



UNIVERSITY OF  
CALIFORNIA  
ANR  
COOPERATIVE  
EXTENSION

# Growing and Producing Golden Hills Pistachio



**Craig Kallsen, UC ANR CE Farm Advisor, Kern County**

**Dr. Dan Parfitt, Pistachio Breeder, UC Davis Plant Science Dept.**

**Joseph Maranto, UC ANR CE Farm Advisor, Kern County emeritus**

**Dr. Brent Holtz, UC ANR County Director and Farm Advisor, San  
Joaquin County**

**Craig Kallsen, office phone 661-868-6221; [cekallsen@ucanr.edu](mailto:cekallsen@ucanr.edu)**

The objective of this presentation is to provide information that help the grower optimize the performance of growing and producing a crop using the Golden Hills cultivar.



## Why devote a presentation to Golden Hills?

While data are limited, it is estimated that about 55,000 acres of Golden Hills pistachio were planted from 2009 through 2017. These 55,000 acres make up about 40% of the pistachio acreage planted since 2009. In the last couple of years, Golden Hills acreage, comprised more than 80% of the total pistachio acreage planted.

Because of this increasing acreage, I have been getting a number of cultivar-specific questions on how to produce pistachios using the Golden Hills cultivar.

Information in the presentation has been amalgamated from a number of small randomized and replicated U.C. trials conducted within larger blocks of Kerman pistachio, largely in Kern and one trial in Madera County.

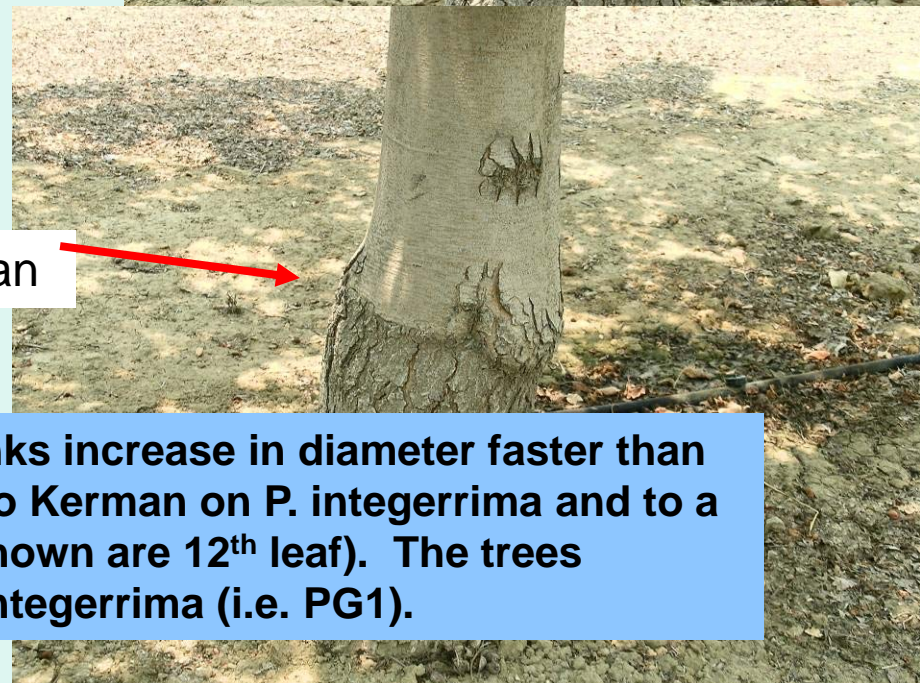
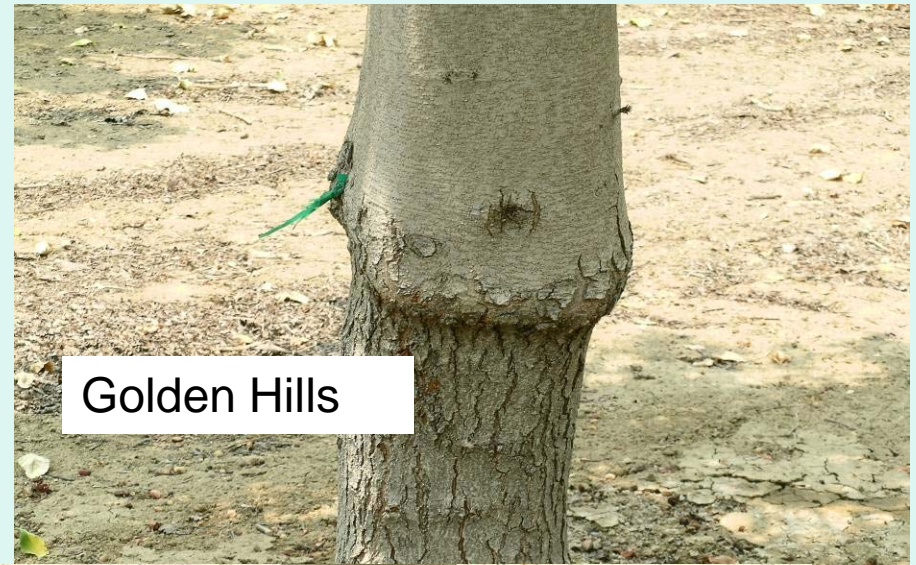
Much of the information contained this presentation is based on multiple years of observations and some on information gleaned from data collected in randomized and replicated trials. My first harvest of Golden Hills nuts was from a single mother tree in 1996 in a Parfitt/Maranto seedling selection trial.



