Update on New Pistachio Varieties and Plantings

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‘Golden Hills’ and ‘Lost Hills’ Female Pistachio Trees

And the associated ‘Randy’ male

Golden Hills, Lost Hills and Randy are patented cultivars released to the pistachio industry by the University of California in 2005.

BLOOM

Lost Hills and Golden Hills bloom at about the same time. Full bloom is usually about 3-10 days earlier than Kerman.

A male tree, called 'Randy', was selected to be the pollinizer for both Lost Hills and Golden Hills. It is at full bloom within a few days of Lost Hills and Golden Hills.

Randy versus Peters, 2005

Most advanced bloom, March 17, 2005

Average bloom, March 24, 2005

Randy early male

- **first flowers appear 10 to 15 days before ‘Peters’**
- **provides good quantities of relatively durable and viable pollen.**
- **is more precocious than ‘Peters’ flowering one year before ‘Peters’.**
- **Randy will provide adequate pollination for Golden Hills and Lost Hills. No other male is necessary.**

Estimated date of full bloom for Kerman, Golden Hills, Peters and Randy in northwestern Kern county (near Lost Hills) and near Madera in Madera county.

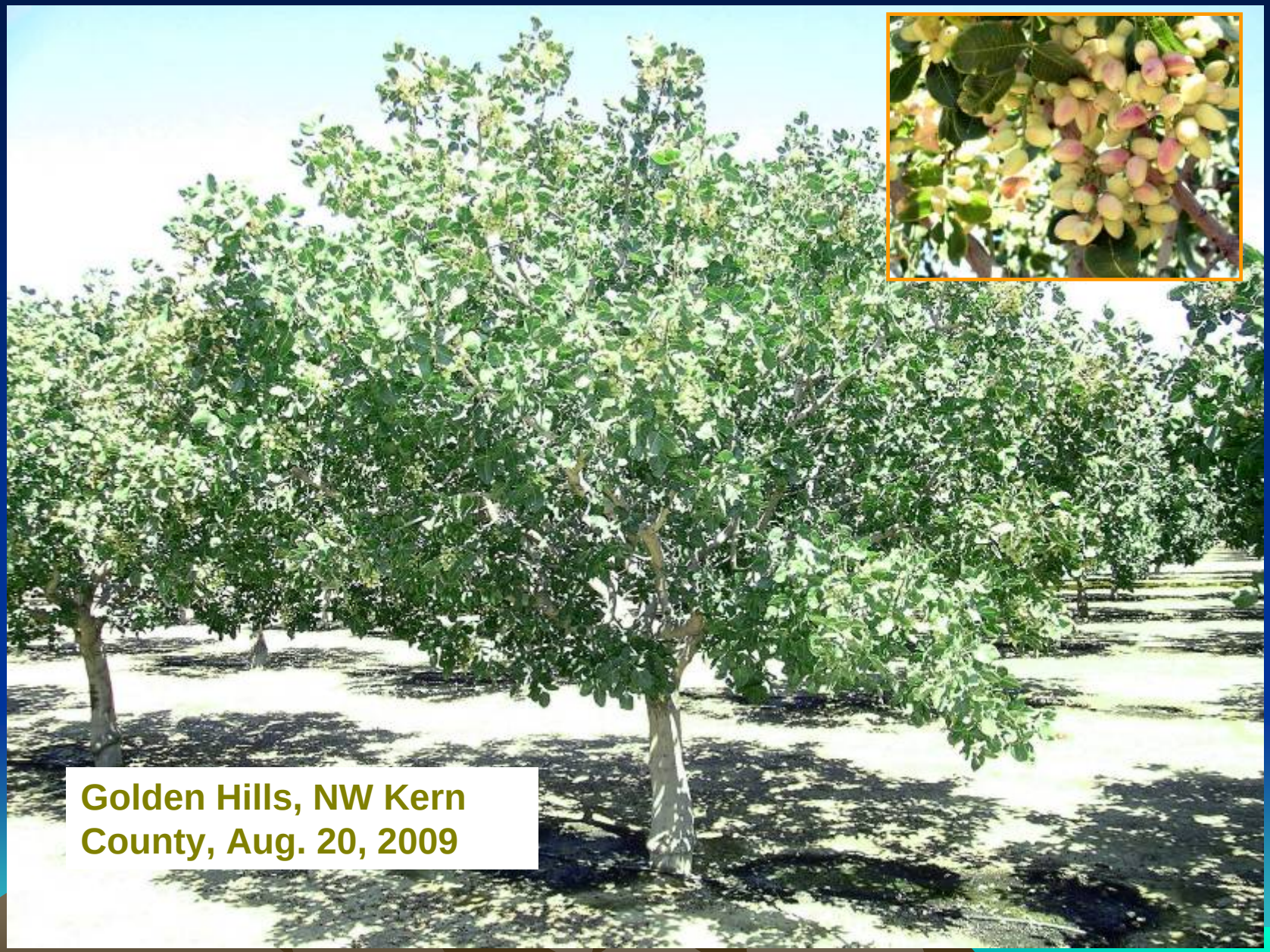
Year	Kerman	Golden Hills	Peters (male)	Randy (male)
2004	April 2	March 29	March 31	March 23
2005	April 1	March 26	April 1	March 25
2006 Kern	May 1	April 24	April 30	April 28
2006 Mad.		April 24		April 27
2007 Kern	April 1	March 26	April 1	March 25
2007 Mad.	April 3	March 29	April 3	March 26
2008 Kern	April 8	April 2	April 11	April 2
2008 Mad.	April 10	April 2	April 11	April 2
2009 Kern	April 8	April 6	April 12	April 5
2009 Mad.	April 15	April 10	April 15	April 10


