

Final Report for Peach Proposal for 2005

PROJECT NO: BJKE 72

TITLE: *Fine-Tuning Time and Rate of Tergitol TMN-6 and Other Blossom Thinners for Peach and Plum*

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

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COOPERATION: In Idaho: Watson's Orchards, Henggeler Orchards, Symms Fruit Ranch, Williamson Orchards; In Utah: Curly Orchards, Utah. Dr. Jim Mc Ferson will be cooperating in the blossom thinning.

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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 2005. Other than hydrogen cyanamide, Tergitol is the most effective blossom thinner we have experienced with for peach and nectarine.**
- 3. The most effective concentrations for thinning is between 0.75% to 1.25%.**
- 3. Tergitol at 0.75% and 1% significantly reduced fruit set in Zee lady peach when applied at 75% bloom, while 1.25% was the most effective concentration for Snow Giant peach when applied at 85% bloom.**
- 4. Tergitol did not have any adverse effect or fruit marking on peaches or nectarines.**

5. For Zee Lady peach, concentrations of 0.75%, 1%, and 1.25% Tergitol significantly reduced fruit set when applied at 75% bloom.

6. For Snow Giant peach, concentrations of 1.25% Tergitol significantly reduced fruit set when applied at 85% bloom.

7. In Utah orchards, Tergitol at concentrations of 0.75%, 1%, and 1.25% reduced fruit set when applied at about 75% to 85% bloom in O'Henry, John Henry, and Angelus peaches.

8. Time of application is very important and we intend to continue or research with Tergitol and "fine tune" the timing of application in 2006 and 2007 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:

For Year 2005:

For all experiments in 2005, the experimental design was be a completely randomized design. Two adjacent rows in two different locations were sprayed with air blast sprayers. There were several buffer rows in between sprayed rows. At least 8 trees were selected per row per treatments. Three to four limbs per tree were selected and fruit set were be measured by 2 methods: 1) counting number of flowers before spraying and counting number of fruits after fruit set and then calculating fruit set based on: fruit number/flower numbers x 100 or 2) by counting number of fruits several weeks after spraying and then calculating fruit set based on: fruit set = fruit number/branch cross sectional area. 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.

Sunny Slope, Idaho 2005: a Nectarine and a peach orchards were selected in Sunny Slope, Idaho and were sprayed with Tergitol at 0.75% or 1% at the following timings: 1) 35-40% bloom and then at 80% bloom; 2) at 80% bloom only. Lime sulfur (2%) combined with fish oil (2%) were applied at 35-40% bloom and then at 80% bloom. The rate of application was 200 gal/acre.

University of Idaho, Pomology Research Orchards, 2005:

Zee lady and snow Giant peaches were sprayed with 0.75%, 1%, or 1.25% Tergitol at 200 gal/ acre rate. Zee lady peaches were at 75% bloom and Snow Giant was at about 80-85% bloom.

Utah and Washington Experiments, 2005:

Several commercial peach and/or nectarine orchards were selected and sprayed with different concentrations of Tergitol. The general methodology was similar in all experiments.

Results and Discussion:

Year 2004 (Figures 1, 2, 3, 4):

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 effective but 200 gal/acre was slightly better. All treatments were hand-thinned early June. In August Lady, the final fruit size and yield in 0.5% Tergitol at 100 gal were smaller than other treatments during 2004 (Table 1). Also, total yield in 1% Tergitol at 200 gal/acre was also lower than control. No significant difference was found in the final fruit size of Zee Lady peach in 2004 (Table 2).

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.

Year 2005 (Figures 5, 6, 7, 8, 9, 10):

Results of 2005 experiments in Idaho and Utah orchards are shown in Figures 5-10. In Zee lady peach, 0.75%, 1%, and 1.25% Tergitol significantly reduced fruit set, but 1.25% was more effective than 0.75% and 1%. For this cultivar, 0.75% to 1%, applied at 75% bloom seems to give a satisfactory level of thinning. Tergitol at all concentrations, significantly reduced needs for hand thinning (Figure 5) and increased fruit size (Table 4) in Zee lady peach. Yield was lower in Zee Lady trees that received 1.25% Tergitol, while no significant difference was found in fruit russetting or color in 2005 (Table 4).

