

# Training Young Walnut Trees

- exploring new ideas -



Janet Caprile

Farm Advisor, Contra Costa Co.

(925) 646-6129

[jlcaprile@ucanr.edu](mailto:jlcaprile@ucanr.edu)



David Doll

Farm Advisor, Merced Co

(209)385-7403

[dadoll@ucanr.edu](mailto:dadoll@ucanr.edu)

# Training Young Walnut Trees

- exploring new ideas -

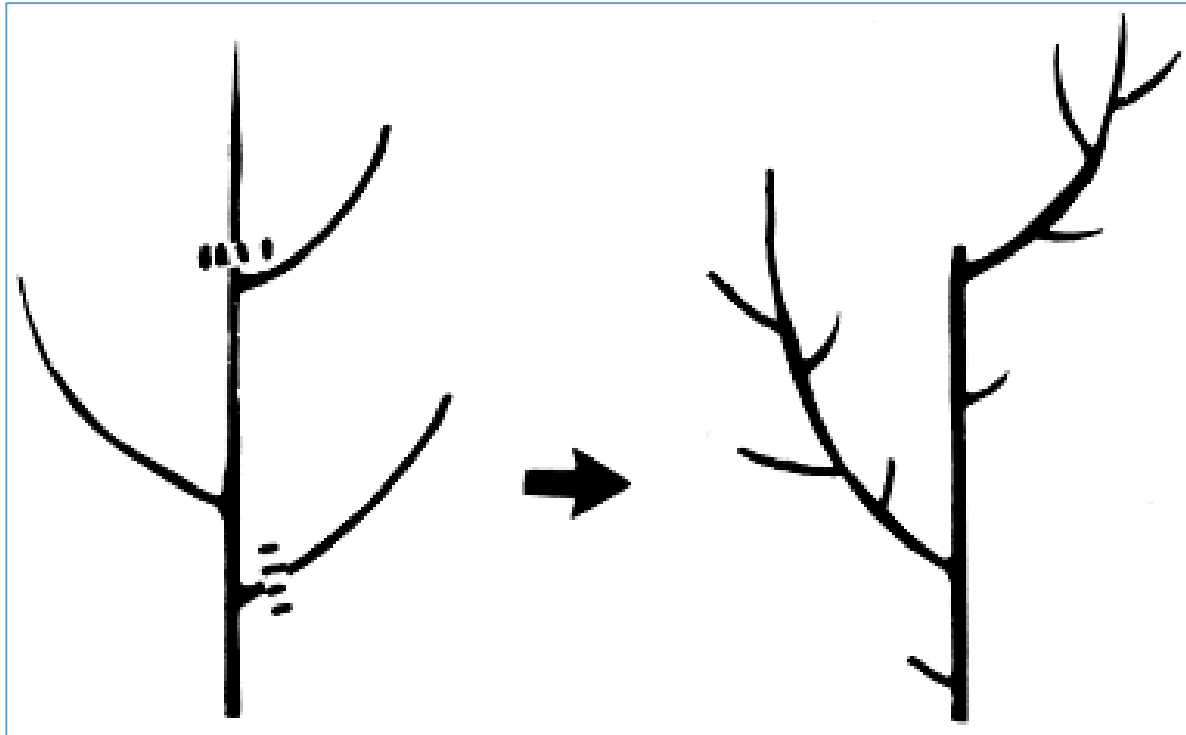
“Training” occurs in years 1-6

- **Traditional way: modified central leader**
  - Active scaffold selection & heading cuts
    - Establish a strong branching structure
    - Keep the tree growing to fill in space
    - Early crop will stunt the trees
- **The new way: The No Heading method**
  - Minimal scaffold selection (thinning cuts only)
  - NO heading cuts... ever
  - Results: Earlier fruit production & full sized trees!



