



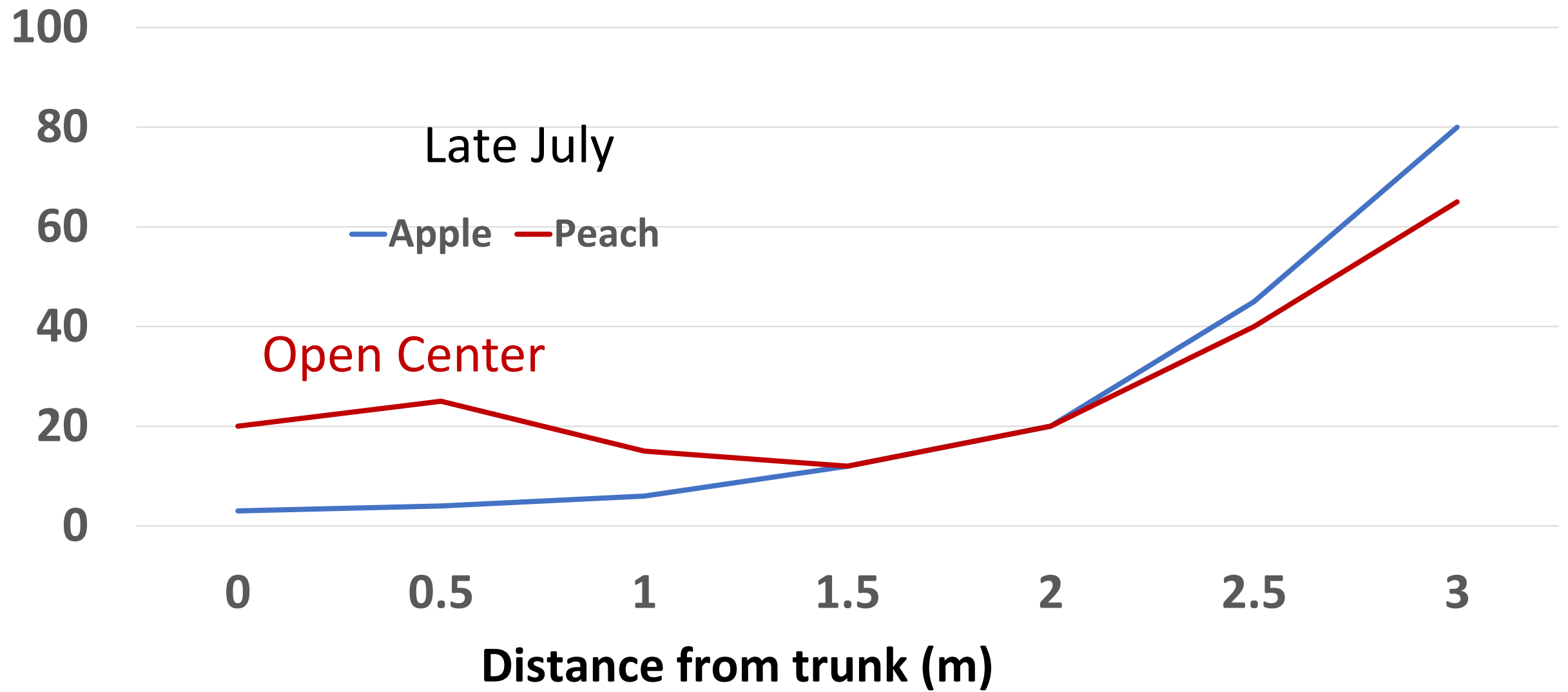
Pruning to Manage Crop Load and Enhance Cold Hardiness of Peach Flower Buds

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Why Prune Peach Trees?

- Maintain tree size & shape
- Maximize light interception & distribution
- Remove excess fruiting wood to manage crop load

% Ambient PAR Penetration in Apple & Peach Canopies



Light Requirements for 'Redhaven' Fruit

Exterior fruit receive about 20 to 22% full sun

Interior fruit receive about 5 to 7% full sun

Exterior fruit mature early, are larger, higher SSC, softer, less red
Relationship between firmness and ground color depends on light-with same ground color shaded fruit are softer

Flower development requires 25% full sun mid-June to late July



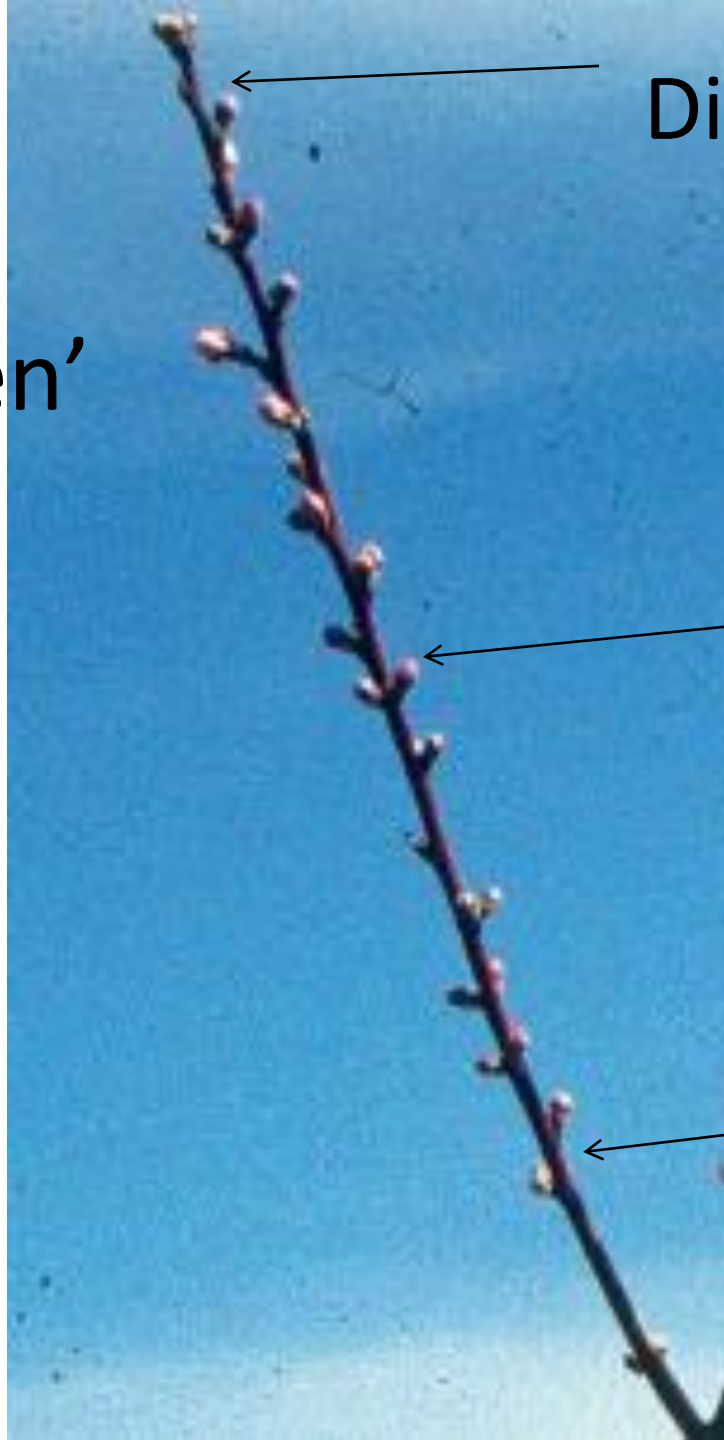
Peach Response to Summer Pruning

- Greater response to mowing than pruning
- Slightly increases light
- Fruit is slightly redder, smaller, lower SSC
- Delayed leaf drop & acclimation
- Slightly reduced early winter bud cold hardiness (2°F)
- Net profit over 2 years [crop value – (pruning + thinning)]
 - Dormant pruned: \$3,391/A/Yr
 - Summer pruned: \$3,318
 - Summer mowed: \$3,007

Fruit Position on a Shoot?

