

Pome Fruits—Chemical Control

Pandemis Leafroller and Apple, Spring Spray Trial, 1993

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An early-season spray trial for pandemis leafroller was conducted in an apple orchard situated in Naches Heights, 5 miles west of Yakima, WA. The orchard was a 25-yr-old planting of 'Delicious' and 'Golden Delicious' on a 16 x 20 ft planting. Ten treatments were selected and each treatment was replicated 10 times. Plots consisted of 4 adjoining trees and were separated by two untreated trees within each row and 1 tree between rows. All materials were applied with a handgun at 200 gal per acre. Treatment 1 was an untreated check. Treatment 2 was sprayed with Lorsban 4EC at 1.5 pints plus 2 gal of Supreme oil per 100 gal on 15 April. Treatment 3 was also sprayed with Lorsban plus oil but was then sprayed with 1 lb of Dipel per 100 gal at pink and bloom. Treatments 4-6 were two sprays of Dipel at 1 lb per 100 gal timed at tight cluster and pink, pink and bloom, and bloom and petal fall, respectively. Treatment 7 was Dipel plus Coax timed at pink and bloom. Treatments 8-10 were MVP at 2 qt, Cutlass at 1 lb, and Javelin at 1 lb per 100 gal timed at pink and bloom, respectively. In all *Bt* applications, the sticker/surfactant Raincoat was added at 1.0 pt per 100 gal. Dates of application were the following: tight cluster, 28 April; pink, 4 May; bloom, 11 May; and petal fall, 19 May.

Leafroller populations were sampled prior to any *Bt* sprays on 23 April. Five buds from the top and bottom of each tree were collected and visually searched for larvae. No precount data were obtained for the Lorsban treatments. Leafroller larvae were again sampled on 25 May. On this date each tree was visually searched for 6 min. The number of live larvae was recorded. Data were transformed with $\sqrt{x + 0.5}$ and subjected to analysis of variance. Significant differences were separated with Newman/Keul's Range test, $P = 0.05$.

Results

The overwintering population density of leafrollers was high with nearly 10% of buds infested (Table 1). All spray applications significantly reduced leafroller populations relative to the check. The lowest population density occurred in the plots sprayed with the latest timing of Dipel, i.e., bloom and petal fall. Plots with earlier timings of Dipel had higher population densities with the tight cluster and pink combination performing the worst. The addition of Coax caused a 46% decrease in the leafroller population density. Javelin was somewhat better but not significantly different from Dipel. MVP and Cutlass provided poor control at the rates tested though this was not significantly different from Dipel. The level of control provided by Lorsban + oil was similar to Dipel applied at pink and bloom. Combining the Lorsban + oil spray with two later sprays of Dipel timed at pink and bloom improved control, but not significantly.

Conclusion

From both field and laboratory studies it appears that the use of two applications of Dipel can be very effective in reducing the overwintering population of pandemis leafroller. Proper

timing of Dipel appears to be bloom and petal fall, though the immediate weather conditions will always be important in determining the effectiveness of *Bt*. These data suggest that the addition of Coax improves the efficacy of Dipel. However, it is not clear whether the addition of Coax is superior to simply increasing the rate of *Bt*. Finally, these data are rather inconclusive on the effectiveness of Dipel for summer control of leafrollers. However, these data suggest that the use of PennCap-M may be harmful to the management of both mites and leafminers.

Table 1. Results of applying various insecticides to control pandemis leafroller larvae overwintering in apple, 1993.

Treatment	Rate ¹	Timing ²	Precount (23 April) No. larvae/24 buds	Postcount (25 May) No. larvae/24 min search
Check	--	--	4.2 ± 0.44a	27.4 ± 3.90a
Lorsban ³	1.5 pt	dd	1.0 ± 0.33b	7.9 ± 1.97bcd
Lorsban ³ + Dipel	1.5 pt 1.0 lb	dd p, b	1.0 ± 0.33b	2.6 ± 0.76d
Dipel	1.0 lb	tc, p	4.1 ± 0.72a	14.0 ± 1.32b
Dipel	1.0 lb	p, b	3.5 ± 0.69a	7.6 ± 1.20bcd
Dipel	1.0 lb	b, pf	3.5 ± 0.86a	2.1 ± 0.64d
Dipel + Coax	1.0 lb 1.5 qt	p, b	4.2 ± 0.59a	4.1 ± 0.89cd
MVP	2.0 qt	p, b	5.1 ± 0.74a	10.6 ± 2.07bc
Cutlass	1.0 lb	p, b	3.5 ± 0.54a	13.4 ± 1.51b
Javelin	1.0 lb	p, b	4.8 ± 0.63a	6.4 ± 1.42bcd

¹All rates are per 100 gal applied with a handgun at 200 gal per acre.

²"dd" is the delayed dormant timing applied on 15 April; "tc" is tight cluster timing applied on 28 April; "p" is the pink timing applied on 4 May; "b" is the bloom timing applied on 11 May, and "pf" is the petal fall timing applied on 19 May.

³The Lorsban and oil treatment was applied prior to the larval count on 23 April.