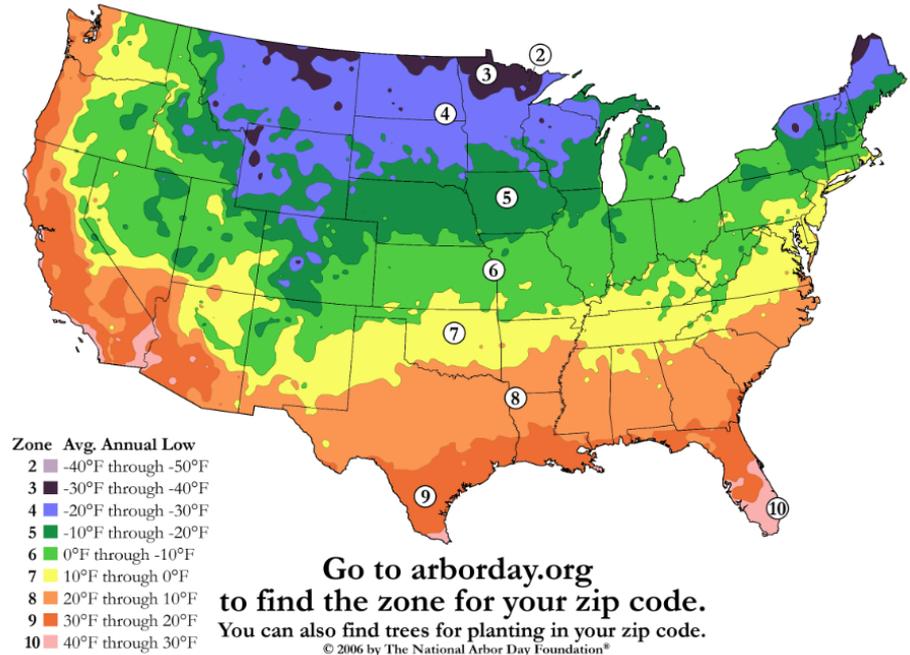
Climate and Site Selection

- Climate Considerations for Grapes:
 - Winter low temperatures and variety selections
 - Timing of spring frosts
 - Frost-free days
 - Growing Degree Days (GDD)
 - See WRCC.DRI.EDU for local climate data