- **Common recommendation: space fruit 6" apart on a shoot**
- Blake (1925) – terminal fruit largest
- Spenser & Couvillon (1975) - terminal fruit largest
(1 harvest)
- Corelli-Grappadelli & Coston (1991) – distal fruit largest
(multiple harvest)

18" 'Redhaven'
Shoot



Distal or terminal

Middle

Basal

Fruit weight is not influenced by shoot position 'Redhaven'

Lateral shoots

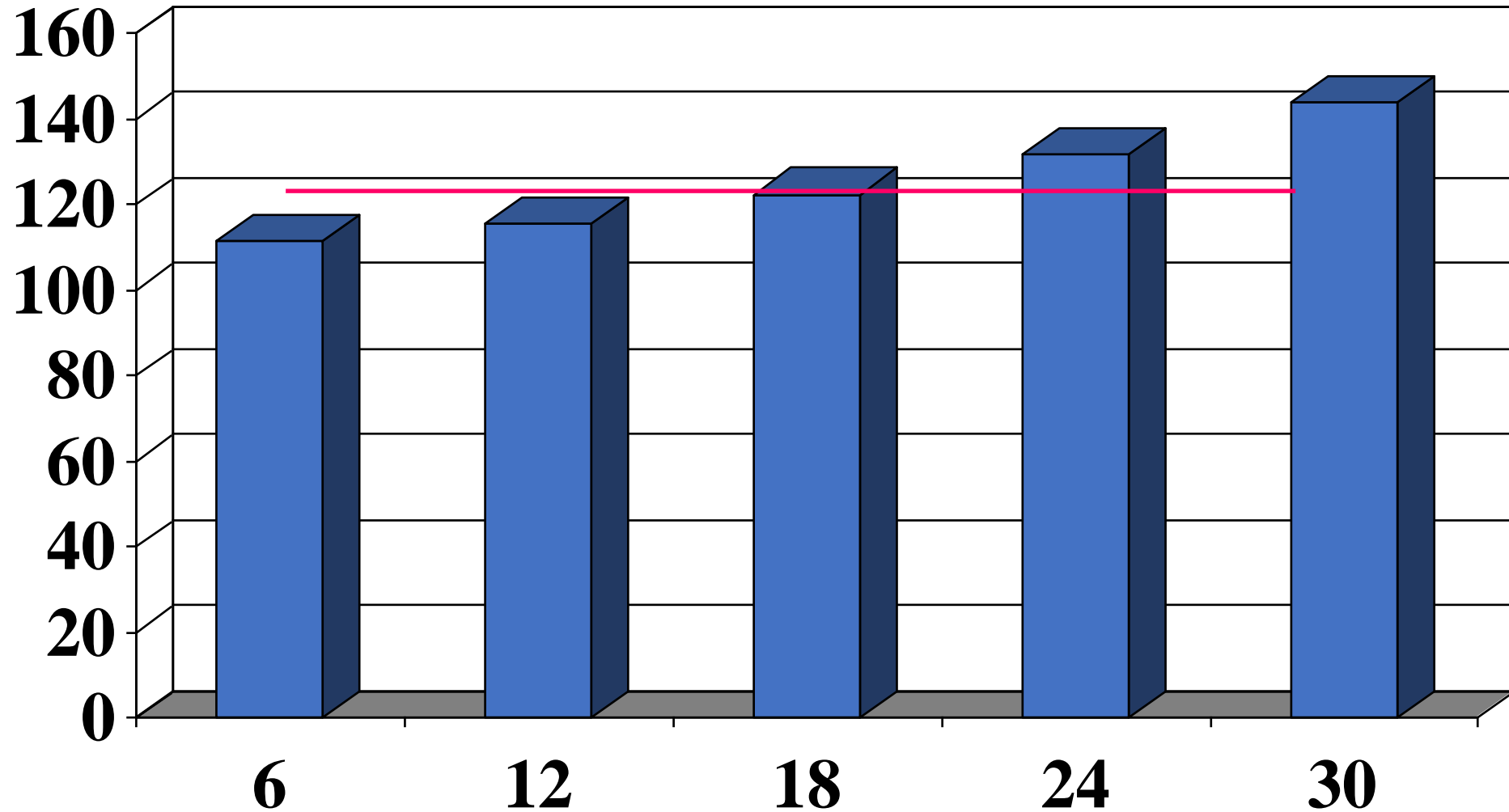
Fruit Position	No	Yes	Mean
Distal	88 b	116 ab	102
Middle	87 b	121 a	104
Basal	98 a	107 b	104
Mean	91	115	

Rather than spacing,
retain largest fruit



Long Shoots Produce Big Fruit

FW vs. Length (inches)



Consider Shoot Quality

Long shoots produce longer terminal shoots with more lateral shoots and leaves

More leaves per shoot = larger fruit

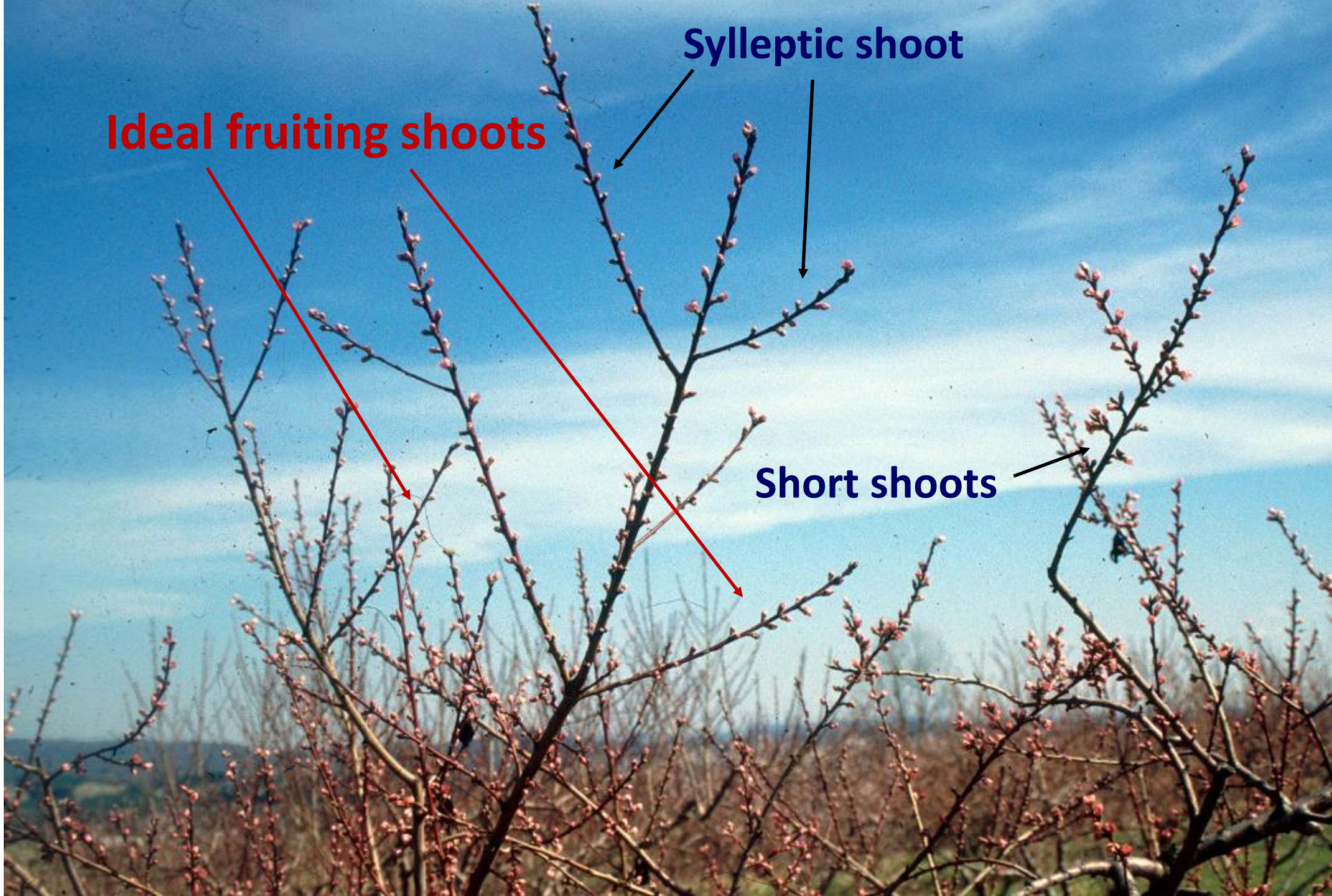
While thinning, Retain largest 3 or 4 fruit on a shoot

Space to avoid fruit crowding (3" apart)