Your results may vary.

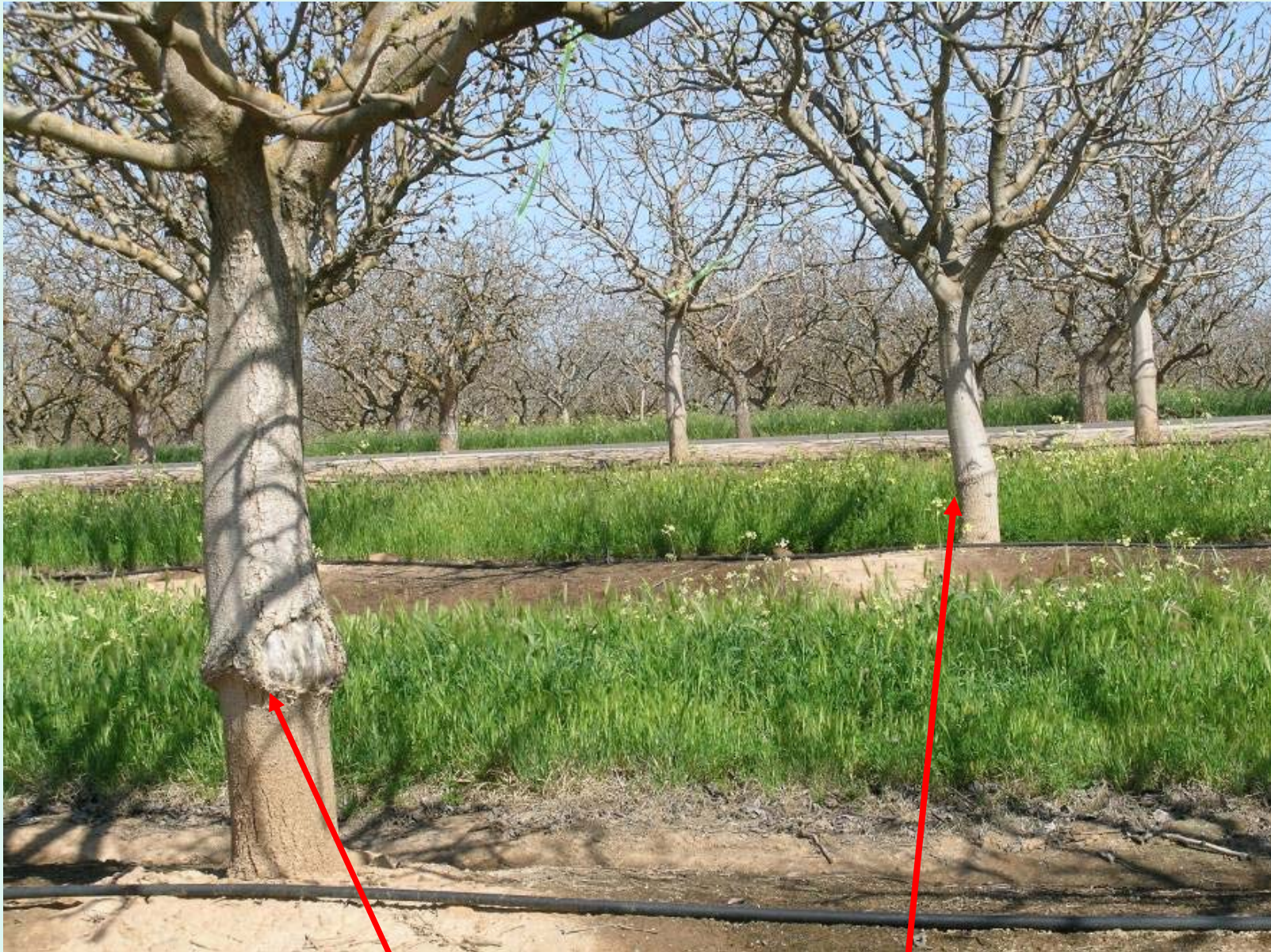


## Choosing a Rootstock



Kerman

**Golden Hills and Lost Hills trunks increase in diameter faster than does the rootstock compared to Kerman on *P. integerrima* and to a lesser extent on UCB1 (trees shown are 12<sup>th</sup> leaf). The trees pictured are all growing on *P. integerrima* (i.e. PG1).**



**Golden Hills on PG1 foreground and UCB1 background.**

## BLOOM SYNCHRONY for GOLDEN HILLS

Below are the Kallsen suggestions for percentage of various male pollinizers in the Golden Hills orchard under various predominant climate (i.e. winter chill) scenarios:

Predominant Winter chill condition	Early male	Primary male	Late male
Low chill	Tejon (25%)	Randy (75%)	-----
Moderate chill	-----	Randy (100%)	-----
High chill	-----	Randy (75%)	Peters (25%)

If you believe the San Joaquin Valley is destined to have warmer and drier winters over the next 20 years, the 'Low Chill' scenario may be more appropriate for this area.

## Budding the trees

Golden Hills has proven more difficult to bud than Kerman.

The reason is not clear. The area of the Golden Hill's branch that has flower buds, and which will eventually be the bud stick, tends to taper quickly.

Bud maturity is often quite variable along the bud stick, with the older buds being too large, and the smaller buds too green/immature.

Suggestion: Have a nursery licensed to distribute U.C. budwood and familiar with budding Golden Hills do the budding in a new planting. Another option is to plant trees that were pre-budded in the nursery.





The growth habit of Golden Hills, compared to Kerman is:

1. More slender
2. Less vigorous
3. More upright

## Tree spacing between trees within the row

(having 19-20 feet between rows is desirable to accommodate large harvesting equipment)

