

Section III.
Biological & Cultural Control

PARASITOIDS OF HOP APHIDS ON *PRUNUS* IN THE SPRING

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Last year, we reported on the identification and relative abundance of hop aphid, *Phorodon humuli* (Schrank), parasitoids on the aphid's overwintering hosts, *Prunus* trees, in the spring of 1999. We continued this work in 2000 and report here on the results of both years.

Aphid-infested *Prunus* leaves (mostly red-leaf ornamental varieties) were collected from the hop-growing areas of Washington and the parasitoids were reared from them. We sampled from 22 April to 16 June in 1999 and from 31 March to 14 June in 2000. We collected 83 samples from 47 sites in 1999 and 59 samples from 28 sites in 2000. In 1999, the hop aphid alone was found in 36 samples, the leaf-curling plum aphid, *Brachycaudus helichrysi* (Kaltenbach), alone was found in one sample and 46 samples had both species. Two of the mixed-species samples also had the mealy plum aphid, *Hyalopterus pruni* (Geoffroy). Hop aphids were more abundant than leaf-curling plum aphids in all but 5 of the mixed colonies. In 2000, *P. humuli* was the only species in 52 samples, *P. humuli* and *B. helichrysi* were found together in the remaining seven samples, and of those, *P. humuli* was more abundant in five. No *H. pruni* were found in 2000.

In 1999, we reared 802 primary and 1,448 secondary parasitoids (hyperparasitoids). Parasitoids were found in 72 (86.7%) samples: 58 (69.9%) had primary parasitoids, 61 (73.5%) had hyperparasitoids, and 11 samples (13.3%) produced no parasitoids. In 2000, we found 94 primary parasitoids and 180 hyperparasitoids. Thirty-six samples (61.0%) had parasitoids: 26 (44.1%) had primary parasitoids, 23 (39.0%) had hyperparasitoids, and 23 (39.0%) had no parasitoids.

Lysiphlebus testaceipes (Cresson) was the most abundant primary parasitoid both years followed by *Praon unicum* Smith (Table 1). *Aphelinus* spp., *Aphidius ervi* Haliday, *Diaretiella rapae* (M'Intosh), and *P. occidentale* Baker were found in low numbers (Table 1). All of the primary parasitoids except *D. rapae* were found in samples containing only hop aphids: proof that they parasitize hop aphids. *L. testaceipes* has a very wide host range and is apparently native to North America. It is active from April through November and appears to be well adapted to parasitizing hop aphid on *Prunus* in the spring.

In 1999, wasps in the genus *Alloxysta* were the most abundant hyperparasitoids followed by *Asaphes* and *Pachyneuron*, and *Dendrocerus* (Table 1). In 2000, *Asaphes* and *Pachyneuron* were the most abundant followed by *Alloxysta*. Hyperparasitoid numbers exceeded those of primary parasitoids both years. The large number of hyperparasitoids may inhibit the effectiveness of the primary parasitoids.

Parasitic Hymenoptera are rare in hop yards but are common on ornamental *Prunus* trees, which are the major source of hop aphids in the spring. These trees are not usually sprayed with insecticides, so they may be good sites for parasitoid populations to increase and reduce the number of hop aphids flying to hops. Knowing the identity of hop aphid parasitoids is important in managing those parasitoids and in planning introductions of exotic parasitoids.

Table 1. Parasitoids reared from aphid samples collected from *Prunus*, spring 1999 and 2000.

Primary parasitoids^a												
	<u><i>Lysiphlebus</i></u> <u><i>testaceipes</i></u>		<u><i>Praon</i></u> <u><i>unicum</i></u>		<u><i>Praon</i></u> <u><i>occidentale</i></u>		<u><i>Aphelinus</i></u> <u>spp.</u>		<u><i>Aphidius</i></u> <u><i>ervi</i></u>		<u><i>Diaretiella</i></u> <u><i>rapae</i></u>	
	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>
Number	654	49	115	35	3	0	7	4	8	1	2	0
%	81.6	52.1	14.3	37.2	0.4	0	0.9	4.3	1.0	1.1	0.2	0
No. of samples	52	14	28	7	2	0	4	4	3	1	2	0
% of samples	62.7	23.7	33.7	11.9	2.4	0	4.8	6.8	3.6	1.7	2.4	0
Hyperparasitoids												
	<u><i>Alloxysta</i></u> <u>spp.</u>		<u><i>Asaphes</i></u> <u>and</u> <u><i>Pachyneuron</i></u>		<u><i>Dendrocerus</i></u> <u>spp.</u>							
	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>	<u>1999</u>	<u>2000</u>						
Number	845	80	514	99	89	1						
%	58.4	44.4	35.5	55.0	6.1	0.6						
No. of samples	51	16	42	13	12	1						
% of samples	61.4	27.1	50.6	22.0	14.5	1.7						

^aUnidentified *Praon* males not included in the table. There were 13 (1.6%) in 1999 and 5 (5.3%) in 2000.