Retain fruit at nodes with lateral shoots

Retain Fruit at Nodes With Lateral Shoots





Ideal fruiting shoots

Sylleptic shoot

Short shoots

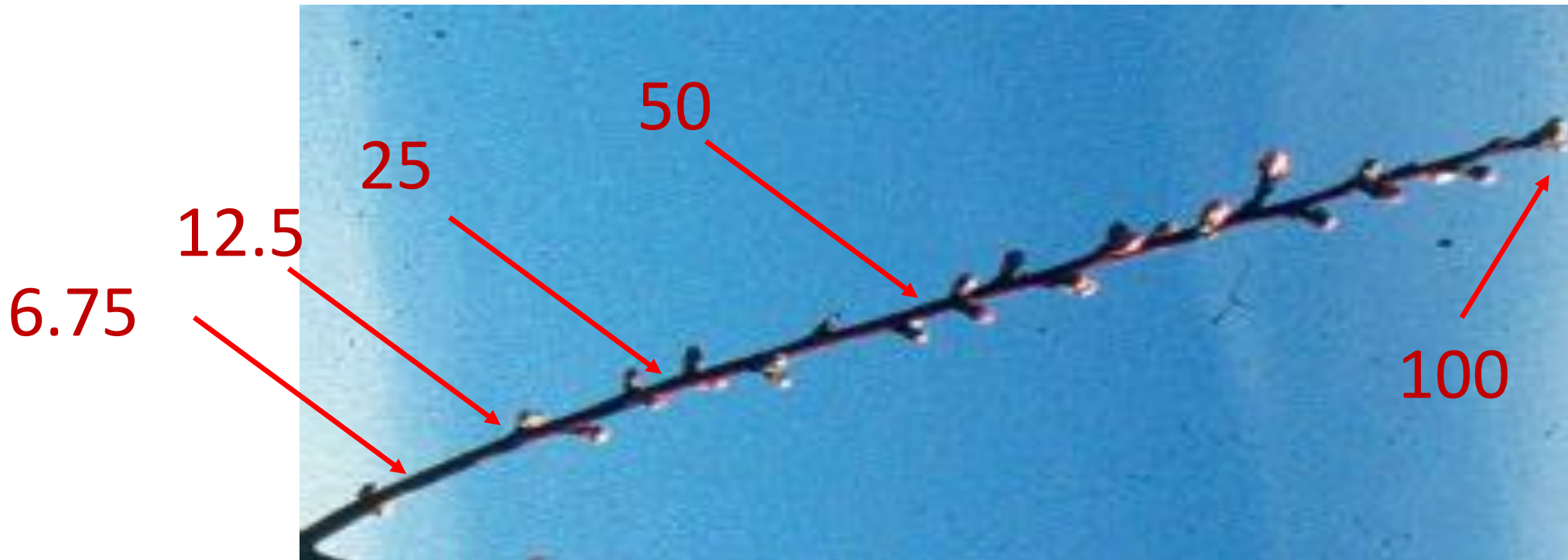
Managing Crop Load

- **Prune excessive fruiting shoots**
- **Bloom thin**
- **Hand thin by 45 days after full bloom**

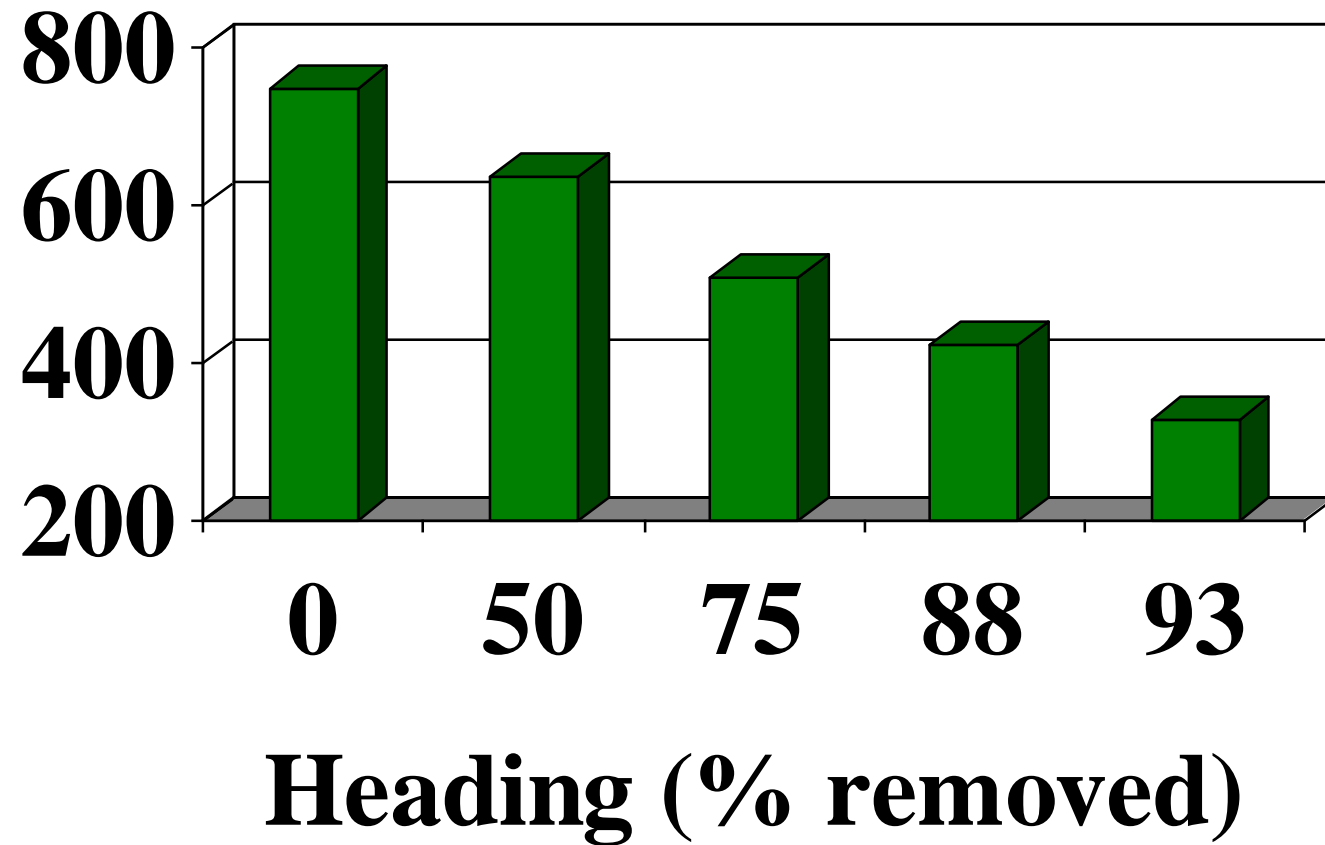
- **The number of fruit to remove depends on the number of fruits that set, which is related to the number of shoots/tree and buds/shoot**

Shoot Heading vs. Bloom Thinning 'Cresthaven'

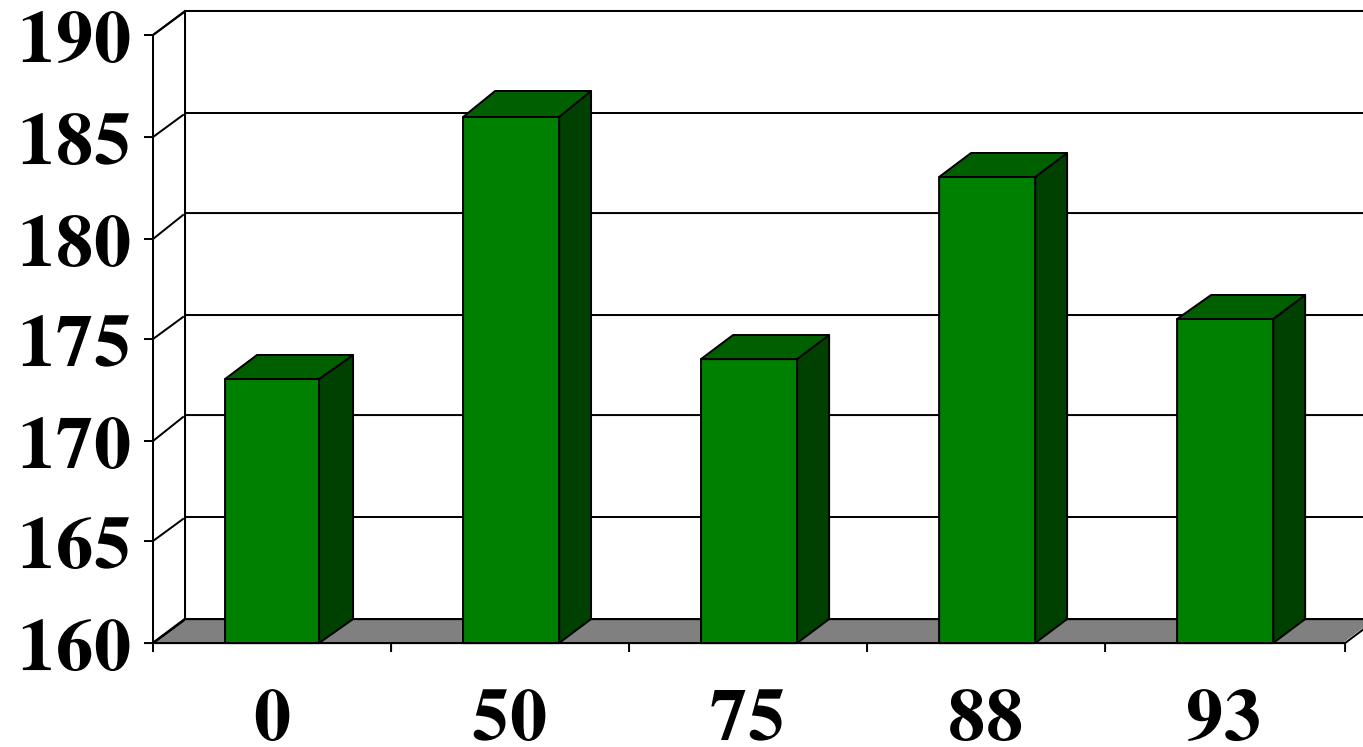
- Expt. 1 & 2: BT or SH and hand thinned to a range of CDs 3 to 9 fruit/cm² TCA
- Expt. 3: Varied BT or SH severity to retain 100, 50, 25, 12.5, 6.75%



