

Final Report for Peach Proposal for 2002, 2003 and

2004

PROJECT NO: BJKC-72

TITLE: Influence of Blossom Thinners in Commercial Peach Cultivars on Fruit Set and Effects of Training and Crop Load Adjustment on Fruit Quality in 'Snow Giant' Peach

PERSONNEL: Project Leader: Dr. Essie Fallahi, Professor and Director of Pomology, University of Idaho, Parma Research and Extension

Technical Support: Bahar Fallahi and Benito Morales, University of Idaho.

ADDRESS: University of Idaho, Parma Research and Extension Center 29603 U of I Lane, Parma, Idaho 83660

COOPERATION: Watson's Orchards, Henggeler Orchards and Williamson Orchards. Dr. Jim Mc Ferson will be cooperating in the blossom thinning.

NAME AND ADDRESS OF ADMINISTRATOR: Dr. Jeff Stark, Aberdeen Research and Extension Center, , University of Idaho 1776 science center Dr Suite 205
Idaho falls Idaho 83402-1575
Tel 208-529-8376
Email Jstark@uidaho.edu

SIFNIFICANT FINDINGS:

- 1. Lime sulfur at 6% effectively thinned peaches and plums in some years but not every year.**
- 2. Teritol effectively thinned peaches in various orchards in Idaho and Utah and Washington during 2003 and 2004. Other than hydrogen cyanamide, Tergitol is the most effective blossom thinner we have experienced with for peach and plum thinning.**
- 3. The most effective concentrations for thinning is between 0.75% to 1.2%. Concentrations at 2 and 3% results in over thinning.**
- 3. Tergitol at 0.75% and 1% significantly reduced fruit set in Empress plum and reduced the needs for hand thinning by about 50%.**
- 4. Tergitol did not have any adverse effect or fruit marking on peaches or plums.**
- 5. Time of application is very important and we intend to continue or research with Tergitol and "fine tune" the timing of application in 2005 and 2006 seasons.**

OBJECTIVES

- 1) To experiment with Tergitol TMN-6 blossom thinner in peaches. This experiment will be in conjunction with Dr. Jim Mc Ferson and peach and perhaps other stone fruit growers in Washington.

- 2) To study the effects of different numbers of "hangers" (crop load) on fruit yield, color, and quality in 'Snow Giant' peach.

Methods:

Methods for Blossom Thinning Experiment:

For Year 2002:

The experimental design was a completely randomized design with at least 8 trees per treatments. Lime Sulfur and Natural Cal were used at different concentrations and timings during full bloom on various peach cultivars at different locations in Idaho. Three limbs per tree were selected and fruit set were measured by counting number of fruit per certain length of limb and dividing that number by the cross sectional area of limb. Fruit were sampled at harvest and fruit quality such as fruit size, color, russetting, and sugar were measured. Trees were sprayed with air blast sprayer at a rate of 200 gal/acre.

For Year 2003:

- a) **Soy Bean Oil Spray:** Three peach orchards (Elberta and August Lady) were selected in Sunny Slope, Idaho for prebloom soybean oil spray. The treatments were 6%, 8%, or water spray (control). The trees were sprayed with soybean oil about 7 weeks before anticipated bloom time at 200 gal/acre with an air-blast sprayer.
- b) Several peach and two plum orchards were selected in Idaho for 2003 blossom thinning experiment. In each orchard in Sunny Slope (Elberta and August Lady) peaches 4 rows were selected for the experiment with two buffer rows in between. In each of the two adjacent rows, 10 trees (total of 40 trees per treatment) were tagged and sprayed with Tergitol at 0.5%, 1%, 2%, 3% or with Fish Oil at 3%. The same number of trees were left unsprayed (control) on each row. The procedures were the same for Elberta, Red Globe, and Blazing star orchards in Fruitland Idaho, except only 6 trees per segments were sprayed. We also left unsprayed (control) for each cultivar. Fruit counting per limbs were conducted in the same manner as described for 2002 season.

In 2003, Trees were sprayed at 200 gal/acre rate at about 70-80% bloom in Sunny Slope and at Full-bloom (100% open) in Fruitland, Idaho.