Randy at full bloom in
NW Kern County, 2008

Lost Hills in front with Randy behind in NW Kern County, April 1, 2009 – 13th leaf


Lost Hills, NW
Kern County,
Aug. 20, 2009

Golden Hills in NW Kern County, April 1, 2009.



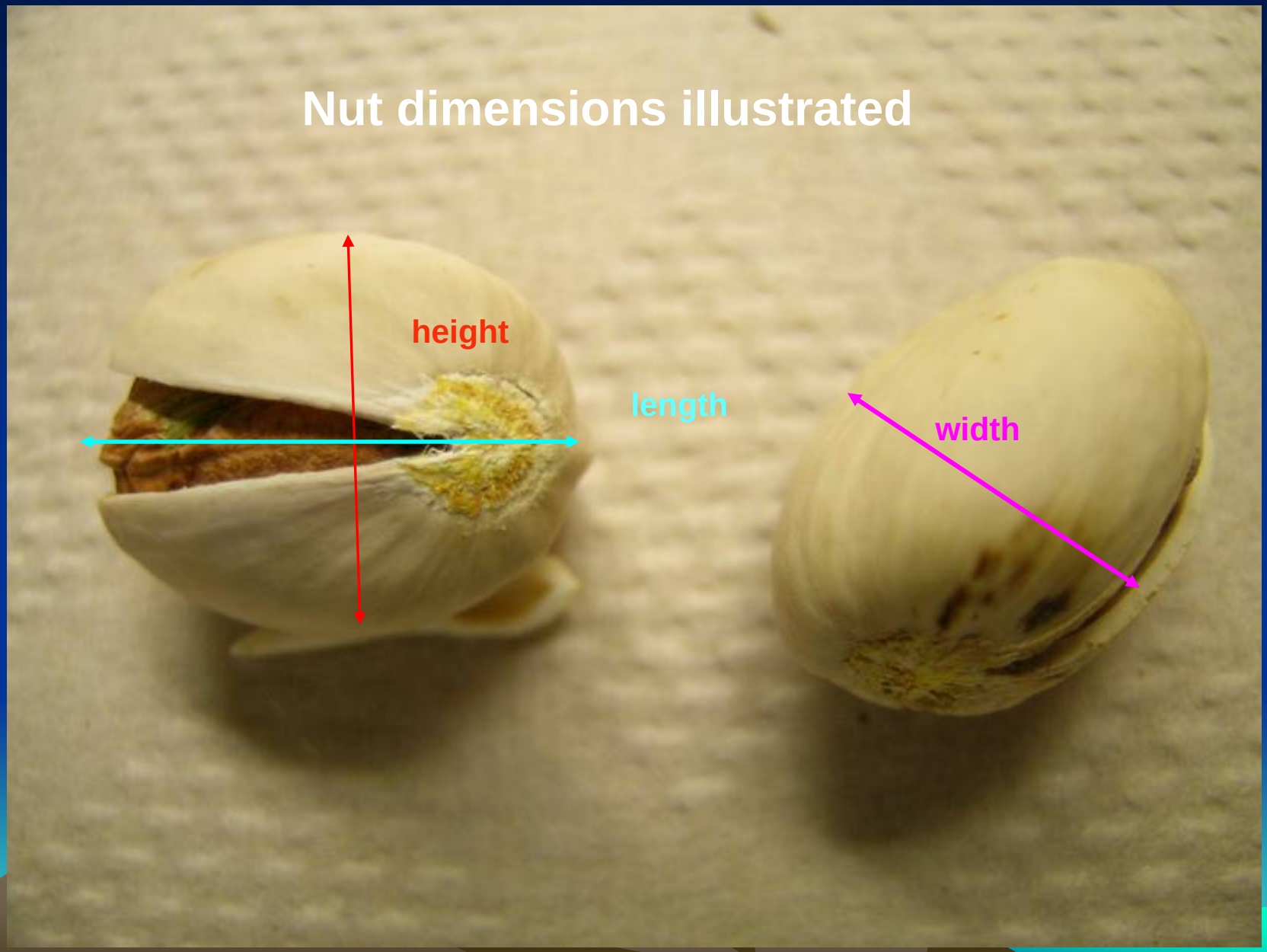
Golden Hills, NW Kern County, Aug. 20, 2009