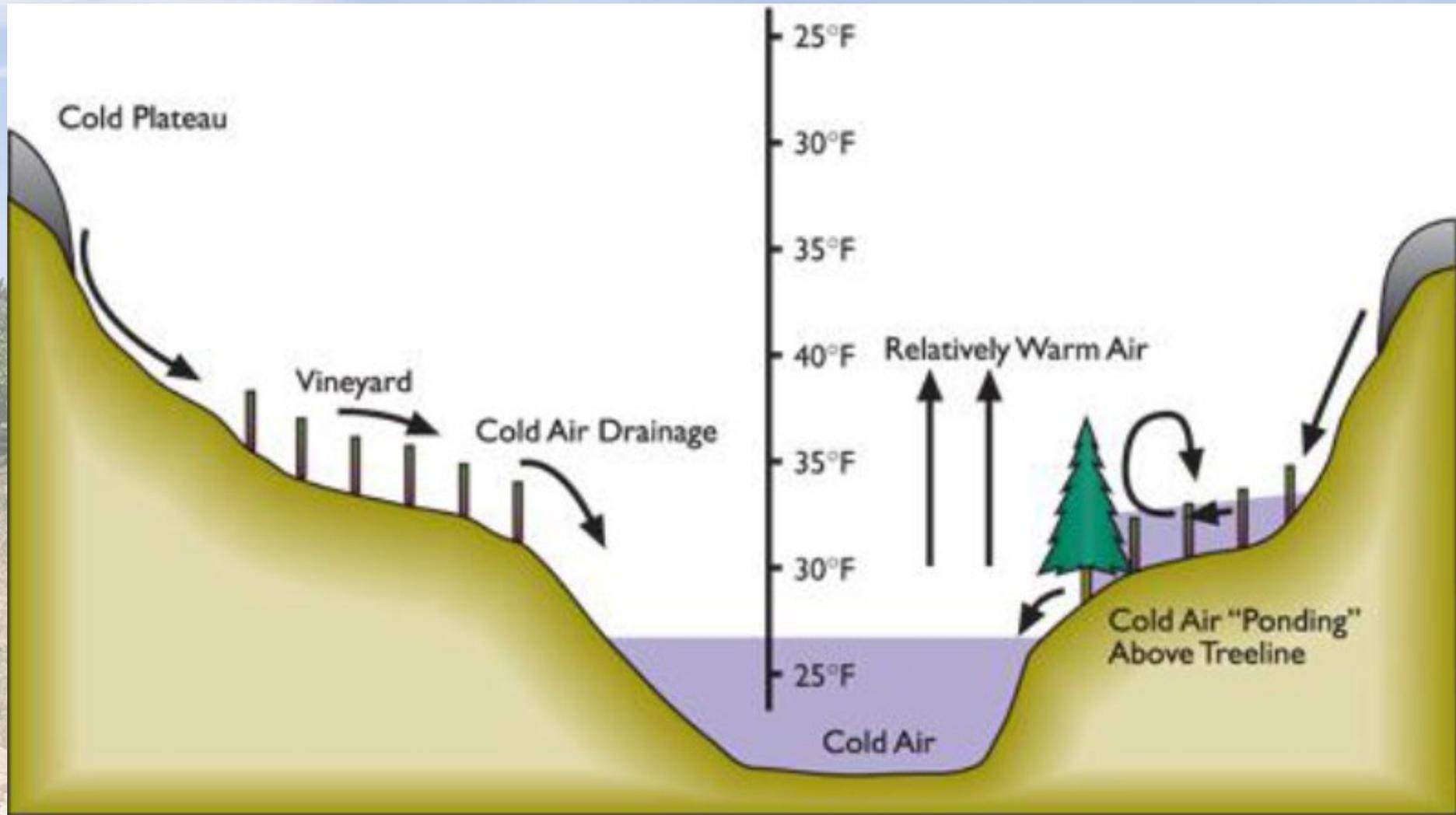
Grape Varieties and Winter Low Temperatures

- On a macro scale, Prescott / Chino Valley areas are USDA Zone 7B (5-10 deg F winter lows)
- Micro-climates within Zone 7B can shift winter lows up or down
- Climate and micro-climate can make the difference in a successful vineyard, depending on the grape variety

2006 arborday.org Hardiness Zones Map



Vineyards and Cold Air Traps



Timing of Spring Frosts

- Arizona climate is such that warm days begin in April in the Prescott area
- Freezing temps can still occur into May
- Median date (50% probability) of last spring frost
 - Prescott Airport ... April 30
 - Chino Valley ... May 18
- Any vines with bud break in April → late spring frost can damage or kill newly-emerged grape vine shoots and grape clusters

Frost Free Days

- “Freeze Free” season... period of time from the last spring frost to first fall frost
 - Prescott Airport ... 179 days
 - Chino Valley ... 153 days
- Table grapes need frost-free season of 150 to 180 days
 - ➔ most of the time, the length of the growing season will not be an issue in the Prescott area

Growing Degree Days (GDD)

- Growing Degree Days are another measure of climate used to assess grape variety suitability for an area
- **Growing degree days (GDD) = $(T_{daily\ max} + T_{daily\ min})/2 - Base\ Temp$**
grapevines do not grow if the temperature remains below 50 °F (base temp) i.e., Activation Temperature
- The summation of daily GDD units can be used for a variety of things: comparing one region to another, comparing one season to another, and predicting important stages in vine development
- Hotter climates = more Growing Degree Days (GDD)
- Average annual accumulation of daily GDD values
 - Jerome ... 4501
 - Prescott Airport ... 3406
 - Chino Valley ... 3316
 - Prescott 2923
 - Napa, California ... 2674
 - Geneva, NY ... 2532
- Bottomline... table grapes developed for cold climates (e.g., upstate NY) are most suitable for Prescott area and some hot-climate table grapes may not be suitable

