

Chemical Control/New Products

PREBLOOM USE OF ESTEEM (EC AND WP FORMULATIONS) AND PYRAMITE FOR CONTROL OF PEAR PSYLLA

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Abstract: Two trials were conducted to evaluate the use of insecticides applied prebloom for control of pear psylla. Plots were at approx. 0.1 acre in size and applications were made with an airblast sprayer. In one trial the effect of Esteem, both the EC and WP formulations, and Pyramite were compared. Leaf counts of pear psylla immatures showed that populations of pear psylla were reduced in all treatments when compared to the check, but few significant differences were seen among the treatments tested. In the second trial the effect of Pyramite on reducing populations of pear rust mite and twospotted spider mite was also examined.

Trial #1—Methods

Two formulations of Esteem and Pyramite were compared when applied prebloom at the pink stage. The trial was conducted in a 2.5 acre block of Bosc and Comice pears which had high levels of pear psylla (PP). Treatments were made to twenty-two-year-old trees planted on 14' x 8' spacing using an air blast sprayer calibrated to deliver 135 gallons of finished spray per acre. The treatments were compared to a control and the trial consisted of four replicates. The size of plot areas were approx. 0.1 acre, each replicate consisted of 40 trees. Replicates were arranged in a randomized design. The Esteem EC was applied at 16 fl oz/A, Esteem 35WP was tested at two rates, 4 oz/A and 5 oz/A, and Pyramite 60W was applied at a rate of 13.2 oz/A. All treatments were applied on 31 March 2001. PP, twospotted spider mite (TSM), pear rust mite (PRM) and predator mite populations were monitored by taking 30 leaves from each replicate, brushing the leaves in the laboratory and counting the number of arthropods present with the aid of a dissecting microscope. PP adults and natural enemies, such as spiders, parasitic hymenoptera and generalist predators were sampled by taking 10 beat trays per replicate. Except for the initial leaf sample taken from Comice on 9 April, when the Bosc had not yet exfoliated, all leaf counts and the beat trays were taken from the Bosc cultivar.

Trial #1—Results

In the initial samples taken following application of the treatments, no significant differences were seen in the leaf counts (Table 1), but in the beat tray sample (Table 2), the number of PP adults was significantly less in the Pyramite treatment than any of the other treatments or the check. However, subsequent beat tray samples showed no significant effects until the end of May. Subsequent leaf samples, conversely, showed a number of significant effects through the end of May. At first, PP eggs were significantly lower in the Pyramite plot than in the check and in all but one of the Esteem treatments. While PP eggs continued to be

lower in the Pyramite plot in following weeks they were not significantly lower than the check. PP eggs were significantly higher in all the Esteem treatments than the Pyramite treatment for 30 April and 8 May, and the high rate of the Esteem WP was significantly higher than the check on both of those dates. Numbers of young PP nymphs, stages 1-3, were significantly lower in all treatments when compared to the check for four consecutive sample dates (24 April through 18 May) with the Esteem EC treatment being significantly lower than any of the other treatments on 30 April. Significantly lower numbers of older nymphs, stages 4 and 5, were observed in all treatments relative to the check for three consecutive weeks (8 May through 24 May). Only one significant difference was seen in any of the mite counts, a higher number of TSM eggs was observed in the low rate of Esteem WP treatment on 30 April, that isolated effect does not appear to be a part of any larger trend. Populations of PRM and predator mites were very low throughout all treatments including the check.