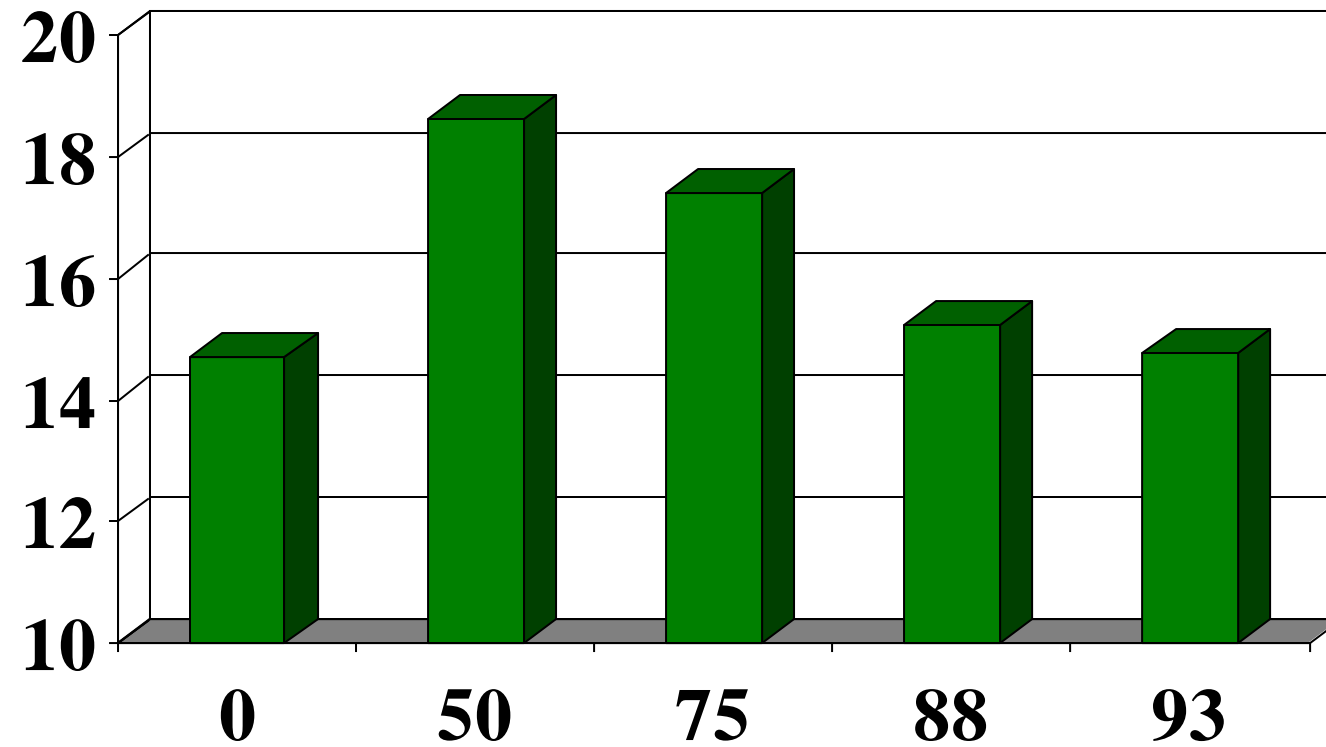
Heading Reduced Fruit Set/tree



Average fruit weight (g)



Crop value (\$/tree)



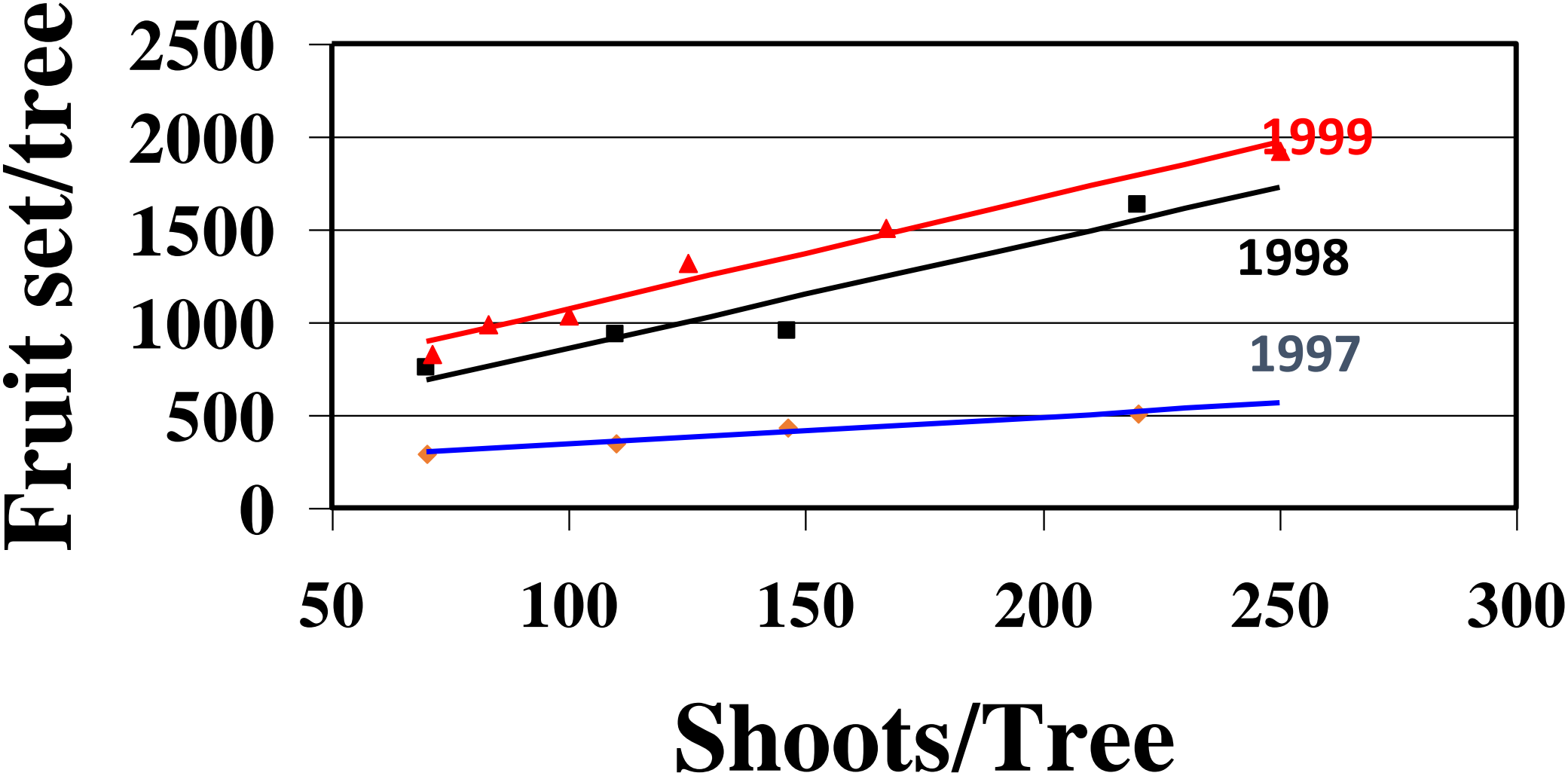
Summary of Shoot Heading (SH) & Bloom Thinning (BT)