Varieties and GDD Heat Regions

- Region I: Below 2,500 degree days; Chardonnay, Pinot Noir, Gewurztraminer, Riesling
- Region II: 2,500-3,000 degree days; Cabernet Sauvignon, Merlot, Sauvignon Blanc
- Region III: 3,000-3,500 degree days; Zinfandel, Barbera, Gamay
- Region IV: 3,500-4,000 degree days; Malvasia, Thompson Seedless
- Region V: Over 4,000 degree days; Thompson Seedless, other table grapes

Arizona Climate Challenges

Growing Grapes

and the

Challenges of Arizona Climate Extremes

video by Justin Brereton, Yavapai College
Horticulture Faculty Instructor

(7:57)

Getting Started

Knowing Your Soil

- Ideal table grape soil is deep, light, silty or slightly sandy loam
- Conversely, classic wine grape soil is thin and rather poor so vines struggle = more intense grape flavor
- However, grapes can adapt to a wide range of soil types typical of Prescott areas but best suited in well-drained soil
- Not all grape varieties like the same type of soil...less vine vigor, small berries = not a good variety-to-soil match



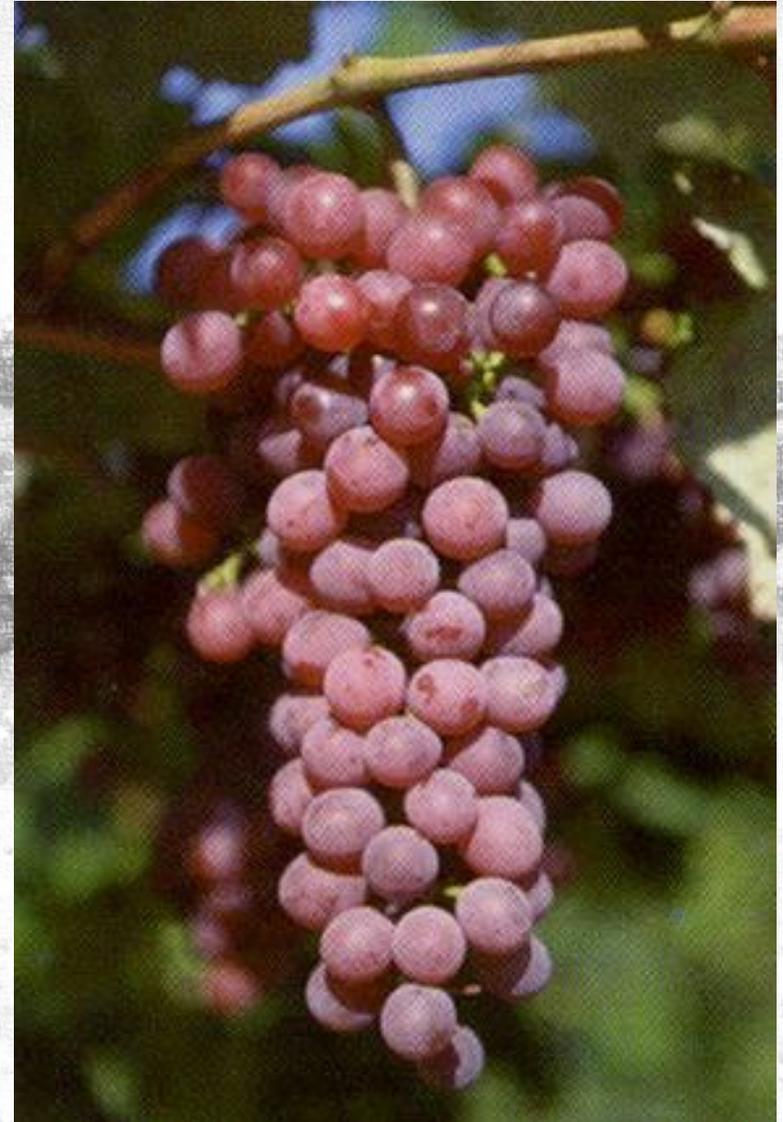
Choosing Plants

- Variety of ways to acquire grape plant stock
 - Unrooted, pruned cuttings
 - Dormant bare-root plants
 - Rooted/potted plants
 - Most table grapes will be on their own roots (i.e., ungrafted)
 - Wine grapes are often grafted onto disease-tolerant rootstock
- Grape plant sources
 - On-line nurseries
 - Local nurseries and retailers
 - Pruned cuttings from neighbors with an exceptional variety
- Rooted plants can be 1-gallon size... no need to purchase older, larger plants
 - Select one that will be easy to prune back to a few buds or to a vigorous basal shoot
 - 1st season planting is to encourage root development and, potentially with sufficient vine vigor, a straight trunk

Choosing Table Grape Varieties

