Final Report for Peach and Nectarine Proposal

PROJECT TITLE: *Determination of Precise Time and Rate of Rate of Tergitol TMN-6*

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TOTAL PROJECT FUNDING: $10,000

WTFRC COLLABORATIVE EXPENSES:

BUDGET: $5000/year (5000 in 2006 and $5000 in 2007).

SIFNIFICANT FINDINGS:

1. Tergitol effectively thinned peaches in various orchards in Idaho and Utah during 2005 and 2006. Other than hydrogen cyanamide, Tergitol is the most effective blossom thinner we have experimented with for peach and nectarine. Application of Tergitol significantly reduced the cost of hand thinning in all orchards.
2. Application of Tergitol, followed by a frost injury makes the trees to even further fruit loss
3. the most effective Tergitol concentrations for thinning are between 0.75% to 1.25%. The most effective time of application is when about 75% of blooms are open.
4. When bloom period is prolonged, using stage of bloom may be misleading as process of pollination and fruit set may continue even before blooms are completely open.
5. Bloom thinning increased as Tergitol concentrations increased. Also a double application always was more effective in thinning than a single application. Repeated application at high concentration may lead to over thinning.
6. Tergitol did not have any mark or cause russetting on peaches or nectarines in 2005. However, in 2006, repeated application of Tergitol at high concentrations increased fruit russetting in nectarine. Tergitol did not increased frit rusting in most peach cultivars in 2006.
7. For Zee Lady and Snow Giant peaches, concentrations of 0.75% to 1.25% Tergitol reduced fruit set when applied at 75% bloom in 2005 and 2006.
8. In Utah orchards, Tergitol at concentrations of 0.75% to 1.25%, applied at 75% to 80% bloom reduced fruit set in peaches.
8. In 2007, concentrations between 0.75% and 1% Tergitol were effective in thinning. Both 0.75% and 1% caused over-thinning when a frost occurred after Tergitol application.
9. We found that time of application is very important in 2006 and 2007.

RESULTS and DISCUSSION:

Year 2006 (Figures 1, 2, 3, 4) and 2007 (Figures 5, 6, 7, and 8):

Several comprehensive studied were conducted on peaches in Sunny slope area in 2006. At Symms Fruit Ranch, various times and concentrations of Tergitol on Peach blossom thinning were studied. The degree and severity of blossom thinning increased as the concentration of Tergitol increased, regardless of time of spray. Also, within each concentration, a double application of Tergitol resulted in higher thinning than a single application of that concentration. Therefore, the highest level of blossom thinning was achieved when Tergitol was applied at one of the following combinations: 0.75% Tergitol at 30% and then 80% bloom; 1.5% Tergitol at 80% bloom; 1.5% Tergitol at 100% bloom, or 1% Tergitol at 30% and again at 80% bloom. Tergitol application increased fruit size as compared to control (Table 1). Double applications of Tergitol at 1% decreased total yield (Table 1). Considering all factors, a single application of Tergitol at 0.75% or 1% at 80% bloom or applications of Tergitol at 1% at 100% bloom or 1.5% at 80% or 100% bloom resulted in an optimum yield and fruit size while significantly reducing the fruit set and the cost of subsequent hand thinning.

Tergitol was also an effective blossom thinner for Zee Lady and Snow Giant peaches when applied at 0.75% to 1.25% at 75% to 100% bloom stages.

Tergitol, applied either as a single or double application at 0.75% to 1% also reduced fruit set in Diamond Ray nectarine in 2006. However, high concentrations and repeated application of Tergitol may increase fruit russeting in nectarine in 2006 (Table 2). Thus, a single application of 0.75% to a maximum of 1% seems to be a safer practice for blossom thinning of nectarines.

In 2007, Tergitolat 0.75% to 1% effectively thinned Summer Lady peach, Zee Lady and Snow Giant peach. When the blooms were in a more advanced stage (85-90%) for Snow Giant, it was necessary to increase the Tergitol concentration to 1.25% to thin peaches in 2007.