For Year 2004:

In general, our methodology in 2004 were similar to those in 2003. Several peaches and plum orchards were sprayed with Tergitol at 0.5%, 0.75%, 1%, and/or 1.2%. In August Lady, blossoms were sprayed at 0.5%, 0.75%, and 1%, at 100 gal and 200 gal per acre rates. In other peach and plum cultivars, only 100 gal/acre rate was used. Fruit set, yield and effects on fruit marking were recorded.

Methods Crop Adjustment with Selecting Certain Number of Hangers: For this experiment, 'Snow Giant' peach trees on Lovell rootstock were planted at the University of Idaho Pomology orchard at 8 x 16.5 ft spacing. Trees were trained as a Y or QAD Vase shape in 2001 and 2002. In this portion of proposal, we had one of the four levels of runners per limb. These treatments are removing the one-year branches (hangers) out to one runner every 4, 8, 12, or 16 inches on of each leader of the tree. Fruit quality, maturity, color and size were evaluated in each treatment.

In 2003, we had two training methods (V shape or 2 Leader and 4-Leader). In each method, we had light pruning (hangers at 15 inches apart), Medium (hangers at 10 inches apart) and heavy (hangers at 5 inches apart). Pruning was conducted late March 2003 and 2004.

Results and Discussion:

Year 2001-2002: Lime sulfur at 6% effectively reduced the fruit set, and increased fruit size in 2001 (Figure 1). In 2002, however, a single application of lime sulfur was not effective on peach blossom thinning. Double application of lime sulfur or a single application of Natural Cal had a moderate effect on thinning in Sunny slope area of Idaho in 2002. Lime sulfur at 6% did not have any effect on blossom thinning in Elberta peach in Fruitland Idaho in 2002 (Figure 2). In Fruitland, Natural cal had a moderate effect on blossom thinning of 'Red Globe' in 2002 (Figure 3).

Results of Training and Crop Load Adjustment in 'Snow Giant': The effects of training on yield and quality are in Figure 4. Effects of training with each crops load adjustment are reported in table 1. Trees receiving a 2-leader training seemed to have higher yield, larger fruit with slightly higher sugar and color than those with 4-leader training (Figure 4).

Heavy crop treatment (more number of hangers) had higher yield and smaller fruits than those with other levels of cropping in both 2 and 4 leader trainings (Table 1). Medium level crop (hangers about 12 inches apart) had good size and overall satisfactory results.

Year 2003:

In all locations, Tergitol significantly reduced blossoms and fruit set in peaches in all different orchards (Figures 5-9).

Application of as low as 0.5% significantly reduced fruit set in Sunny Slope. Application of more than 1% was too much and resulted in over thinning (see Figures 5-9). Application of 1% Tergitol showed excellent results in Fruitsland, perhaps because we applied at 100% bloom. However, trees with 1% application had light crop in Sunny Slope because we sprayed at 70-80% bloom. In Sunny Slope, based on conditions of our experiment (about 80% bloom), it seemed that somewhere between 0.5% and 1% (perhaps 0.75%) is sufficient for effective bloom thinning. In Fruit Land, however, 1% resulted in excellent results, perhaps because we sprayed at full bloom. We would like to continue our experiment with Tergitol, as it seems to be THE BEST Blossom thinner we have ever tested for peaches and plums in many years.

We sprayed 'Empress' plums with 3% Tergitol in two locations. This concentration resulted in over thinning but not as drastic as in peaches.

Application of 3% Fish oil also reduced fruit set, but effects were not nearly as significant as Tergitol effects) Please see figures of 2003). .

TERGITOL IS VERY CHEAP!! And we think it has the potential to be an outstanding blossom thinner for stone fruits after registration. The cost will be about \$15/acre!!

No one has experimented with this new blossom thinner in the PNW and we are hoping to be able to receive the requested funding and to continue our experiment with fine tuning this chemical in both Washington and Idaho.

The crop load adjustment experiment showed that removal of hangers down to 10 05 15 inches apart on a leader will result in larger fruits but lower yields (Table 2).

Year 2004 (Figures 10, 11, 12, 13):

Results are shown in the following figures. In general, Tergitol at 0.75% and 1% often reduced fruit set in Zee lady and August lady peaches. Both rates of 100 gal/acre and 200 gal/acre were equally effective but 200 gal/acre was slightly better.

