

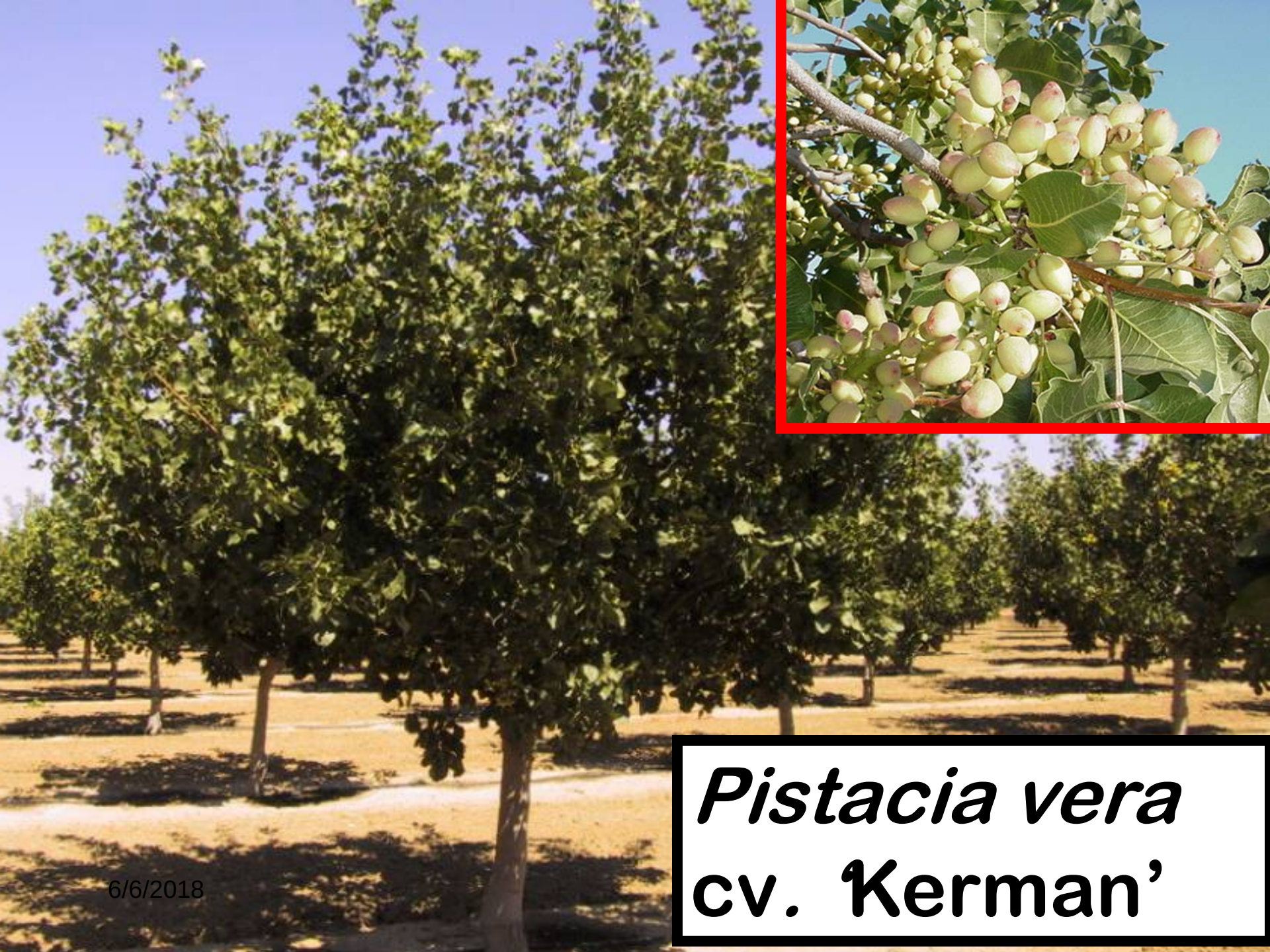
Mature Tree Pruning

Louise Ferguson

Plant Sciences Department

University of California Davis

[LFerguson@UCDavis.edu](mailto:L Ferguson@UCDavis.edu)



Pistacia vera
cv. 'Kerman'

6/6/2018

Why Prune a Mature Orchard?

