

Pruning & Training Almond Trees

Roger Duncan

*UC Cooperative Extension,
Stanislaus County*



Given: Pruning does not improve or sustain almond yield in the short term or the long term.

- Pruning reduces yield.
- The more you prune, the more you reduce yield.

- Sometimes you have to prune. You must accept the sacrifice in yield.
- Reason to prune needs to justify expense and yield loss

Two Phases of Pruning Almond Trees

1. Tree Training Phase

- Establish permanent framework of the tree
- Primary & secondary scaffold selection
- Years 1 – 3

2. Maintenance Pruning Phase

- Years 4 - 25

Why Train Almond Trees?

- Scaffold selection to improve structural integrity of the tree (prevent limb breakage)
- Allow access for shakers (including limb shaking) and other equipment

Why Maintenance Prune Almond Trees?

- Maintenance pruning after year 3
 - Allow equipment access (shakers, weed sprayers, harvest equipment, etc.)
 - Safety for tractor driver
 - Sunlight on orchard floor to improve drying
 - Remove dead or diseased limbs
 - Reduce sticks at harvest
 - Reduce disease? (Alternaria, hull rot, rust, etc.)

Why Maintenance Prune Almond Trees?

Not to improve yield

“Old” Minimum Pruning Trial Nickels Estate. 1979 - 1999

	21st leaf Lb / acre	Cumulative Yield
Annually pruned	2136	34,176
Unpruned	2307	35,082
Temporary trees removed	1662	27,861

“New” Nickels Estate Minimum Pruning Trial.

Cumulative Yield Through 16th Leaf

(Average of all 4 varieties)

	Cumulative Yield Years 3 - 16
Standard Annual Pruning	31,985
Temporary Scaffold	28,441
Mechanically Topped 2 nd & 4 th leaf	31,427
Minimum / Unpruned	33,852

Kern County Pruning Trial

Paramount Farms. 1996 - 2006

Spacing = 24' x 21'; Class I Wasco Sandy Loam

1. Dormant pruned every year
2. Dormant pruned every other year
3. Mechanically topped & hedged every year
4. Mechanically topped & hedged every other year
5. Mechanically topped & hedged and hand pruned every year
6. No scaffold selection, no pruning

Cumulative Yields – Kern County through 11th leaf

Pounds per acre

	Nonpareil	Carmel	Monterey
Annual pruning	19,245	21,698	20,841
Pruned every other year	20,585	20,363	21,313
Topped & hedged annually	20,667	22,771	22,153
Mechanical alternate years	20,088	22,561	20,831
Mechanical + hand pruned	18,643	20,248	20,096
Unpruned	21,536	23,577	21,843

Stanislaus County Pruning Trial

- Planted fall, 1999
- Four spacings (10 x 22, 14 x 22, 18 x 22, 22 x 22)
- Four pruning strategies