- SH & BT were similar, BT had slightly fewer fruit & less crop value than SH
- Fruit set/tree & fruit thinned/tree declined linearly with severity
- Severity did not affect fruit harvested/tree, CD, FW or crop value
- Both reduced thinning costs with little effect on crop value
- Heading all shoots is time-consuming, but less than bloom or fruit thinning

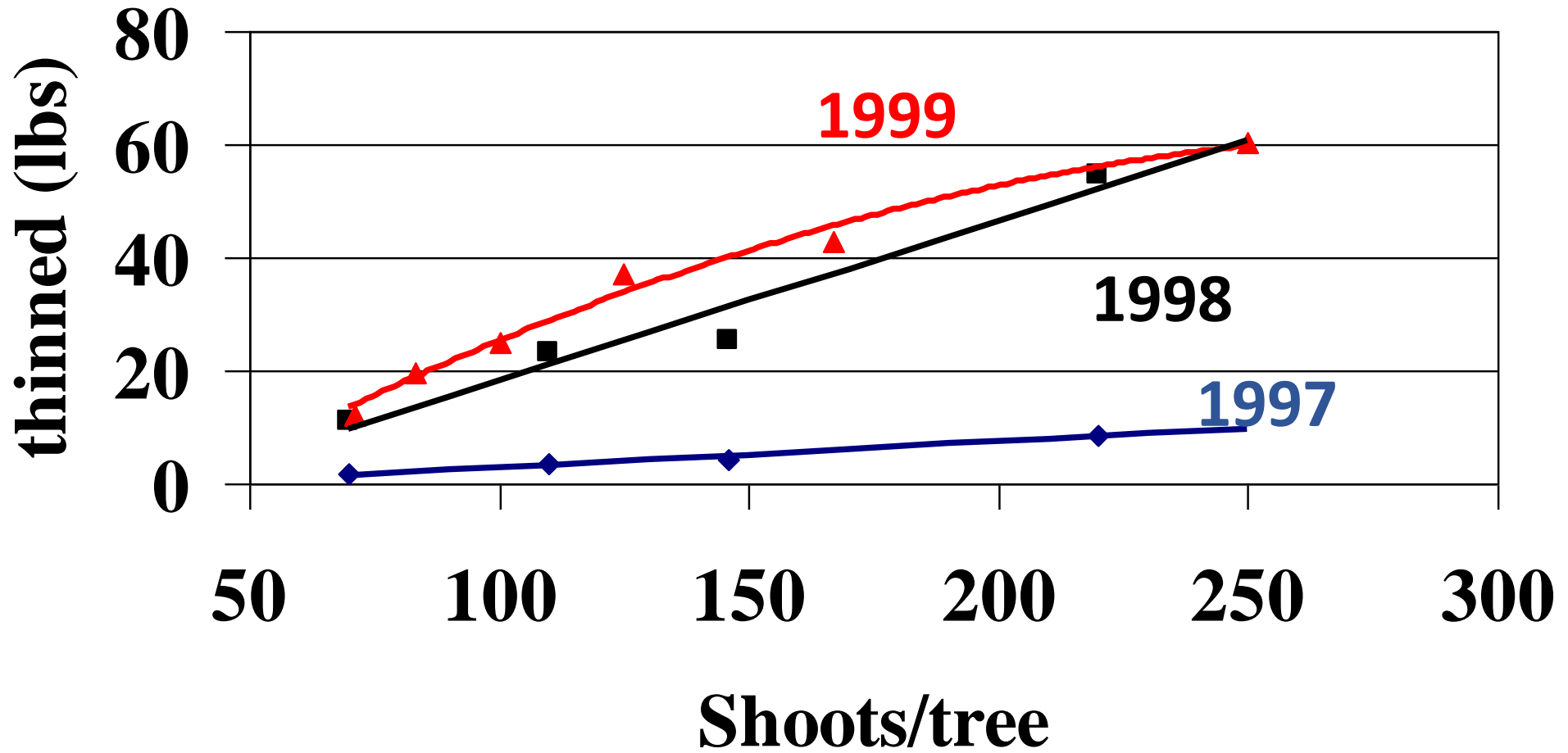
Number of buds/tree is related to Number of shoots/tree

- Over 3 years, 'Cresthaven' trees were thinned to retain varying numbers of shoots/tree (70 to 250)
- Removed all shoots shorter than 12"
- Fruit thinned at 40 DAFB to about 440 fruits per tree, based on previous experience with these trees
- Some years crop load was less than desired due to frost

