Biology/Phenology

BIOLOGY AND MANAGEMENT OF THE OBLIQUEBANDED LEAFROLLER IN SWEET CHERRY

M. Omeg and H. Riedl
Mid-Columbia Agricultural Research & Extension Center, Oregon State University
3005 Experiment Station Dr., Hood River, Oregon 97031; omegm@bcc.orst.edu

Keywords: obliquebanded leafroller, *Choristonuera rosaceana*, sweet cherry, biology, phenology model, temperature thresholds, spinosad, Success, methoxyfenozide, Intrepid

The project's goal is to develop a predictive degree-day model for improving the control of the obliquebanded leafroller (OBLR) in sweet cherry. Three mature cherry blocks were sampled at regular intervals and the OBLR life stage noted to aid in the development of a phenology model. Data from the 1999 and 2000 seasons were used in model development. It was determined that a majority of the overwintering generation larvae emerge from their hibernacula between stages 3 (green tip) and 5 (open cluster). Sampling results suggest the larvae are evenly distributed throughout the top and bottom sections of the tree through bloom. Overwintering larvae begin to pupate in mid-May, with most of them pupating by the end of May. Moth flight was monitored with pheromone traps. Degree-days (°D) were calculated using thresholds of $29.4C_{max}/6C_{min}$ with a vertical cutoff using first moth catch as a Biofix point. These thresholds and cutoff method are currently under review. The first flight (overwintering generation) peaked (50% catch) at 170 °D after Biofix and was 95 percent complete at 600 °D. Oviposition of the first flight began 120 °D after Biofix. Most of the egg masses had been laid and their larvae emerged at 1050 °D. The first summer generation larvae were easily detected at 620°D and became noticeable in fruit bins at 1100 °D.

Field trials were conducted to determine the effectiveness of Lorsban, Success, and Bt. at various pre-bloom and pre-harvest application timings against the overwintering generation (Table 1). Trials were also conducted to determine the effectiveness of the insect growth regulator Intrepid (Table 2), and the Bt. formulations Deliver, Dipel, and Javelin against the summer generation larvae (Table 3).

Laboratory experiments were conducted to compare the developmental rate (1/days) of OBLR feeding on various food sources: old & young cherry leaves, old & young apple leaves, old & young pear leaves and artificial diet. Development was fastest to slowest on: young pear, young cherry, old pear, old cherry, young apple, artificial diet and old apple. Experiments were also conducted to determine the developmental threshold temperature on OBLR larvae feeding on artificial diet. The upper developmental temperature appears to be 31.1C and the lower 10C. Results of these experiments indicate that the threshold temperatures used for OBLR in sweet cherry may need modification. Further analysis of field data and laboratory data will be used to establish temperatures and cut-off methods for OBLR feeding in sweet cherry. Results of this analysis will be available on the web at: www.ent.orst.edu/oblr/oblr.htm.

Table 1. Average number of live OBLR larvae in sweet cherry trees treated with hydraulic handgun with different insecticides and at different application timings; The Dalles, OR; 2000.

Tmt. no.	Spray applications: Material and formulation	Rate/ acre	Bud stage	Date sprayed	Ave. number of larvae/tree/2-min. count on 5/22/00	
1	Success 2SC[1]	6 oz.	1: delayed dormant	3/21	3.25	bc
2	Success 2SC[1]	6 oz.	1: delayed dormant	3/21	1.00	d
	Success 2SC[2]	6 oz.	Shuck fall	5/13		
3	Lorsban 4E[1]	2 qt.	1: delayed dormant	3/22	2.00	bcd
4	Lorsban 4E[1]	2 qt.	1: delayed dormant	3/22	1.00	cd
	Javelin WG	2 lbs.	Shuck fall	5/13		
5	Success 2SC[1]	6 oz.	3-4: open cluster	3/31	4.00	b
6	Lorsban 4E[1]	2 qt.	3-4: open cluster	3/31	1.50	bcd
7	Success 2SC[1]	6 oz.	3-4: open cluster	3/31	1.00	d
	Success 2SC[2]	6 oz.	Shuck fall	5/13		
8	Lorsban 4E[1]	2 qt.	3-4: open cluster	3/31	2.50	bc
	Javelin WG	2 lbs.	Shuck fall	5/13		
9	Control	---	---	---	9.25	a

ANOVA: means followed by the same letter are not significantly different at p=0.05 (Fisher's LSD Test)
[1] 1% Orchex oil added. [2] 0.25% Orchex oil added.

Table 2. Average number of live OBLR larvae in sweet cherry trees treated by hydraulic handgun with different Bt. insecticides; The Dalles, OR, 2000.

Tmt. no.	Spray applications: Material	Rate/ acre	Spray Schedule (total sprays)	Ave. no. of larvae/tree/2-min. count on 8/11/00	
1	Check	--	--	13.75	a
2	Javelin	2 lbs.	900 °D; 2 weeks later (2)	2.25	b
3	Intrepid 2F Latron B1956	16 oz. 32 oz.	900, 1200, 1500 °D (3)	0.00	c
4	Intrepid 2F	16 oz.	900, 1200, 1500 °D (3)	0.00	c
5	Intrepid 2F Latron B1956	16 oz. 32 oz.	120 °D; every two weeks (4)	0.25	c
6	Intrepid 2F	16 oz.	120 °D; every two weeks (4)	0.25	c

ANOVA: means followed by the same letter are not significantly different at p=0.05 (Fisher's LSD Test)

Table 3. Average number of live OBLR larvae in sweet cherry trees treated by hydraulic handgun with different Bt. insecticides; The Dalles, OR, 2000.

Tmt. no.	Spray applications: Material and formulation	Rate/ acre	Date sprayed	Ave. number of larvae/tree/2-min. count: Pre-spray 7/18/00	Post-spray 7/27/00	
1	Deliver	1 lb.	7/19/00	9.25	3.75	a
2	Javelin	2 lbs.	7/19/00	6.75	2.00	a
3	Dipel	2 lbs.	7/19/00	8.5	2.50	a
4	Check	--	7/19/00	10	9.75	b

ANOVA: means followed by the same letter are not significantly different at p=0.05 (Fisher's LSD test)