In summary, both Esteem and Pyramite used at pink produced a significant reduction in the level of PP nymphs up to the end of May. Numbers of PP nymphs, all stages, peaked in all treatments on 8 May. The level in the check was 3.73 nymph per leaf, well over the treatment threshold, whereas the treatments kept the peak PP numbers between 0.48 and 0.87 nymphs per leaf. The degree of reduction of the nymphal population relative to the check ranged from 75% in the low rate of Esteem WP to almost 90% in the Esteem EC. The reduction in the PP levels following 8 May, while part of the natural population dynamic, may have been influenced by treatments of Avaunt (6 oz/A) and horticultural mineral oil (1% v/v) which were applied on May 11th and 29th. In particular, an application of horticultural mineral oil would suppress both pear psylla and mite populations. The higher number of PP eggs seen in the Esteem treatments in late April and early May can be attributable to the sterilizing effect of this juvenile hormone mimic on the adult PP and the subsequent accumulation of unhatched eggs. Few significant differences between Esteem treatments were seen, one exception was the seasonal mean for young PP nymphs where the low rate of Esteem WP was significantly higher than the Esteem EC, the high rate of Esteem WP and Pyramite (both at maximum label rates) were intermediate. One indication of the degree of PP control provided by all of the treatments is the significantly higher numbers of PP adults in the check than any of the treatments in the beat tray samples at the end of May and beginning of June when the surviving nymphs were giving rise to the summerform adults.

Trial #2—Methods

Pyramite was applied at the pink stage in a 1.2 acre block of Anjou and Bartlett pears which had high levels of pear psylla (PP), twospotted spider mite (TSM) and pear rust mite (PRM) in order to evaluate the material for its efficacy against these pests. Treatments were made to thirty-year-old trees in a hedgerow planting (12' x 4') using an air blast sprayer calibrated to deliver 167 gallons of finished spray per acre. The Pyramite treatment was compared to an untreated control and each treatment was replicated three times. The size of plot areas ranged from 0.1 to 0.2 acre. Replicates were arranged in a randomized design. The Pyramite was applied at a rate of 13.2 oz/A and the treatment was made at the pink stage, 26 March 2001. PP, TSM, PRM and predator mite populations were monitored by taking 30 leaves from each replicate, brushing the leaves in the laboratory and counting the number of arthropods present with the aid of a dissecting microscope. PP adults and natural enemies, such as spiders, parasitic hymenoptera and

generalist predators were sampled by taking 15 beat trays per replicate. In both the leaf counts and the beat trays, only the Anjou cultivar was sampled.

Trial #2—Results

Counts from leaf brushing samples (Table 3) taken following application of Pyramite and up to 18 May, when Agrimek (16 fl oz/A) was applied to the block, indicate that the Pyramite treatment significantly reduced PP nymphs, both early and late stages, and TSM eggs. Significant reductions in PP eggs and TSM motiles were observed on two of the sample dates. PRM populations were about 90% lower overall in the Pyramite treated plots, although the difference was not statistically significant. The beating tray samples (Table 4) yielded only one significant difference, on 9 May generalist predators were lower in the Pyramite treated area. This difference appears somewhat anomalous and may be at least in part attributable to lower prey availability in the Pyramite treated areas. The remaining beating tray data, while not statistically significant, indicate a trend to lower numbers of PP adults, spiders and other natural enemies in the Pyramite plots.

In summary, Pyramite applied at pink at the maximum label rate in a block with high levels of PP, TSM and PRM provided good control of all three pest species. PP nymphs peaked at 0.29 per leaf on 1 May and then began to decrease. TSM motiles peaked at 0.64 per leaf on 18 May and had not begun to decrease prior to treatment with Agrimek and Imidan (5 lb/A) at first cover. The level of PP control provided by Pyramite was sufficient while the control of TSM would have been adequate for all but the most susceptible cultivars.

Table 1. Trial #1: Leaf count data—mean number per leaf (30 cluster leaf sample)

Treatment	Rate (form.)	PP eggs	PP young nymphs	PP old nymphs	TSM eggs	TSM motiles	Pear rust mites	Pred. mites
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4/9

Pyramite 60W	13.2 oz/A	2.50	0	0	0.03	0	0	0
Esteem 0.86EC	16 fl oz/A	2.52	0	0	0.33	0.03	0	0
Esteem 35WP	4 oz/A	2.12	0.02	0	0.15	0.03	0	0
Esteem 35WP	5 oz/A	1.70	0	0	0.15	0.02	0	0
Check	----	2.28	0.15	0	0.40	0.10	0	0