My Favorites... based on hardiness and production:

- Many table grape varieties, so individual research is necessary using refs listed at end of presentation
- Cold-climate varieties suited to our 7B climate zone and soil
 - Glenora (blue)
 - Reliance (red)
 - Vanessa (red)
 - Saturn (red)
 - Neptune (green)
 - Remaily (green)
 - Himrod (green)
 - Hope (green)
- Marginally suited
 - Interlaken (green)
 - Flame (red)
- Selections based on harvest results of Cielo Azul Vineyard ... some still TBD



Seeded Table Grape Varieties

My Favorites, continued

- Cold-climate varieties suited to our 7B climate zone
 - Swenson (Red)
- Marginally suited
 - Concord (Blue)

Wine Grape Varieties

- Varieties suited to GDD Region III in Chino Valley
 - Syrah
 - Cabernet sauvignon
 - Zinfandel
 - Cabernet dore
- Varieties grown at Granite Creek Vineyard in Chino Valley ... could be other varieties as well



Propagating Grapes... It's Easy!

- Acquire cuttings from early spring grape vine prunings (dormant) or order cuttings online
- [Propagating Grapes from Dormant Hardwood Cuttings](#) video (8:40) presentation by Justin Brereton, Yavapai College Horticulture Instructor



Planting Grapes

- Plant rooted grape cuttings in late May after the last spring freeze
- Full sun location
- Planting hole should be large enough to accommodate all of the roots
- If vines are grafted, do not plant graft union below the soil line
- No compost or soil amendments in planting hole



Irrigating Grapes

DRIP IRRIGATION SCHEDULE FOR GRAPES IN THE CENTRAL VALLEY

Week	Gallons of water per day per trellised vine under drip irrigation						
	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.5	5.0	8.0	8.0	10.0	6.5	5.0
2	1.0	5.0	8.0	8.0	6.0	6.5	5.0
3	2.0	7.0	8.0	10.0	6.5	5.0	3.0
4	3.5	8.0	8.0	10.0	6.5	5.0	3.0

