Table Grapes

Table Grape Production at All Scales

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One (or two) Specie(s)

Nearly all grapes grown for food, wine, or other purposes are one of two species:

Vitis vinifera or ***Vitis labrusca***

This is true for wine, table, juice and raisin grapes

Vitis vinifera

- The species *V. vinifera* is likely the most common grapevine in cultivation

- It also has the most variability within the species with over 10,000 unique cultivars in existence

- *V. vinifera* can be generalized into three main categories based on intended use:

  - **Wine Grapes ; Table Grapes; Raisin Grapes**

Vitis labrusca (Concord)

- Concord is one of the only native N. American grape species still used for food and wine today
- It has unique traits that make it more tolerant to common pests of *V. vinifera*
- Initially used for wine, during prohibition demand fell for its use as a winegrape
- It was instead used as a juice and jelly grape and continues to be today in addition to the "grape flavor" on candies

Credit: Missouri State University

Table Grapes – a Brief History

It's likely that the first domesticated grapes were used as table grapes

The delineation into winegrapes happened around the same time so it's hard to say which came first

Grapevines were first domesticated around 8,000 BCE in the regions around the Caspian Sea

Ancient Cultivars

One of the oldest grape cultivars we have is a table grape

Muscat of Alexandria

Plenty of other "ancient" cultivars that trace back thousands of years still are grown in Turkey, Greece, and other Mediterranean regions

Most had/have seeded fruit

Modern Cultivars

Modern cultivars are developed with the goal of shelf life in mind

Modern cultivars also mimic the sweetness and crunch of apples

Seedless grapes are one of the distinguishing traits present in many modern table grapes

Seeds

In today's market, most consumers prefer seedless grapes in the USA

However, this trait is a genetic fluke and would halt reproduction of the grapevine

One of the first seedless grapes we know of is Black Corinth, sometimes called "Champagne Grapes"

The Myth of the First Table Grapes

We think Black Corinth or one of its close relatives was the first seedless, cultivated grapevine

But berries without seeds never grow large, instead people likely ate the whole rachis like a single fruit

The story goes: *One day a tired shepherd tied his goat to the trunk of a seedless grapevine. The shepherd fell asleep and the goat became restless. Unable to free itself, it struggled and wrapped its leash around the trunk of the vine until the vine was girdled. Later that year, the shepherd noticed the grapes grew to great size. He rewarded his goat with the first cluster*

Why we have Seedless Grapes at All

Thank the goat. And clonal propagation.

Grapevines are one of the only perennial crops capable of surviving full trunk girdling

- So long as the xylem remains intact

Restricting the phloem from reaching the roots causes the sugars from photosynthesis to redirect to a new sink tissue; this is typically the berry

Girdling Knives

How did we learn to recreate the genius of the girdling goat?

We use specialized girdling knives that only cut through the phloem and leave the xylem intact

This practice is required for any seedless table grape varieties not bred to naturally develop large, seedless berries

Credit: New Mexico State University

Side Fact: Where do grapes come from during Winter?

The Southern Hemisphere (since our seasons are reversed)

How do they make it all the way to N. America without rotting?

- They don't unless they are designed to
- Also Sulfur bags

Example: Calmeria grapes have some of the longest shelf life of any *V. vinifera*; I call them the "Potato Grape" because of how starchy they can be

- During travel the starch breaks down into simple sugars perfect for putting on the shelf

Table Grape Varieties

“Variety” vs. “Varietal”

The term “**Variety**”

- Refers to the **Plant cultivar**
- Can be used interchangeably with cultivar
- The variety is defined by fruit characteristics along with botanical traits of the vine itself

The term “**Varietal**”

- Refers to the **grape cultivar(s) in the wine**
- A wine made primarily of a single cultivar of winegrape fruit is called a **single-varietal wine**
- A wine made of a blend of many cultivars is referred to as a **blend** of varietals

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Variety of Table Grapes

There are (at least) hundreds of table grapes in existence

The vast majority of these are grown in Eastern Europe, the Middle East, and Asia

California has around 50 table grape varieties grown for commercial production

Table Grapes in California

Table grapes represent approximately **17%** of all grapevines planted in California

This accounts for around 120,000 acres of table grapes

The majority can be found in the San Joaquin Valley where table grape production is some of the most voluminous in the world

Table Grape Varieties in California

A handful of table grape varieties make up the majority of table grape production in California

Autumn Crisp	Autumn King	Autumn Royal
Crimson Seedless	Flame Seedless	Ivory
Red Globe	Scarlet Royal	Blanc Seedless

As you can probably tell, the great majority of these are seedless varieties

Many of these varieties were developed by **USDA** and **CSU Fresno**

Other Table Grapes (probably with seeds)

The Old World and Asian growing regions have a wider variety of table grapes

Italia	Muscat of Alexandria	Bitunni	Marawi
Dabouki	Sultaniye	Hasandede	Arkadia
Laitiko	Rozaki	Shine Muscat	Ruby Roman

And many, many more

Most are utilized as both a table grape and a wine grape

What do you want to grow?