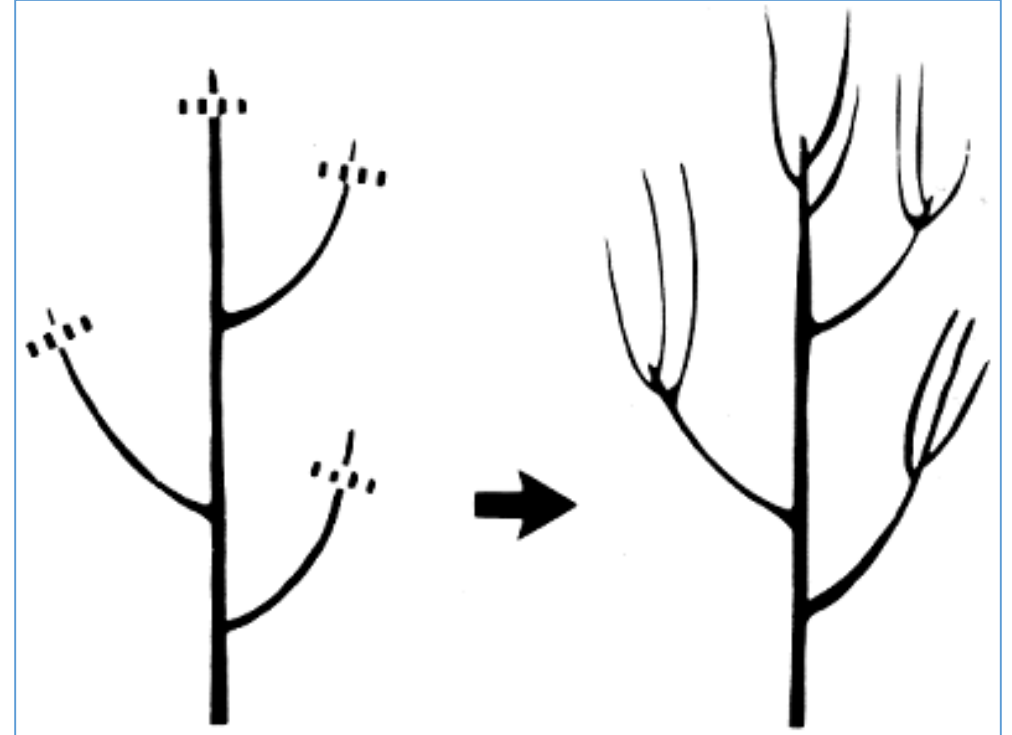
## Thinning Cut:

- Remove the entire branch
- Redirects growth to remaining branches
- Open's up the canopy



## Heading cut:

- Remove top of a branch
- Encourages branching below the cut
- Makes a denser canopy





# Walnut Training Trials

To head or not to head?

Planted in Brentwood in 2011

1. Chandler - more vigorous

With Mark Maggiore, Maggiore & Sons

2. OR Howard - less vigorous

With Jason Tennant, Houston Orchards



# Chandler Training Trial

Maggiore & Sons, Brentwood  
vigorous site



# Chandler – after the 2<sup>nd</sup> leaf

Rootstock	Reps	No. Spurs & Branches
<b>PARADOX</b>		
Pruned	18	12
Unpruned	18	18
		P=.000
<b>OWN ROOTS</b>		
Pruned	59	11
Unpruned	59	14
		P=.000