In 2007, a severe frost occurred after Tergitol applications in some orchards. Frost made the effects of Tergitol even more severe. Lime Sulfur mixed with Crocker Fish oil was alyas less effective than Tergitol on blossom thinning of various cultivars of peaches in 2007 (Figures 5-8). In Utah, application of less than 0.5% of Tergitol was not effective in 2007 (Fig. 8).

Overall, results with Tergitol in 2006 and 2007 are extremely positive for stone fruit (peaches and nectarines) and we would like to follow our experiments with this chemical during 2008, to verify our previous experiments. 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".

Fig. 1. Effects of Tergitol on Zee Lady Peach Blossom Thinning, 2006.

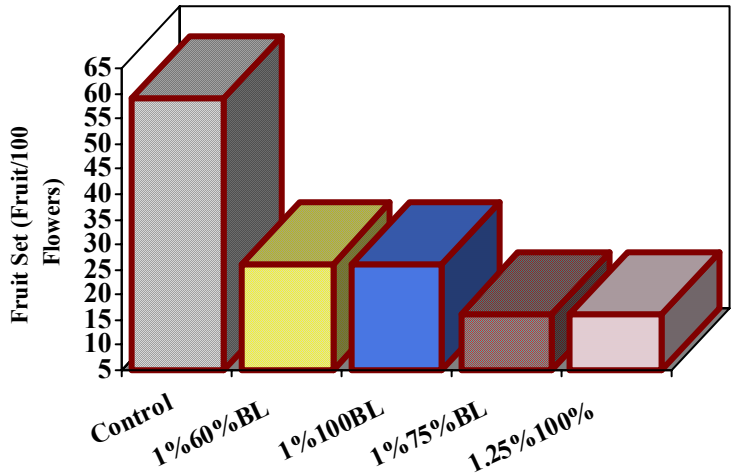

Fig. 2. Effects of Tergitol on Snow Giant Peach Blossom Thinning, 2006.