Tergitol at 1.25% significantly reduced fruit set and reduced yield (as compared to control) in Snow Giant peach, but 0.75% and 1% were not as effective (Table 1 and Figure 6). This is because Tergitol was sprayed at a later stage on Snow Giant than on Zee lady (85% bloom in Snow Giant vs. 75% in Zee lady). 'Snow Giant' fruit size and color were not affected by any treatment because fruits in all treatments were hand-thinned in June (Table 1).

Application of Tergitol at 0.75% or 1% at either one application or two applications, reduced fruit set in 'July Red' nectarine without major adverse effect on fruit quality or russetting in Idaho (Figure 7 and Table 5). However, two application of this chemical was significantly more effective (figure 7). Only treatments with 0.75% Tergitol applied twice showed more "russetting type" symptom than control. Other treatments did not cause any russetting which is a positive news for nectarine growers. Application of Tergitol at all concentrations significantly increased fruit size (Table 5), although they all were hand-thinned in June. However, yield in all

treatments were the same. Reduction in the number of fruits resulted in larger size, leading into the same amount of yield in all treatments (Table 5).

Tergitol at 0.75%, 1%, or 1.25% significantly reduced fruit set and needs for hand thinning in all cultivars tested in Utah. That includes John Henry, O'Henry, and Angelus peaches (Figures 8, 9, and 10). Application of this chemical at 1.25% was always more effective than 0.75% in Utah in 2005.

Overall, results with Tergitol are extremely positive for stone fruit (peaches and nectarines) and we would like to follow our experiments with this chemical during 2006 and 2007, to verify our previous experiments and fine-tune for the precise timing and concentrations of application for maximum efficiency. As a result of our experiments, peach and nectarines growers who have visited our research plots are becoming interested in this chemical and there might be a great chance for registration of this chemical, although it is currently labeled as a "surfactant". Details of data will be presented at the Washington stone fruit meeting and questions will be answered.

Acknowledgement:

The senior investigator wishes to thank the Washington Tree Fruit Research Commission Stone Fruit Group for support of this project. Also, special thanks to Williamson's Orchards, Idaho and Hengeller's Orchards, Idaho, and Symms Fruit Ranch, Idaho, and Curly Orchards in Utah and several growers in Washington for their excellent cooperation in this projects.

Figure 1. Effects of Tergitol on Blossom Thinning of Empress Plum, , 2004

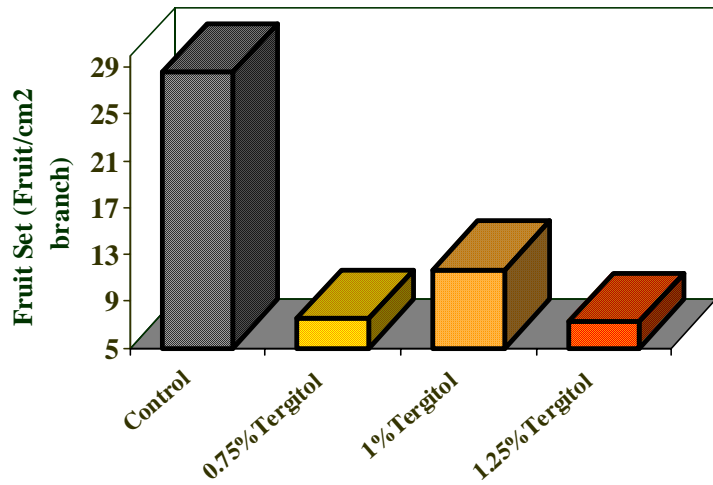


Figure 2. Effects of Tergitol and volume of Spray on Blossom Thinning of August Lady, 2004

