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Early Walnut Tree Training: How to Handle Different Nursery Products

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Early walnut tree training begins at the time of planting either a rootstock or a “finished tree” (grafted or budded with the English variety) through the “first leaf” (first growing season of English scion in the orchard). Traditionally, the nursery products available were bare root rootstock that was subsequently field grafted or finished bare root trees. A decade ago, clonal Paradox production introduced the option of planting a potted (container) tree. UC also began researching leaving finished trees unheaded (or high headed) to increase early yields. With more choices comes more complexity of how to develop rootstock growth, when to bud or graft and how to train English scion growth.

In this article, we discuss the various walnut nursery products available and training practices through the first leaf growing season. For information on the subsequent first through fifth dormant training of the English scions see the article at: www.sacvalleyorchards.com/walnuts/horticulture-walnuts/training-young-walnut-trees-minimum-pruning-vs-no-pruning-compared/. Each type of nursery product requires different initial handling, but ultimately they can all lead to a productive orchard. It boils down to economics, tree availability, and grower preference. The main factors to consider include time required to bring the orchard into bearing, labor availability, cultural management, and the cost of various nursery products.

Walnut nurseries provide rootstocks that are then field budded or grafted, or finished trees that were June budded or nursery grafted. Seedling rootstocks (Paradox or black), or clonal Paradox rootstocks (RX1, VX211, or Vlach) are sold as bare root rootstock or as bare root budded or grafted finished trees. Clonal rootstock trees may also be sold as potted rootstock that is fall budded or spring grafted in the field. Some nurseries produce clonal own-rooted English trees for specialized situations such as, where walnut blackline disease is prevalent.

With good irrigation management, young walnut trees can grow very quickly. Walk through new orchards regularly to ensure proper training.

To simplify information, trade names of products may be used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

Visit www.acvalleyorchards.com/walnuts/ for more in-depth information on rootstock selection, planting and irrigating bare root and potted rootstock.

Main Nursery Walnut Products and Training Options:

Bare Root Rootstocks (seedling Paradox, seedling black or clonal Paradox)

- At planting, cut back to between 15-30 inches in height. Leave larger caliper trees on higher side, smaller caliper trees on shorter side.
- Rootstocks can either be grafted in spring after planting, fall budded, or grafted the following spring.
- If waiting until fall or the following spring, train one dominate rootstock shoot through the summer by pinching back less vigorous shoots. For fall budding, a minimum of ½ inch diameter wood is needed. Otherwise, plan to whip graft the next spring.
- Once successfully grafted or budded to the English variety, encourage a single leader (the trunk) by keeping side shoots pinched or cut back to about a foot. Tie the leader **loosely** to the stake through the summer (photo 1). This developing trunk must be allowed to move freely in the wind; if tied too tightly there is no flexing during windy weather resulting in a weak trunk prone to breaking near the top of stake (photo 2). Avoid pushing more than twelve feet of growth for first leaf trees. To slow trunk growth where excessive, allow side shoots to grow longer during the summer. Even if the trunk is taller than you want during the summer, do not tip or head the trunk to slow growth because it forces next year's primary buds to break (Photo 3). The weak limbs produced by tipping or heading the trunk must be removed at the first dormant pruning (Photo 4).



Photo 1 (left): Tie developing trunk **loosely** to the stake through the summer. (Photo credit: J. Hasey)

Photo 2 (right): Photo 2. When developing trunk is tied too tightly to the stake, there is no flexing during windy weather resulting in a weak trunk prone to breaking near the top of stake. (Photo credit: J. Hasey)



- Planting rootstock and fall budding or grafting the following spring adds an additional year in the training process.