### Soil characteristics

### Spacing within row

Deep, well-drained, loams to clay loams

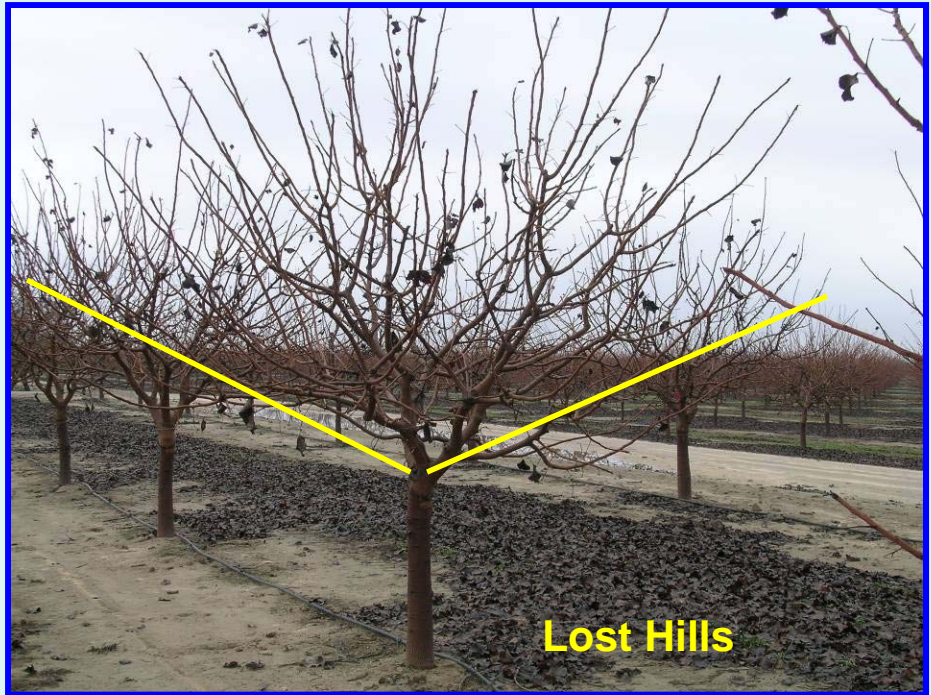
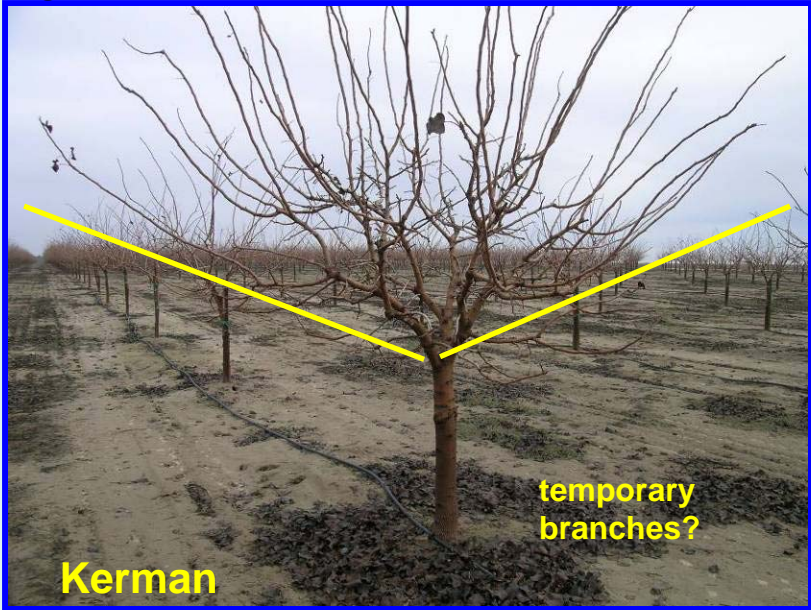
17-18 feet

Less productive (saline, boron, shallow, impermeable)

14 to 16 feet

# GROWTH HABIT of GOLDEN HILLS

6<sup>th</sup> leaf pistachio trees before dormant pruning



6th leaf pistachio trees



# TRAINING AND PRUNING GOLDEN HILLS TREES





Kerman is trained to grow more upright. Many of the training cuts involve removing sagging, horizontal branches. As we prune Kerman, we leave branches on the outer canopy that we designate as being temporary. They will produce yield when the trees are young; to be removed later when they are pulled down by the weight of nuts and leaves.

With Golden Hills, the focus is on encouraging more horizontal growth, since the tree tends to grow so upright naturally. The outer branches of Golden Hills can be considered more permanent than is the case with Kerman since they resist growing horizontally.

## Non-bearing trees

'Golden Hills' should be pruned harder than 'Kerman' to encourage more outward growth.

Whereas tertiary branches of Kerman are typically cut at 20 to 22 inches, Golden Hills tertiaries are often cut at 18 inches.

Circle tying Golden Hills branches, as is sometimes done with Kerman to encourage more upright growth, is unnecessary.



## Training Golden Hills versus Kerman (spring/summer training first and/or second year)

Cutting secondary branches too early (or too close to the terminal bud) is more likely to result in insufficient or delayed bud push below training cut. Wait until you can see the developing buds in the axils of leaves below the proposed training cut before making it.

Golden Hills, particularly, appears to demonstrate poor bud push below the training cut if cut too early. You may end up with only one bud pushing.

Wait until you can see some development of the axillary buds directly below the proposed cut.







**Bud not visible  
in axil. Cut  
below this leaf  
axil.**



**Mature bud development to branch tip**

**This branch could be cut anywhere and axillary buds would push.**

## Dormant Season Tree Training

Do not tip Golden Hills late (i.e. after third week in February to be safe).

Apical buds begin producing auxins in the spring, which prevents buds lower on the branch from pushing. Tip the apical buds before they come out of dormancy.

Everything happens earlier with mature Golden Hills than Kerman – as much as 2 weeks earlier.