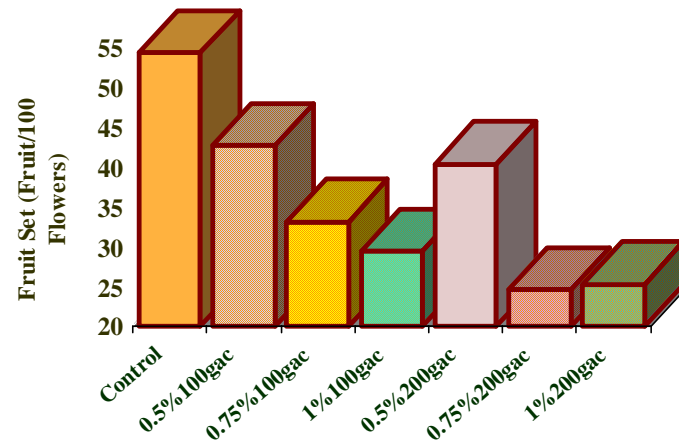


Figure 3. Effects of Tergitol and volume of Spray on Blossom Thinning of August Lady, 2004.

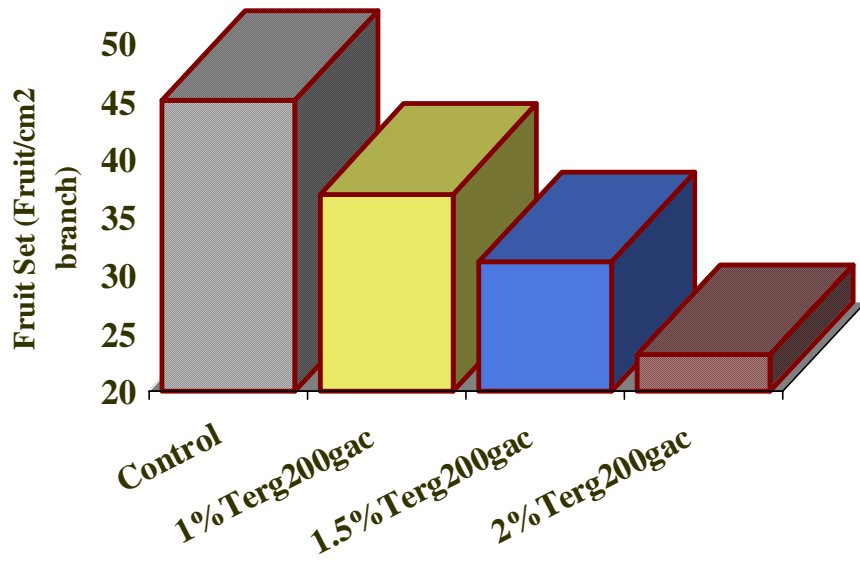


Figure 4. Effects of Tergitol on Blossom Thinning of Elberta Peach., 2004

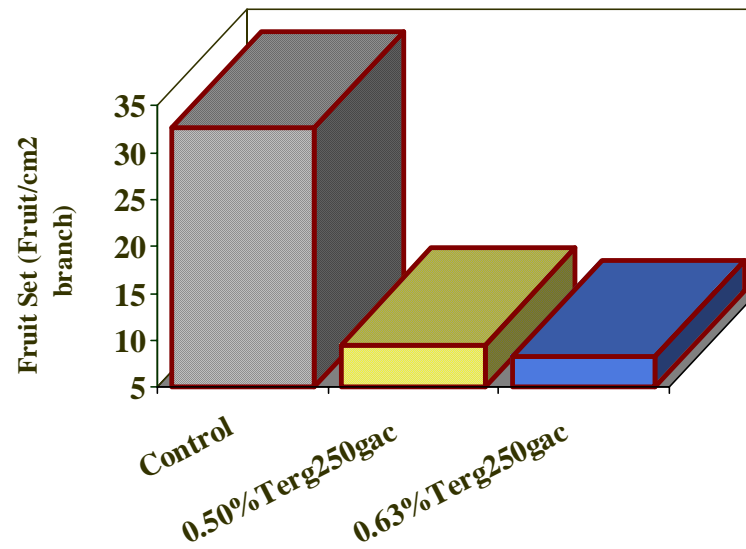


Figure 5. Effects of Tergitol on Zee Lady Peach Blossom Thinning, 2005.