From California Master Gardener Handbook

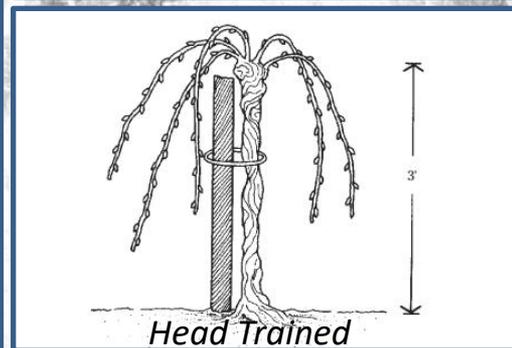
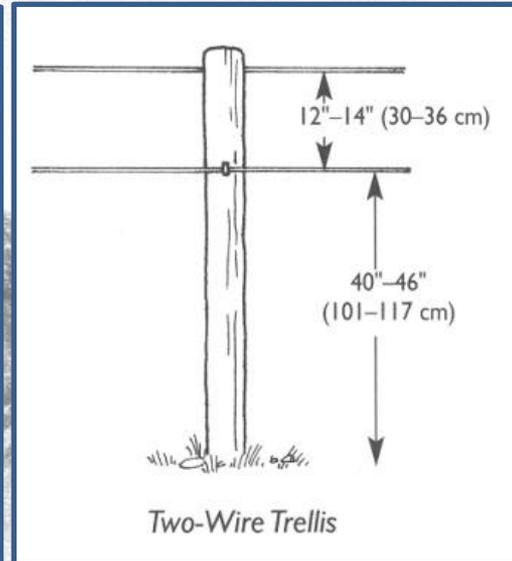
- Drip irrigation with 1 or 2 gph emitters works well
- Water deeply to encourage roots to grow down
- Stop watering a minimum of a month before the fall frost date so that vines can harden off !!

Fertilizing

- Watering young vines is more important than fertilizing
- Withhold fertilizer unless symptoms of nutrient deficiency begin to show
 - e.g. Nitrogen deficiency = pale green foliage
- Nutrients most likely to show deficiencies are nitrogen, potassium, magnesium, and boron
- Too much fertilizer results in plant energy going into vegetative growth, not bigger grapes

Structured Training

- Trellising
 - End posts and anchors
 - Line posts
 - 3 or 4 wires (dripline catchwire, cane training wires)
- Arbor
- Fence
- Head Trained



Vine Development

Rules of Thumb

- Season 1 – Root Development
- Season 2 – Trunk Development
- Season 3 – Cane/Cordon Development
- Season 4 – Partial Fruit Development i.e., Thinning
- Season 5 – Full Fruit Development

Table Grape Harvesting

- Table grapes are not harvested until mature ... they do not ripen after harvest
- Grapes are picked after they reach the optimum stage of acceptability in **appearance and flavor**
 - What is the **characteristic color** for a certain variety?
 - **Sugar content** (Brix) influences taste ... measure with a refractometer or just sample as you harvest
 - In Chino Valley, harvest begins in mid-August and ends in mid-October
- Unlike wine grapes, table grapes are seldom harvested all at one time ... as many as five pickings may be necessary

Pruning

- Pruning is necessary for quality fruit!!
 - 90% of vine is pruned out
 - Regulates the amount of crop... unmanaged vines likely to produce small berries
 - Makes the vine manageable and the fruit accessible
- How a vine is best pruned depends on the grape variety
 - If the variety is unknown, use the cane pruning approach
- Two pruning approaches:
 - Cane Pruning...production from last year's green shoots
 - Spur Pruning... production from spurs on permanent cordons
- Pruning occurs in the dormant season ... January through March in the Prescott area

Annual Cycle of a Grape Vine



Grape Pests/Diseases/Weeds

- Animals
 - Gophers
 - Birds
 - Deer/Antelope
 - Rabbits
- Insects
 - Grape Leaf Skeletonizer
 - Yellowjackets/Bees
- Weeds
 - Bindweed, mustard weed
- Diseases
 - American variety table grapes not prone to soil diseases like wine grapes
 - Powdery mildew
 - Crown gall



PRESENTATION SUMMARY/REVIEW

CASE HISTORY EXAMPLE OF CIELO AZUL VINEYARD



Site Evaluation

- Chino Valley location, Zone 7b
- Level land but micro-climate is such that daytime temps are typically several degrees warmer and night temps several degrees cooler than most other areas of Chino Valley
- 2-3 ft deep soil horizon (sandy clay loam), alkaline (pH 7.0 to 8.2)
- Immediately adjacent to commercial vineyard (Granite Creek Vineyard) ... if they can grow grapes, I can grow grapes