Tergitol at 0.5% and 0.65% applied at 250 gal/acre reduced fruit set in Elberta peaches. Tergitol at 0.75% and 1% and 1.5 % applied at 200 gal/acre significantly reduced fruit set in Empress plum (Figure 13)..

Figure 1. Effect of Organic Blossom Thinners on Fruit Set and Fruit weight of Peach in 2001

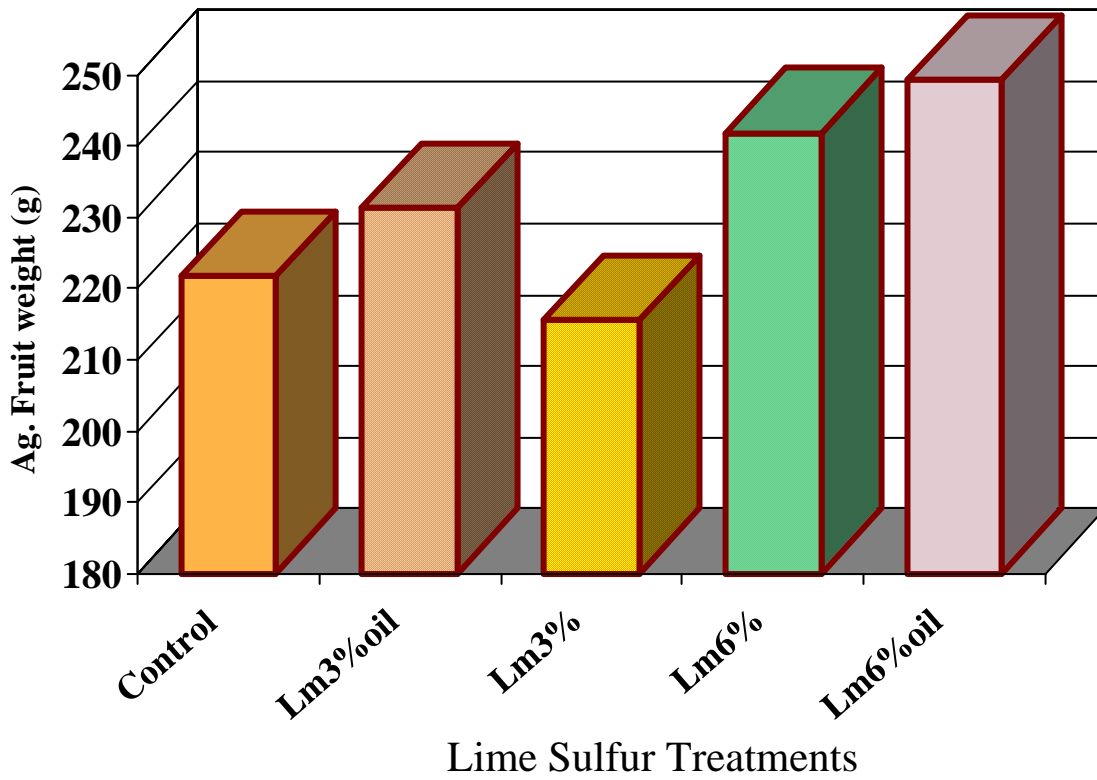
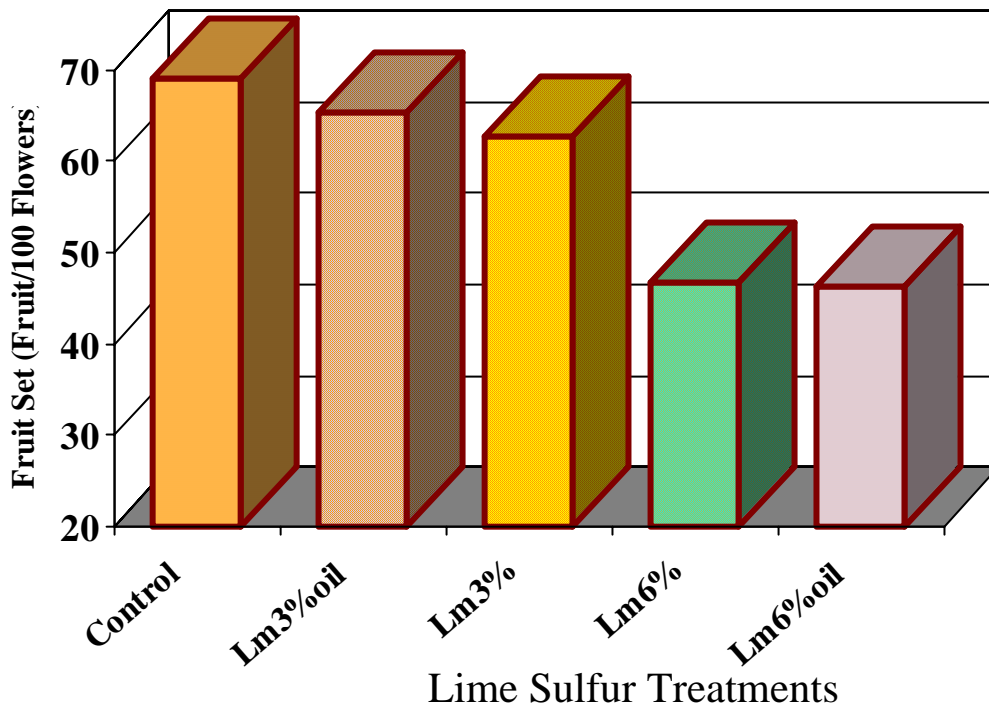
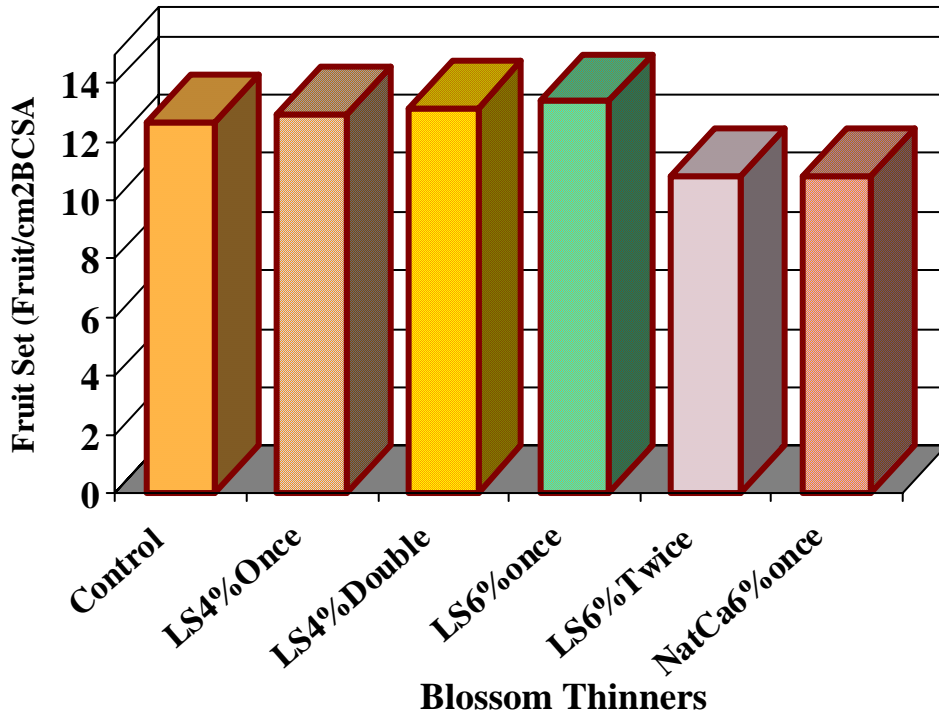