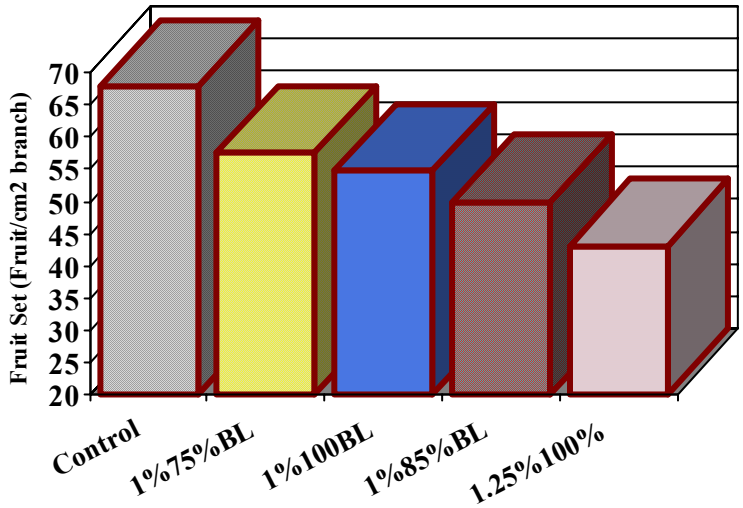

Fig. 3. Peach Blossom Thinning, using Tergitol TMN-6 at Symms Fruit Ranch, 2006

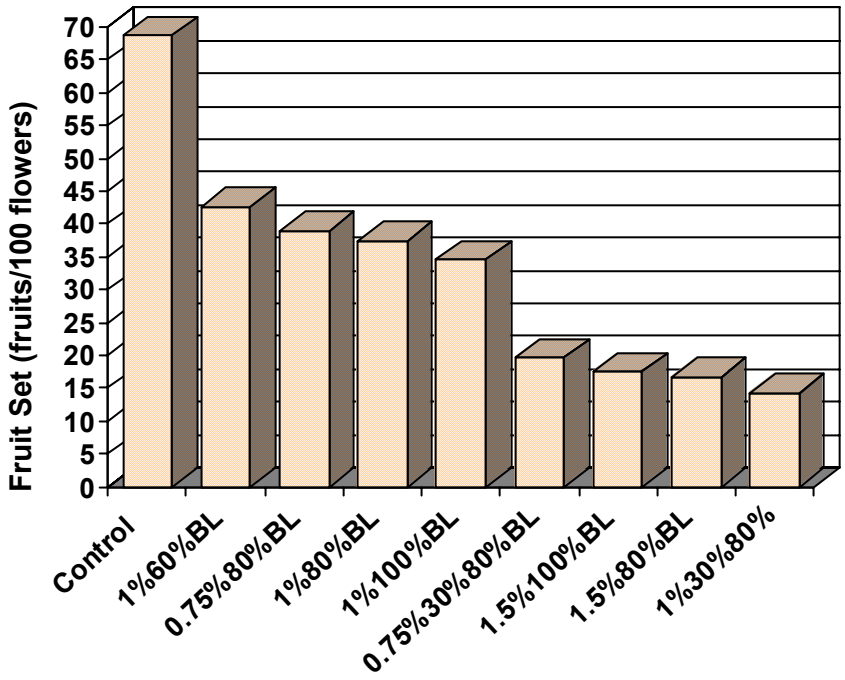

Fig. 4. 2006 Blossom Thinning, Nectarine, Sunny Slope, Idaho

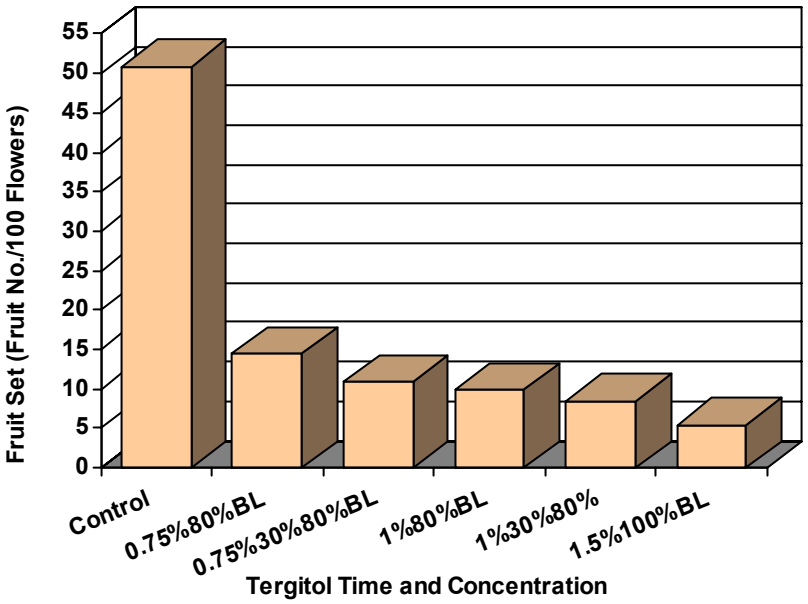

Table 1. Effects of Tergitol on 'August Lady' Fruit Quality, Symms Fruit Ranch, 2006.

Treatment	Yield (kg/tree)	Fruit wt (g)	Fruit Color	Russett (%)
Control	77.91 a	141.20 d	2.70 c	5.36 a
1% Tergitol once at 60% bloom	70.29 ab	157.52 c	3.83 a	7.50 a
0.75% Tergitol once at 80% bloom	77.56 a	157.17 c	3.28 b	2.58 a
0.75%Tergitol once at 30% and once at 80% bloom	56.44 bc	180.11 ab	3.60 ab	5.91 a
1% Tergitol once at 80% bloom	76.18 a	156.91 c	3.98 a	3.33 a
1%Tergitol once at 30% and once at 80% bloom	52.43 c	190.09 a	4.04 a	6.06 a
1% Tergitol once at 100% bloom	84.49 a	166.04 bc	3.65 ab	4.17 a
1.5% Tergitol once at 80%	76.87 a	181.43 ab	3.93 a	7.50 a
1.5% Tergitol once at 100%	72.72 ab	182.93 a	3.92 a	5.13 a