- Most of these varieties would perform well in California
- The vast majority are *V. vinifera* and can grow anywhere winegrapes do
- If planning to sell commercially, seedless varieties are most common and in-demand in the USA

Non-*vinifera* Table Grape Varieties

- There are other table grapes not related or partially-related to *V. vinifera*
- **Concord** – *V. labrusca* is the most common alternative and is grown often in New York and Virginia
- **Hybrids** – There's a long list of grapes that are hybrids of *V. vinifera* and another species (sometimes Concord) that perform well in non-traditional grape growing climates and are suited to harsher cold or humidity conditions

Credit: Missouri State University

Non-*vinifera* Table Grape Varieties

- **Muscadine Grapes** – *Muscadinia/Vitis rotundifolia* are the other species of native N. American grape that are grown for food and wine. They have, an acquired taste, but are popular in the southern and SE United States.

Credit: Alabama Cooperative Extension

- **Fun fact!** They are also one of the only aromatic grape species. You can smell the fruit before you see the vine!

What to pick for California

Stick with *V. vinifera* or Concord

These perform well in California and are suited to the vast majority of CA mesoclimates

Hybrid varieties were developed for regions where *V. vinifera* would not grow well

Muscadine grapes grow well in CA, but are not popular at all

Rootstocks for Table Grapes

The Myth of "Picking the Right Rootstock"

It might be tempting to assume there is an ideal or close to ideal option when selecting a rootstock

The practical application of rootstock selection almost always leaves us with a handful of comparable options

Even if we consider the site, stressors, resources, etc. we still will have several commercially-available rootstocks to choose from

140 Ru – deep rooted

Not Choosing the Wrong Rootstock

Your primary goal when selecting a rootstock should be to "not choose the wrong" one, rather than trying to find the best fit

First identify what kind of traits you need in a rootstock:

- Invigorating/Devigorating the Scion
- Specific Pest tolerance
- Tolerance of detrimental soil conditions
- Etc.

101-14 mgt – shallow rooted

Not Choosing the Wrong Rootstock

Once you identify the specific traits you require of a rootstock, identify the available rootstock varieties that have these traits

Then, among those you've identified, study the detrimental traits each cultivar has or conditions they are intolerant of

- e.g., St. George is a great "generalist" rootstock that is tolerant of drought and poor soils, but cannot handle nematode damage in the least

Finally, from the list you've made, pick the rootstock that fits your needs, fits your site, and has the least downsides to production

Nothing is Perfect

You'll likely never find a rootstock that perfectly fits your growing limitations and requirements

But you can get "as close as possible" to the best rootstock choice by methodically eliminating those that are "wrong" for you

Understanding the growth habit, traits, and resource requirements of your chosen rootstocks will also help you prepare for dealing with the pitfalls of that rootstock when and if they occur

Rootstocks for Table Grapes

The rootstocks used in table grape production differ from those used in wine grape production

However, there is some overlap

In Winegrapes, the most common are:

1103P	110R	101-14 mgt
Ramsey	St. George	3309C
140 Ru	039-16	420A

In Table grapes, the most common are:

3309C	101-14mgt	Ramsey
Harmoney	Freedom	1103P
5BB	5C	Schwarzmann

Selecting a Rootstock is Difficult

When choosing a rootstock, if you have the benefit of a similar-minded neighbor ask them what they use

Otherwise, try to follow the steps outlined in the previous slides

Know the traits you want and the weaknesses of each rootstock; compare that information to your site conditions