Figure 2. Effect of Organic Blossom Thinners on Fruit Set of Peach at Williamson's Orchard (top) and Fruitland Idaho , 2002



Effect of Organic Blossom Thinners on Elberta Peach Fruit Set, Fruitland, 2002

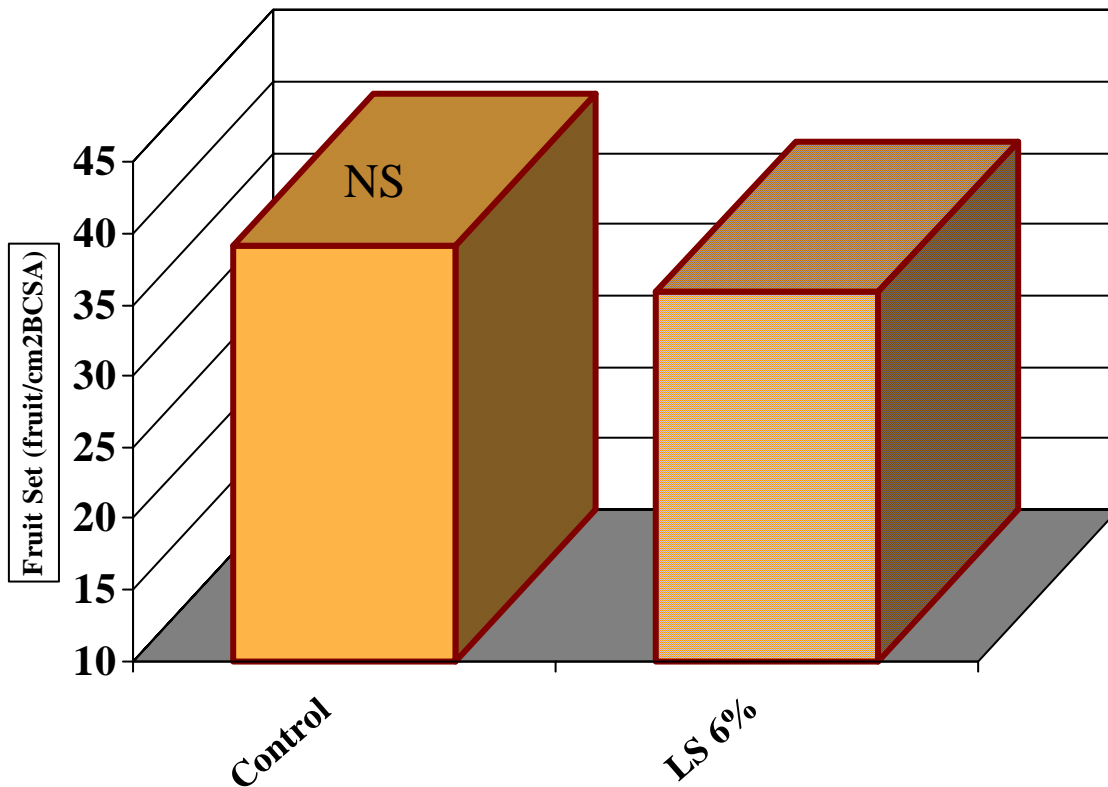
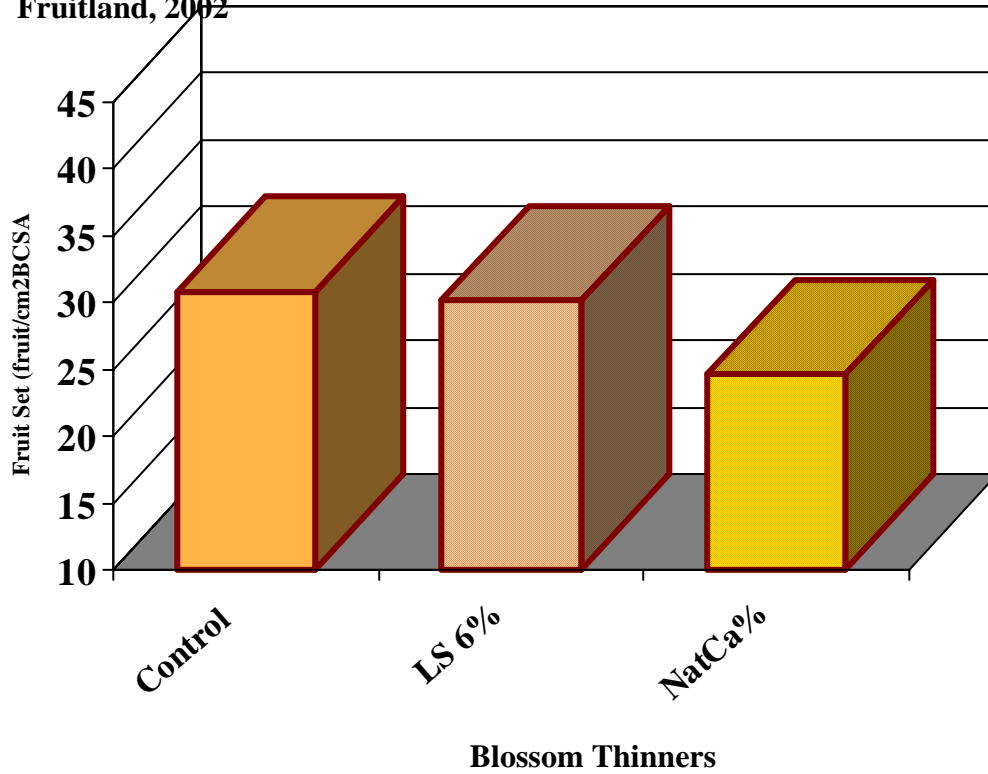


