Jack Kelly Clark

Peach twig borer

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Fruittree leafroller

Some lepidopterous pests of central coast apricots

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Studies in San Benito County apricot orchards showed that fruittree leafroller caused most surface damage, and peach twig borer was responsible for most interior fruit damage. The preferred spray timing for all fruit-feeding lepidopterous pests except orange tortrix was at the petal-fall stage.

In response to grower reports of feeding damage and live larvae in apricot fruits, despite insecticide treatments, we conducted a survey of apricot orchards and a spray timing trial in San Benito County. Our objectives were to learn what lepidopterous pests were present, when they were present, when fruit damage occurred, and when control measures might be effective in reducing damage.

The normal timing of sprays to control peach twig borer, *Anarsia lineatella* Zeller, is either during the dormant/delayed dormant (red bud) period or in May, based on pheromone trap catches and a day-degree model. These spray timings, however, do not control other insects from petal fall through early May. Past research has shown that coastal valley apricot orchards are attacked by lepidopterous insect pests not found or of little importance in San Joaquin and Sacramento Valley apricot orchards. These include: fruittree leafroller, *Archips argyrospilus* (Walker); orange tortrix, *Argyrotaenia citrana* (Fernald); western tussock moth, *Hemerocampa vetusta* (Boisd.); green fruitworm, *Orthosia hibisci* (Guenée); and fall and spring cankerworms, *Alsophila pometaris* (Harris) and *Paleacritica vernata* (Peck).

Population monitoring

Commercial apricot orchards (Blenheim cultivar) were monitored in 1983 and 1984 for lepidopterous pests. None of the orchards surveyed had been treated with either a dormant or a delayed dormant application.

In 1983, two orchards, one untreated and one treated with azinphosmethyl (Guthion 50WP at 3 pounds per acre in 400 gallons of water) on June 1, were monitored for larvae. Monitoring was done by searching the foliage visually for 1 hour weekly from March 8 to May 5, followed by 2-week samples through June 17. In 1984, three orchards, one untreated, one treated on March 16 with diazinon 50WP (4 pounds per acre in 400 gallons of water), and one treated on June 1 with azinphosmethyl (Guthion 50WP at 3 pounds per acre in 400 gallons of water), were monitored weekly by 1-hour foliar search samples from March 16 through June 22. All larvae collected in both years were reared on artificial media to disclose the degree of parasitism and facilitate identification of the adult moths.

Only limited fruit sampling was possible in 1983. In 1984, we inspected 500 fruit samples taken at random weekly in each orchard for feeding damage by lepidopterous larvae. Feeding damage was primarily surface scarring. Sampling began on April 6 in each orchard and ended with harvest on June 29 in the two treated orchards and on July 9 in the untreated control.

Spray timing

In 1985, we conducted an insecticide spray timing trial in a previously untreated Blenheim apricot orchard. Three spray timings and an untreated control were replicated 10 times on individual trees. The spray timings were: April 5 (late jacket stage); May 10 (peach twig borer timing calculated by degree-day model); and both April 5 and May 10. The insecticide in all cases was azinphosmethyl (Guthion 50W) at the rate of 2 pounds in 100 gallons of water per acre applied by handgun.

We monitored lepidopterous pest populations by taking 20-minute foliar search samples per treatment before spraying on April 5 and at 2-week intervals from April 12 through May 10. At harvest on July 5, a 100-fruit sample per tree was evaluated for fruit damage, classified into old and new damage and larvae present. Old damage was defined as healed-over feeding scars; new damage was fresh feeding wounds.

Results and discussion

Fruittree leafroller (FTLR) was the predominant species present from petal fall until early May. It reached a peak in late March and early April 1983 (table 1). Very little parasitism of FTLR was noted in either orchard. A much smaller population of orange tortrix (OT) was found throughout the season with an increase in late May and June. Parasitism of OT, primarily by *Apanteles aristotiliae* Viereck, was much higher in the untreated orchard (31.1%) than in the treated orchard (15.2%).

In 1984, FTLR was again the predominant species present from petal fall until early May, with a peak population in late March (table 2). FTLR numbers were especially low in the orchard treated in March. None of the orchards had a high level of parasitization of FTLR.

The OT population was consistent throughout the season without the late-spring increase seen in 1983. Both the untreated and early-treated (March 16) orchards had more OT larvae and a higher percentage of parasitization than the late-treated (June 1) orchard. The fewer larvae

TABLE 1. Number of fruittree leafroller (FTLR) and orange tortrix (OT) larvae and percent parasitism, San Benito County, 1983

	Untreated				Treated			
	FTLR		OT		FTLR		OT	
Date	Larv	Par	Larv	Par	Larv	Par	Larv	Par
		%		%		%		%
3/8	4	0	0	0	5	20.0	0	0
3/15	25	0	2	0	4	0	1	0
3/24	60	0	1	0	25	0	2	50.0
4/1	88	1.1	1	0	16	0	0	0
4/7	66	0	3	0	11	0	0	0
4/15	76	0	5	0	20	0	1	0
4/22	47	0	5	20.0	15	13.3	3	0
4/30	10	0	4	25.0	3	0	1	0
5/5	4	0	5	20.0	—	—	—	—
5/20	0	0	1	0	2	0	3	33.3
6/3	0	0	17	64.7	0	0	31	6.5
6/17	0	0	1	0	0	0	17	17.6
TOTAL	380	0.3*	45	31.1*	122	2.5*	46	15.2*

*Percent of total larvae collected per season that were parasitized.