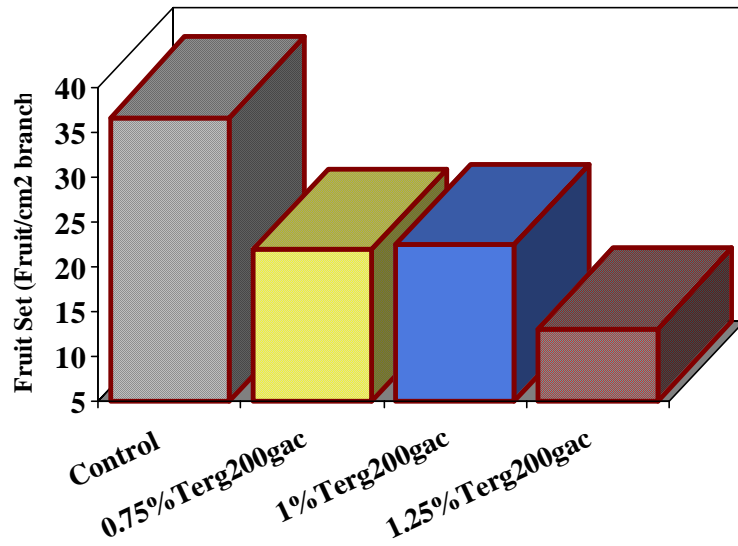


Figure 6. Effects of Tergitol on Snow Giant Peach Blossom Thinning, 2005.

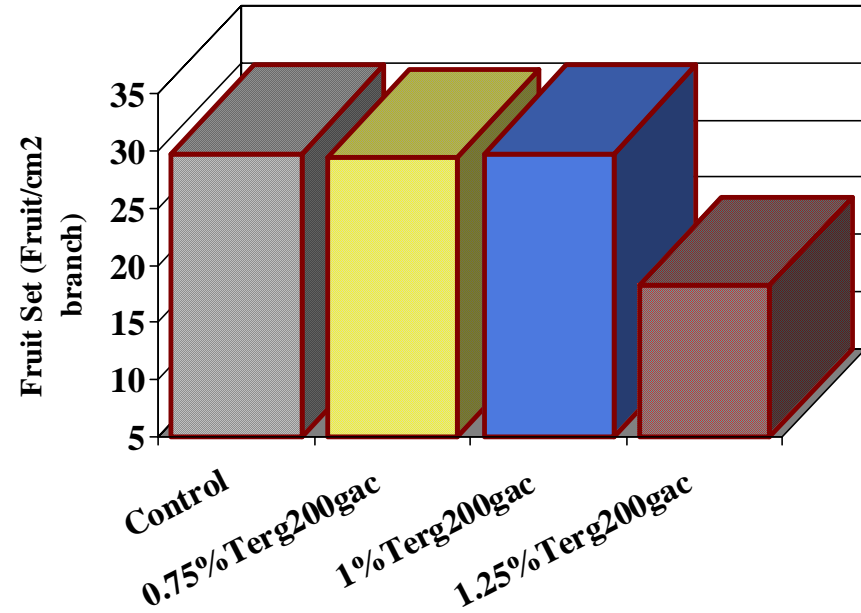


Figure 7. Effects of Tergitol on Nectarine Blossom Thinning, Sunny Slope, Idaho 2005.