Figure 3. Effect of Organic Blossom Thinners on 'Red Globe' Peach Fruit Set, Fruitland, 2002



Effects of Lime Sulfur on 'Empress Plum' Thinning, 2001

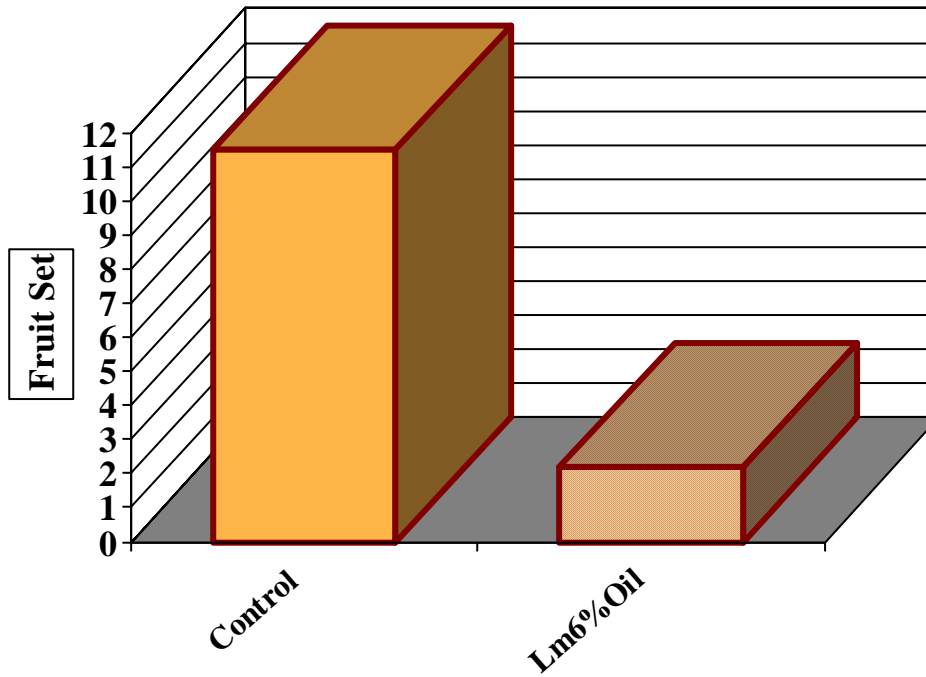


Figure 4. Effects of Training on Yield and Fruit Quality of 'Snow Giant' Peach, 2002