Rootstock	Vitis parentage	Phylloxera resistance	Nematode Resistance		Tolerance			
			Root knot	Dagger (*Xiphinema index*)	Drought	Wet soil	Salinity	Lime
Riparia Gloire	riparia	High	Low	Med.	Low	Low	Med.	Low
St. George (*Rupestris du lot*)	rupestris	High	Low	Low	Low–med. in shallow soils; high in deep soils	Low–med.	Med.–high	Med.
SO4 (Selection Oppenheim)	berlandieri × riparia	High	Med.–high	Low–med.	Low–med.	Med.–high	Low–med.	Med.
5BB (Kober)	berlandieri × riparia	High	Med.–high	Med.	Med.	Low	Med.	Med.–high
5C (Teleki)	berlandieri × riparia	High	Med.–high	Low–med.	Low	Low–med.	Med.	Med.
420A (Millardet et de Grasset)	berlandieri × riparia	High	Med.	Low	Med.	Low–med.	Low	Med.–high
99R (Richter)	berlandieri × rupestris	High	Med.–high	Low–med.	Med.–high	Low	Med.	Med.
110R (Richter)	berlandieri × rupestris	High	Low–med.	Low	High	Low–med.	Med.	Med.

Trellising and Training Table Grapes

Primary Objectives: Trellising and Training

Table grapes must be as unblemished as possible to sell

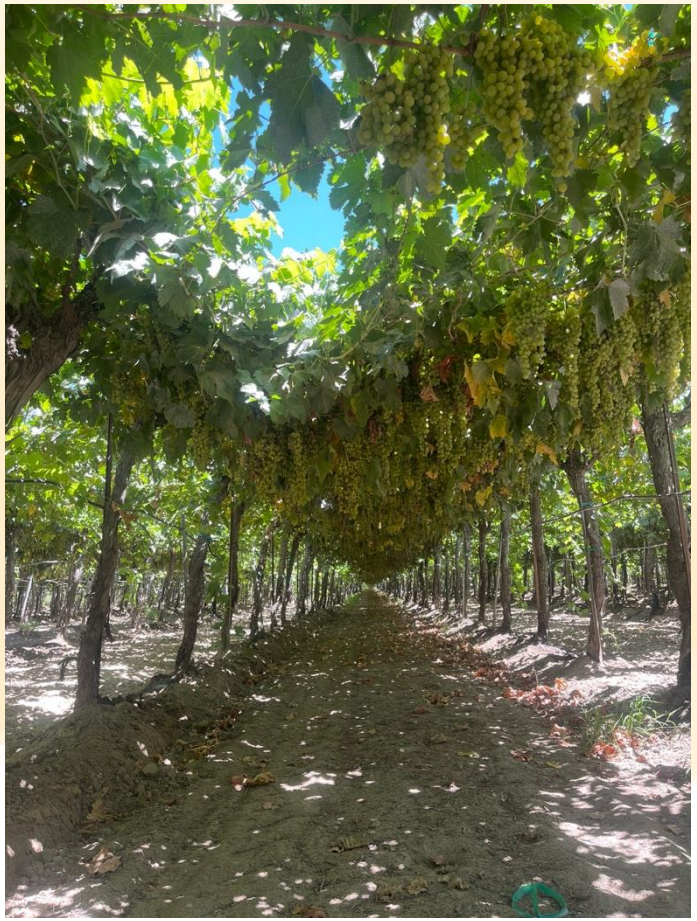
This is not the case with wine grapes which are immediately crushed

When growing table grapes, several considerations should be factored in before designing a cropping system:

Considerations for Table Grape Production

Factors to consider before designing a table grape vineyard:

1. Fruit must be as unblemished as possible
2. Sunburn and damage from pests must be minimized as much as possible
3. Clusters need some sunlight to ripen
4. Harvest must be done by hand and should not result in frequently damaged clusters
5. Pathogen infection must be removed immediately
6. Easy access to the vine and fruit is essential



Commercial Table Grapes

Most commercial table grape vineyards are established on a **gable** trellis system

These systems create an overhead canopy of grapevine leaves

The grapevine's own canopy both shields fruit from sun damage and allows fleck lighting in to ripen the fruit

Commercial Table Grapes

Vines are cane pruned to minimize permanent tissue

This reduces risk of fungal infections

Fruit is positioned to hang at eye level in the row, unencumbered by foliage

Harvesting Commercial Grapes

Harvest of table grapes has to be completed by hand

This limits the amount of damage the fruit receives when removed from the vine

Often, table grapes are packed into clam-shell boxes immediately after picking

When to harvest

Most grapes are harvested based on their sugar content (units = ºBrix)

Wine grapes are considered mature at a higher sugar content than table grapes:

Wine grape ≈ 24-28 ºBrix

Table grape ≈ 18-20 ºBrix

The actual sugar content at harvest may vary by cultivar


CALIFORNIA TABLE GRAPES
HMC
FARMS
Caution: Self-Dri
Precaución: Vehículo

Labor Requirement

Whether at commercial scale or a home scale, table grapes are a labor heavy crop choice