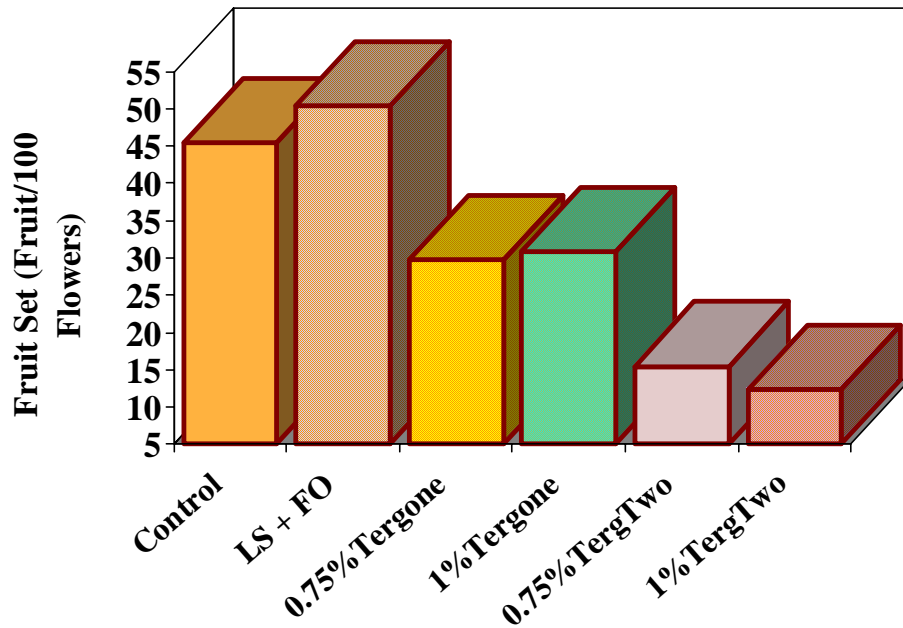


Figure 8. Effects of Tergitol on 'John Henry Peach, Utah, 2005.

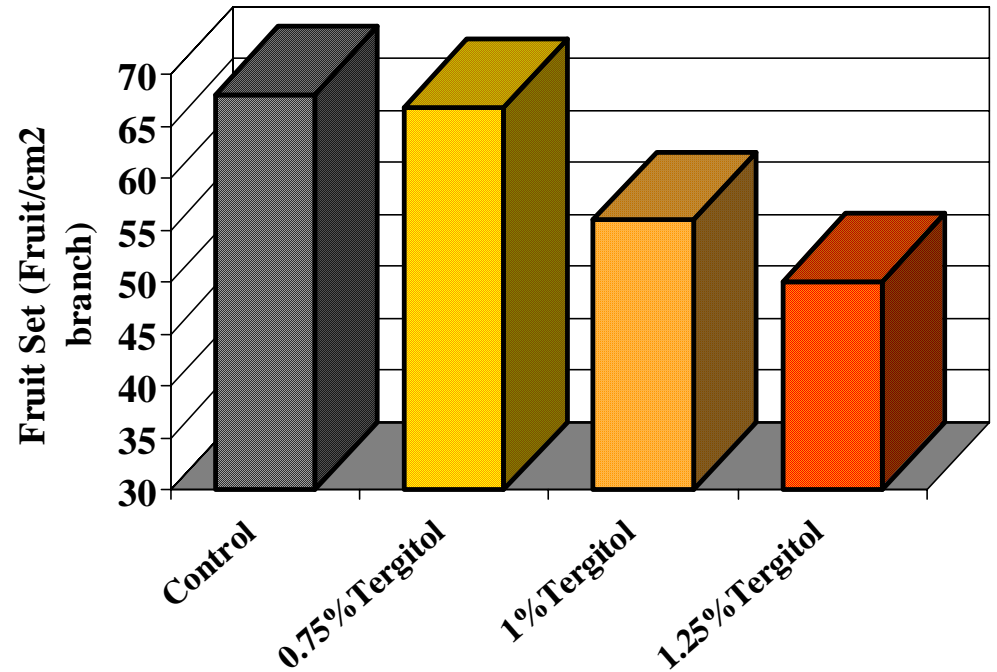


Figure 9. Effects of Tergitol on 'Angelus' Peach Blossom Thinning , Utah, 2005.