- **Maintain Productivity**

- optimize light exposure of existing shoots/leaves
- create new bearing wood
- control alternate bearing

- **Control Tree Size**

- facilitate orchard operations
 - harvesting
 - spraying

Steps in Pruning a Mature Orchard

- Understand the tree
 - Tree bearing habit
 - Tree growth habit
- Know your options
 - Types of pruning cuts
 - Heading
 - Thinning
 - Methods of making these cuts
 - Hand
 - Mechanically

Understand the Bearing Habit

- **Bearing habit:**
 - lateral
 - year old wood
 - alternating





Understand the Growth Habit

- Growth habit:
 - apically dominant







6/6/2018

LFerguson@ucdavis.edu



Combined Result ?

Branches:

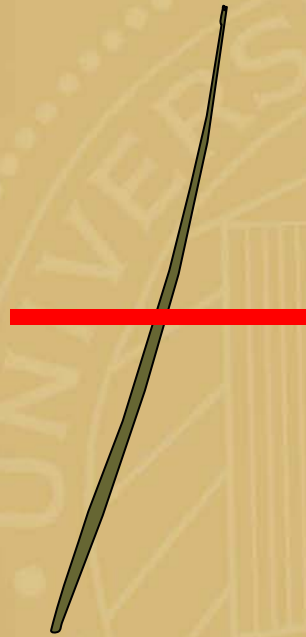
- long
- unproductive
- drooping
- Harvest poorly



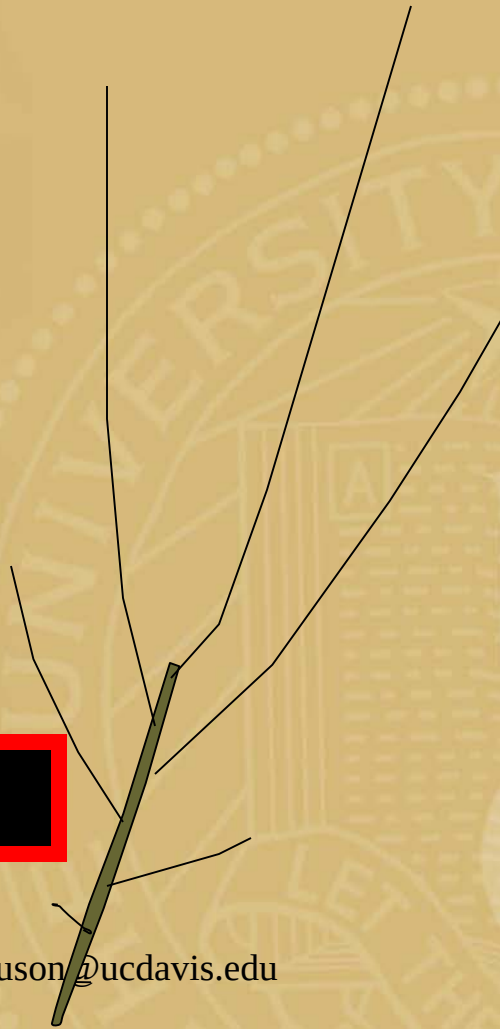
Types of Pruning Cuts

- **Heading cuts:**
shoot is cut in half
 - basal portion with less buds remains
 - Stored carbohydrates
 - subtending and proximal shoot growth
- **Thinning cuts:**
entire shoot is cut off at base