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

Table 2. Effects of Tergitol on 'Diamond Ray Nectarine' Fruit Quality, at Williamson Orchard 2006

Treatment	**Yield (kg/tree)**	**Fruit wt (g))**	**Color**	**Russett (%)**
Control	43.71 a	136.06 c	2.50 c	9.87 c
0.75% Tergitol at 80% bloom	29.17 b	156.67 ab	2.75 abc	20.83 b
0.75% Tergitol at 30% & 80% bloom	28.47b	149.04 ab	2.92 abc	21.49 b
1% Tergitol at 80% bloom	22.91 bc	145.98 bc	2.64 bc	22.99 b
1% Tergitol at 30% & 80% bloom	16.65 c	159.05 a	3.00 ab	32.57 a
1.5% Tergitol at 100% bloom	21.53 bc	151.44 ab	3.16 a	24.61 ab

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

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

Table 3. Effects of Tergitol on 'Snow Giant' fruit yield and quality, U of I, 2006

Treatment	Fruit wt (g)	Yield (kg/tree)	Fruit Color	Russett (%)
Control	216.8 b	23.22 a	2.28 a	1.39 b
1%Tergitol@60%Bloom	243.9 a	23.33 a	2.39 a	4.72 ab
1%Tergitol@75%Bloom	236.1 a	23.39 a	2.33 a	5.84 a
1%Tergitol@100%Bloom	242.0 a	23.45 a	2.41 a	3.95 ab
1.25%Tergitol@100%Bloom	242.5 a	22.05 a	2.42 a	6.95 a

Table 4. Effects of Tergitol on 'Zee Lady' fruit yield and quality, U of I, 2006

Treatment	Fruit wt (g)	Yield (kg/tree)	Fruit Color	Russett (%)
Control	191.5 a	23.11 b	3.38 a	2.14 a
1%Tergitol@60%Bloom	197.9 a	30.36 a	3.50 a	1.43 a
1%Tergitol@75%Bloom	194.8 a	24.84 b	3.60 a	0 a
1%Tergitol@100%Bloom	199.9 a	23.46 b	3.30 a	0 a
1.25%Tergitol@100%Bloom	186.8 a	23.46 b	3.65 a	1.43 a