Conventional Pruning

- Three scaffolds
- annual pruning

Minimal training & pruning

- 4-6 scaffolds
- maximum of 3 cuts each year thereafter

Untrained, unpruned

- no scaffold selection
- no annual pruning*



Start of 3rd Leaf March 2002



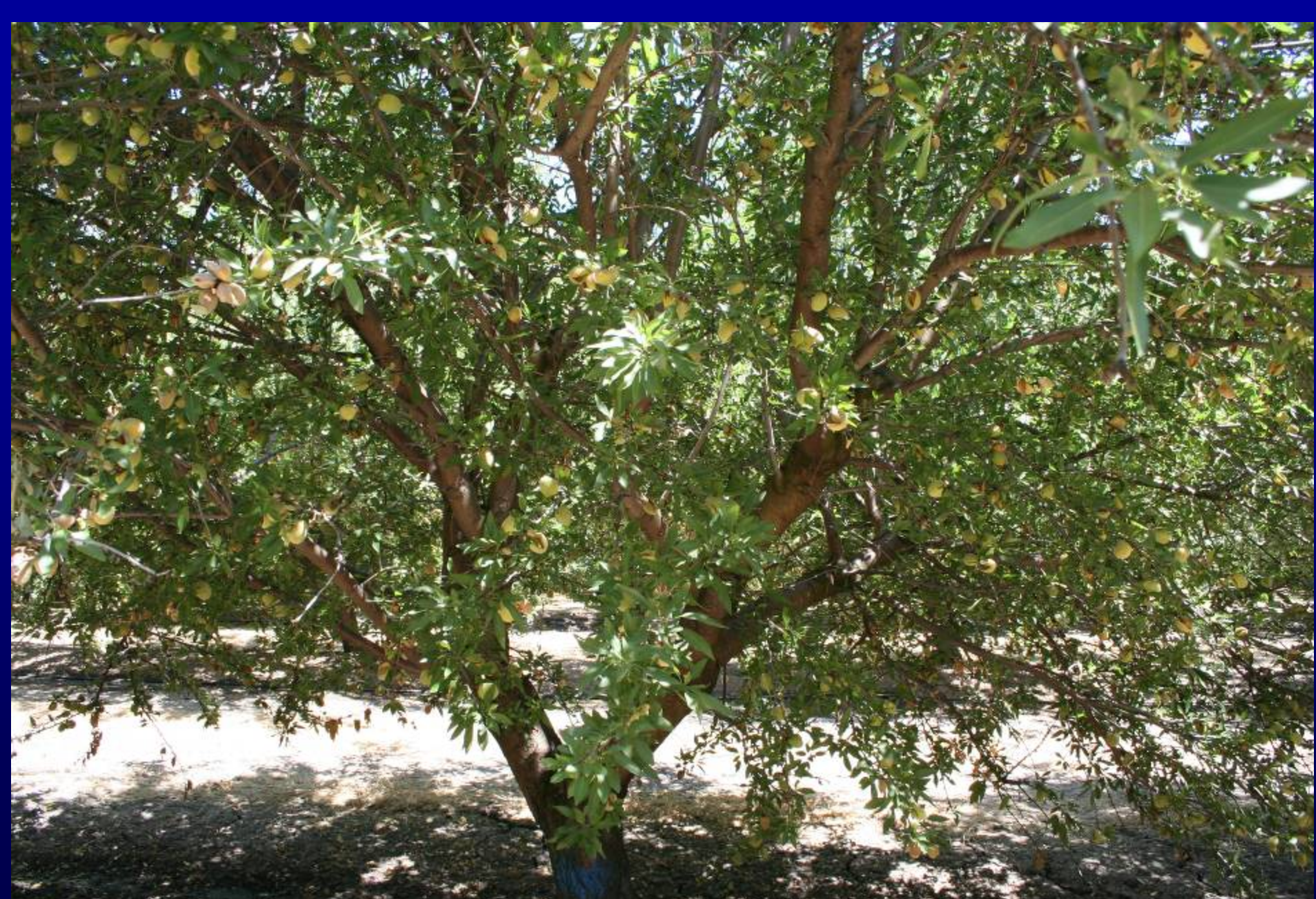
Standard trained,
pruned annually



Minimally trained,
minimally pruned



Untrained,
unpruned

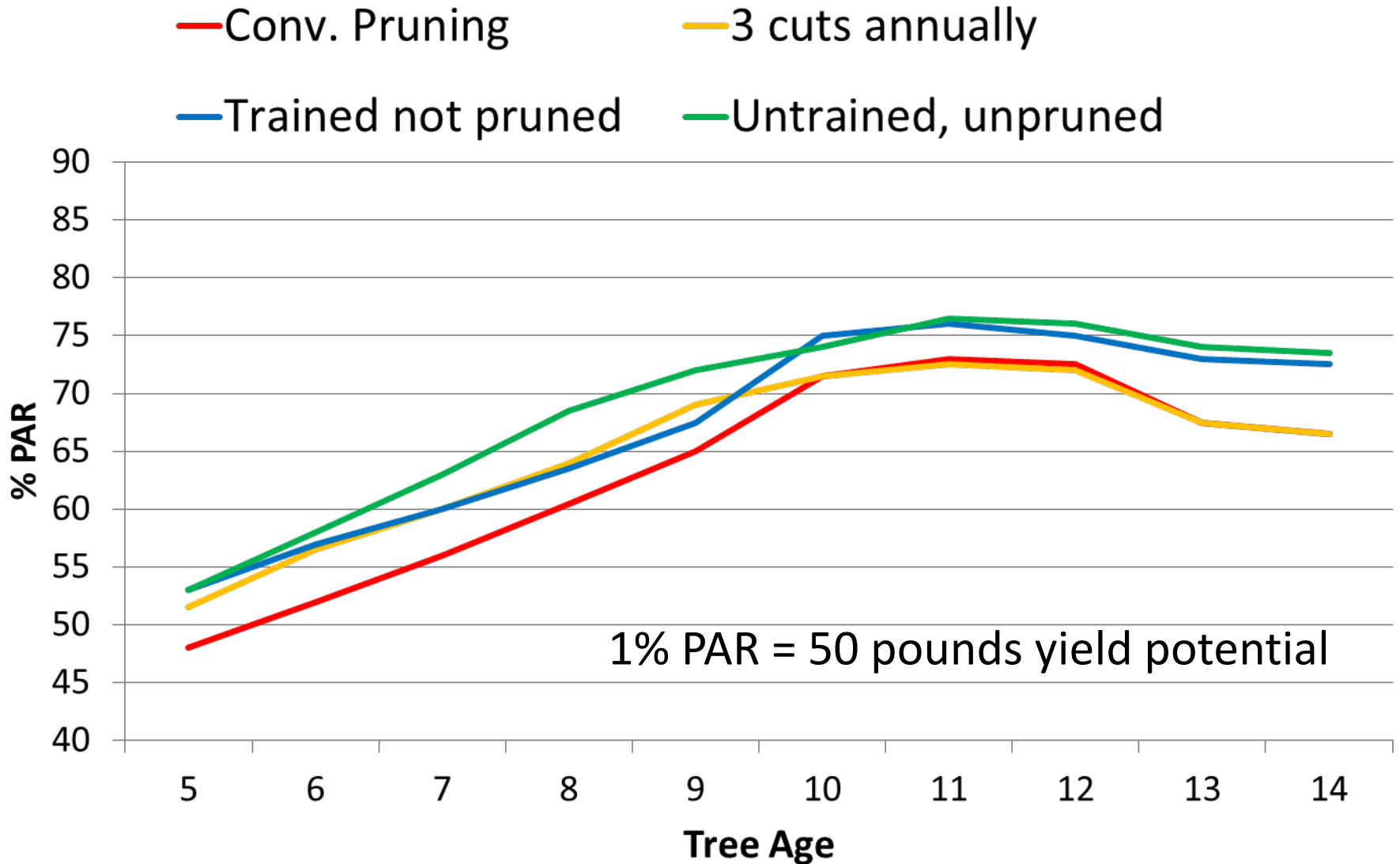


Standard Trained, Unpruned five years – 7th leaf

The Effects of Pruning on 2013 (14th Leaf) & Cumulative Yield

	Nonpareil		Carmel	
	2013 Yield (lb / a)	Cumulative	2013 Yield (lb / a)	Cumulative
Training & Pruning				
Trained to 3 scaffolds; Annual, moderate pruning	3199 a	32,537	2195 a	27,815
Trained to 3 scaffolds; unpruned after 2 nd year	3092 a	33,762	2232 a	29,767
Trained to multiple scaffolds; Three annual pruning cuts	3093 a	31,862	2340 a	29,420
No scaffold selection; no annual pruning	3236 a	33,625	2291 a	31,127

Light Interception Dynamics of Different Pruning Methods



Early Conclusions, Stanislaus County Trial:

- Pruning has not increased or sustained yield. Conventional annual pruning has reduced yield in most years so far.
- 14 years x \$150 pruning costs = \$2100
- Decrease in yield by 1000 – 3000 pounds = loss of ~\$2000 - \$6000 / acre
 - Total loss from pruning \$5,000 - \$8,000 / acre

Early Conclusions, Stanislaus County Trial:

- Trees trained to more than three scaffolds were more prone to scaffold breakage – need to rope them
- Scaffold selection (training) is less important in closely planted trees
 - Trees stay smaller, less weight on each limb
 - May not need to limb shake
- More hull rot in unpruned trees? No difference observed in other diseases.
- No difference observed in mummies.
- No difference in tree height

Things to Consider if You Want to Try a Minimum Pruning System

- Consider starting with three primary scaffolds properly placed
- Leave scaffolds as long as possible
 - Must be stiff enough not to “flop”
- Don't worry about small side shoots if less than 1/3 diameter of scaffold
- The idea is to leave as much wood as possible to avoid stimulating rank growth
