

# THE APPLE-AND-THORN-SKELETONIZER, *EUTROMULA PARIANA* (LEP., CHOREUTIDAE), AND ITS PARASITES IN SW BRITISH COLUMBIA

BY MIKTAT DOGANLAR AND BRYAN P. BEIRNE

Pestology Centre  
Department of Biological Sciences  
Simon Fraser University  
Burnaby, B.C.

## ABSTRACT

*Eutromula pariana* (Clerck) overwinters mainly in the pupal stage in south-western British Columbia. The moths emerge in warm periods and can survive severe cold. Parasitism in 1977-78 was by 29 species and totalled 54 percent. *Apanteles longicauda* (Wesm.), an introduced European Braconid species, comprised 80 percent of the parasites. The host may be an important reservoir for *A. longicauda* as a parasite of fruit-tree leaf-rollers.

## INTRODUCTION

*Eutromula pariana* is a Palearctic moth that was introduced accidentally into North America. It was found first in the Eastern United States in 1917, in Eastern Canada in 1923, and in British Columbia on Vancouver Island in 1937 and in the Lower Fraser Valley in 1944. It is not known if the B.C. population originated by introduction from eastern North America or by re-introduction from abroad. It has caused conspicuous damage to apple foliage in B.C.

Two questions have arisen: is it likely to increase and become a pest when it reaches the main orchard areas in the Interior of the Province; and, because its life-cycle is out-of-phase with those of most other Lepidoptera of similar size and apple-feeding habits, is it important as an alternative host of their parasites?

## Overwintering

It is stated in the literature that the adult stage overwinters. Whether or not the moth could survive the cold winters of the Okanagan district is important in assessing its potential as a pest there.

In southwestern B.C. this species was found to overwinter as both pupa and adult. Moths emerged from pupae in field cages in October, in mild periods during the winter, and in the spring. Pupae were collected in fallen leaves in orchards during the winter: 309 at Haney on January 15 and 114 at Burnaby on February 15. In the winter of 1976-77, at least, the pupa was the dominant overwintering stage, up to a mild period in February.

The moths, as well as the pupae, can survive severe cold: moths that emerged in winter survived 30 days at around minus 10 degrees C. in a refrigerator and only a few of the moths that emerged in an outdoor cage during a warm period in April did not survive below-freezing temperatures a few days later. These results, and the fact that the species survives in Eastern North America where winters are cold,

indicate the likelihood that it could survive in the Interior of British Columbia when it spreads or is introduced into that region.

## Parasitism

Parasites emerged from 54 percent of 2940 larvae and pupae of *E. pariana* that produced either moths or parasites. The incidence of parasitism was high as compared with that of 26 species of leafrollers feeding on apple or other deciduous trees and shrubs in the Vancouver district in 1977 and 1978, in none of which did total parasitism exceed 17 percent (Doganlar and Beirne, unpublished).

Twenty-four species of primary and secondary parasites were reared from *E. pariana* in 1977. *Apanteles longicauda* (Wesm.) comprised 80 percent of all parasites. A species of *Enytus* and *Triclistus emarginalis* Say together comprised 16 percent of the 1197 primary parasites that were reared.

The material was collected mainly at Burnaby and at New Westminster. The sequence of emergence of the parasite species, except *T. emarginalis*, was the same at the two locations. There were minor peaks in numbers of emergences of *Enytus* and *A. longicauda* in mid-June and early in July, followed in mid-July by the major peak in emergences of the secondary parasites which were chiefly a *Pteromalus* (subgen. *Habrocytus*) sp. (or spp.), a parasite of *A. longicauda*. Late in July there was a minor peak of *T. emarginalis* at Burnaby. There were then three major peaks in succession: of *A. longicauda* in early August, when it comprised 81 percent of all parasites that emerged at that time; of *Enytus* in mid-August; and, only at Burnaby, of *T. emarginalis* in late August. Emergences of *A. longicauda* were few after early August until there was a second major peak late in September when it comprised 79 percent of all parasites that emerged at that time.

Possible interactions between the various

parasite species in and on *E. pariana* were not investigated, but it appears that *A. longicauda* could be a significant control factor subject to its effectiveness being reduced by secondary parasites in summer.

*Apanteles longicauda* is a known parasite of *E. pariana* in Europe (Wilson 1928, Wilkinson 1945, Thompson 1953, Telenga 1955, Nixon 1972). It was reared from 7 other species of Lepidoptera in the Vancouver district, all of them found feeding on *Malus* and most of them found also on *Pyrus* and *Crataegus*. This indicates that *E. pariana* could be a significant reservoir for *A. longicauda* as a parasite of fruit-tree leaf-rollers in the Vancouver district. However, parasitism by it on the other species was insignificant in 1977 and 1978: under 1 percent for 6 species and under 2 for the seventh.

The unusual feature is that *A. longicauda*, itself originally an accidental introduction into North America (Doganlar and Beirne, 1978), is mainly a parasite of introduced species of Lepidoptera in the Vancouver district: of, in addition to *E. pariana*, *Croesia holmiana* (L.), *Pandemis cerasana* (Hbn.), *Archips rosanus* (L.), *Hedia nubiferana* (Haw.), and *Silonota ocellana* (D. & S.); of *Phyllonorycter elmaella* Dog. & Mut., whose origin as a native or introduced species is unknown; and of the native species *Choristoneura rosaceana* (Harr.) and *Zelleria parnassiae* Brown. It was not reared from more than 20 other species of Lepidoptera collected on the same plants at the same times. The *Enytus* sp. was reared from *C. holmiana* and *H. nubiferana* and from the native *C. rosaceana*, and *T. emarginalis* from *P. elmaella*.

Parasite species that were of minor significance to *E. pariana* and that were reared also from other Lepidoptera in the Vancouver dis-

trict were: *Macrocentrus iridescens* French, from *P. cerasana*, *A. rosanus*, *C. rosaceana*, *S. ocellana*, *H. nubiferana*, *Acleris comariana* (Zell.), and *A. variegana* (D. & S.); *Dibrachys cavus* (Walk.), which is usually a hyperparasite of *A. longicauda*, *Enytus* sp. and *T. emarginalis*, from *P. cerasana* and *C. rosaceana* (and recorded from *E. pariana* in Eastern North America); and *Pseudoperichaeta erecta* (Coq.) from *P. cerasana*. These parasite species were reared in only small numbers, indicating that none of them exerted any significant control over those hosts in the Lower Fraser Valley in the late 1970's.

Other parasitic species reared from *E. pariana* or its parasites, of minor importance are: Primary parasites; *Colpoclypeus* sp.nr. *florus* (Walk.), *Diadegma* spp. *Oncophanes americanus* Weed, *Glypta* sp., *Rogas* sp., *Scambus* (*Scambus*) *canadensis* (Walley), *S. (S.) decorus* (Walley), *S. (S.) transgressus* (Holmg.), *Sympiesis bimaculatipennis* Gir.

Primary and secondary parasites; *Itopectis conquisitor* (Say), and *I. quadricingulata* (Prov.), especially on *T. emarginalis*.

Secondary parasites; *Cyrtogaster vulgaris* Walk., *Asaphes vulgaris* (Walk.), *Miscogaster* sp., *Tricomalus* sp., *Mesopolobus finlaysoni* Dog., *M. longicaudae* Dog., *Elasmus atratus* How., *Tetrastichus caeruleus* Ashm., *Tetrastichus (Abrostocethus)* sp., *Gelis tenellus* Say, *Gelis* spp.

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