Most table grape vineyards are either:

- Head trained – Cane pruned OR
- Head trained – Spur pruned

Harvest must be done by hand labor

Most of the management of table grapes requires a skilled and knowledgeable worker to apply properly

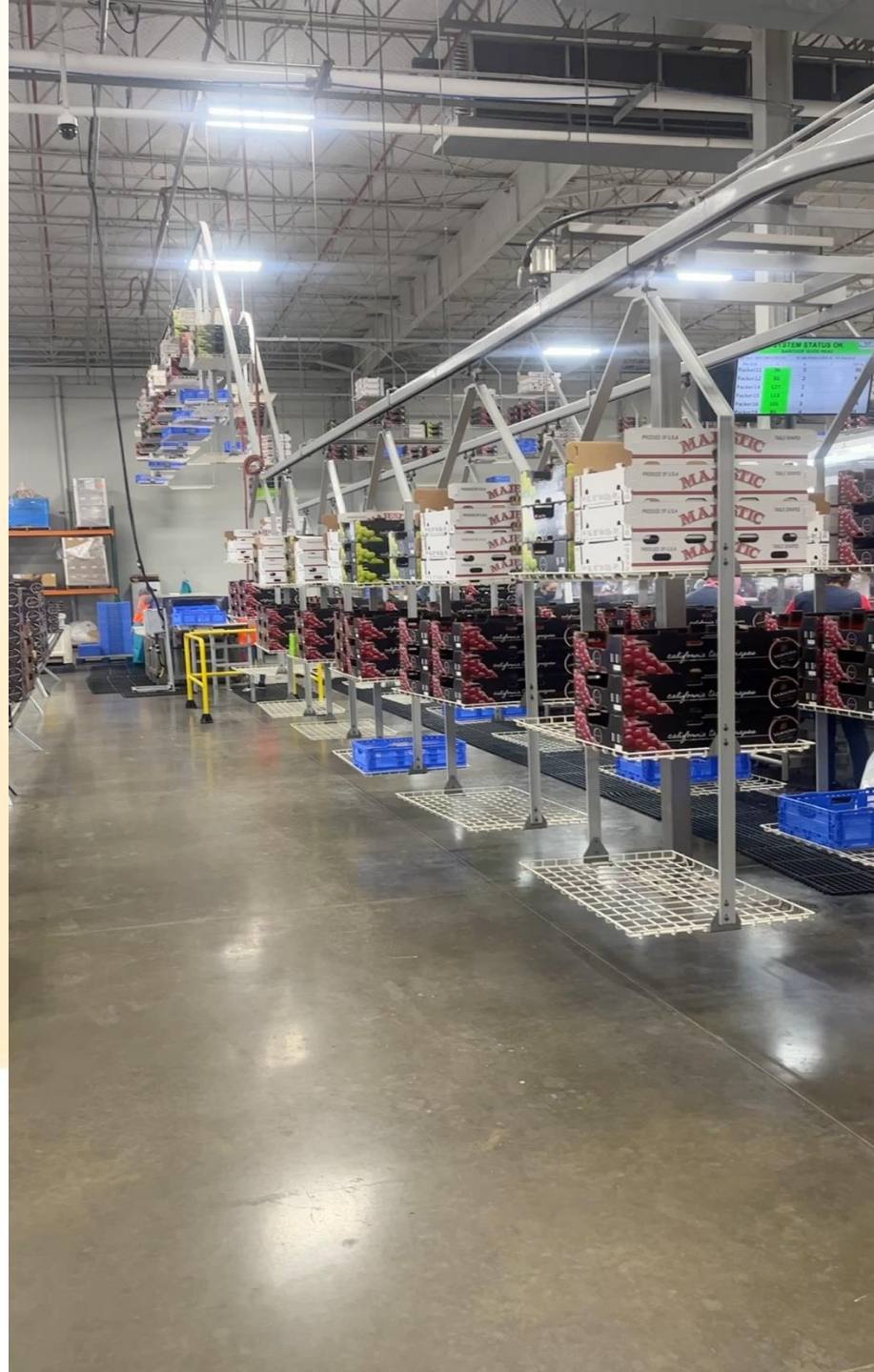


Table Grapes at a Smaller Scale

At a smaller scale of a few vines to a few acres, table grapes can produce well

Depending on cultivar, training style, and pruning style, an individual table grapevine can produce between 20-40 lbs of fruit each year