Potted Rootstocks (clonal Paradox)

- Once potted trees are planted either in early fall, the dormant period, or as actively growing plants in the late spring, train as in third and fourth bullet above.
 - Clonal rootstocks are inherently vigorous, so pay attention where growth is excessive. Avoid pushing growth by over irrigating or fertilizing. Consider that nitrogen may not be needed the first season when growing the rootstock or the following summer when training the English trunk (first leaf). Monitor soil moisture or use stem water potential to avoid over or under irrigation, keeping trees growing at a reasonable pace.
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Photo 3. 1st leaf tree headed in July forcing primary buds (yellow arrows) that were headed again in September. (Photo credit: J. Hasey)



Photo 4. Tree at first dormant pruning that was headed the summer before during first leaf which forced primary buds to grow. These must be removed. (Photo credit: J. Phillips)

- Planting potted rootstock and fall budding or grafting the following spring adds an additional year in the training process.

Bare Root Finished Trees (seedling or clonal Paradox rootstock)

Note: Trees can be “June budded” (“1 year-old”; One year of scion growth in the nursery) or “Nursery grafted” (“2 year-old”; One year of rootstock growth, then one year of scion growth in the nursery)

Traditional Method

- At planting, cut back to 3-6 good buds above the graft or bud union.
- During the 1st leaf English scion growing season, select the strongest shoot which is current season growth (neoformed) and train as the trunk (photo 5). Keep side shoots pinched or cut back to about a foot. Tie the leader **loosely** to the stake through the summer (photo 1). This developing trunk must be allowed to move freely in the wind; if tied too tightly, there is no flexing during windy weather resulting in a weak trunk prone to breaking near the top of stake (photo 2). Avoid pushing more than twelve feet of trunk growth. To slow trunk growth where excessive, allow side shoots to grow longer during the summer and see second bullet above to make sure not to over-fertilize. Even if the trunk is taller than you want during the summer, do not tip or head the trunk to slow growth because it forces next year’s primary buds to break. The weak limbs produced by tipping or heading the trunk must be removed at the first dormant pruning.

New Nursery Walnut Product and Training Options:

Bare Root Finished Trees (seedling or clonal Paradox rootstock)

Note: Trees can be “June budded” (“1 year-old”; One year of scion growth in the nursery) or “Nursery grafted” (“2 year-old”; One year of just rootstock growth, then one year of scion growth in the nursery)

High headed or unheaded method

- More recently, research has shown tall finished walnut trees can be left unheaded or high headed and will grow very well. With this training method, primary scaffolds can be produced during the first leaf growing season in the orchard from preformed buds (that grew while in nursery); these are typically removed by heading at planting in the traditional method.
- Research conducted at UC Davis and in grower orchards has shown trees that are left unheaded after planting grow as well or better than those that are cut back to 3-6 buds. The trees left unheaded grow more slowly initially resulting in fewer problems with bending in the wind.
- Primary scaffolds formed during the first leaf growing season and high yields were produced in the third leaf on tall, unheaded June budded trees in a Sutter County study. These trees were not headed in the nursery or at planting, and scaffolds were not headed for the first through third dormant training (other than removing broken and some lower limbs).
- Likewise, high headed 2 year-old nursery grafted trees were able to achieve primaries the first year in a demonstration study.
- This method of high or no heading tall trees at planting, which produces primary scaffolds during the first leaf growing season looks promising, allowing earlier tree development and earlier returns.
- The availability of tall June budded trees may be limited at the present time.

