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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

<table>
<thead>
<tr>
<th>WINE GRAPES</th>
<th>TABLE GRAPES</th>
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<tbody>
<tr>
<td><strong>Vitis vinifera</strong> (European heritage)</td>
<td><strong>Vitis labrusca</strong> (American heritage)</td>
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<tr>
<td>Seeds (i.e., wine flavor and structure)</td>
<td>Seedless (or seeded)</td>
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<tr>
<td>Thicker Skins (i.e., more tannins)</td>
<td>Thinner Skins</td>
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<tr>
<td>Higher Sugar Content (22-30% sugar)</td>
<td>Lower Sugar Content (10-15% sugar)</td>
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<td>More Acidity</td>
<td>Less Acidity</td>
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<tr>
<td>Vines Tolerate Poorer, Rocky Soils</td>
<td>Vines Need More Fertile Soil</td>
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<td>Spur Pruning</td>
<td>Cane or Spur Pruning</td>
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<td>Lower Yield (10 lb per vine)</td>
<td>Higher Yield (up to 30 lb per vine)</td>
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</table>
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
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) = \( \frac{T_{daily \, max} + T_{daily \, min}}{2} - Base \, Temp \)**

  *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 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!!

From California Master Gardener Handbook
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

HANGTIME
THE LIFE CYCLE OF A VINE

VERAISON
July - August
40-50 days after fruit set, grapes begin to change color and ripen with sugar.

CROP THINNING
June - July
Removal of surplus, imperfect and excess grape clusters to ensure the best harvest.

WINTER PRUNING
November - February
Used to guide the vine and prepare the plant for budbreak.

BUDBREAK
March
Green buds burst forth from winter vines. Most vulnerable time for the vines.

FLOWERING
April - May
Occurs 40-60 days after bud break. Tiny flowers appear at the end of the shoots. Maximum yield is set.

FRUIT SET
May - June
Grapes begin to form. Marks the beginning of a cluster’s ‘hangtime.’

CANOPY MANAGEMENT
May - July
Refers to leaf removal, shoot thinning and positioning to manage the vines for optimal grape production and ripening.

HARVEST
August - October
Grapes are picked, marking the end of ‘hangtime’ and the annual vine life cycle.
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

Well, Power (DC solar w/ AC Backup), Irrigation Valves, Distribution Lines
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

July 2013
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

Cane Pruned

Spur Pruned
Weather Monitoring

- If freezing temps occur after bud break, no active measures are in place to mitigate
- Occasional crop losses are expected
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Vines in 5th through 9th Season (2021)
15 rows / 300 vines
“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

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For more information about our programs, visit our website at extension.arizona.edu/yavapai

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