Heading Cuts Destroys Local Apical Dominance



Heading Alters Bud: Carbohydrate Ratio

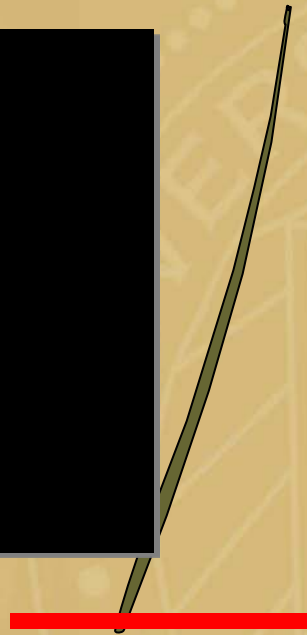


Encouraging shoot growth

Thinning Cuts Remove Entire Shoot at Origin

Does not alter
bud:carbohydrate ratio

- less response
- tree canopy is thinned
 - letting light enter!



Two Pruning Methods

- Hand (=/- tying)
 - Advantages
 - precise
 - Disadvantages
 - Expensive
 - Time Consuming
 - Difficult to teach

- Mechanically
 - Advantages
 - Cheap
 - Decreases Alternate Bearing
 - Disadvantages
 - Indiscriminate

Hand Pruning Directions

- **Four Step System**
 - **Broken, low, crossovers**
 - **Thinning cuts**



Hand Pruning Directions

- **Four Step System**
 - Broken, low, crossover branches
 - Force canopy up
 - Heading cuts



6/6/2018

L.Ferguson@ucdavis.edu

20

Hand Pruning Directions

- **Four Step System**
 - Broken, low, crossover branches
 - Force canopy up
 - Kill the snakes
 - Thinning cuts



6/6/2018

L.Ferguson@ucdavis.edu

22

Hand Pruning Directions

- **Four Step System**
 - Broken, low, crossover branches
 - Force canopy up
 - Thinning cuts
 - Kill the snakes
 - Tip the whips
 - Heading cuts
 -



Circle Tying

- Circle circling tree branches with rope:
 - helps young pistachio trees grow upright



- **Same principal for 12-20 year old trees**



- ‘Second tier’
 - circle-tying of mature bearing trees
 - 5/8 inch
 - one-ton rope







- **Rope around structural crop bearing limbs.**



- **Done during the dormant season**



- **Circle-tying has been effective in keeping branches upright with heavy crops**

Circle Tying Conclusions

- **Circle-tying keeps branches upright with heavy crop**
- **Unknowns:**
 - **Enhanced tree structure?**
 - **Improved harvest shake?**
 - **Less subsequent hand pruning?**
 - **Less and chain saw cuts?**
 - **Higher yields and net return?**

Maintenance Mechanical Pruning





Topping and Hedging



Moderate Topping and Hedging does not Decrease Yield!!!