Lost Hills, 2007

Kerman, 2007

Golden Hills, 2007

Nut dimensions illustrated



Average nut dimensions (2002-2006) for Kerman, Golden Hills and Lost Hills nuts (shells) at the advanced selection trial near Lost Hills in western Kern County.

variety	nut length, mm	nut width, mm	nut height, mm
Kerman	18.6 a	13.3 a	12.5 a
Golden Hills	19.5 a	13.5 a	13.1 b
Lost Hills	21.2 b	14.0 b	12.9 b

Nut length measured from 2004-06, nut height from 2005-06

Harvest Date

Golden Hills and Lost Hills, on average, have been 10 days to two weeks earlier than Kerman in NW Kern County and at Madera. Golden Hills tends to be the earliest maturing and has demonstrated the most uniform maturation across the tree. Lost Hills in some trials, especially the newer trials, has demonstrated uneven maturity across the tree, that in some instances would have required two shakes. Lost Hills also has a tendency toward early splits.

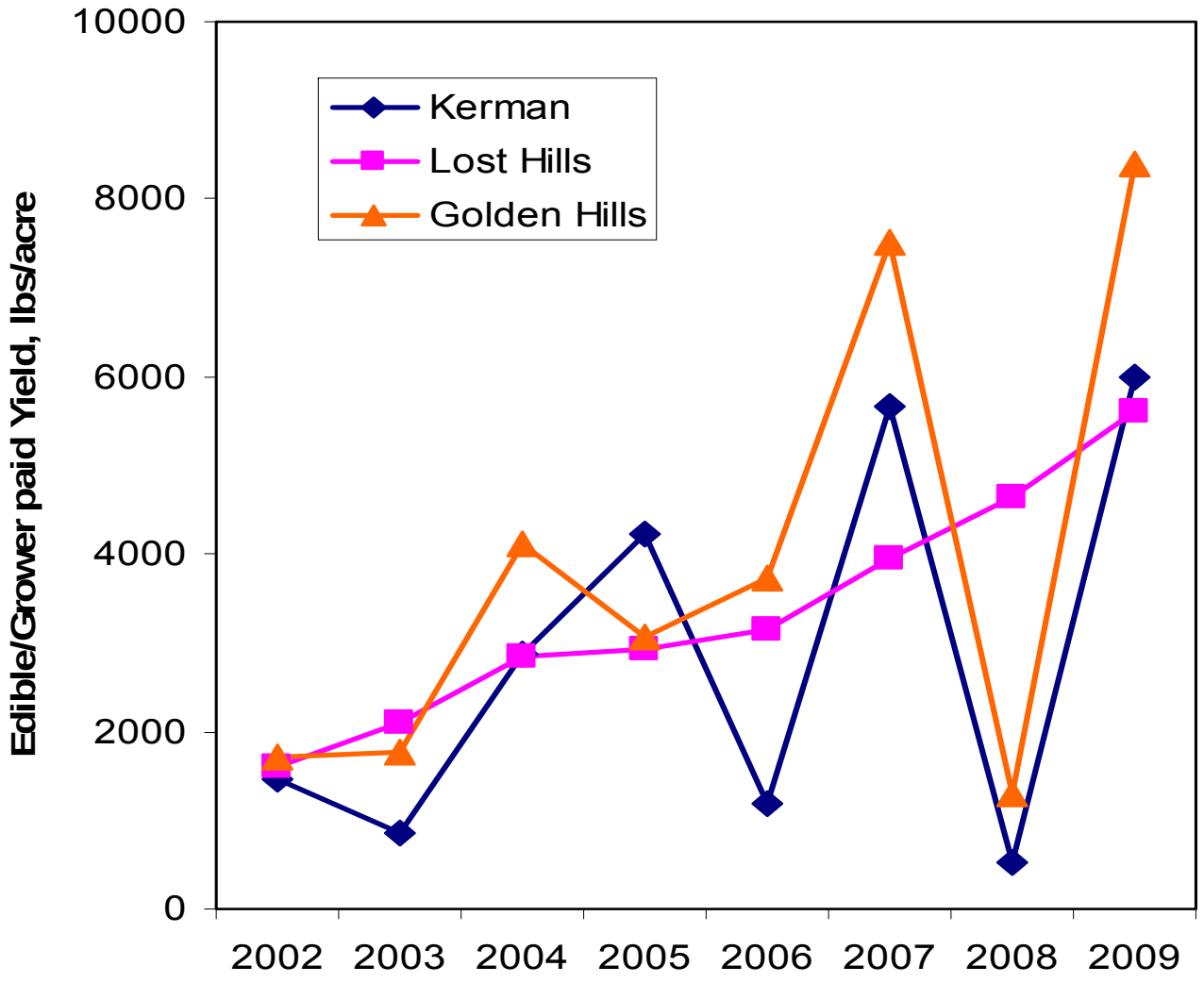
Harvest Readiness date in NW Kern county