Unheaded





# Chandler – after 2nd leaf

Unheaded



Modified Central Leader





# Chandler/PDX – after 3<sup>rd</sup> leaf

Unheaded

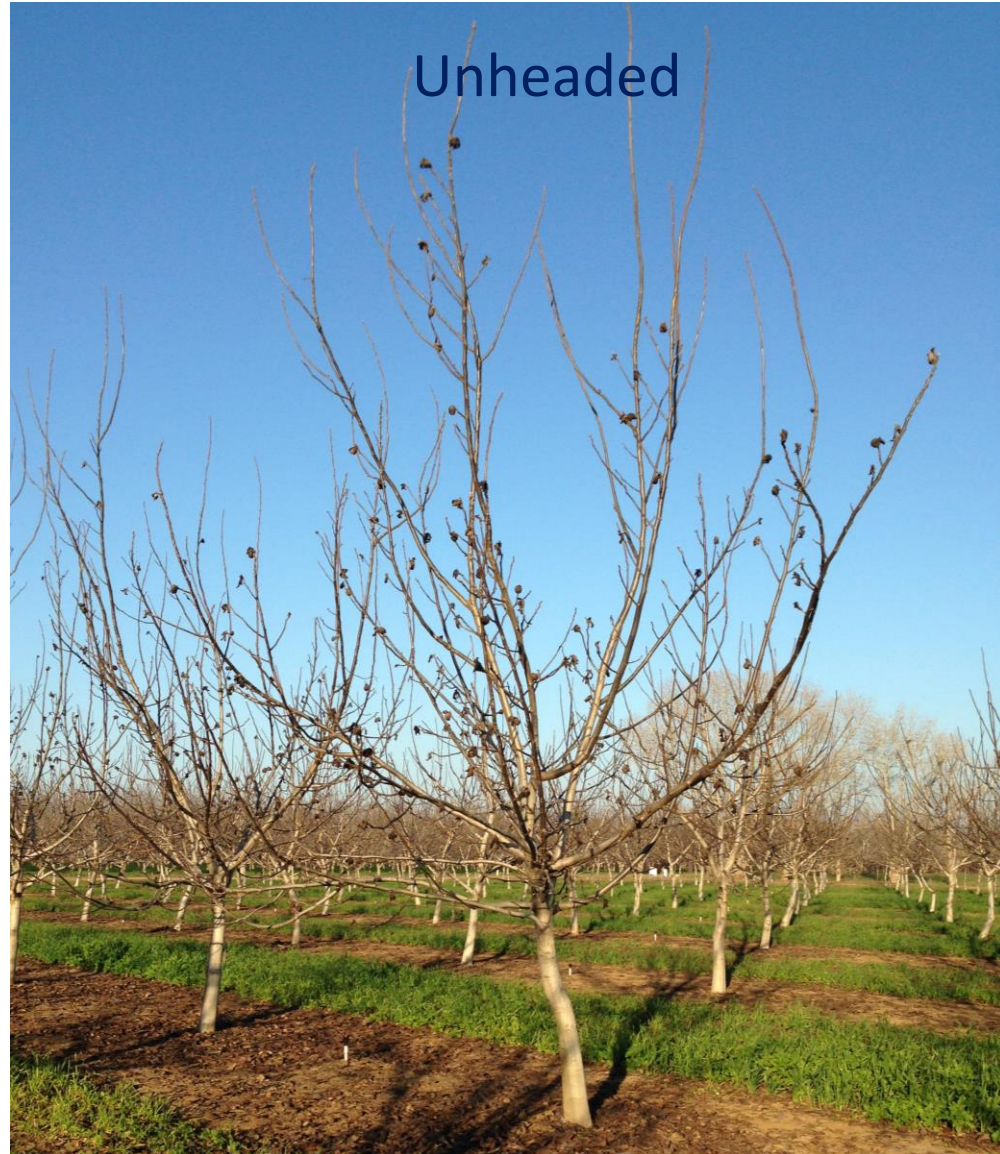


Modified Central Leader





# Chandler/PDX – after 4th leaf



# Chandler: Diameter (cm)

Rootstock	Reps	<u>After 2<sup>nd</sup> leaf</u> Nov 2012	<u>After 3<sup>rd</sup> leaf</u> Feb 2014	<u>After 4<sup>th</sup> leaf</u> Jan 2015
<b>PARADOX</b>				
Pruned	18	7.2	11.3	14.0
Unpruned	18	7.5	10.7	13.2
		NS	NS	NS
<b>OWN ROOTS</b>				
Pruned	59	7.2	11.9	14.4
Unpruned	59	7.2	11.9	14.2
		NS	NS	NS