If you tip the terminal buds after the terminal buds come out of dormancy, buds a foot or more below that point will be extremely slow to push or won't push it all.



The same thing happens in Kerman, but the buds remain dormant for an additional 10 days to two weeks, giving you more time to prune a Kerman orchard in late winter.

Once Golden Hills trees reach maturity, pruning requirements tend to be much less than for Kerman.



Golden Hills tree on left, Kerman on right – near harvest 2016 (10<sup>th</sup> leaf)

Many of the Golden Hills flower buds are on short branches in the upper and outer canopy. Mature Golden Hills trees do not produce as much neoformed growth (i.e. growth in June and July) as Kerman.

When winter pruning, ensure that cuts are not being made into the fruit wood.

There may be very little wood that needs to be tipped from the tree. Don't tip just to be tipping.

Again, to summarize:

Prune Golden Hills hard during training (i.e. non-bearing) to encourage more branching and greater outward spread of branches.

Reduce pruning, compared to Kerman, once it comes into bearing. Much of the yield is at the end of the branches but still within the canopy.

Boron leaf damage in Golden Hills is more severe than Kerman in areas with high boron in the soil and/or water on UCB-1 and pure *P. integerrima* rootstocks (Twisselman area).



The following may be considered a plug for the existing U.C. breeding program:

The two pictures below of Golden Hills canopies were taken in an advanced selection rootstock trial on Sept. 8, 2017. The trees below were adjacent to each other. Soil sat. extract > 5 ppm B.



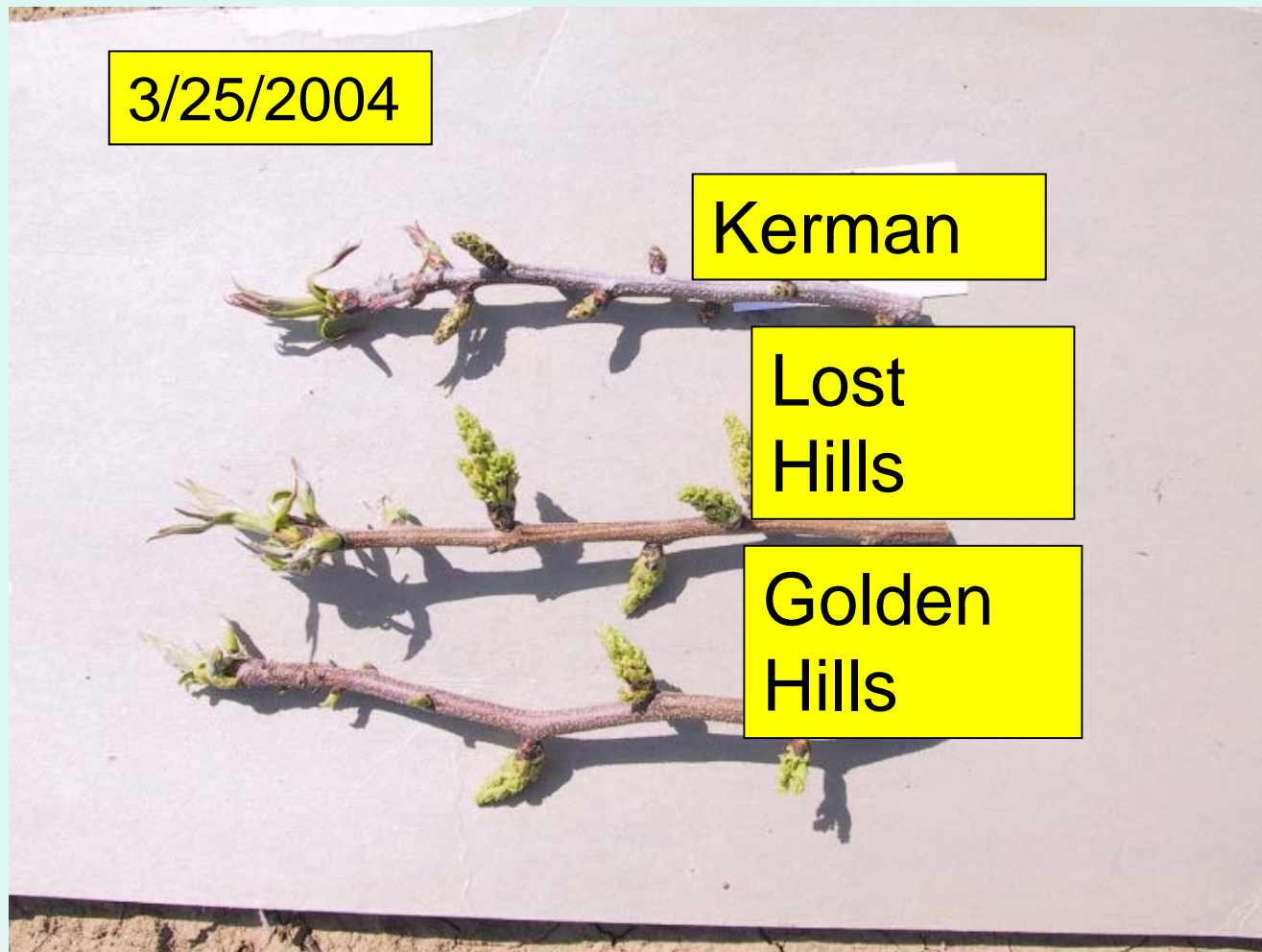
**Leaves of Golden Hills on UCB-1 seedling rootstock (average leaflet boron 1337 ppm).**