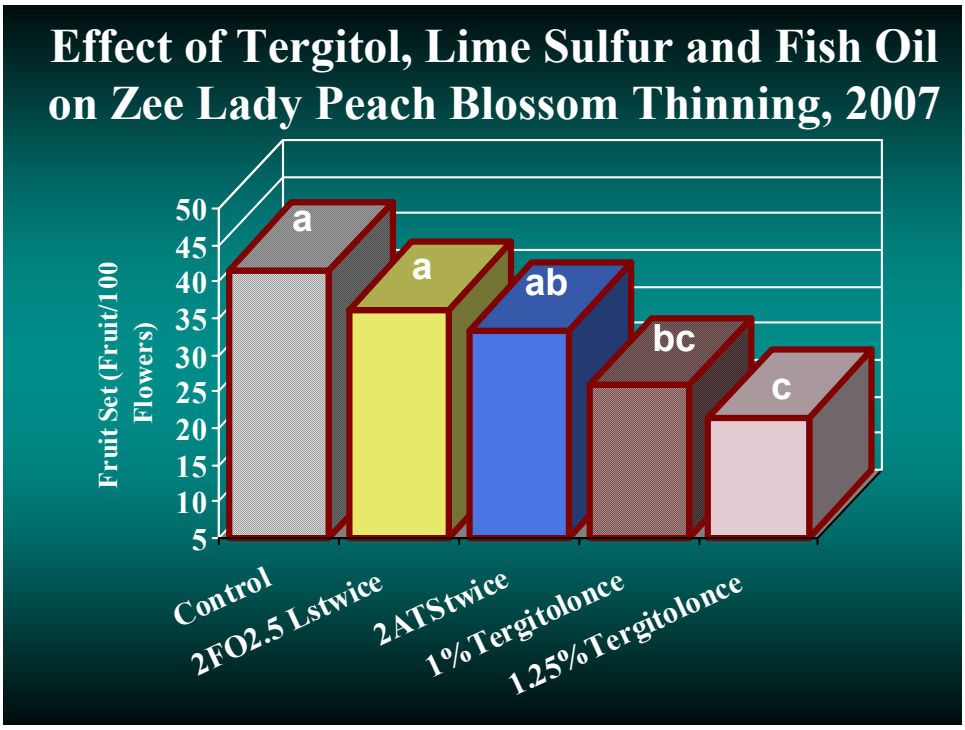

Fig. 5. Effects of Tergitol and Lime Sulfur and Fish Oil on Zee Lady Peach Fruit Set in 2007

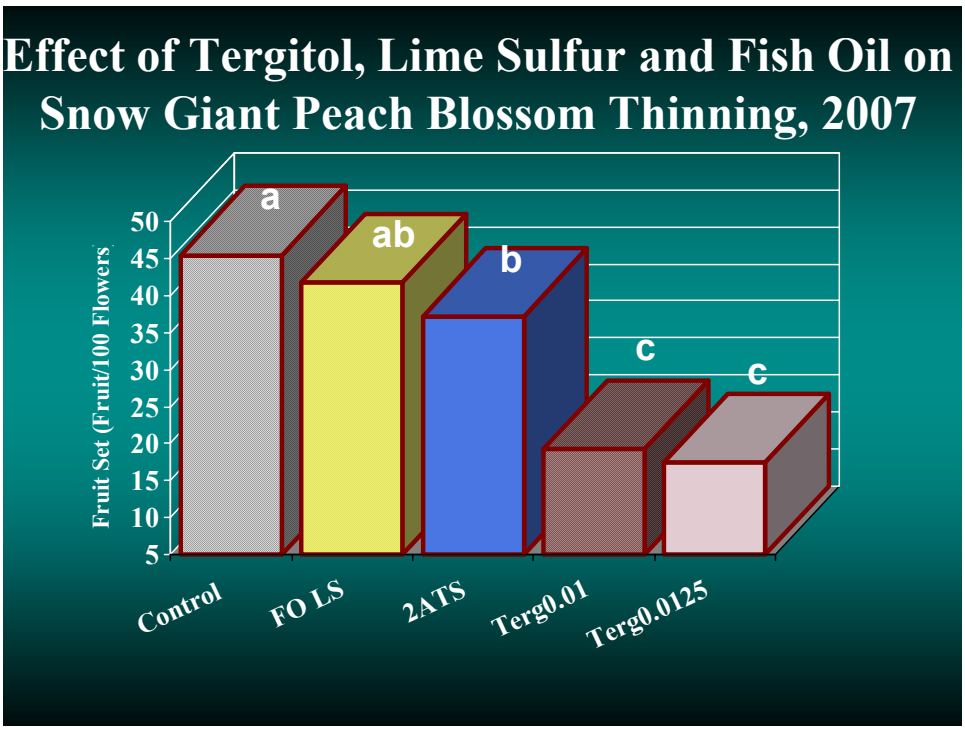

Fig. 6. Effects of Tergitol and Lime Sulfur and Fish Oil on ‘Snow Giant’ Peach Fruit Set in 2007