4/24

Pyramite 60W	13.2 oz/A	1.15 a	0.22 a	0	0.03	0.02	0	0
Esteem 0.86EC	16 fl oz/A	2.52 ab	0.08 a	0	0.03	0.02	0	0
Esteem 35WP	4 oz/A	3.73 b	0.13 a	0	0.02	0	0	0
Esteem 35WP	5 oz/A	3.97 b	0.13 a	0	0.12	0	0	0
Check	----	3.73 b	0.70 b	0	0.02	0	0	0

4/30

Pyramite 60W	13.2 oz/A	0.28 a	0.45 b	0	0 a	0	0	0
Esteem 0.86EC	16 fl oz/A	2.12 bc	0.08 a	0.02	0.03 a	0.01	0	0
Esteem 35WP	4 oz/A	1.88 bc	0.57 b	0	0.35 b	0.02	0	0
Esteem 35WP	5 oz/A	3.25 c	0.43 b	0	0 a	0.02	0	0
Check	----	1.03 ab	3.07 c	0.02	0.05 a	0	0	0

5/8

Pyramite 60W	13.2 oz/A	0.17 a	0.47 a	0.20 a	0.15	0.02	0	0.02
Esteem 0.86EC	16 fl oz/A	1.22 bc	0.43 a	0.05 a	0	0.03	0	0
Esteem 35WP	4 oz/A	1.30 bc	0.85 a	0.02 a	0.05	0.03	0	0
Esteem 35WP	5 oz/A	2.00 c	0.58 a	0.03 a	0.32	0.13	0	0
Check	----	0.53 ab	3.15 b	0.58 b	0	0.02	0	0

5/18

Pyramite 60W	13.2 oz/A	0.08	0.18 a	0.10 a	0.05	0	0	0
Esteem 0.86EC	16 fl oz/A	0.17	0.43 a	0.05 a	0.43	0.10	0	0
Esteem 35WP	4 oz/A	0.12	0.45 a	0.12 a	0.42	0.12	0	0
Esteem 35WP	5 oz/A	0.28	0.25 a	0.08 a	0.28	0.02	0.10	0.02
Check	----	0.17	0.95 b	0.48 b	0.38	0.03	0	0

Treatment	Rate (form.)	PP eggs	PP young nymphs	PP old nymphs	TSM eggs	TSM motiles	Pear rust mites	Pred. mites
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5/24

Pyramite 60W	13.2 oz/A	0.02	0.05	0.07 a	0.02	0	0	0
Esteem 0.86EC	16 fl oz/A	0.12	0.08	0.07 a	0.58	0.25	0	0
Esteem 35WP	4 oz/A	0.09	0.23	0.06 a	0.28	0.08	0	0
Esteem 35WP	5 oz/A	0.07	0.12	0.07 a	0.08	0.12	0	0
Check	----	0.02	0.25	0.58 b	0.05	0.07	0	0

6/11

Pyramite 60W	13.2 oz/A	0.07	0.07	0.02	1.02	0.58	0	0.08
Esteem 0.86EC	16 fl oz/A	0.03	0.07	0.02	3.52	1.48	0	0.10
Esteem 35WP	4 oz/A	0.05	0.10	0.06	3.27	1.60	0	0.06
Esteem 35WP	5 oz/A	0.02	0.05	0.05	3.62	1.87	0	0.03
Check	----	0.23	0.12	0.12	2.68	0.22	0	0.05

4/9-6/11 (post treatment mean)

Pyramite 60W	13.2 oz/A	0.08	0.19 ab	0.10 a	0.31	0.15	0	0.03
Esteem 0.86EC	16 fl oz/A	1.24	0.17 a	0.03 a	0.70	0.28	0	0.01
Esteem 35WP	4 oz/A	1.33	0.34 b	0.04 a	0.65	0.27	0	0.01
Esteem 35WP	5 oz/A	1.61	0.22 ab	0.03 a	0.65	0.31	0.01	0.01
Check	----	1.14	1.20 c	0.25 b	0.51	0.06	0	0.01

In the table above, for a given date, means in a column followed by different letters indicate that they were significantly different using Fisher's LSD test ($p=0.05$). A column with no letters indicates that the difference was not statistically significant. Data were transformed, $\log(x+1)$, prior to analysis, untransformed means are presented.