**Leaves of Golden Hills on experimental rootstock (average leaflet boron 597 ppm).**



Golden Hills is at full bloom about 5 days before Kerman and nut development is ahead of Kerman for the rest of the season.



Randomized and replicated research trials have demonstrated that trees just coming into bearing will harvest later than mature bearing trees.

Since many of the older Golden Hills trees in the SJV are just coming into bearing, or have been bearing for just a few years, they will tend to harvest closer in time to older Kerman trees. However this will not continue.

A one-shake harvest for a mature Golden Hills orchard will be completed 10 days to two weeks before a one-shake mature Kerman orchard, if growing in the same valley location.

Temperatures tend to be higher when mature Golden Hills trees are ready for harvest.

It is even more important to harvest Golden Hills when nuts are first ready, than it is for Kerman.

Mid-summer temperatures will age nuts more rapidly than late summer temperatures, and adhering hull and stain will occur more rapidly.

Another thing,

I have heard almond growers use the term 'dry down' to refer to the process of drying out the orchard, particular the orchard floor, prior to harvest.

Unless you have the soggiest, highest saturation-percentage soils in the SJV, if you want well-split nuts, the term 'dry down' should be deleted from the vocabulary of pistachio growers, particularly growers of Golden Hills.

It is hot when Golden Hills is ready for harvest. The trees will be transpiring at very high rates. For many blocks, if you can't get in and harvest the nuts within two or three days after shutting the water off, you need to fix the leaks in the irrigation system, correct the irrigation distribution inefficiencies, adjust your irrigation scheduling or have a serious talk with your harvest contractor.

There is no reason to have a 'bone dry' root-zone prior to or immediately after harvest.

# Getting the Most Out of a Golden Hills Harvest

## Kallsen Definition for a 'Double Shake'

A double shake is when an orchard is harvested twice and roughly equal weights of nuts are harvested within each of the two shakes.

A double shake is composed of a light, initial bump shake [in which rachises (clusters) are not removed] and a hard shake roughly 10 days or more later.



If more than 90% of the total nut load is removed during the first shake, the following shake is more of a “sanitation” shake and falls outside my definition of a double shake.

Bloom evaluation in randomized and replicated test trials have demonstrated that the relatively short bloom period for Golden Hills translates to more even nut maturity across the tree at harvest than is the case for Kerman or Lost Hills.

More even nut maturity across the tree at harvest means there is less need for a double shake.

Because of the more even maturity of nuts across the tree, a double shake, unless the bloom period was extended due to poor chill, is unnecessary for Golden Hills. For mature trees, when the hulls of the most advanced nuts begin to slip and are ready for harvest, waiting an additional eight to ten days, will usually allow you get 95% or more of the nuts in a single shake. Don't rush harvest.

If you shake the first nuts early for Golden Hills, when only 50% are ready, you will need to come back in a week or less to remove the remaining nuts and maintain nut quality. Most growers are not prepared to come back to the same orchard in a week or less for a double shake.