Rejuvenation Mechanical Pruning



Effect of Mechanical Pruning on Alternate Bearing: 1985 - 1991

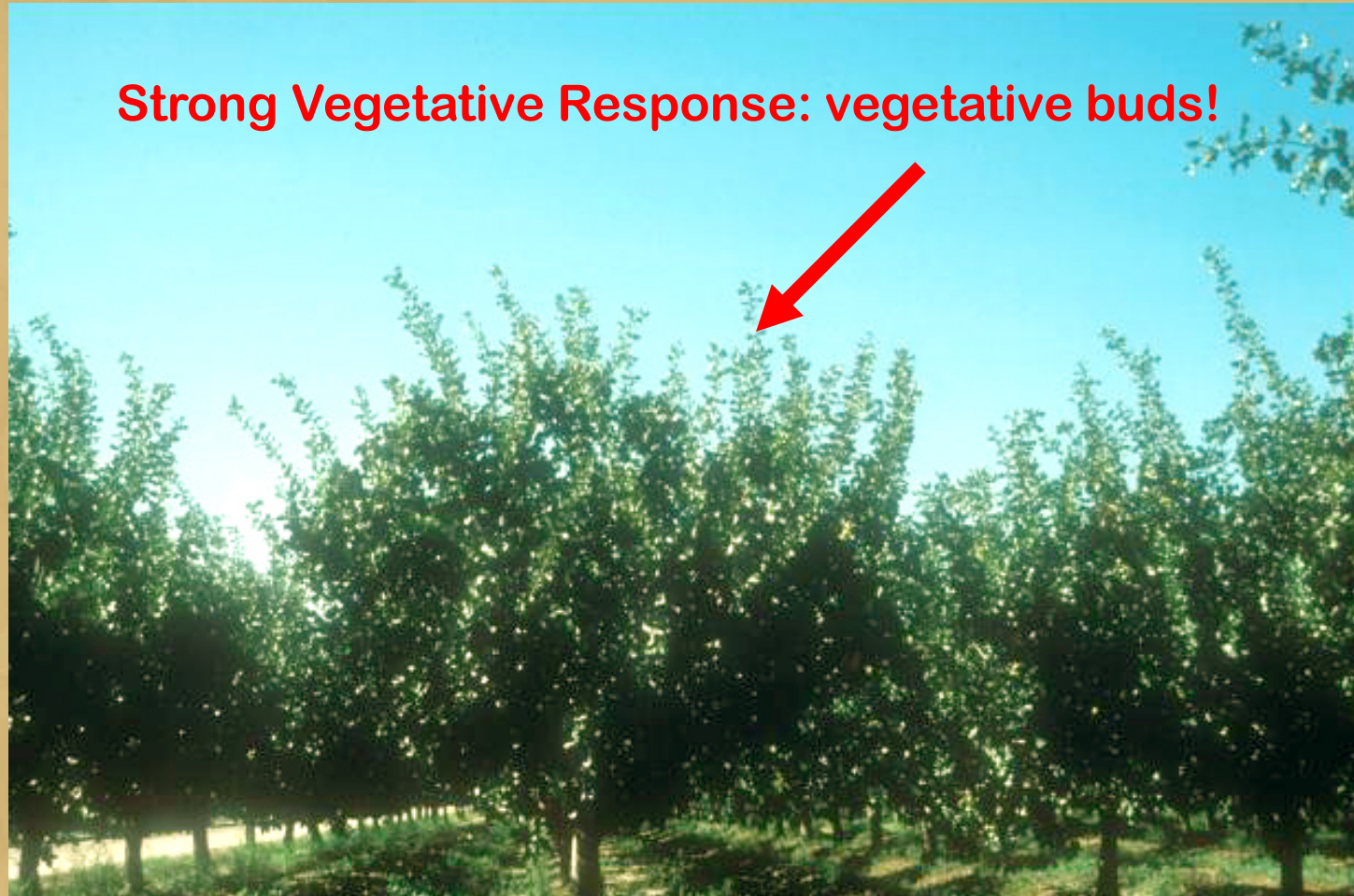
- **Treatments:**
 - **Control**
 - **Hedging**
 - **Topping**
 - **Hedging + Topping**

Prior to off Crop!