	2002	2003	2004	2005	2006	2007	2008	2009
Kerman	4-Sep	19-Sep	12-Sep	15-Sep	20-Sep	2-Sep	12-Sep	15-Sep
Lost Hills	4-Sep	29-Aug	25-Aug	1-Sep	11-Sep	23-Aug	29-Aug	2-Sep
Golden Hills	4-Sep	3-Sep	16-Aug	1-Sep	11-Sep	16-Aug	27-Aug	31-Aug

Cumulative Edible Yield/Grower-Paid Weight, in NW Kern County (2002 – 2009: 6th – 13th leaf) Madera (2004 – 2009: 6th through 11th leaf) and new trials located near Wasco and the Grapevine (2007 - 2009: 6th through 8th leaf)

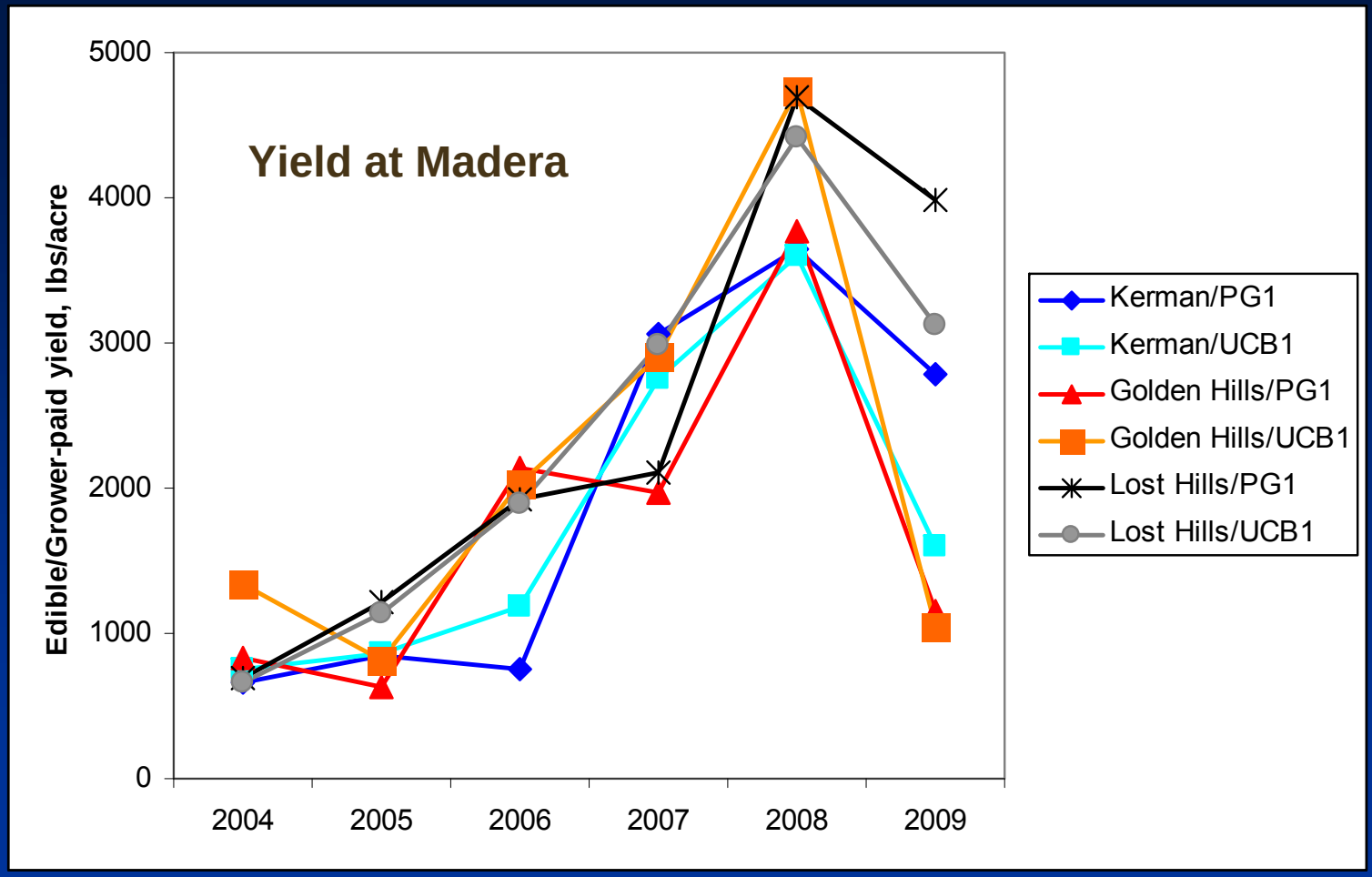
Cultivar	Cumulative Edible Yield, lbs/acre		
	Madera	NW Kern County	New Trials
Kerman	11,266 a	22,788 a	3147 a
Golden Hills	11,680 a	31,635 a	3572 a
Lost Hills	14,397 b	26,809 a	3884 a

Different letters in the same column denote significant differences by Fisher's protected LSD test at $P \leq 0.05$



Yield at Twisselman – NW Kern County

Lost Hills appears to be less alternate bearing than Kerman or Golden Hills. What happens to Lost Hill's yield in 2010 should be informative.