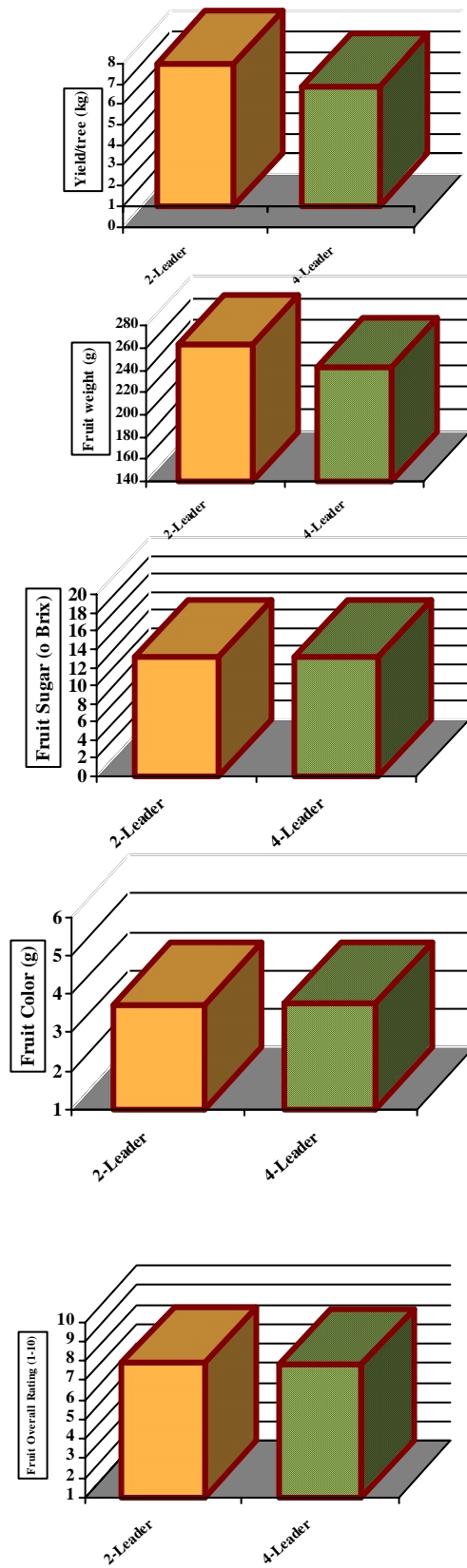


Table 1. Effect of Training and Crop Load Adjustment on Snow Giant Peach Quality and Yield, 2002.

Pruning	Crop load ^Z	Avg net yield (kg/tree)	Avg sugar (Brix)	Color (1-5)	Avg fruit wt (g)	Overall Rating ^Y
2-Leader	Extra light	6.08	13.24	3.40	258.34	7.90
	Light	6.70	13.72	3.85	280.05	7.90
	Medium	8.57	12.71	3.82	264.61	7.61
	Heavy	12.54	13.14	3.75	247.26	8.19
4-Leader	Extra light	4.89	13.37	3.57	250.20	7.46
	Light	5.62	13.40	3.80	241.44	7.90
	Medium	7.60	13.0	3.75	246.82	8.03
	Heavy	9.53	12.54	3.83	233.77	7.73

^Z hangers on each branch are removed down to : One hanger for every 4 inches apart = Heavy Crop; 8 inches apart = Medium Crop; 12 inches apart = Light Crop; 16 inches apart = Extra Light Crop. ^Y Overall Rating: 1=Worst progressively to 10= Best.

Table 2. Effects of Different Runner Spacing on Snow Giant Peach Quality and Yield, 2003.

Crop load	Avg net yield (Boxes/tree)	Avg sugar (Brix)	Color (1-5)	Avg fruit wt (g)
Light (Runners 15 inches apart)	0.83 c	11.58 a	3.76 a	259.9 a
Medium (Runners 10 inches apart)	1.05 b	11.96 a	3.58 a	264.7 a
Heavy(Runners 5 inches apart)	1.38 a	11.7 a	3.68 a	234.6 b

Values followed by different letters are significantly different at 5% based on LSD mean separation.

Table 2. Effect of Training on Snow Giant Peach Quality and Yield, 2003.

Crop load	Avg net yield (Boxes/tree)	Avg sugar (Brix)	Color (1-5)	Avg fruit wt (g)
4 Leader Training	1.11 a	11.86 a	3.65 a	251.8 a
2 Leader (V shape) Training	1.04 a	11.62 a	3.70 a	256.7 a

Figure 5. Effect of Blossom Thinners on Fruit Set of 'Elberta' Peach, Sunny Slope, Idaho, 2003

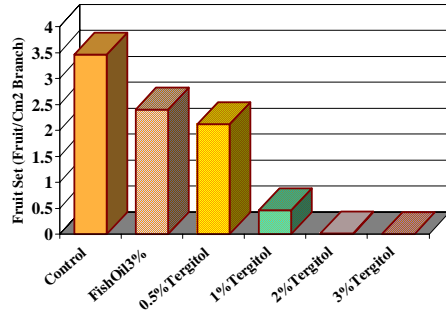


Figure 6. Effect of Blossom Thinners on Fruit Set of 'August Lady' Peach, Sunny Slope, Idaho, 2003