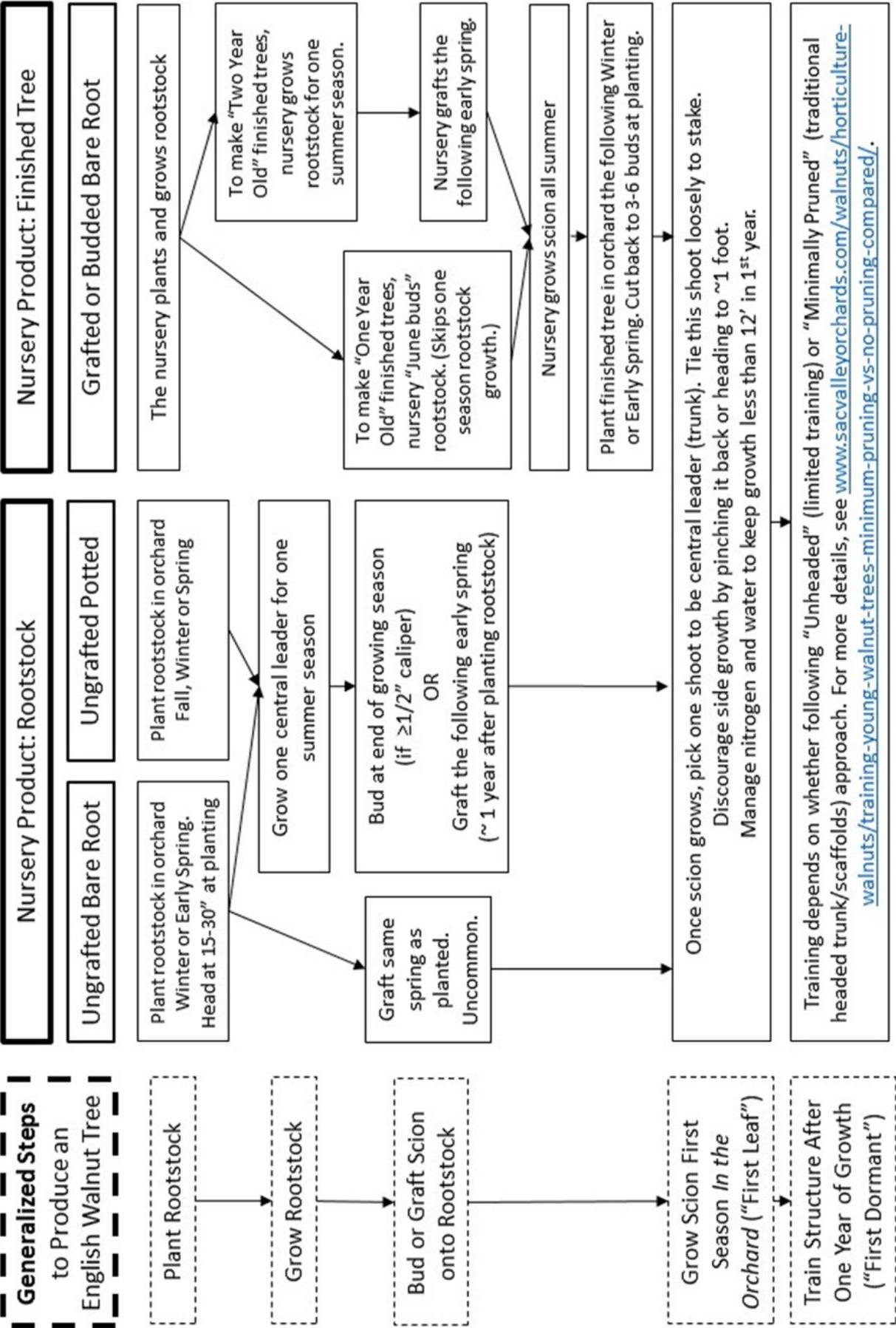


Photo 5. A nursery grafted tree cut back to about 4-6 buds above graft union in March. Select the strongest shoot to train as the trunk and tie loosely to the stake. Cut side shoots back to about a foot (yellow arrow). (L. Milliron taken May 21, 2018)

Potted Finished Trees (clonal Paradox rootstock)

Some nurseries are beginning to sell clonal Paradox rootstock grafted in a pot (container). These trees have very limited and sporadic availability. They are planted in late winter/early spring. The trunk is trained during the first leaf growing season in the orchard.

Steps of Early Walnut Training with the Most Common Nursery Products



Leaf Symptoms of Overwatering Walnut Trees

Bruce Lampinen, UCCE Walnut Specialist, UC Davis



Excess water

Normal water

Various symptoms observed on trees that were intentionally over-irrigated throughout the season. Leaf samples listed as normal water were taken at a similar time of the season on trees that were not over-irrigated.