TABLE 2. Number of fruittree leafroller and orange tortrix larvae and percent parasitism, San Benito County, 1984

	Untreated				Early treatment				Late treatment			
	FTLR		OT		FTLR		OT		FTLR		OT	
Date	Larv	Par	Larv	Par	Larv	Par	Larv	Par	Larv	Par	Larv	Par
		%		%		%		%		%		%
3/16	26	0	0	0	1	0	4	0	37	0	0	0
3/23	82	1.2	1	100	1	0	2	50	130	0	0	0
3/29	107	0	1	0	1	0	1	100	102	1.0	3	0
4/6	80	0	0	0	2	0	5	20	43	2.3	1	0
4/13	20	0	2	100	2	50	6	83.3	8	0	1	0
4/20	1	0	0	0	0	0	2	50	4	0	3	66.7
4/27	0	0	11	63.6	0	0	2	50	1	0	0	0
5/5	1	0	2	100	2	0	6	16.7	0	0	1	0
5/11	0	0	5	40	0	0	4	50	0	0	0	0
5/18	0	0	4	50	0	0	3	33.3	0	0	0	0
5/24	0	0	8	100	0	0	7	28.6	0	0	1	0
6/1	0	0	8	63	0	0	6	83.3	—	—	—	—
6/7	0	0	1	0	0	0	7	28.6	0	0	6	50.0
6/15	0	0	1	0	0	0	4	0	—	—	—	—
6/22	—	—	—	—	—	—	—	—	0	0	1	0
TOTAL	317	0.3*	44	65.9*	9	11.1*	59	39.0*	325	0.6*	17	29.4*

* Percent of total larvae collected per season that were parasitized.

TABLE 3. Average percent damaged or infested apricot fruit, San Benito County, 1985

	Damage		
Treatment*	Old	New	Total
	%	%	%
Early/late	5.0 ab	1.8 a	6.8 a
Early	3.6 a	4.5 a	8.1 a
Late	7.1 b	3.9 a	11.0 a
Check	7.8 b	14.5 b	22.3 b

NOTE: Averages followed by the same letter in a vertical column are not significantly different at the 5% level (Duncan's Multiple Range Test).
* Early = treatment applied April 5. Late = treatment applied May 10.

and lower percent parasitization in the late-treated orchard may have resulted from the use of Guthion the previous year.

Other lepidopterous pests identified during both years of the foliar survey, in descending order of occurrence, were: western tussock moth; peach twig borer; green fruitworm; spring cankerworm; omnivorous leaftier, *Cnephasis longana* (Haworth); and omnivorous looper, *Sabulodes caberata* (Guenée). These pests account for less than 5% of the total larvae found in either year of sampling. Other research has shown that some of these, particularly western tussock moth, are cyclic pests that can be damaging in some years but are often controlled by parasites.

Damaged fruit found in the weekly 500-fruit inspection increased from 2.8% on April 6 to 6.4% on April 20 and 11.2% at harvest in the untreated orchard. In the early-treated (March 16) orchard, fruit damage was 1% on April 6, remained constant at 0.8% on April 20 and then gradually increased to 6.8% at harvest. In the late-treated (June 1) orchard, fruit damage was 7% on April 6, and increased to 15% on April 20 and to 26.4% at harvest. This damage was mostly external feeding and appeared to be the result of FTLR, since it closely paralleled the number of FTLR larvae found in the foliage search samples. FTLR was also observed feeding on the fruit during the sampling.

The lepidopterous larvae found in the 20-minute foliage searches in the 1985 spray timing trial were exclusively FTLR. The population was not significantly different (P=0.05) in pretreatment samples on April 5, with the average number of larvae ranging from 1 to 2.5 per tree. At the April 12 sampling date, no FTLR larvae were found in the trees sprayed April 5, but the populations remained high at 1.9 larvae in the untreated trees and 2.5 larvae in the trees to be sprayed on May 10. No FTLR were found in any treatment after May 10.

The percentage of total fruit damaged was reduced by an insecticide spray early (April 5) in the growing season as compared with an application later (May 10) or no treatment (table 3). Lower FTLR populations early in the season resulted in less old damage at harvest and thus the reduction in total fruit damage. Early and late treatments resulted in less new damage than in the untreated control. There was no difference in the percentage of larvae present among the sprayed treatments at harvest, and all larvae in the fruit were peach twig borer.

Conclusions

The predominant lepidopterous fruit-feeding larva present in San Benito County apricot orchards from petal fall to early May was the fruittree leafroller. This insect caused most of the surface feeding damage.

A lesser amount of damage from orange tortrix feeding, often between two adjoining fruits, occurred in May and June in some orchards. Other surface-feeding larvae included western tussock moth, green fruitworm, spring cankerworm, omnivorous leaftier, and omnivorous looper. The primary larva found inside fruit at harvest was peach twig borer.

Parasitism provides little control of fruittree leafroller but appears to be important in controlling orange tortrix populations.

An insecticide spray at petal fall will control peach twig borer damage. The petal-fall application also will control FTLR and other spring fruit-feeding larvae.

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