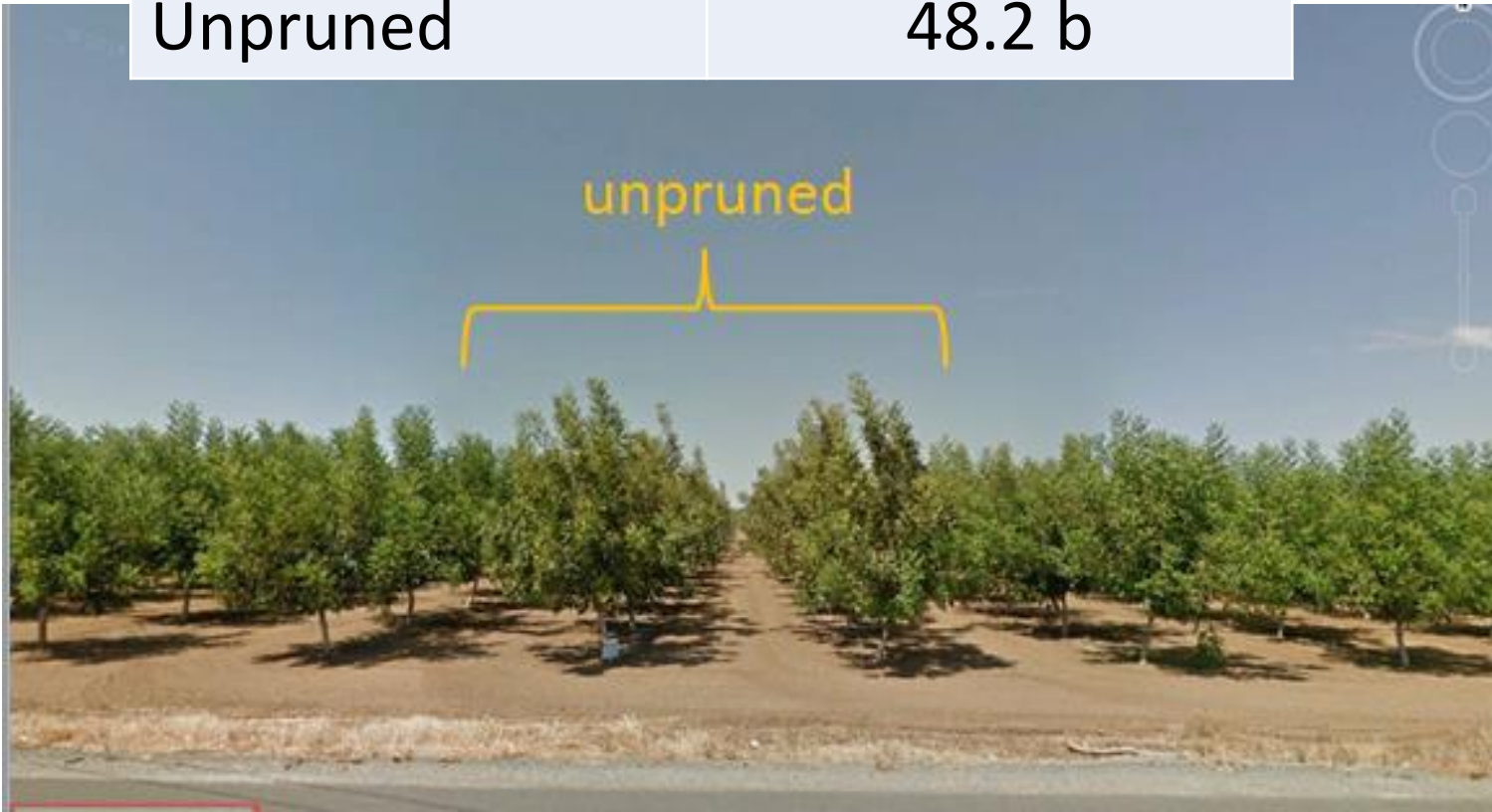
# Chandler: Height (feet)

Rootstock	Reps	<u>After 2<sup>nd</sup> leaf</u> Nov 2012	<u>After 3<sup>rd</sup> leaf</u> Feb 2014
<b>PARADOX</b>			
Pruned	18	12.9	17.7
Unpruned	18	14	18.2
		<u>P=.02</u>	<u>NS</u>
<b>OWN ROOTS</b>			
Pruned	59	12.3	16.8
Unpruned	59	12.3	17.9
		<u>NS</u>	<u>P=.000</u>



# Chandler: % Shading (PAR)

<u>Rootstock</u> (own roots)	<u>After 4th leaf</u> Oct 2014
Pruned	55.8 a
Unpruned	48.2 b





# Howard Training Trial

Jason Tennant, Houston Orchards, Byron



# Howard – after the 2<sup>nd</sup> leaf

- Lower vigor variety
- Low vigor portion of the field

Rootstock	Reps	No. Spurs & Branches
OWN ROOTS		
Pruned	13	10.5
Unpruned	13	9.4
		P=.07





# Howard – after 2nd leaf

Unheaded



Modified Central Leader





# Howard – after 3<sup>rd</sup> leaf





# Howard – after 4th leaf



# Howard: DIAMETER (cm)

Rootstock	After the 2 <sup>nd</sup> leaf	After the 3 <sup>rd</sup> leaf	After the 4 <sup>th</sup> leaf
OWN ROOTS			
Pruned	6.2	9.9	13.1
Unpruned	6.4	10.1	13.9
	NS	NS	P=.03

