PREDATOR STUDIES OF THE
BALSAM WOOLLY APHID IN
BRITISH COLUMBIA, 1969

by
A. F. Dawson and J. W. E. Harris

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INTRODUCTION

In 1968, five species of imported predators of the balsam woolly aphid were released in British Columbia (Harris and Dawson, 1969). Searches were made later in the year of release and again in 1969 to determine if any of the species had overwintered. Earlier releases (Harris et al., 1968) were also checked. This report describes the search for both released and native predators from May to September, 1969.

METHODS

Releases

A shipment of Aphidecta obliterata (Linnaeus) (Coleoptera: Coccinellidae) received in January was kept in cold storage and fed honey-water once a month until release in May. Four hundred and twenty-five specimens were released on trees with aphid-infested boles at three sites in the Seymour River Valley.

Assessment

Thirty trees selected in 1969 were examined for native and released predators, including those on which predators were released in 1968, as well as several additional trees. Examinations were made at three-to-five-week intervals from March to September. The number of trees examined at each visit varied as sample trees or aphid populations on them died out and observations were discontinued, and as new trees were selected to replace those which had to be dropped.

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The bark of aphid-infested sample trees, examined visually up to six feet from the ground, was wrapped with corrugated cardboard bands to trap insects pupating on bark such as *Pullus impexus* Mulsant (Coleoptera: Coccinellidae) and native coccinellids, syrphids and Neuroptera. Funnel-traps were placed against trees on which *Cremifania nigrocellulata* Czerny, *Leucopia n. sp.* (both Diptera: Chamaemyiidae) and *Laricobius erichsonii* Rosenhauer (Coleoptera: Derodontidae) were released. These insects pupate in the soil, duff or litter and are caught in the traps as they drop from the bole. Since some predators attacking this aphid or others such as *Mindarus abietinus* Koch (Homoptera: Aphididae) might occur in the crown, branch sampling was done in the Seymour Valley and at Thetis Lake Park at or near release areas.

On Vancouver Island, five grand fir, *Abies grandis* (Dougl.) Lindl., were examined: one at Langford, two at Thetis Lake Park, and two at Francis Park. By the end of the season, however, only two at Thetis Lake Park remained for examination as the others had either died or the aphids had disappeared.

On the mainland, 25 amabilis fir, *Abies amabilis* (Dougl.) Forb., were examined: three at Rainy River, seven at Witherby Point, three at Seymour River and 12 at Seymour Lake. Here, also, examinations were discontinued on several trees that were dying, dead or on which the aphids had disappeared. At Witherby Point, the only area where new stem-attacked *Abies* could be found in 1969, new trees were examined in the area as old ones died out.

RESULTS

Predator activity was very limited during the 1969 season compared to previous years. This was probably due to a decline of aphid populations at all sites, combined with death of some sample trees.

Native Predators

Only *Allothrombium mitchelli* Davis (Acarina: Trombidiidae) was commonly collected or observed, as in other years. The most prevalent insect predators last year, syrphids and hemerobiids, were infrequently noticed this year and only one or two were collected in cardboard bands, where many pupated last year. Other native predators were seldom encountered.
Released Predators

Recoveries of predators released in 1968 and of Aphidecta released in 1969 were poor. Of the five species released, Aphidecta and Leucopis were not recovered. Laricobius, Pullus, and Cremifania, however, successfully overwintered (Table 1). Predators were found only in the Seymour River Valley and Witherby Point areas on the mainland.

Table 1. Introduced predators released in 1968 and recovered in 1969.

<table>
<thead>
<tr>
<th>Species released</th>
<th>Released</th>
<th>Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Location</td>
</tr>
<tr>
<td>Laricobius erichsonii</td>
<td>3,164</td>
<td>Rainy River, Witherby Point, Thetis Lake Park, Francis Park</td>
</tr>
<tr>
<td>Pullus impexus</td>
<td>2,079</td>
<td>Seymour Lake, Seymour River</td>
</tr>
<tr>
<td>Cremifania nigrocellulata</td>
<td>706</td>
<td>Seymour Lake</td>
</tr>
<tr>
<td>Aphidecta obliterata</td>
<td>1,100</td>
<td>Rainy River, Langford</td>
</tr>
<tr>
<td>Leucopis n. sp.</td>
<td>2,273</td>
<td>Seymour</td>
</tr>
</tbody>
</table>

In early spring, Laricobius adults were recovered from release trees at Witherby Point. Stem attack on these trees gradually disappeared and some trees were dying or dead by late spring to summer; later searches were also made on new trees which still had healthy stem attack. Larvae were found on one tree in May and adults on several trees in July.

In the Seymour River Valley, Pullus larvae were noticed in April and May on several trees along Seymour Lake and Seymour River. However, no adults were found later in the season. Aphidecta, released this May, were only observed two days after release, when 21 adults were noticed on two of three release trees. Three puparia of Cremifania were collected at Seymour Lake.
DISCUSSION

Over 9,000 specimens of five predator species were released in 1968 against the balsam woolly aphid. Although there was some establishment after one winter, results were disappointing.

Predators were undoubtedly adversely affected by the very low aphid populations that developed in 1969. Mass stem attack on trees in release areas had dwindled from 1968, when stem-attacked trees were then uncommon. Also, many release trees were beginning to die and a few were dead, further reducing aphid populations on which young predators had to develop or die, because only in the adult stage could they move from tree to tree.

Both aphid and predator populations were undoubtedly adversely affected by unusually severe winter temperatures in 1968-69, with record minimum temperatures of 4°F at Victoria and -0.3°F at Vancouver probably being exceeded at sites in the nearby forest. Countering this near the ground, however, was a record high snowfall.

Three of the released predators, Laricobius, Leucopis and Cremifania, normally prefer areas of mass attack. Difficulty of establishment of these species would be expected when aphid populations become low. Aphidecta is capable of existing on twig attack or on several alternate aphid hosts, and Pullus on light, often waning stem attack. Pullus might be expected to survive under declining Adelges populations, but only a few larvae were actually recovered. Aphidecta, known to disperse widely for overwintering, might still have been present in crowns of various conifers feeding on adelgids or other aphids, but limited branch sampling revealed no sign of the species. Further sampling when aphid populations are more adequate to support a good predator population should indicate more positively whether or not the release program has been successful.

REFERENCES