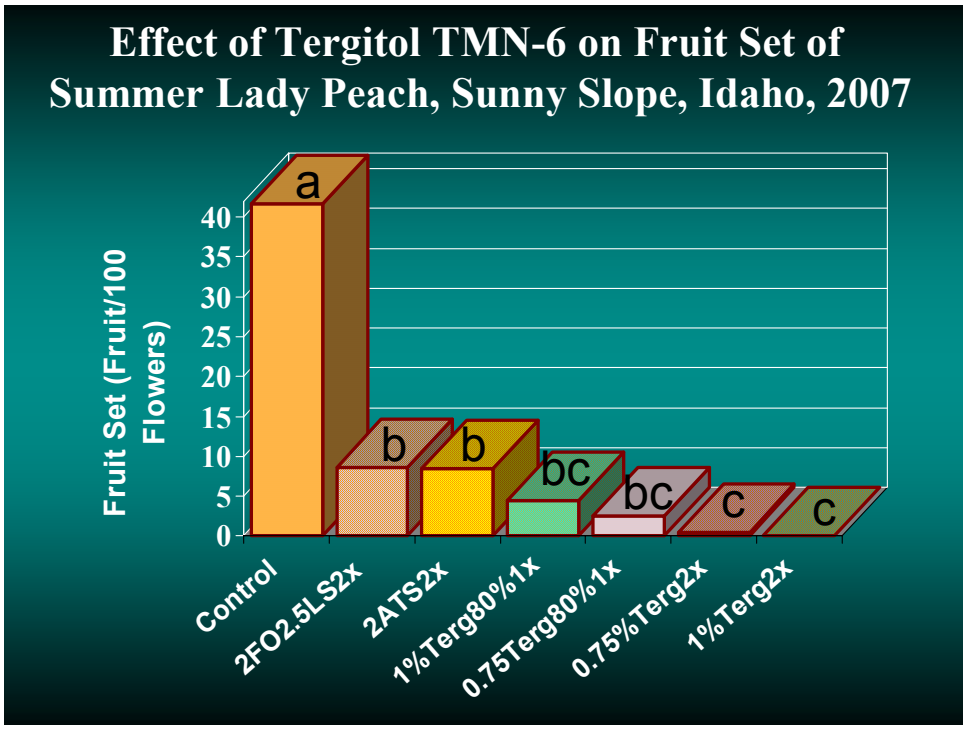

Fig. 7. Effects of Tergitol and Lime Sulfur and Fish Oil on 'Summer Lady' Peach Fruit Set in 2007

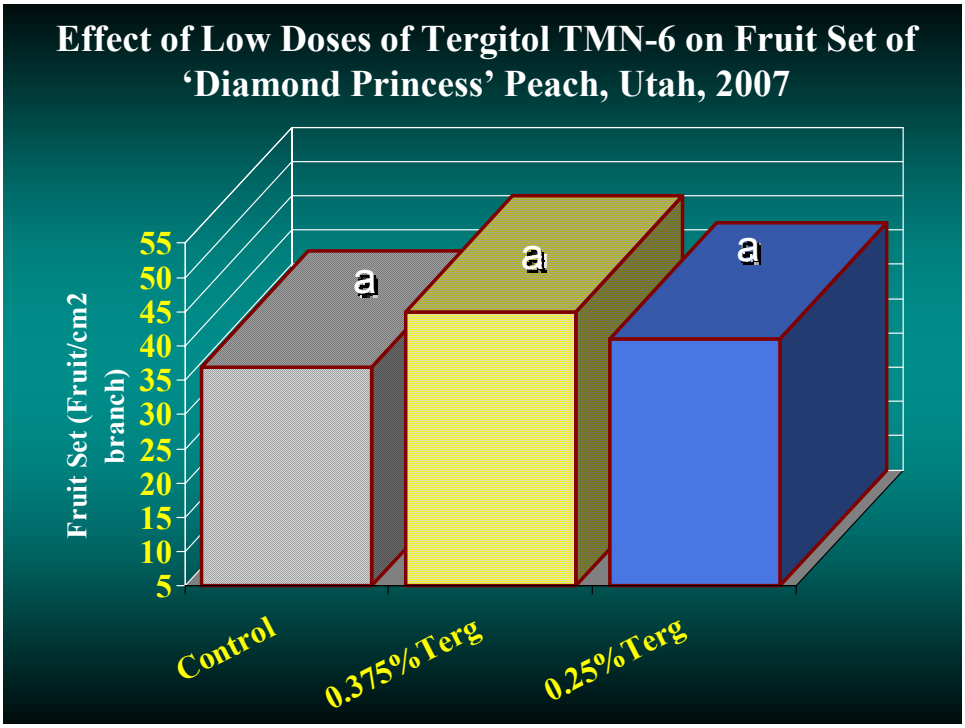

Fig. 8. Effects of Low Concentrations of Tergitol 'Diamond Princess' Fruit Set in 2007