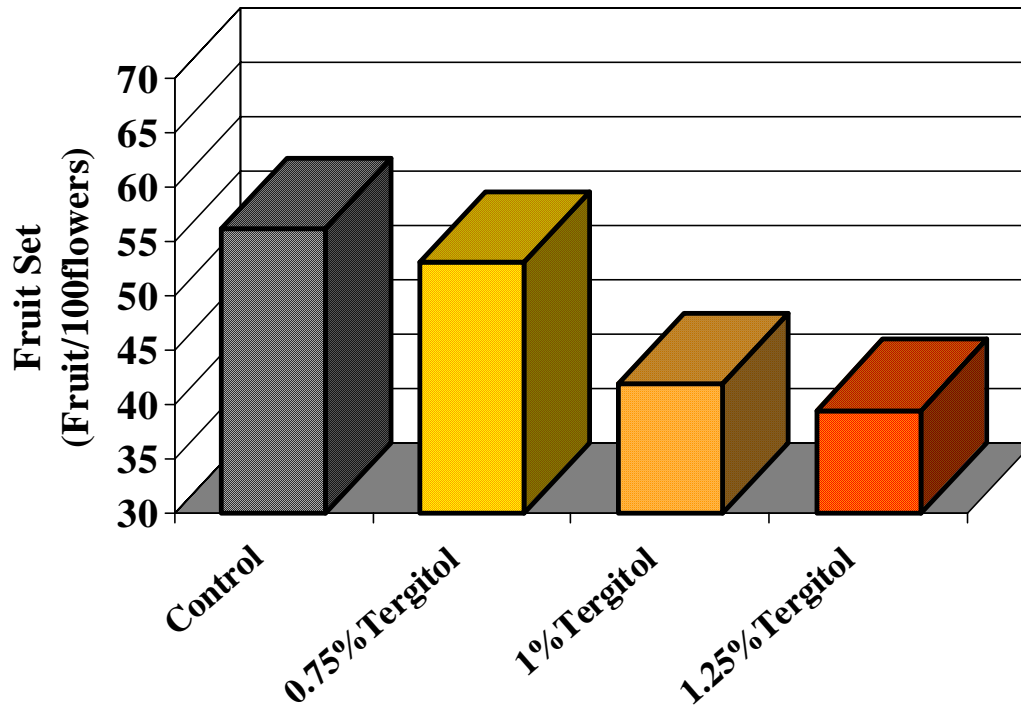


Figure 10. Effects of Tergitol on 'O' Henry Peach Blossom Thinning , Utah 2005.

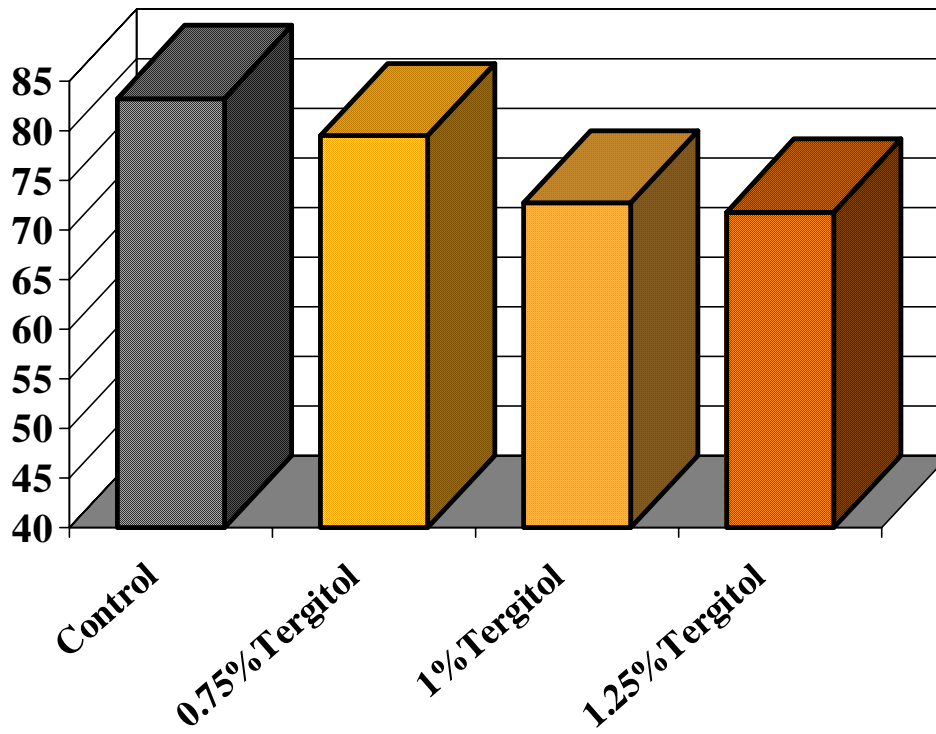


Table 1. Effects of Tergitol on 'August Lady' Fruit Quality, at 85% bloom at Williamson Orchard 2004