2018 IPM Breakfast Meetings

Join Area IPM and Farm Advisors to discuss current pest management and production issues. We will largely focus on orchard crops (but everything is on the table for discussion!). These meetings are open to all interested growers, consultants, PCAs, CCAs, and related industry.

Meetings will be held the third Friday of each month (7:30-9:00 am) from March through October and will cover a wide range of timely pest and orchard management topics. Meeting locations will be rotated throughout the Sacramento Valley each month. Please contact Emily Symmes to request topics or bring your questions to the meeting!

Upcoming meetings:

Glenn County: June 15th (Berry Patch Restaurant, Orland)

Butte County: July 20th (Red Rooster Café, Durham)

Yuba-Sutter-Colusa Counties: August 17th (IHOP, Yuba City)

Tehama County: September 21st (Rockin' R Restaurant, Red Bluff)

Full 2018 schedule is available on the events page at sacvalleyorchards.com or by contacting UC IPM Advisor Emily Symmes at (530) 538-7201 or ejsymmes@ucanr.edu.

Seating is limited – please RSVP to Emily prior to the meeting date

Walnut Orchard Management – June through August

Dani Lightle, UCCE Orchards Advisor, Glenn, Butte & Tehama Cos.

JUNE

- If *walnut husk fly* traps are not set out by now, you're late! Yellow sticky traps with an ammonium carbonate lure work best and should be checked 2-3 times per week. Depending on treatment approach, treat based on first detection of husk fly, detection of eggs or trends in trap catch numbers. For more details on treatment decision-making, see: sacvalleyorchards.com/walnuts/insects-mites-walnuts/walnut-husk-fly-biology-monitoring-and-spray-timing/.
- We're heading towards the second *codling moth* biofix. This biofix is set when trap numbers increase, approximately 800 to 1300 DD after the first biofix. Use the following decision table to determine whether treatment is necessary: ipm.ucanr.edu/PMG/r881300211.html
- If Bot pressure is low, mid-June to early July is the best timing for a single fungicide treatment for *Bot canker*. More info at: sacvalleyorchards.com/walnuts/diseases/botryosphaeria-canker-blight/
- Monitor *spider mites* weekly through August. Examine 10 leaflets from 10 trees (5 should be from higher branches). If more than half the leaflets with spider mites don't also have predators (predaceous mites and/or sixspotted thrips), this is a cause for concern. Treatment guidelines based on spider mite and predator presence can be found at: ipm.ucanr.edu/PMG/r881400111.html

JULY

- *Codling moth* third flight occurs in late July to early August (on average, 1100 DD after the second biofix). Check traps to pinpoint the third flight biofix. Treatment decisions are based on a combination of factors including previous treatments, number of nuts infested in the previous generation, trap catches, and the ability to harvest early. If sprays are going to be applied for eggs from the second generation, apply at 300 Degree Days (DD) after the third biofix (200-250 DD if insect growth regulators are used). More details: ipm.ucanr.edu/PMG/r881300211.html
- Continue weekly monitoring for *husk fly* and *spider mites*. See trapping and monitoring details above.
- Take *July leaf samples* to assess nitrogen, potassium, and zinc, as well as boron toxicity, depending on your circumstances. Sample 1-2 terminal leaflets from at least 29 trees, each at least 100 feet apart, on the same rootstock scattered throughout the orchard.