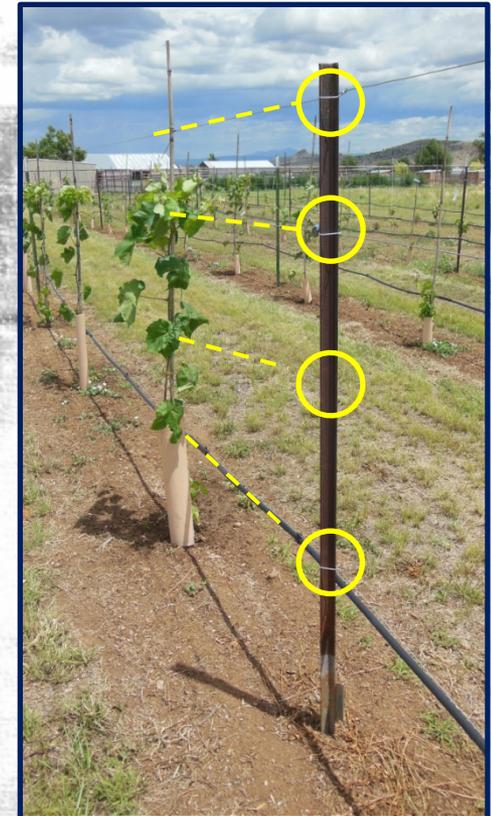
Planting Holes Augered

- 30" deep, 1 ft wide to accommodate a gopher basket
- 8 ft spacing between vines, 20 vines per row
- 10 ft between rows
- Rows oriented N – S ... to enhance air movement down rows and minimize vines shading each other

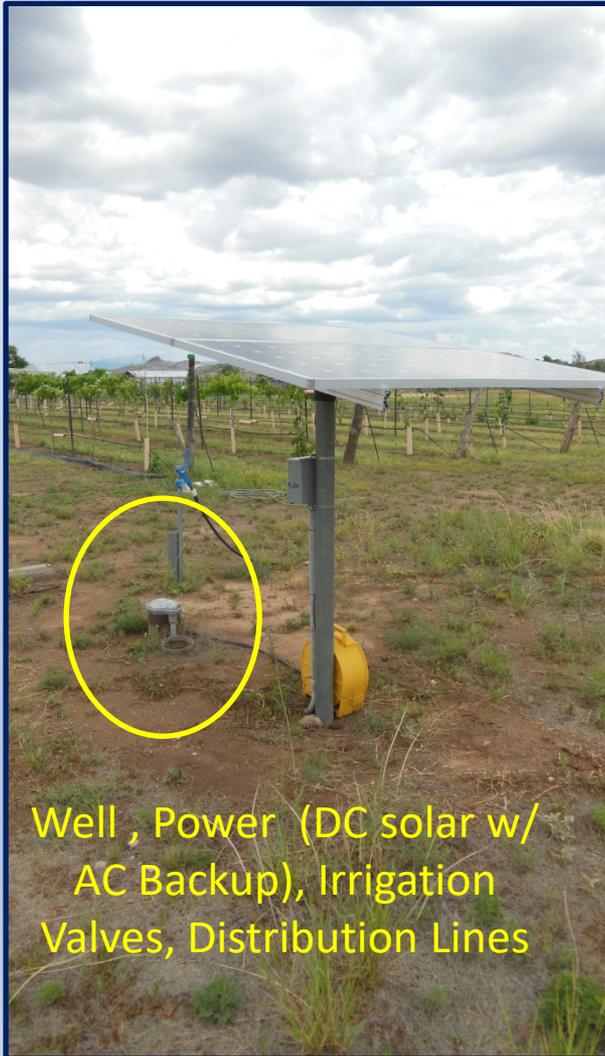


Install Trellis System

- Simple 4-wire system
 - 21" Catchwire
 - 36" Fruiting wire
 - 54" Fruiting wire
 - 66" Catchwire
- Endposts, Earth anchors, Lineposts