Table 2. Trial #1: Beating tray data—mean number per tray (10 tray sample)

Treatment	Rate (form.)	Pear psylla adults	Spiders	Parasitic hymenoptera	Other predators
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3/29 (pre-treatment)

Pyramite 60W	13.2 oz/A	1.30	0.05	0	0
Esteem 0.86EC	16 fl oz/A	1.25	0	0	0
Esteem 35WP	4 oz/A	1.50	0.03	0	0
Esteem 35WP	5 oz/A	2.10	0	0	0
Check	----	1.60	0	0	0

4/9

Pyramite 60W	13.2 oz/A	0.45 a	0	0	0
Esteem 0.86EC	16 fl oz/A	1.10 b	0	0	0
Esteem 35WP	4 oz/A	1.23 b	0.03	0.05	0.03
Esteem 35WP	5 oz/A	1.38 b	0	0	0
Check	----	1.80 b	0	0	0

4/24

Pyramite 60W	13.2 oz/A	0.13	0.13	0.03	0
Esteem 0.86EC	16 fl oz/A	0.48	0.03	0	0
Esteem 35WP	4 oz/A	0.48	0.05	0.03	0
Esteem 35WP	5 oz/A	0.58	0.15	0.08	0
Check	----	0.43	0.03	0	0

4/30

Pyramite 60W	13.2 oz/A	0.08	0.06	0	0
Esteem 0.86EC	16 fl oz/A	0.12	0.05	0	0
Esteem 35WP	4 oz/A	0.17	0.07	0.02	0.02
Esteem 35WP	5 oz/A	0.07	0.08	0.02	0
Check	----	0.08	0.02	0.03	0.02

5/8

Pyramite 60W	13.2 oz/A	0.18	0.08	0.03	0
Esteem 0.86EC	16 fl oz/A	0.10	0.10	0.05	0
Esteem 35WP	4 oz/A	0.10	0.08	0.05	0.03
Esteem 35WP	5 oz/A	0.20	0.03	0.03	0
Check	----	0.13	0.05	0	0

5/18

Pyramite 60W	13.2 oz/A	0.13	0.03	0.03	0
Esteem 0.86EC	16 fl oz/A	0.03	0	0.05	0
Esteem 35WP	4 oz/A	0.03	0	0	0
Esteem 35WP	5 oz/A	0.03	0	0	0
Check	----	0.03	0	0	0.03

Treatment	Rate (form.)	Pear psylla adults	Spiders	Parasitic hymenoptera	Other predators
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5/24

Pyramite 60W	13.2 oz/A	0.15 a	0.10	0	0.03
Esteem 0.86EC	16 fl oz/A	0.05 a	0	0	0
Esteem 35WP	4 oz/A	0.15 a	0.03	0	0
Esteem 35WP	5 oz/A	0.13 a	0.08	0	0.03
Check	----	0.98 b	0.03	0.03	0

6/8

Pyramite 60W	13.2 oz/A	0.40 a	0.10	0	0
Esteem 0.86EC	16 fl oz/A	0.53 a	0.05	0.03	0
Esteem 35WP	4 oz/A	0.40 a	0	0.08	0.03
Esteem 35WP	5 oz/A	0.60 a	0.10	0.05	0
Check	----	2.40 b	0.03	0.13	0

4/9-6/8 (post treatment mean)

Pyramite 60W	13.2 oz/A	0.21 a	0.07 b	0.01	0
Esteem 0.86EC	16 fl oz/A	0.34 ab	0.03 a	0.02	0
Esteem 35WP	4 oz/A	0.36 ab	0.03 a	0.03	0.01
Esteem 35WP	5 oz/A	0.42 b	0.06 b	0.02	0
Check	----	0.83 c	0.02 a	0.03	0.01

In the table above, for a given date, means in a column followed by different letters indicate that they were significantly different using Fisher's LSD test (p=0.05). A column with no letters indicates that the difference was not statistically significant. Data were transformed, log(x+1), prior to analysis, untransformed means are presented.