No significant differences in yield between PG1 and UCB1 rootstocks. Cumulative yields for UCB1 higher than for Kerman and Golden Hills. Golden Hills severely pruned in winter of 2008.

Golden Hills, initially, is a slower growing, willowy tree. As it grows older, it is very upright, with strong, short branches. It probably requires less pruning than Kerman. **Do not** be tempted to prune the trees as done in these photos to make it grow more like Kerman.

Average edible inshell split nuts in NW Kern County (2002 – 2009: 6th – 13th leaf) and Madera (2004 – 2009: 6th through 11th leaf)

Cultivar	Average edible inshell split nuts, %	
	Madera	NW Kern County
Kerman	78.2 a	74.6 a
Golden Hills	91.1 a	94.5 b
Lost Hills	89.1 a	94.8 b

Different letters in the same column denote significant differences by Fisher's protected LSD test at $P \leq 0.05$

Average individual nut weight in NW Kern County (2002 – 2009: 6th – 13th leaf) and Madera (2004 – 2009: 6th through 11th leaf)

Cultivar	Average individual nut weight, grams	
	Madera	NW Kern County
Kerman	1.38 b	1.25 a
Golden Hills	1.26 a	1.29 a
Lost Hills	1.44 b	1.47 b

Different letters in the same column denote significant differences by Fisher's protected LSD test at $P \leq 0.05$

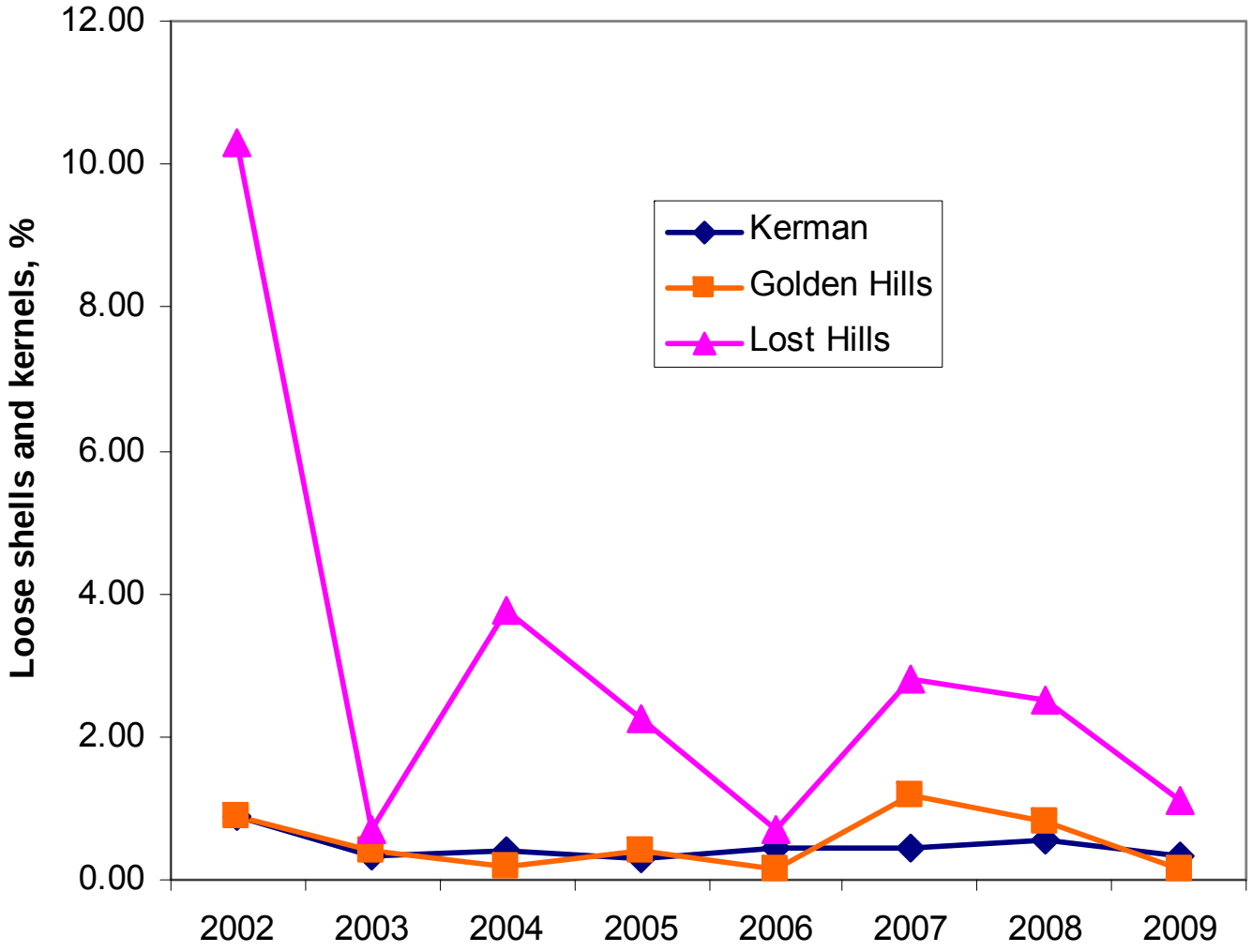
Nut size is very dependent on total yield. Golden Hills tends to have a larger range of nut sizes, and in very high-yielding years will have a higher percentage of smaller nuts that will pass through the 30/64 inch screen and go to shelling.