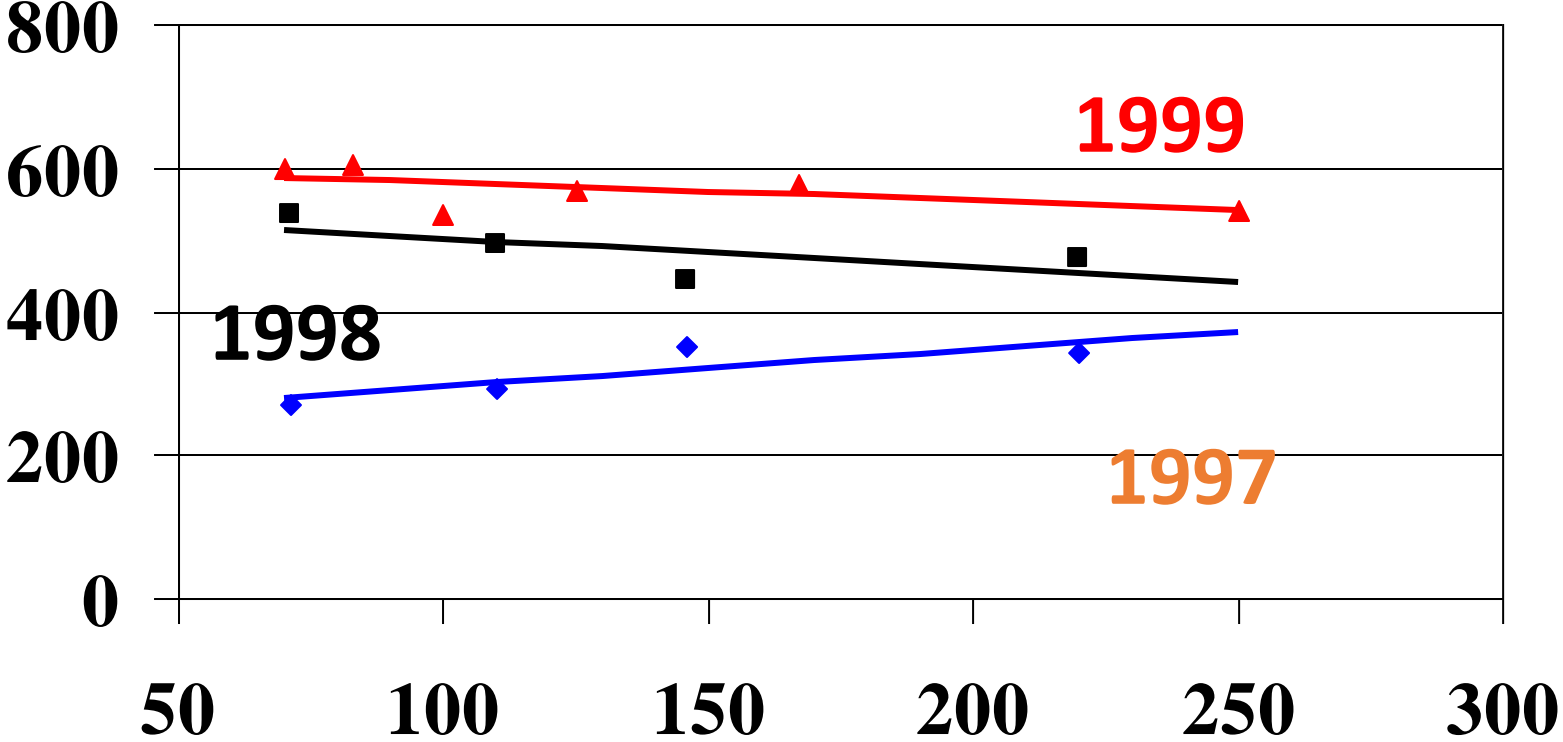
No. Fruit Set per Tree



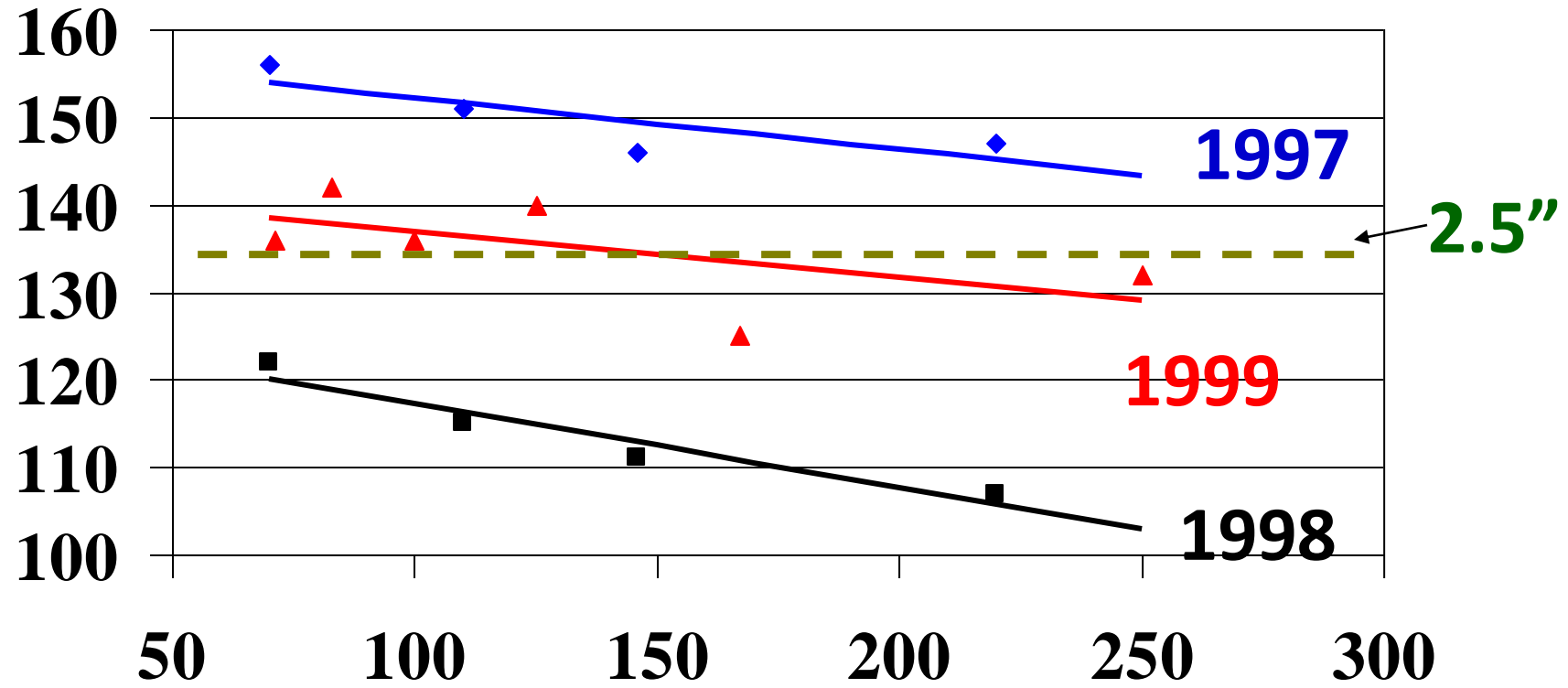
Fruit thinned (lbs/tree)