Establish Water Supply and Install Drip Irrigation System



Propagate and Plant Vines

- Cold-hardy varieties selected
- Hardwood cuttings started mid-March in greenhouse have developed extensive roots by June 1
- Planted after last frost date
- Planted only as deep as the pot
- Each variety tagged...variety, pruning approach, berry color



1st Season Vines

- Focus primarily on root development
- If vine is vigorous enough, train to the stake and then to the wire



2nd Season Vines

- Focus primarily on trunk and cordon/cane development
- Do not allow to fruit so that plant strength goes to roots and vine structure

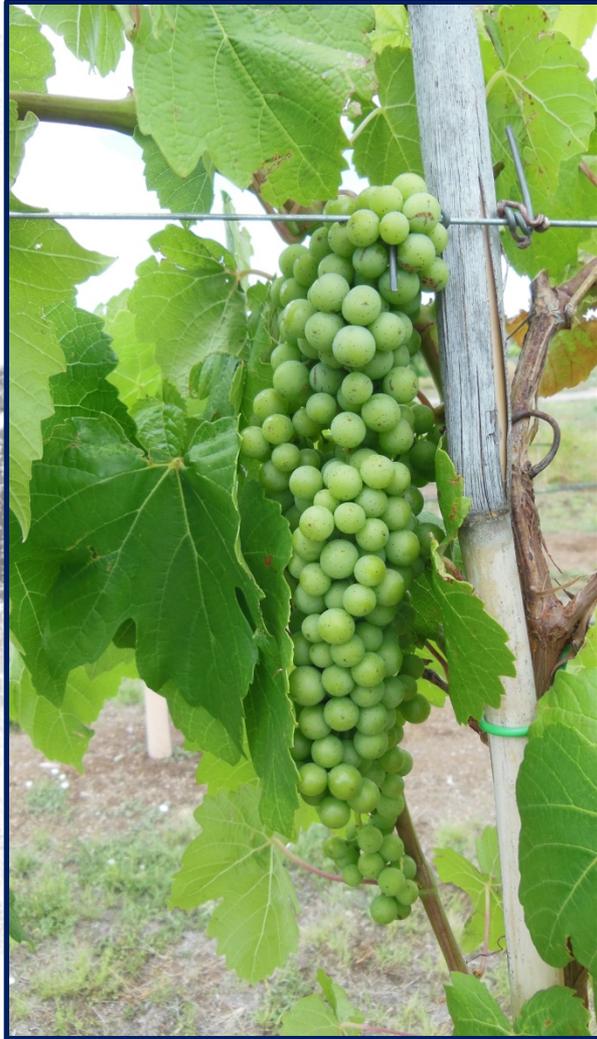


Vines Entering Their 3rd Season



Vines Entering their 3rd Season

Vine Structure Developed _ Fruiting Allowed



Minimizing Pest Damage



- Side netting hangs from top catch wire on each side of the vine and forms an envelope around vine/fruit ... birds excluded (mostly)
- Side benefit of limiting sun scald and hail damage to clusters
- No disease issues
- Co-exist with bindweed
- Trap gophers as needed



Routine Fertigation

Solar-powered sub pump
in well



Fertilizer Injector



Zoned Irrigation

Pruning



July 2013

Weather Monitoring

- If freezing temps occur after bud break, no active measures are in place to mitigate
- Occasional crop losses are expected



Vine Identification/Record Keeping

43 Table Grape Varieties

Microsoft OneNote

The screenshot shows the Microsoft OneNote interface with a document titled "CA Vineyard_2019". The document contains a table representing a vineyard layout. The table has 11 columns representing rows (Row A to Row I) and 11 columns representing years (2013 to 2015). Each cell in the table contains a grape variety name and a colored circular icon representing the vine. A legend at the bottom left indicates that a grey square represents a "replacement vine".