Mechanical Pruning: 1984 - 5



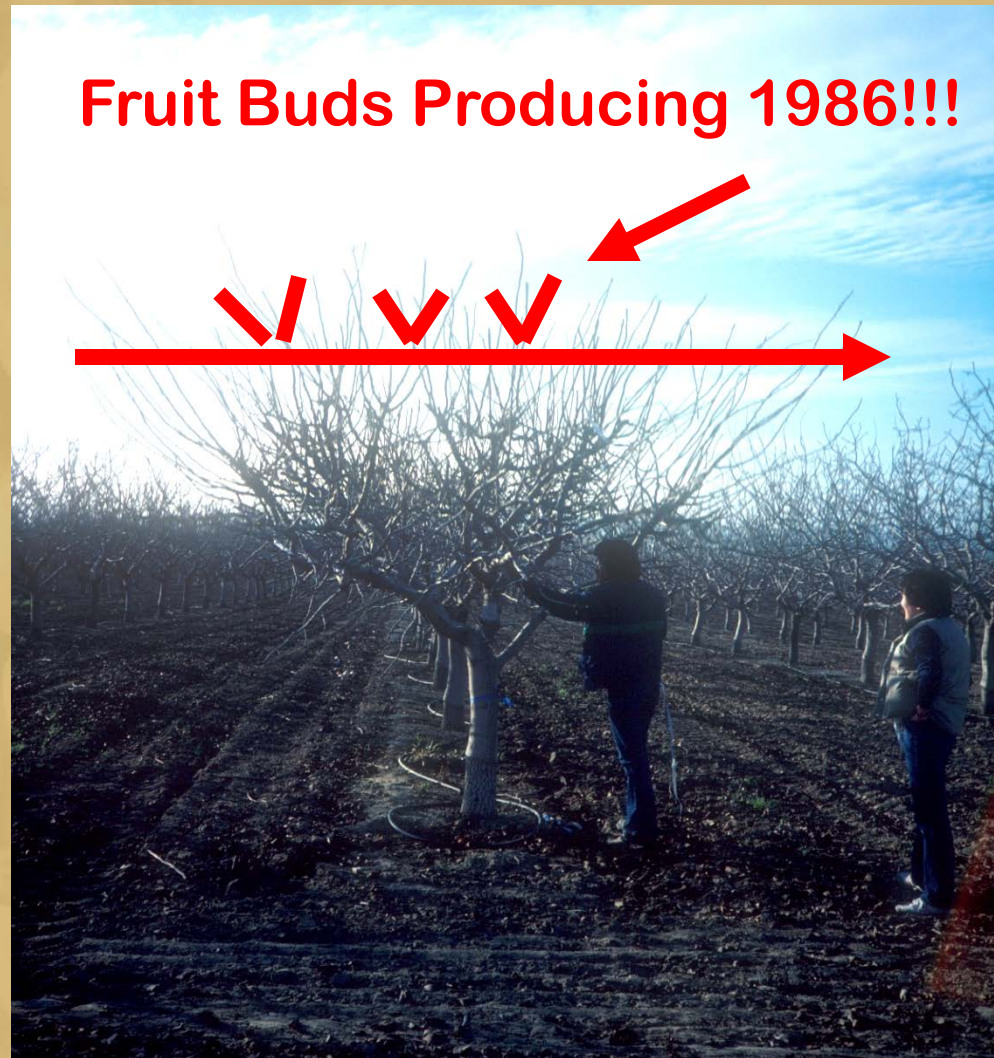
Mechanical Pruning Response: 1985



Dormant Pruning : 1985 - 1986



Pruning Response : 1987



7 Year Yield Response

• Hedged and Topped

- 1985: 0.8 kg/tree
- 1986: 12.7 kg/tree ON!
- 1987: 6.4 kg/tree
- 1988: 11.8/kg/tree ON!
- 1989: 5.1/kg/tree
- 1990: 12.2/kg/tree ON!
- 1991: 11.6/kg/tree
- 60.6/kg/tree cumulative

• Control

- 1985: 2.9 kg/tree OFF!
- 1986: 22.1 kg/tree
- 1987: 1.6 kg/tree OFF!
- 1988: 15.3/kg/tree
- 1989: 0.1/kg/tree OFF!
- 1990: 16.7/kg/tree
- 1991: 1.4/kg/tree OFF!
- 60.1/kg/tree cumulative