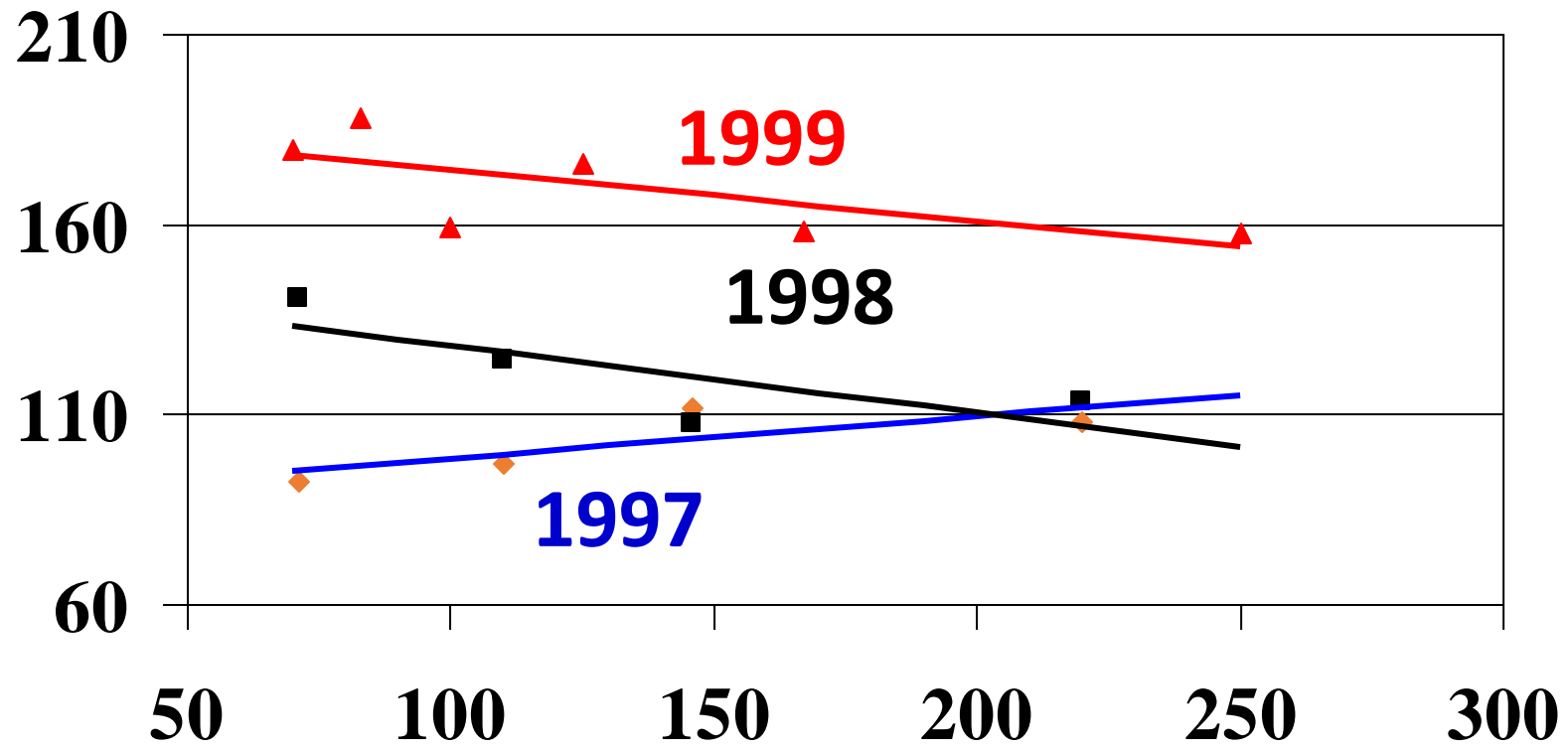
No. Fruit Harvested



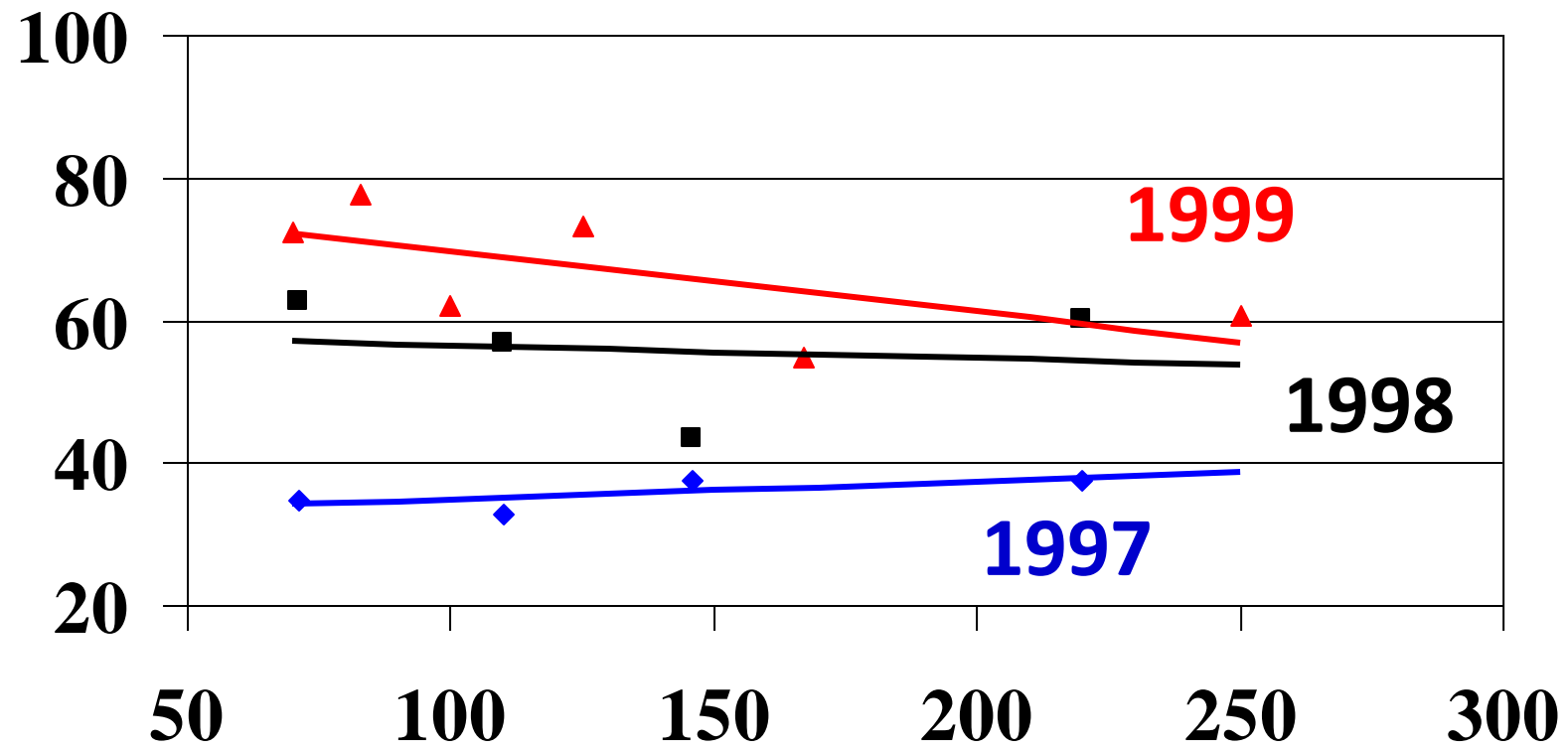
Fruit wt. (g)



Yield (lbs/tree)



Crop Value (\$/tree)



Costs (\$/tree) @ \$7.00/hr

Activity	70	220
Pruning	1.87	1.40
Thinning	1.52	7.35
<hr/>		
Total/Tree	3.39	8.75
Total/Acre	508.50	1,312.50

Net Profit [Crop value – (pruning + thinning costs)]

Years with poor set: - \$688/acre

Years with heavy set: + \$2,429/acre

**Severe pruning is profitable if
fruit set is heavy 1 year out of 3**

Shoot Pruning to Manage Crop Load

- **Can develop a cropping strategy**
- **Determine number of fruit/A**
- **Calculate number of fruit/T**
- **Calculate number of shoots/T**
- **Retain desired number of fruit per shoot**

Provisional number of fruit per acre

Variety size	fruit/acre	Shoots/acre
Large	100,000	20,000
Medium	70,000	15,000
Small	45,000	9,000

Our 'Cresthaven':

$150 \text{ trees/A} \times 440 \text{ fruit/tree} = 66,000 \text{ fruit/A}$

Crop Load Management Strategy for 'Loring'

Target Crop Load is 100,000 fruit/A

Trees/A	100	500
Fruit/A	100,000	100,000
Shoots/A	20,000	20,000
Shoots/T	200	40
Fruit/shoot	5	5

Suggestions for pruning

- Remove all shoots less than 6" long
- Remove all shoots with sylleptic branches
- Remove shoots hanging below the vertical
- Retain about one fifth as many branches as the desired number of fruit
- Thin Fruit to Retain 5 fruit/shoot

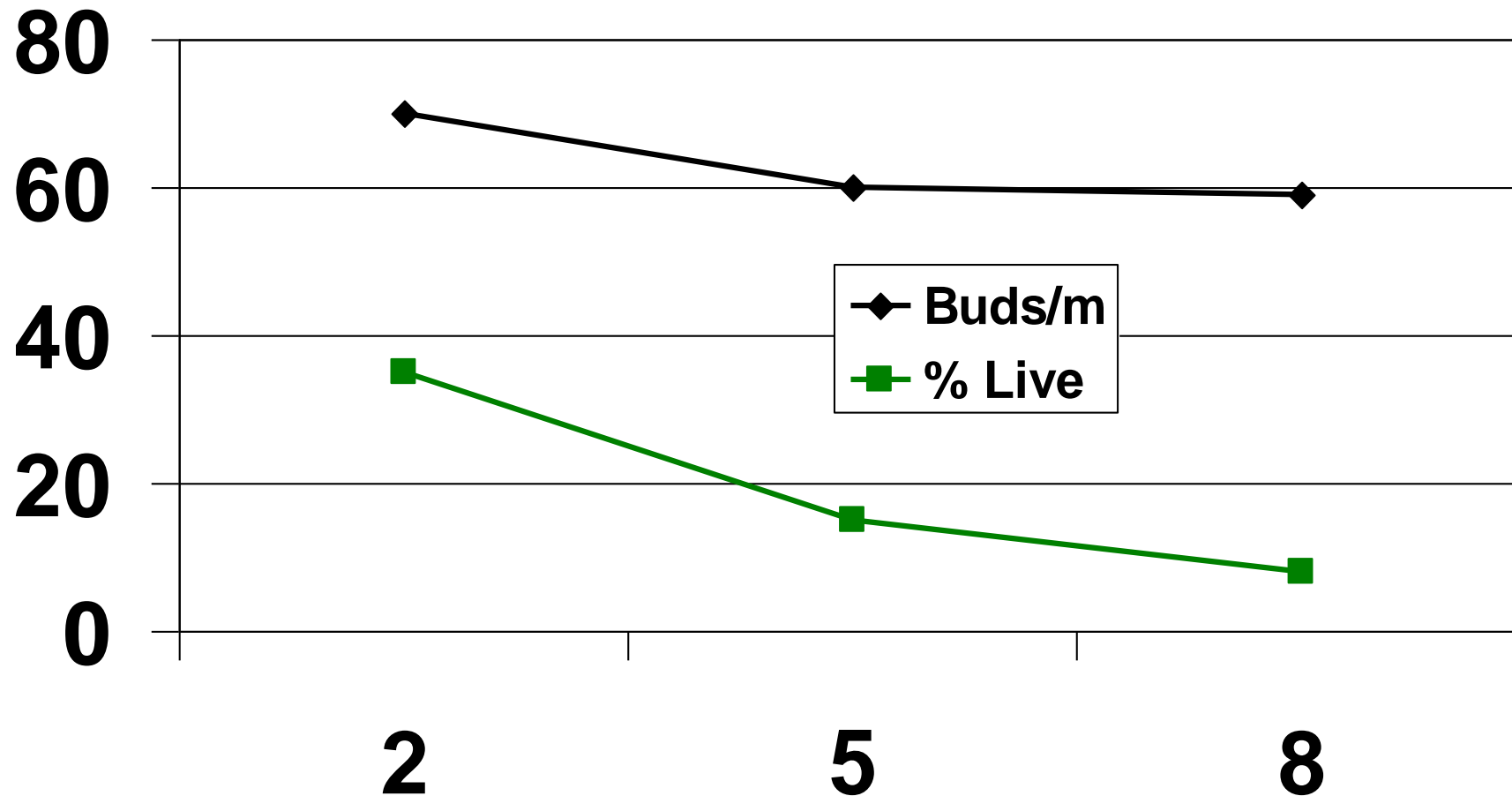
Crop Load Influences Flower Bud Cold Hardiness

- Byers – thinned ‘Cresthaven’ trees at 0, 38 or 68 DAFB
- Marini – thinned ‘Redhaven’ & ‘Cresthaven’ to CDs of 1.8 to 11.3 fruit/cm² TCA
- The following spring we counted total buds/shoot, live buds/m of shoot length
- Winchester - 3 frosts of -3, -6, and -8 C at early swell, no pink

Cresthaven Bud density and survival effected by thinning Winchester

Thinned (DAB)	Buds/m	% Live buds
0	83	33
38	68	22
68	54	18

RH Bud density & buds surviving a frost in pink as affected by CD the previous season