	2013 Row A	2013 Row B	2013 Row C	North	2014 Row D	2014 Row E	2014 Row F	2015 Row G	2015 Row H	2015 Row I
20	AZ Native	AZ Native	<i>Dr Good</i>	Lakemont	Lakemont	USDA Royal Blue	Himrod	Centennial	Vanessa	
19	Saturn		AZ Native	Dr. Good	Lakemont	USDA Royal Blue	Himrod	Centennial	Vanessa	
18	Saturn	Vanessa	AZ Native	Dr. Good	Royal Blue	USDA Royal Blue	Himrod	Centennial	Vanessa	
17	Saturn	Interlaken	AZ Native	Dr. Good	Royal Blue	USDA Royal Blue	Himrod	Centennial	Vanessa	
16	Rubv	AZ Native	AZ Native	Challenger	Royal Blue	Mars	Himrod	Centennial	Vanessa	
15	Rubv	Vanessa	AZ Native	Challenger	Royal Blue	Mars	Himrod	Centennial	Vanessa	
14	<i>Reliance</i>	Himrod	AZ Native	Challenger	Veepie	<i>Neotune</i>	Himrod	Centennial	Vanessa	
13	Reliance	Centennial	AZ Native	USDA Royal	Veepie	Monastery Muscat	Himrod	Centennial	Vanessa	
12	Reliance	Centennial	<i>Venus</i>	<i>Neotune</i>	Veepie	Monastery Muscat	Himrod	<i>Reliance</i>	Vanessa	
11	Reliance	Centennial	Venus	<i>Vanessa</i>	USDA Concord	<i>Dr Good</i>	Himrod	Centennial	Marquis	
10	<i>Soartan</i>	Vanessa	Glenora	Garv Seeded	USDA Concord	Delight	Glenora	Golden Muscat (seeds)	Marouis	
9	Flame	Vanessa	Glenora	Bronx	<i>Swenson</i>	Delight	Glenora	Golden Muscat	Reliance	
8	Flame	Vanessa	Glenora	Bronx	Rubv	Delight	Glenora	Golden Muscat	<i>Reliance</i>	
7	Einset	Swenson	Soartan	Bronx	Swenson	USDA Niaara	Glenora	Golden Muscat	Reliance	
6	Einset	Himrod	Soartan	Garv Seeded	Rubv	USDA Niaara	Glenora NM	Golden Muscat (seeds)	Reliance	
5	Vanessa	Swenson	Soartan	Black Corinth	Swenson	USDA Niaara	Glenora NM	<i>Niaara</i>	<i>Glenora</i>	
4	Vanessa	AZ Native	Neptune	Black Corinth	Swenson	<i>Swenson</i>	Glenora NM	<i>Niaara</i>	Saturn	
3	Canadice	<i>Soartan</i>	Neptune	Beautv	Swenson	Remailv	Glenora NM	<i>Niaara</i>	Saturn	
2	Canadice	Suffolk Red	Neptune	Beautv	<i>Remailv</i>	Remailv	Glenora NM	<i>Himrod</i>	Saturn	
1	AZ Native	AZ Native	AZ Native	Beautv	<i>Swenson</i>	<i>Swenson</i>	Glenora NM	<i>Himrod</i>	Saturn	

replacements vine

Harvest/Marketing





Vines in 5th through 9th Season (2021)
15 rows / 300 vines

Reference Materials and Info Sources

- “The Grape Grower – A Guide to Organic Viticulture” by Lon Rombaugh
- www.bunchgrapes.com
- Oregon State Extension Service
 - Growing Table Grapes, Circular 1639, May 2011
- Yavapai College Viticulture Program
- Rich Peterson
 - rpeterson@email.arizona.edu

Q & A



July 2013

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