Effect of Mechanical Pruning on Alternate Bearing: 1985 - 1991

1985 - 1991

AB Index

Avg. Cum. Kg

1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

62
61
60
59
58
57
56
55
54
53

Control

Hedged

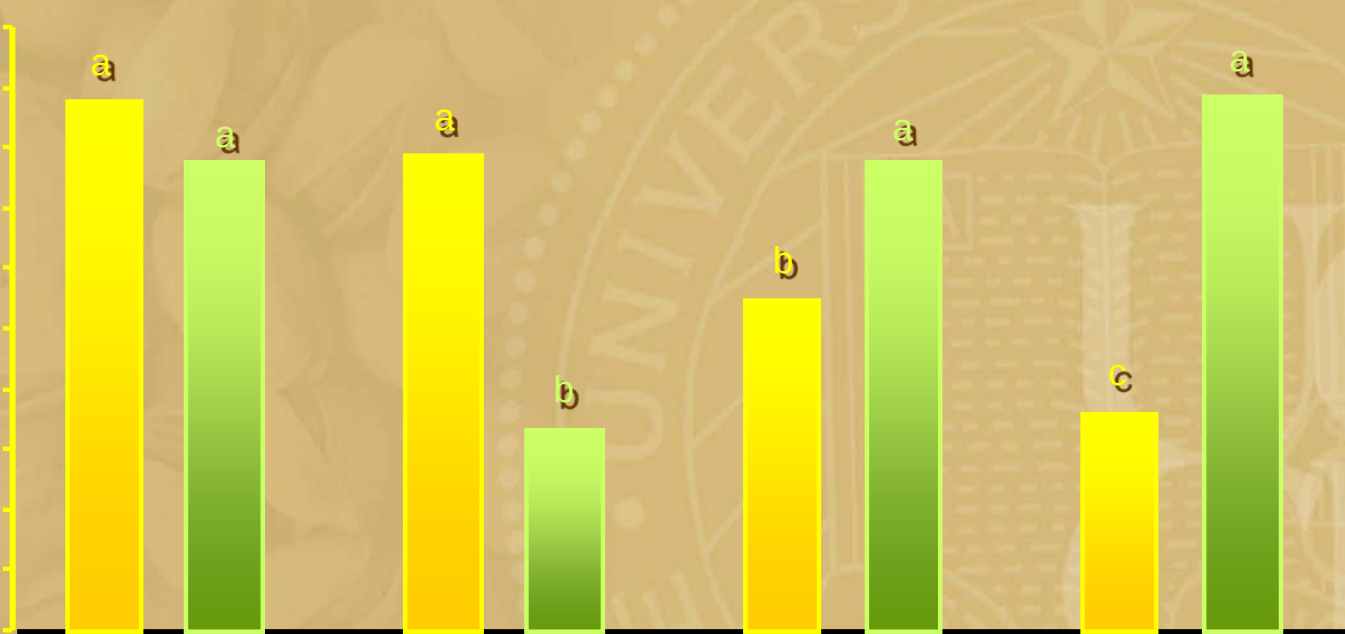
Topped

Topped + Hedged

44

6/6/2018

gusson@ucdavis.edu



7 Year Yield Response

- **Rejuvenation Mechanical Pruning**
 - Reduced yield the first two years!
 - Produces its effects by using tipping cuts to produce:
 - strong vegetative response year 1: OFF year
 - fruit buds produced in year 2: ON year
 - Fruit buds produce in year 3: OFF

7 Year Yield Response

- Alternate bearing is mitigated
- Yields were insignificantly different

Pruning Mature Trees to Control Alternate Bearing:

- **Year 1:** entering an off year
top 2/3:
 - into first growth
flush of 2 year old wood

Year 1



6/6/2018

LFerguson@ucdavis.edu

48

Pruning Mature Trees to Control Alternate Bearing

- **Year 2:** entering an on year
 - retop – 2/3 first growth flush the next year
 - this will produce fruit buds for following off year

Year 2:



6/6/2018

Pruning Mature Trees to Control Alternate Bearing

Year 3 - 6:

- top/tip lightly every other year
- hedge + hand every other year
 - every other row middle

Years 3 – 6:



Years 3 – 6:



The background of the slide features a large, faint, circular seal of the University of California. The seal contains a star at the top, an open book in the center with the letter 'A' on the left page, and a banner at the bottom that reads 'LET THERE BE LIGHT'. The words 'THE UNIVERSITY OF CALIFORNIA' are written around the perimeter of the seal.

Muchas Gracias

UCCE University of
California
Cooperative Extension

UC DAVIS

DEPARTMENT OF PLANT SCIENCES

College of Agricultural and Environmental Sciences