# Howard: HEIGHT (feet)

Rootstock	Reps	After the 2 <sup>nd</sup> leaf	After the 3 <sup>rd</sup> leaf	After the 4 <sup>th</sup> leaf
OWN ROOTS				
Pruned	13	10.6	14.2	18.5
Unpruned	13	10.0	14.4	19.9
		NS	NS	P=.02



# Howards – 4<sup>th</sup> leaf: % Shading (PAR)

Rootstock	4 <sup>th</sup> leaf
Pruned	48.8 a
Unpruned	55.8 b





# Howard – 4<sup>th</sup> leaf

## YIELDS



Unpruned



Pruned



Rootstock	Reps	Yield (lbs/tree)	Yield (lbs/acre)
Pruned	13	1.9	144
Unpruned	13	8.9	673
P= .000			

# Looks promising!

## Questions for the future:

- Will the trees fill in the space in a standard planting?
  - The early Lampinen trials were in hedgerow plantings
  - They have filled in their space by year 6-7
- Can the Non-Heading approach replace hedgerows?
  - Earlier harvest like hedgerows
  - Without hedging -> maximize yields on mature trees (years 8 to 30+)
  - Lower cost with minimal early pruning & fewer trees



# 2014 Update: Merced County Walnut Minimal Pruning Trial

David Doll  
UCCE Merced  
3-12-2015

# Findings after 4 years:

As of 2014, 4th leaf walnut yields of unheaded trees have cumulatively out yielded headed and delayed headed treatments, even though 2014 yields were similar.

Outside of the increase in yield, there were no differences in trunk diameter or light interception of the three treatments.



# Project Collaborators:

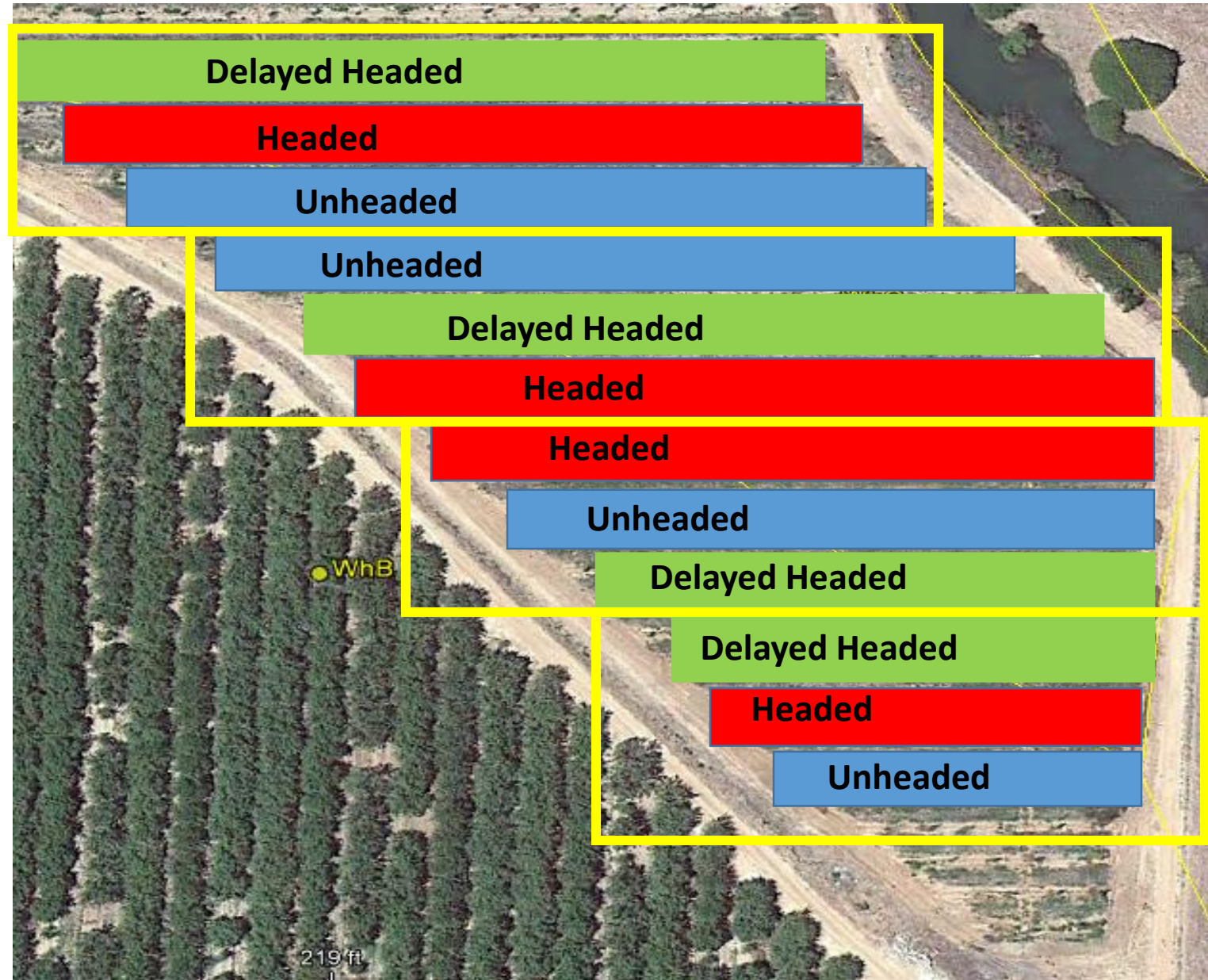
- Castle Farms – Hosting the trial
- Andrew Ray, Matt Jones– Support Staff
- Bruce Lampinen – UC Specialist
- Sam Metcalf – UC Davis Support Staff