Inevitably some of the fruit won't be harvested due to lack of labor or damage

Recommendation: growing a few acres

At an acre or more, a trellis system is essential to properly manage the vines

Basic recommendations are:

- Gable trellis system (overlapping canopy)
- High fruiting wire (5 – 6 ft from ground)
- Cane pruned (easy to manage each winter)
- Fungicide applications regularly in spring and early summer (sulfur, oils, etc.)
- Regular monitoring for pathogens and pests

Recommendation: just a row or two

At a smaller scale, you can pay more attention to each grapevine, but still need a system

Basic recommendations are:

- Head trained, cane pruned vines
- On a Wye, V, or Lyre style trellis
- Fruiting wire at 5-6 ft off the ground
- Fungicides regularly in spring and early summer
- Minimal leaf removal to limit sunburn (but still remove some leaves for light exposure)
- Monitoring for pests and pathogens

Recommendation: One or two vines

Here you can really dial it in:

Basic recommendations:

- No trellis needed
- Head trained, Spur pruned
- Aggressive leaf removal in center of canopy during spring
- Regular fungicide applications
- Monitoring for pests and pathogens

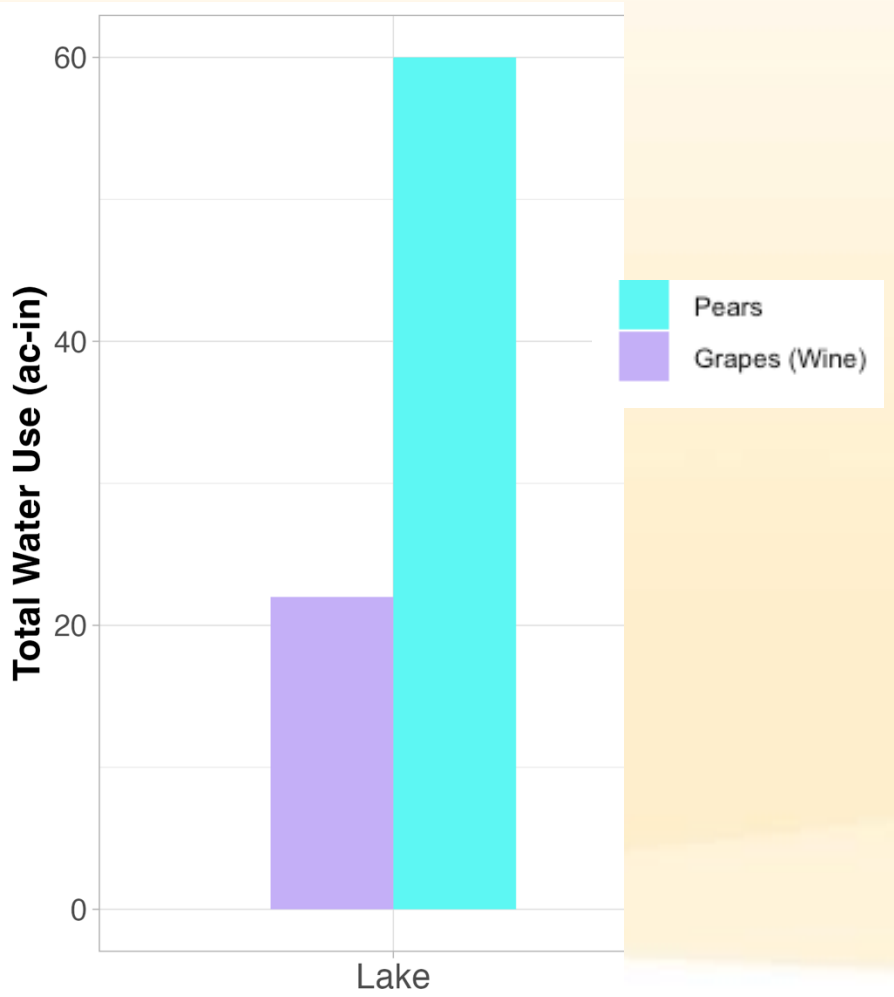
Last note: Irrigation

Irrigation is a whole other conversation

Generally, grapevines don't need as much water as the next perennial cropping system

For table grapes it is recommended that each vine receives:

- 4-8 gallons/week in cooler climates
- 9-15 gallons/week in hot climates
- 15 + gallons/week in hot climates with sandy soils



Thank you

For more information on Table Grapes, contact Joy Hollingsworth, UCCE Table Grape Advisor

You can find this presentation at:
https://ucanr.edu/sites/chenlab
Speaker Presentations

Contact me: codchen@ucanr.edu

Thank You