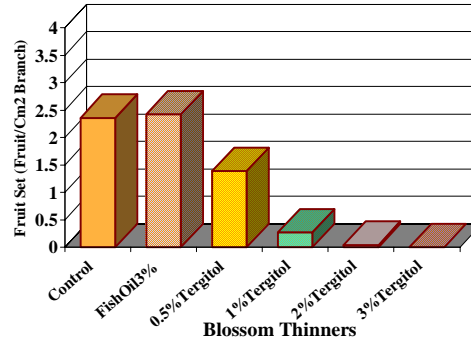


Figure 7. Effect of Tergitol on Fruit Set of 'Red Globe' Peach, Fruitland, Idaho 2003

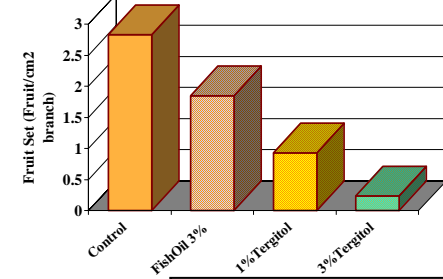


Figure 8. Effect of Tergitol on Fruit Set of 'Elberta' Peach, Fruitland, Idaho 2003

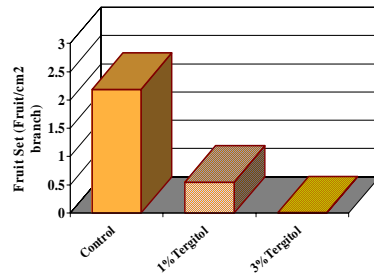


Figure 9. Effect of Tergitol on Fruit Set of 'Blazing Star' Peach, Fruitland, Idaho 2003

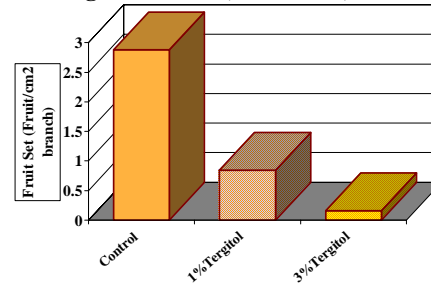


Figure 13. Effects of Tergitol on Blossom Thinning of Empress Plum, 2004

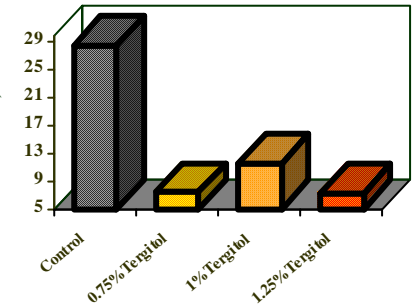


Figure 10. Effects of Tergitol and volume of Spray on Blossom Thinning of August Lady, 2004

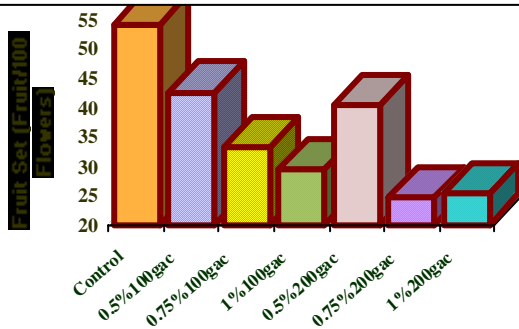


Figure 11. Effects of Tergitol and volume of Spray on Blossom Thinning of August Lady, 2004.

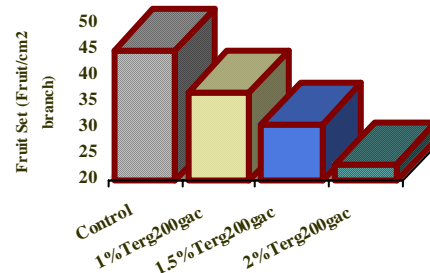


Figure 12. Effects of Tergitol on Blossom Thinning of Elberta Peach, 2004