# Plot Layout

- Planted in 2011
- Spacing 24'x22', 82 trees per acre
  - 'Chandler' on Paradox
  - Nelson R5 rotators
  - 396 trees total, 4.8 acres
- High Vigor Situation
  - Virgin Ground
  - 40 lbs N/acre (the grower reports)
- Dormant Heading Cuts: Early March
- Delayed Dormant Heading: Bud Break-April
- Delayed Dormant left unheaded in 2013



# Plot Layout



Block 1   Block 2   Block 3   Block 4

# Treatments: Beginning of Season 2012



**Unheaded**



**Delayed Headed**



**Headed**



# Treatments: Late May 2012



**Unheaded**



**Headed/Delayed**



# Treatments: Late June 2012



**Unheaded**



**Headed/Delayed**



# Treatments: Late August 2012



**Unheaded**



**Headed/Delayed**



# Treatments: End of Season 2012



**Unheaded**



**Headed/Delayed**



# Treatments: Pruning Year 3 - 2013



**Unheaded**



**Headed/Delayed**



# Treatments: Season 3-2013



**Unheaded**

**Headed**



# Treatments: After Year 3 - 2013



**Unheaded**



**Headed/Delayed**



# Treatments: After Year 4 - 2014



**Unheaded**



**Headed/Delayed**

# Treatment Growth

Treatment	Year 1 diameter change (mm)	Year 2 diameter change (mm)	Year 3 diameter change (mm)	Cumulative diameter change (mm)
Headed	21.5	30.4 B	78.4	108.8
Unheaded	22.6	35.3 A	78.5	113.8
Delayed Headed	21.6	32.5 AB	80.0	112.4

Different letters indicate different statistical groupings at  $p < 0.05$



# Treatment Yields

Treatment	2013 PAR%	2013 Yield (tons/acre)	2014 PAR%	2014 Yield (tons/acre)	Cumulative Yield (ton/acre)
Headed	24.8	0.350 B	48.1 A	1.36 A	1.70 B
Unheaded	24.6	0.675 A	49.3 A	1.57 A	2.25 A
Delayed Headed (left unheaded after 2013)	23.9	0.303 B	46.7 A	1.41 A	1.71 B

# Findings after 4 years:

As of 2014, 4th leaf walnut yields of unheaded trees have cumulatively outyielded headed and delayed headed treatments, even though 2014 yields were similar.

Outside of the increase in yield, there were no differences in trunk diameter or light interception of the three treatments.



# Current Thoughts:

- Yield and growth will be the same this point forward
- Making minimal thinning cuts from the ground on Unheaded trees, no more than 1-2 cuts/tree
- Did not observe much breaking in “stopped pruning trial.” Will keep watching it in 2015.