Anecdotal Observations

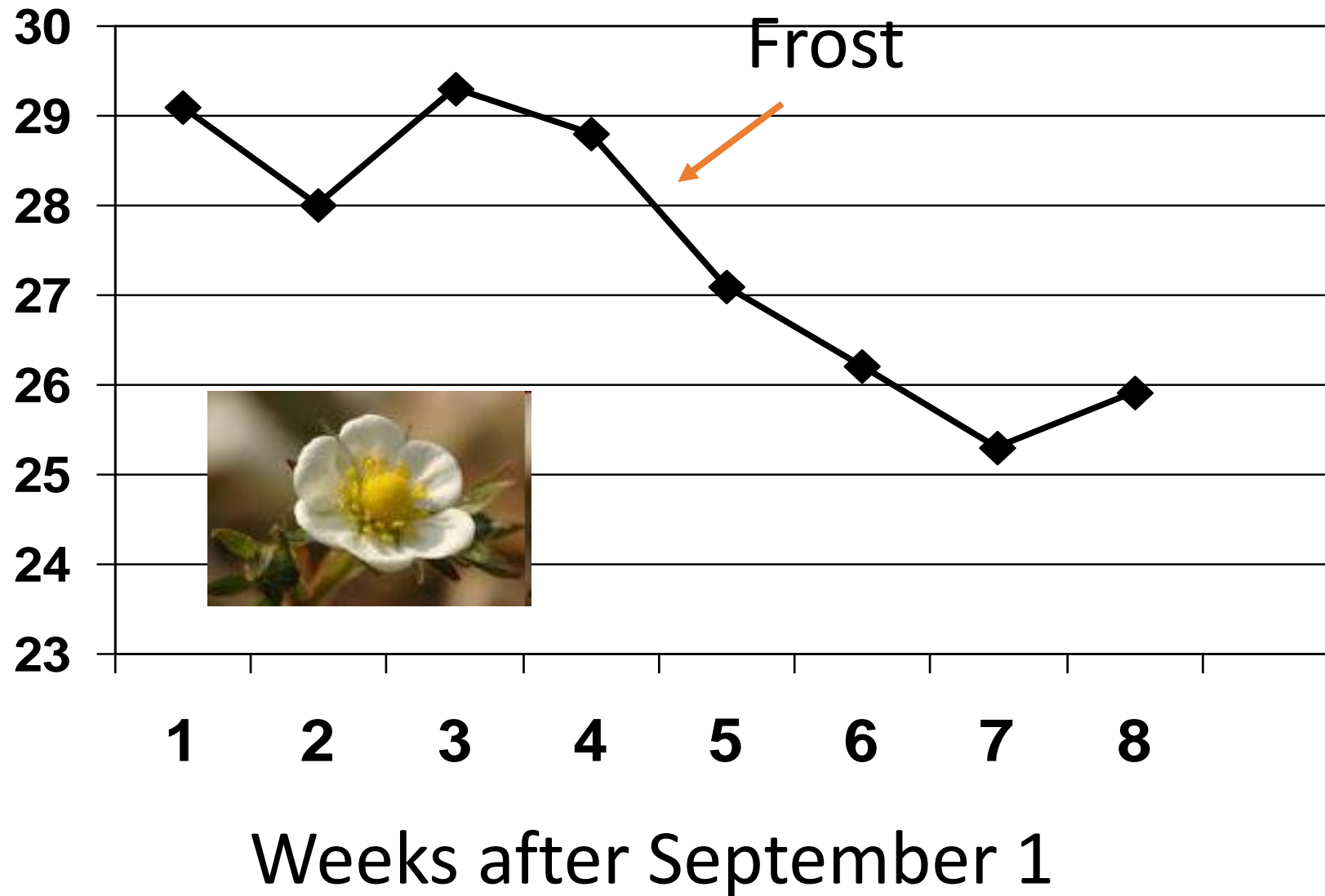
Cream ridge, NJ

- 1982 – heavy crop
- 1983 – no crop following -12°F
- 1984 – half crop following -14°F

Blacksburg, VA

- 1996 – Pruned 2 rows of ‘Cresthaven’ at pink 2 days before a frost
 - Pre-bloom pruned trees had 1/3 of a full crop
 - Post-bloom pruned trees had full crop, needed thinning

Strawberry flower acclimation (°F)



Further Research Needed

- **When during dormancy are trees most affected by pruning?**
- **To what extent does pruning reduce hardiness?**
- **How long after pruning and for what duration is hardiness reduced?**
- **Is hardiness related to pruning severity?**
- **Does pruning affect all parts of the tree?**
- **Can trees reacclimate after pruning?**

Questions?





Fruiting shoot

One-year-old shoot
with flower buds





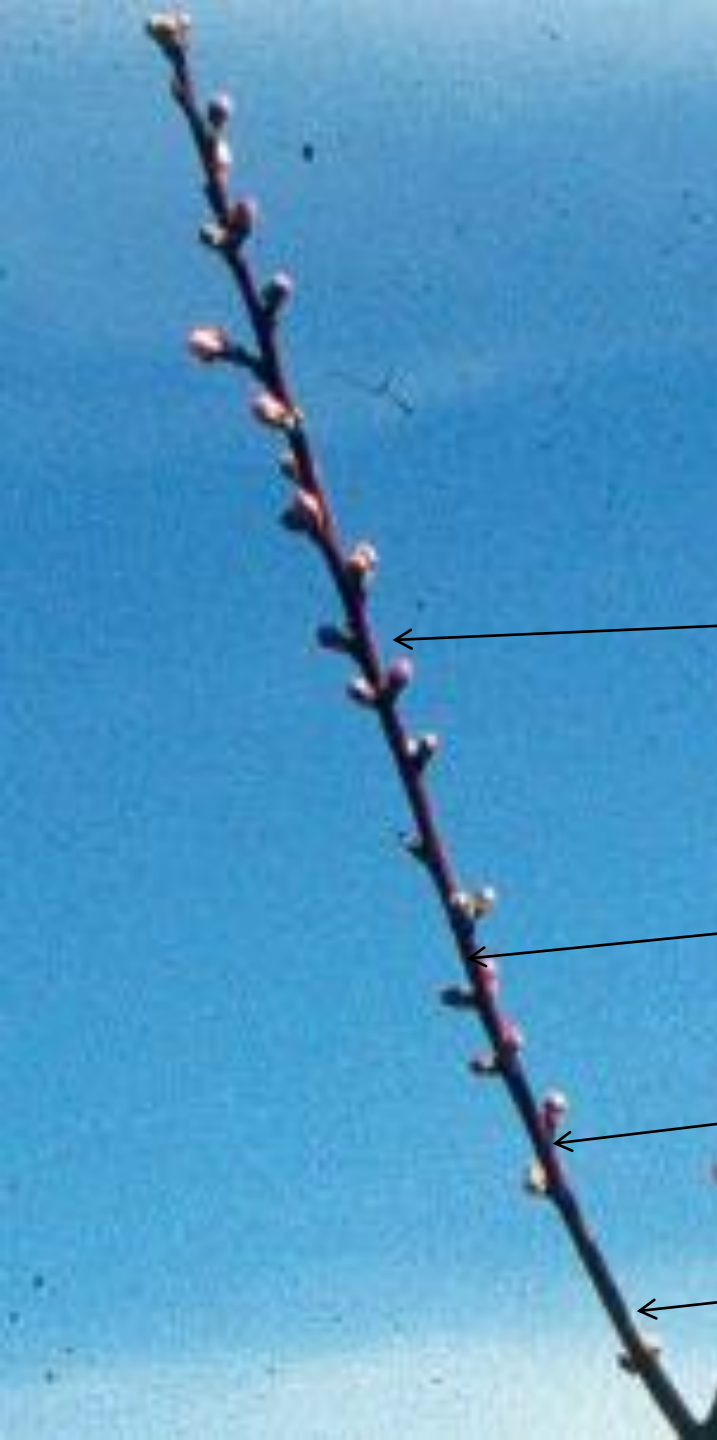




SH vs. BT (50%) to Manage Crop Load on 'Cresthaven' and thinned to CD~ 6 fruit/cm² TCSEA

	Fruit/tree				Yield	FW	Net
	Set	Thinned	Harvested	CD	(Kg/T)	(g)	(\$/Tree)
CK	1359	955	403	6.8	53.2	134	23.70
BT	1037	699	368	6.4	50.4	141	22.80
SH	1162	809	354	5.6	47.3	138	20.70
Sign.	0.06	0.05	0.45	0.01	0.58	0.34	0.53

Heading Shoots (SH) vs. Blossom Thinning (BT) to Manage Crop Load



50%

(% Removed)

75%

88%

93%