# PARASITES OF THE LARCH CASEBEARER, *COLEOPHORA LARICELLA* (HBN.), IN BRITISH COLUMBIA (LEPIDOPTERA: COLEOPHORIDAE)

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ABSTRACT

The following nine species of parasites and hyperparasites were recovered from rearings of the larch casebearer, **Coleophora laricella** (Hbn.), in Interior British Columbia, 1966-1968: **Bracon** sp., **Scambus decorus** Wly., **Scambus transgressus** (Holmg.), **Gelis tenellus** (Say), **Dicladocerus westwoodii** (Westw.), **Tetrastichus xanthops** (Ratz.), **Amblymerus** prob. new sp., **Sceptrothelys deione** (Wlk.) and **Spilochalcis albifrons** Walsh.

The larch casebearer, *Coleophora laricella* (Huebner), was introduced from Europe to the eastern United States in the 1880's and spread to the Lake States and Ontario and Quebec. The insect was found infesting western larch near St. Maries, Idaho, in 1957, and subsequently spread into northeastern Washington and northwestern Montana. It was first discovered in British Columbia in 1966 near Rossland and in the valleys of the Yahk and Salmo rivers. It has spread as far north as Lardeau at the north end of Kootenay Lake, west to Anarchist Mountain near Osoyoos and east to the Kootenay River. Populations in British Columbia have increased rapidly and caused light damage. Repeated defoliation by the casebearer causes significant reduction in terminal and radial growth and occasionally kills branchlets, and may kill trees.

Over 50 species of native parasites have been reared from larch casebearer in eastern Canada and the United States, but none in significant numbers. Two introduced parasites, *Agathis pumila* (Ratzburg) and *Chrysocaris laricinellae* (Ratzburg), have become well established in eastern infestations. Realeases of *A. pumila* in Idaho in 1960 resulted in the successful establishment of this parasite in Western larch infestations in the United States, but it has not been released or recovered in British Columbia, although releases are planned.

The parasites associated with the larch casebearer in British Columbia were investigated in 1966, 1967 and 1968 to determine their significance, and to find out if *A. pumila* had spread into the Province from the United States. Casebearer larvae were collected from several localities each year between 16 May and 14 June and reared on larch branches in cloth-covered cages at the Forest Entomology Laboratory in Vernon. In all, nine species of hymenopterous parasites and hyperparasites have been recovered from these rearings. Following is a list of those reared at Vernon and identified by Dr. W. R. M. Mason, Dr. O. Peck and Mr. G. S. Walley of the Systematics Unit, Entomology Research Institute, Ottawa.

## BRACONIDAE

**Bracon** sp. - 1 specimen from Osoyoos, B.C. emerged 18-VI-68.

## ICHNEUMONIDAE

**Scambus decorus** Walley - 2 specimens from Creston, B.C. emerged 5-VI-67 and 6-VI-67.

**Scambus transgressus** (Holmgren) - 13 specimens from Creston, B.C. emerged 10-VI-68 and 12-VI-68.

**Gelis tenellus** (Say) - 1 specimen from Salmo, B.C. emerged 27-VI-68; 1 specimen from Creston, B.C. emerged 18-VI-68.

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**EULOPHIDAE**

**Dicladorcerus westwoodii** (Westwood) - 6 specimens from Creston, B.C. emerged 18-VI-68.

**Tetrastichus xanthops** (Ratzburg) - 2 specimens from Creston, B.C. emerged 18-VI-68.

**PTEROMALIDAE**

**Amblymerus** probably new sp. - 4 specimens from Salmo, B.C. emerged 18-VI-68; 6 specimens from Creston, B.C. emerged 14-VI-68 and 18-VI-68.

**Sceptrothelys deione** (Walker) - 2 specimens from Creston, B.C. emerged 14-VI-68.

**CHALCIDIDAE**

**Spilochalcis albifrons** Walsh - 12 specimens from Creston, B.C. emerged 27-VI-68; 7 specimens from Salmo, B.C. emerged 27-VI-68; 5 specimens from Salmo, B.C. emerged 5-VII-66, 6-VII-66, 7-VII-66, 18-VII-66.

All parasites were recovered from ultimate instar larvae or pupae of *C. laricella*.

*G. tenellus* is a common hyperparasite and *S. albifrons* is often hyperparasitic.

In 1966, 0.69% of 1,004 casebearers reared at Vernon were parasitized; in 1967, 0.22% of 881 casebearers were parasitized and in 1968, 4% of 1,360 casebearers reared were parasitized, with the greatest percentage (14% of 208) occurring near Creston.

# LABORATORY REARING OF *NOTONECTA UNDULATA* SAY (HEMIPTERA : NOTONECTIDAE)

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ABSTRACT

Four generations of **Notonecta undulata** Say were reared in the laboratory within a year. Adults were kept in 15 gallon oviposition aquaria maintained at a temperature of 25 ± 1°C and a pH of 6.5 - 7.5. Eggs were transferred to an incubation aquarium kept under identical conditions. Nymphs were reared individually in 100 ml glass beakers. Live prey were supplied regularly for food.

*Notonecta undulata* Say, one of the most common species of backswimmer in North America, is a predaceous water bug found in many fresh - water habitats throughout Canada and the United States. Various aspects of its life-history, ecology and behavior are known (Bueno 1905; Essenburg 1915; Hungerford 1917, 1919; Clark 1928; Clark and Hersh 1939; Ellis and Borden 1969). Adults can be collected throughout the year in southwestern British Columbia, although with considerable difficulty during the winter. Because *N. undulata* is suitable for biological studies, we have, therefore, developed a technique by which this species may be reared in the laboratory.

In southwestern British Columbia there are generally two generations per year. Our colony was started in April, 1967, from field-collected adults and has continued for 23 months.

The rearing conditions were as follows: backswimmers were kept in covered 15-gallon aquaria, filled with tap water that had been aerated for at least 24 hours to remove chlorine. Aquaria were equipped with a filter-aerator, pH was 6.5-7.5 and temperature was maintained at 25 ± 1°C by a standard aquarium heater. The backswimmers were kept under natural daylight. The aquaria were covered with canopies to prevent the escape of adults, two 25-watt light bulbs being used to facilitate periodic inspection. The bottoms of the aquaria were covered with sand, and several pieces of green rubber-mesh

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