AUGUST

- Monitor for *navel orangeworm*. Healthy, intact walnuts are only susceptible to NOW damage at and after hull split. When considering treatment options, bear in mind pre-harvest intervals and duration of residual activity. More information at: sacvalleyorchards.com/walnuts/insects-mites-walnuts/navel-orangeworm-in-walnut/
- Be careful when timing *ethephon* applications for advancing walnut harvest this year. A late bloom and leaf-out may delay application timing compared to the last couple years. The most reliable way to avoid damage is to examine nuts for the packing tissue brown (PTB) stage. Do not treat earlier than 100% PTB. For more on sampling for PTB and safely applying ethephon, see: sacvalleyorchards.com/walnuts/horticulture-walnuts/ethephon-for-earlier-harvest/

Early Walnut Tree Training: How to Handle Different Nursery Products and How to Use a Pressure Chamber for Irrigation Scheduling: Hands-on Workshop

When: Tuesday, July 10, 2018

8:30-9:00: Sign-in and refreshments courtesy of Sierra Gold Nursery

9:00-10:30: Early Walnut Tree Training

10:30-Noon: Using a Pressure Chamber

Where: 4549 Railroad Avenue, Yuba City, CA 95991

(Look for the yellow UCCE signs)

What: Early Walnut Tree Training

- Discuss early handling and training practices for different nursery products
- Cover both conventional and novel nursery products and training practices

Hands-on Pressure Chamber Workshop

- Discuss using the plant-based pressure chamber for irrigation timing
- You can practice using the pressure chamber and learn how to interpret the results

Speakers include:

Janine Hasey, UCCE Farm Advisor Sutter/Yuba/Colusa Counties

Luke Milliron, UCCE Farm Advisor Butte/Tehama/Glenn Counties

Bruce Lampinen, Walnut Specialist, UC Davis

Ken Shackel, Plant Science Professor, UC Davis

Cliff Beumel, Vice President, Sierra Gold Nurseries

Questions: UCCE Sutter-Yuba Office at (530) 822-7515 or

find updated information at: www.sacvalleyorchards.com/events/

This meeting is sponsored by University of California Cooperative Extension in Sutter/Yuba and Butte Cos.
CCA CE credits requested

Listen to the new podcast from UC tree crop researchers!

Listen to the first episode, available now at: www.growingthevalleypodcast.com

Growing the Valley

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Walnut Short Course

November 5-7, 2018

Plan to join us for this integrated orchard management short course featuring UC faculty, Cooperative Extension specialists and farm advisors, and USDA researchers who will provide an in-depth, comprehensive study of all phases of walnut culture and production.

The program is based on the latest information and research and will cover the fundamental principles that form the basis for practical decisions and include Q&A for each session, quality time with instructors and networking opportunities.

Who should attend: New and experienced growers as well as other industry members interested in commercial walnut production.

Register to learn about:

- Orchard planning, design and development
- Walnut variety and rootstock selection
- Evaluation and modification of water and soils
- Tree propagation, training, pruning and canopy management
- Tree and root physiology
- Bud development and pollination management
- Irrigation scheduling
- Proper use and maintenance of irrigation systems
- Mineral nutrition and fertilization
- Cover crops
- Management of weeds, vertebrate pests
- Integrated pest management of insects and diseases
- Considerations for replanting orchards
- Quality & harvest concerns
- Organic production
- Economics of walnut farming and marketing

**Registration available
September 1**

Registration includes:

- **Three Full Days of Instruction with over 45 Presentations**
- **Binders with presentations**
- **PCA & CCA credits (pending approval)**

***ARC Ballroom
UC Davis
Davis, California***

For more information visit:

<http://ucanr.edu/sites/WalnutShortCourse/>

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UC DAVIS



Points to Consider in Prevention of Crown Gall

The Paradox hybrids (*Juglans hindsii* x *Juglans regia*) commonly used as walnut rootstocks are highly susceptible to Crown Gall caused by the common soil-borne bacterium *Agrobacterium tumefaciens*. Here we present information from our quest to develop a robust comprehensive approach to crown gall prevention. [Read More](#)



Photo: D. Lichter

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Remember to visit us at the Sac Valley Orchard Source for up-to-date news and events!

Featuring:

- Weekly irrigation and pest updates
- Event calendar with all orchard related UC Cooperative Extension meetings throughout the Sacramento Valley
- Timely posts responding to current events

Visit us at www.sacvalleyorchards.com

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Walnut Newsletter

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