Average Insect Damage in NW Kern County (2002 – 2009: 6th – 13th leaf) and Madera (2004 – 2009: 6th through 11th leaf)

Cultivar	Average Insect Damage, %	
	Madera	NW Kern County
Kerman	0.7 a	1.6 b
Golden Hills	0.7 a	0.2 a
Lost Hills	0.7 a	0.4 a

Different letters in the same column denote significant differences by Fisher's protected LSD test at P ≤ 0.05

How split should a pistachio nut be?



The "real" processing process may be rougher on edible split inshell nuts than the sample hullers.

Lost Hills also has more early splits on the tree some years

Short Summation of characteristics of Golden Hills compared to Kerman for Growers and Processors (from 6th through 13th leaf).

- Earlier harvest (two weeks on average)
- Similar, or greater average annual CPC-assessed yield, edible split inshell yield, and grower paid weight.
- Similar nut size and shell-hinge strength
- Greater percentage of split nuts, less closed shell, and fewer blanks means less weight to haul to the huller, and less trash for the huller to dispose of.
- Has done well in limited taste tests.
- Greater ratio of scion to rootstock diameter.
- Earlier full bloom (by about 6 days on average). Randy male overlaps bloom well.
- Is more difficult to bud.

Evaluations are based only on trees that are, at most, 12-years old (13th leaf). Any initial plantings should be conservative in nature.

Short Summation of characteristics of Lost Hills compared to Kerman for Growers and Processors (from 6th through 13th leaf).

- Earlier full bloom (by about 6 days on average). Randy male overlaps bloom well.
- Earlier harvest (10 days to two weeks on average)
- Similar, or greater average annual CPC-assessed yield, edible split inshell yield, and grower paid weight.
- Greater nut size but weaker shell-hinge strength. Greater propensity for early splits and uneven maturity across tree.
- Greater percentage of split nuts, less closed shell, and fewer blanks means less weight to haul to the huller, and less trash for the huller to dispose of.
- So far, including harvest in 2009 (13th leaf), has not demonstrated alternate bearing.
- Greater ratio of scion to rootstock diameter.

Evaluations are based only on trees that are, at most, 12-years old (13th leaf). Any initial plantings should be conservative in nature.

The Kalehghouchi Variety

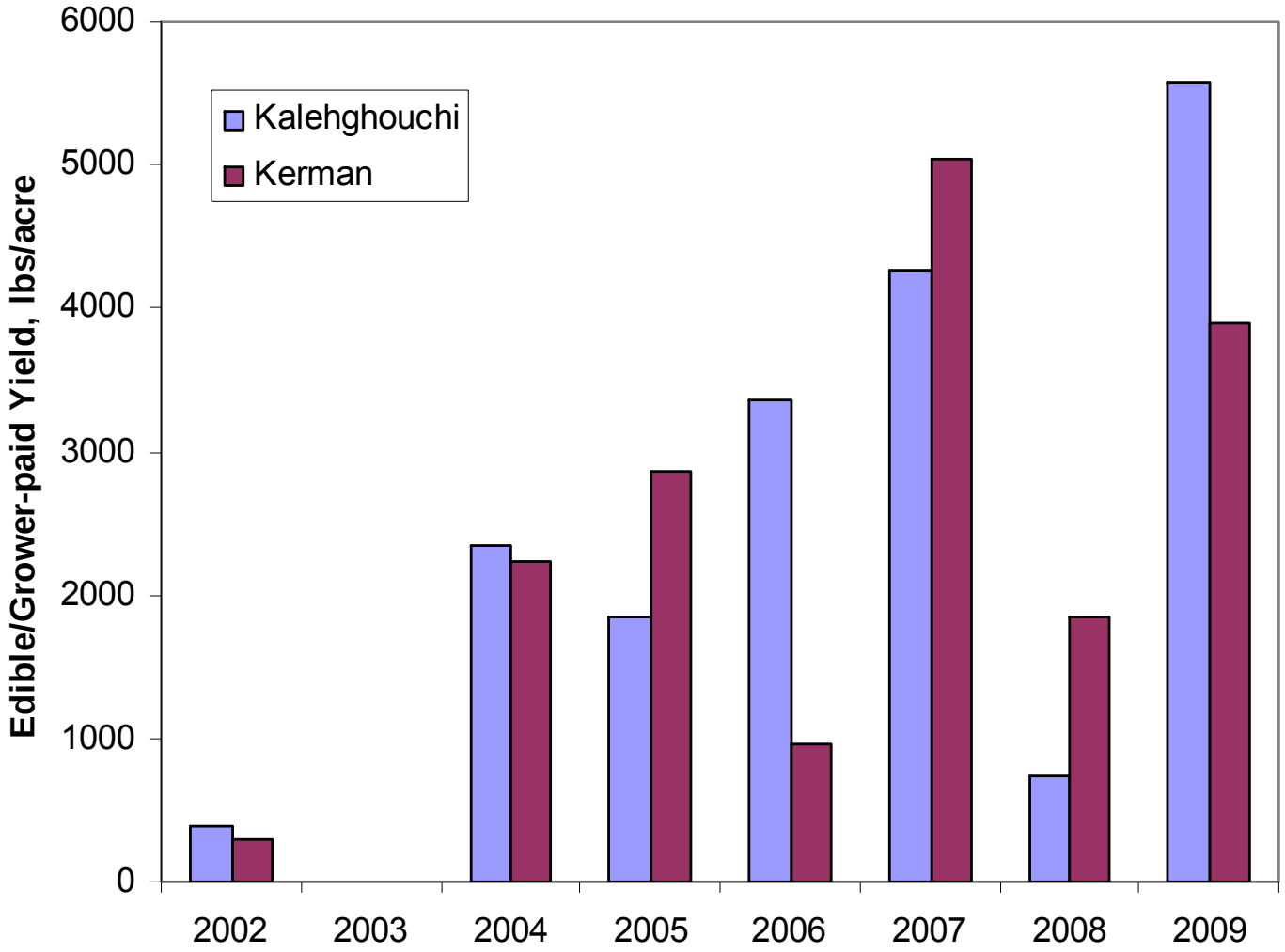
Some blocks of Kalehghouchi and Aria in California are 20 years old or more.