Treatment	Fruit wt (g)	Yield (kg/tree)
Control	146.2 ab	74.2 a
0.5% Tergitol at 100 gal/ac at 80% bloom	119.4 b	28.9 c
0.75% Tergitol at 100 gal/ac at 80% bloom	150.1 a	66.2 ab
1% Tergitol at 100 gal/ac at 80% bloom	139.4 ab	64.8 ab
0.5% Tergitol at 200 gal/ac at 80% bloom	159.2 a	72.1 a
0.75% Tergitol at 200 gal/ac at 80% bloom	163.5 a	64.4 ab
1% Tergitol at 200 gal/ac at 80% bloom	155.7 a	52.8 b

Means are separated by LSD at 5%. Note: No russetting was observed in any treatment

Table 2. Effects of Tergitol on 'Zee Lady' Fruit Quality, at 80% bloom at Williamson Orchard 2004

Treatment (per 200 gal/acre)	Fruit wt (g)	Yield (kg/tree)
Control	142.9 a	63.7 ab
0.5% Tergitol	152.9 a	80.8 a
0.75% Tergitol	156.9 a	63.5 ab
1.00% Tergitol	144.3 a	48.4 b

Means are separated by LSD at 5%. Note: No russetting was observed in any treatment

Table 3. Effects of Tergitol on 'Snow Giant Peach' Blossom Thinning, Applied at at 85% bloom, U of I, 2005

<u>Treatment</u>	<u>Fruit wt (g)</u>	<u>Yield (kg/tree)</u>	<u>Fruit Color</u>	<u>Russett (%)</u>
Control	289.0 a	14.85 a	2.83 a	4.17 a
0.75% Tergitol	273.2 a	14.52 ab	3.10 a	5.83 a
1% Tergitol	286.1 a	14.85 a	2.80 a	5.00 a
1.25% Tergitol	277.9 a	11.22 b	2.85 a	8.41 a

Means are separated by LSD at 5%.

Table 4. Effects of Tergitol on 'Zee Lady Peach' Blossom Thinning, Applied at at 75% bloom, U of I, 2005

<u>Treatment</u>	<u>Fruit wt (g)</u>	<u>Yield (kg/tree)</u>	<u>Fruit Color</u>	<u>Russett (%)</u>
Control	189.1 b	17.38 a	4.02 a	1.99 a
0.75% Tergitol	209.2 a	14.60 ab	4.10 a	3.47 a
1% Tergitol	210.3 a	15.64 a	4.30 a	0.56 a
1.25% Tergitol	211.1 a	11.70 b	4.15 a	2.22 a

Means are separated by LSD at 5%.

Table 5. Effects of Tergitol on 'July Red Nectarine' Fruit Quality, Williamson Orchard, 2005

<u>Treatment</u>	<u>Fruit wt (g)</u>	<u>Yield (kg/tree)</u>	<u>Fruit Color</u>	<u>Russett (%)</u>
Control	147.5 c	99.9 a	1.27 a	10.11 b
0.75% Tergitol once at 80% bloom	195.7 ab	75.7 a	1.29 a	14.76 ab
1% Tergitol once at 80% bloom	173.5 b	82.4 a	1.30 a	9.7 b
0.75% Tergitol at 35% and 80% bloom	206.9 a	72.4 a	1.25 a	17.35 a
1% Tergitol at 35% and 80% bloom	206.1 a	91.3 a	1.29 a	14.63 ab
Lime Sulfur and Fish Oil at 35% and 80% bloom (2%/2%)	174.0 b	98.4 a	1.32 a	9.6 b

Means are separated by LSD at 5%.