By waiting until 95% or more of the nuts are ready, you will get the majority of your crop off well before the first shake of Kerman, and suffer little loss in terms of nut quality that will occur if the second shake of Golden Hills is delayed.



With Golden Hills, don't delay harvest until the hulls have tattered. Do not use hull tatter (i.e. split hulls) to gauge harvest with Golden Hills or Lost Hills.

The hull of Golden Hills nuts do not tatter as much as Kerman when ready for harvest.



Once a majority of the hulls slip harvest can begin. The greenish 'tight' hulls are most likely blanks.

Most of the nuts will be split and ready for harvest even if many of the hulls remain intact.

Intact hulls at harvest may reduce infestation by navel orangeworm compared to Kerman and Lost Hills.

Golden Hills Nut Cluster – these nuts are ready for harvest. The hull may feel firm on some, but will separate cleanly from the shell in the huller.

If a grower in the southern San Joaquin Valley is shaking mature Golden Hills trees at the same time as Kerman, something didn't go right.

Even if a 2<sup>nd</sup> shake of mature Golden Hills is necessary, it should be completed before the first shake of Kerman.

High levels of adhering hull and dark stain at harvest, assuming the nuts were processed at the plant in a timely manner, means that the harvest was later than it should have been.

If only the percentage of adhering hull is high and stain % is low, it suggests that the harvest was too early.

## Post-Harvest Irrigation

The yield and nut quality data for Golden Hills in our studies were obtained in small trials within larger blocks of Kerman. Golden Hills, after harvest, was irrigated based on the full irrigation requirements for Kerman, which had not yet been harvested.

Thus, Golden Hills, typically, received a generous post-harvest irrigation.

The pistachio tree has been shown to produce and store significant quantities of carbohydrate for future nut production in the fall. For optimal yields, continue to meet water requirements of the mature trees after harvest (which may be an additional month or six weeks) if green leaves are present.

Attempting to institute post-harvest regulated deficit irrigation on Golden Hills, which are usually harvested by the end of August in Kern County, may produce yield and nut quality results quite different from the fully-irrigated post-harvest trees in our small experimental trials.

It is not difficult or expensive to become a licensed producer of U.C. budwood.

Golden Hills, Lost Hills, Gumdrops, Randy, Tejon and Famoso are proprietary varieties of the University of California.

Nursery, Budder (contractor) or Private-Grower licenses are available from the University of California to produce these cultivars. For licensing info contact the following person:

DENISE L. MEADE, Sr. Intellectual Property Analyst  
Technology Transfer Services - UC Davis Innovation Access  
1850 Research Park Drive, Suite 100  
Davis, CA 95618  
Tel: 530-754-8674  
[dlmeade@ucdavis.edu](mailto:dlmeade@ucdavis.edu)  
[www.research.ucdavis.edu/InnovationAccess](http://www.research.ucdavis.edu/InnovationAccess)

Questions, comments or concerns?

There is always a learning curve associated with any new cultivar. Please do not hesitate to share your thoughts or questions at sessions like this. Your feedback can help others produce Golden Hills more profitably and provide ideas for future cultivar selection and development.



Gumdrop Update – the female cultivar ‘Gumdrop’ was released to the industry in July, 2016.



## Notes on growing Gumdrop:

1. At this time, 'Gumdrop', should only be planted by those who want an earlier harvest and who will have access to a processing plant that will be open early enough to accept the harvested nuts.
2. Later in the season (July) some nuts produce a drop of gum on the hull (hence its name). A 'Gumdrop' harvest is 'stickier' than a 'Kerman' harvest.
3. 'Gumdrop' nuts do not hold well on the tree and air temperatures can be really hot when 'Gumdrop' is ready for harvest. A timely 'double shake' harvest is suggested. In the San Joaquin Valley, depending on season and location, the first harvest will occur in early August with a second shake a week to ten days later. 'Gumdrop' is an alternate bearer like 'Kerman' and 'Golden Hills'.
4. 'Gumdrop' will perform best on well-drained soils where water 'ponding' does not occur.
5. 'Gumdrop' has shown more growth variability on UCB-1 seedling rootstock than 'Golden Hills'. Growth among 'Gumdrop' trees has been much more uniform on 'Platinum<sup>®</sup>' clonal rootstock in an observation trial planted in 2014.