However, to my knowledge, the first replicated trials comparing Kalehghouchi and Aria to Kerman were established in 1998 in Kern County.

Kalehghouchi Female

Kalehghouchi was selected by a private grower, who has made budwood available to new growers for propagation. This grower, also has a male tree, that has proven to be a useful pollinator of Kalehghouchi.

The male tree, ‘Randy’ has also been shown to be at full bloom when Kalehghouchi is at full bloom.



In a replicated trial in NW Kern County. The year 2002 is 5th leaf.

Selected average nut quality parameters and cumulative yield (lbs per acre) of Kerman and Kalehghouchi pistachio in northwestern Kern County, 2002-2009 – 5th through 12th leaf.

Parameter	Kalehghouchi	Kerman
Edible split nuts, %	83.8 b	74.1 a
Cumulative edible yield	18,516 a	17,122 a
Cumulative split nut yield	12,369 a	12,167 a
Individual nut weight, gms	1.44 b	1.25 a
Shelling stock, %	5.6 b	3.3 a
Loose shells and kernels, %	1.2 b	0.5 a

Different letters in the same row denote significant differences by Fisher's protected LSD test at $P \leq 0.05$

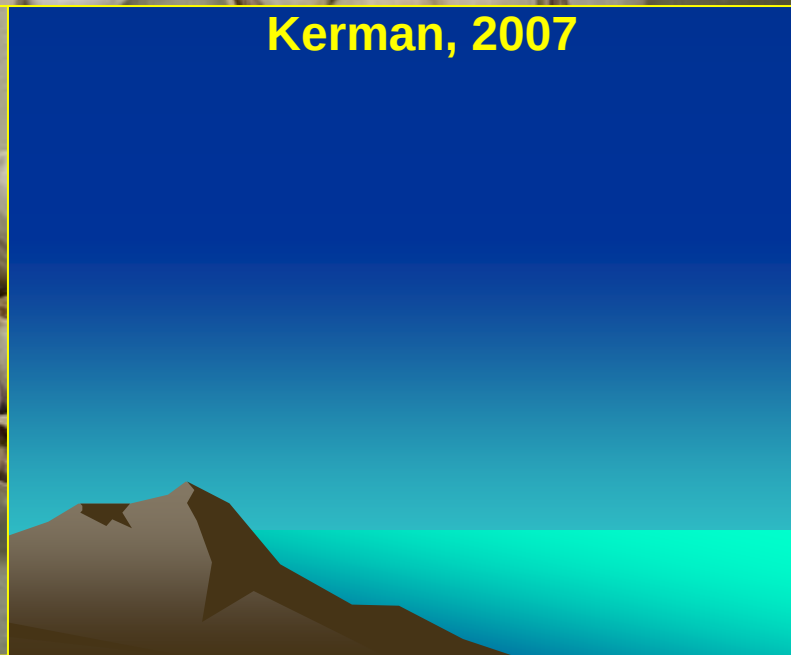
Selected average nut quality parameters and cumulative yield (lbs per acre) of Kerman and Kalehghouchi pistachio in the foothills on the east side of the San Joaquin Valley in northern Kern County, 2004-2009 – 7th through 12th leaf.