- Be prepared to circle rope ~ 2/3 height in canopy



- Minimally trained trees should be loosely tied after second dormant pruning to prevent scaffold breakage

If you decide not to select scaffolds...

- Head tree extra high at planting time (minimum of 40 inches)
- Maybe not head trees at all??
- First dormant pruning: prune off all limbs that will interfere with shaker
- May want to remove very obvious problem scaffolds
- Works best with tighter tree spacing

Untrained / unpruned Nonpareil. 7th Leaf.



Low limbs get in the way

Tree Training: a discussion

Training: first dormant pruning is most critical.



- Space scaffolds vertically at least 3 inches if possible
- This requires topping newly planted trees at 36 – 40 inches
- Don't choose top shoot – especially with Aldrich
- Don't skim too many shoots down low during 1st summer
- Avoid shoots too flat or too vertical
- Avoid occluded bark

Good



Better?



Scaffolds too flat and not spaced well vertically



Bad Training

Scaffolds not spaced well vertically



Better. Scaffolds staggered vertically and around





Gum in Crotch of Tree



Gum is a Result of Crack at Base of Limb







Avoid occluded bark



Excessively
short pruning
leads to many
problems



- Short pruning will lead to excessive water sprouts and root suckers which will need to be removed.
- This leads to excessive pruning the next year
- Excessive pruning increases potential for canker diseases and crown gall
- Delay in yield is significant





Vigorous tree: PxA hybrid

- Short pruned first year
- Minimally pruned 2nd year
- Not roped

















Multiple Problems

- Scaffolds originate from same plane
- Scaffolds too flat
- Pruned too short first year
- Mechanically topped

In Summary

- Initial tree training is important, especially in wider spacings
- Can certainly stop pruning at some point
- At 20th leaf? 10th leaf? 2nd leaf? Never prune??



Thank you for
your attention.

Roger Duncan
209-525-6800

raduncan@ucdavis.edu
cestanislaus.ucdavis.edu

University of California
Agriculture and Natural Resources