Table 3. Trial # 2: Leaf count data—mean number per leaf (30 cluster leaf sample)

Treatment	Rate (form.)	PP eggs	PP young nymphs	PP old nymphs	TSM eggs	TSM motiles	Pear rust mites	Pred. mites
4/4								
Pyramite 60W	13.2 oz/A	1.16	0	0	0.58	0.09 a	0	0
Check	----	2.22	0.02	0	2.67	0.24 b	0	0.06

4/23								
Pyramite 60W	13.2 oz/A	0.53	0.27	0	1.62 a	0.13	0	0
Check	----	0.69	1.82	0	5.82 b	0.27	0.40	0

5/1								
Pyramite 60W	13.2 oz/A	0.22 a	0.27	0.02	1.33	0.49	0.13	0.04
Check	----	0.73 b	1.70	0.04	5.40	1.04	0.27	0.18

5/9								
Pyramite 60W	13.2 oz/A	0.02	0.09	0.07	0.56	0.51 a	0.13	0.06
Check	----	0.13	0.96	0.31	4.47	5.56 b	1.73	0.08

5/18								
Pyramite 60W	13.2 oz/A	0.07	0.04	0.07 a	0.53	0.64	0.27	0.02
Check	----	0.04	0.62	0.47 b	1.42	2.64	3.47	0.02

5/25								
Pyramite 60W	13.2 oz/A	0.11	0.04	0	0.04	0.16	0	0
Check	----	0.07	0.04	0.02	0.18	0.31	0	0

6/8								
Pyramite 60W	13.2 oz/A	0.07 a	0.09	0	0	0.04	0	0
Check	----	0.31 b	0	0	0.02	0.07	0	0

4/4-5/18 (post treatment mean)								
Pyramite 60W	13.2 oz/A	0.40	0.13 a	0.03 a	0.92 a	0.37	0.11	0.03
Check	----	0.62	0.70 b	0.16 b	3.01 b	1.86	1.12	0.05

In the table above, for a given date, means in a column followed by different letters indicate that they were significantly different using Fisher's LSD test ($p=0.05$). A column with no letters indicates that the difference was not statistically significant. Data were transformed, $\log(x+1)$, prior to analysis, untransformed means are presented.

Table 4. Trial #2: Beating tray data—mean number per tray (15 tray sample)

Treatment	Rate (form.)	Pear psylla adults	Spiders	Parasitic hymenoptera	Other predators
3/18 (pre-treatment)					
Pyramite 60W	13.2 oz/A	1.43	0	0	0
Check	----	1.37	0.07	0	0

4/16

Pyramite 60W	13.2 oz/A	0.09	0.04	0.04	0
Check	----	0.40	0.16	0.04	0

4/23

Pyramite 60W	13.2 oz/A	0.04	0.22	0	0.02
Check	----	0.13	0.33	0.02	0.04

4/30

Pyramite 60W	13.2 oz/A	0.07	0.22	0.04	0.07
Check	----	0.20	0.31	0.02	0.07

5/9

Pyramite 60W	13.2 oz/A	0.04	0.18	0.04	0.09 a
Check	----	0.11	0.31	0.09	0.27 b

5/18

Pyramite 60W	13.2 oz/A	0.31	0.18	0.09	0.13
Check	----	0.71	0.22	0.07	0.13

5/25

Pyramite 60W	13.2 oz/A	0.36	0.11	0.02	0.02
Check	----	0.76	0.13	0.04	0.07

6/7

Pyramite 60W	13.2 oz/A	0.78	0.07	0.04	0
Check	----	1.60	0.07	0.07	0.02

4/16-5/18 (post treatment mean)

Pyramite 60W	13.2 oz/A	0.11	0.17	0.04	0.06
Check	----	0.31	0.27	0.05	0.10

In the table above, for a given date, means in a column followed by different letters indicate that they were significantly different using Fisher's LSD test ($p=0.05$). A column with no letters indicates that the difference was not statistically significant. Data were transformed, $\log(x+1)$, prior to analysis, untransformed means are presented.