Parameter	Kalehghouchi	Kerman
Edible split nuts, %	87.1 b	78.2 a
Cumulative edible yield	10,744 a	10,335 a
Cumulative split nut yield	10,354 a	9,920 a
Individual nut weight, gms	1.43 b	1.33 a
Shelling stock, %	4.7 b	2.9 a
Loose shells and kernels, %	1.5 b	0.6 a

Different letters in the same row denote significant differences by Fisher's protected LSD test at $P \leq 0.05$

Kalehghouchi, 2007

Kerman, 2007



Vigorous vegetative growth results in low hanging branches which may need to be removed before harvest.

Kalehghouchi was made for topping, hedging, cross-hedging and probably skirting.

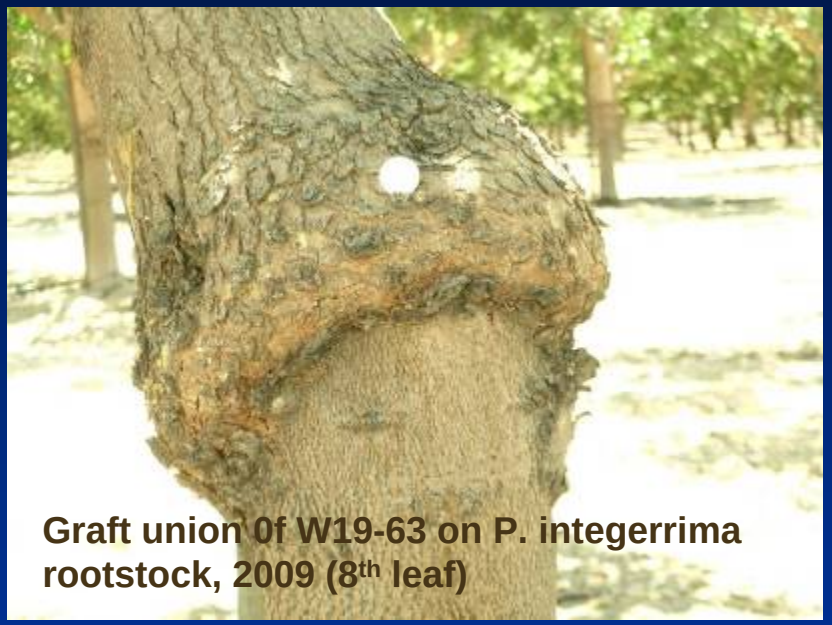
Frequent, light mechanical pruning appears to work for this variety

Kalehghouchi nuts have shaken very well from the trees in both of our test plots. However, there are reports as the tree gets older, nuts are more difficult to remove.

Short Summation of characteristics of Kalehghouchi compared to Kerman for Growers and Processors (so far).

- **Earlier full bloom (about 1 week on average)**
- **Harvest earlier or slightly later (2-3 days earlier on average on west side of SJV).**
- **Larger nut size.**
- **Higher split percentage and slightly less shell-hinge strength.**
- **Similar cumulative CPC yields and grower paid weight.**
- **More difficult to train and prune trees.**
- **Ability to shake as trees get older?**
- **Greater ratio of scion to rootstock diameter.**

Evaluations are based only on trees that are, at most, 11 years old (12th leaf). Any initial plantings should be conservative in nature.



Graft union 0f W19-63 on P. integerrima rootstock, 2009 (8th leaf)

Graft union of Kalehghouchi on P. integerrima, 2009 (12th leaf)

Golden Hills on UCB1 rootstock (12th leaf)

If possible, cultivars other than Kerman should be budded at 31 inches or higher to integerrima or integerimma-hybrid rootstocks

Disease Resistance?

While efforts are underway to compare the resistance of Lost Hills, Golden Hills and Kalehghouchi, and Kerman to Botryosphaeria and Alternaria under controlled conditions, this information is not yet available.

Golden Hills and Lost Hills were bred and selected in the southern end of the San Joaquin Valley, with its very low precipitation, low humidity and hot conditions. Its relative resistance to diseases like Botryosphaeria and Alternaria remain unknown in wettest parts of the pistachio growing area of the state.

Golden Hills and Lost Hills have not demonstrated any more susceptibility to these diseases in the Madera trial, but that may not be indicative of performance further north in the Central Valley of California.

Another Pistachio Cultivar that is being widely planted in California is:

Pete1

Available from Dave Petersen.

I have not had the opportunity to evaluate it in replicated trials, but have observed that it is earlier maturing than Kerman, produces a high percentage of edible split nuts, and the kernel has more green color than Kerman

Contact him for more information at

Petersen Pistachio Development
4161 Nighthawk Way
Chico, CA 95973-7642
Phone:(530) 518-3283891-4796
E-mail: pete1pistachio@aol.com

Other pistachio selections bred in the University of California Breeding Project are currently under evaluation in additional experimental trials for possible eventual release to the pistachio industry.

These trials usually include existing cultivars present in California, that originated in the mid-east or in California, and which have never been evaluated in replicated scientific trials.