Hymenopterous parasites of the blackheaded budworm, *Acleris gloverana* on Vancouver Island, British Columbia, 1970-1974

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ABSTRACT

Thirteen hymenopterous parasites of the blackheaded budworm, *Acleris gloverana* Walsingham, from Vancouver Island are compared with those found in British Columbia during the 1940-44 outbreak and outbreaks in the early 1950's and mid-1960's in Alaska. Six species of the parasites reported were first records for British Columbia. Some of those reported may be new species.

INTRODUCTION

The range of the blackheaded budworm, *Acleris gloverana* Walsingham, extends from west-central Alaska along the Pacific Coast to northern California, and this insect occurs endemically in the Selkirk Mountains of British Columbia (B.C.). Outbreaks have occurred approximately every ten years (Prebble and Graham 1945b; Anonymous 1972). The decline of these cyclic infestations is not understood although some controlling factors suggested have been weather (Silver 1960, 1963) and natural control (non-chemical) factors (Prebble and Graham 1945a&b). The primary host of the budworm is western hemlock, *Tsuga* sp. but the larvae also feed on *Abies, Larix, Picea,* and *Pseudotsuga* (Powell 1962). During the 1940-44 outbreak, M.L. Prebble (unpublished report) listed 48 different species of parasites of the blackheaded budworm. Torgersen (1970) published a list of 16 different parasites which occurred in an Alaskan infestation. The parasites reported in this study were from the infestation that occurred on Vancouver Island from 1970 to 1974.

MATERIALS AND METHODS

During the outbreak period of 1970 to 1974, nine research plots were established to represent western hemlock stands on Vancouver Island. These plots were used to develop a sampling system (Shepherd and Gray 1990 a,b), and to investigate the population dynamics of this insect. The samples consisted of 100 45-cm branches from each of eight locations and 200 45-cm branches from another location for which defoliation estimates and the number of blackheaded budworm were recorded. Branch samples were taken when the blackheaded budworm was at the egg, early larval, late larval and pupal stages of development from 1972 to 1975. Blackheaded budworm larvae and pupae were placed individually in 3/4 oz. plastic containers to allow the parasites to emerge. Artificial diet (McMorran 1965) was provided for the larvae to complete their feeding. The adult parasites were pinned and labelled, and representatives of each species were sent to the Biosystematics Research Centre in Ottawa for identification.

RESULTS AND DISCUSSION

Percent parasitism during this infestation was initially quite low and, in fact, was undetectable in some plots. Parasitism had increased by the second year of the outbreak. In 1972 the average parasitism was 15% (7 plots, 2 plots had no parasitism), it increased to 53% (5 plots, 4 plots had no parasitism) in 1973, but decreased to 13.5% (7 plots, 2 plots had no parasitism) in 1974 when the outbreak collapsed. By 1975, the high populations had disappeared and larvae were not recovered from any of our study plots. Dipteran parasites were present in high numbers compared to hymenopteran parasites (46 in 1972 (6 plots, 3 plots had no dipteran parasites) and 423 in 1973 (5 plots, 4 plots had no dipteran parasites)) but no parasite adults were obtained

Table 1

Hymenopterous parasites of the blackheaded budworm occurring on Vancouver Island, 1972-1974.

Parasites	Family	Adults Emerged	Present in B.C. in 1940-44 (Pebble (unpubl.) 1945)	Years Present (Torgerson 1970)	Occurs in Alaska
Larval					
Ascogaster provancheri Dalla Torre	Braconidae	13	yes	1973-74	no
Charmon extensor (Linne)	"	12	no	1972-74	no
Meteorus argyrotaeniae (Joh.)	"	1	no	1972-73	yes
Meteorus sp.	"	1	no	1974	no
Microgaster peroneae (Walley)	"	18	yes	1972-74	yes
Habrocytus sp.	Chalcidoidea	2	yes	1972,1974	no
Campoplex sp.	Ichneumonidae	3	yes	1973-74	no
Mesochorus pictilis (Holmg.)	"	1	no	1974	no
Mesochorus sylvarum (Curtis)	"	4	no	1973-74	no
Mesopolobus sp.	Pteromalidae	15	no	1972,1974	no
2Pupal					
Itoplectis quadricingulata (Provancher)	Ichneumonidae	6	yes	1974	yes
Phaeogenes arcticus (Cush.)	"	1	yes	1974	yes
Phaeogenes hariolus (Cress.)	"	1	yes	1974	no

from the puparia. Torgersen (1970) also had difficulty in obtaining adult emergence even though he tried various temperatures and photoperiods to break what appears to be a parasite pupal diapause. There was considerable variation between the hymenopterous species recovered between outbreaks and also between locations (Table 1.). Of particular interest are: *Charmon* (= *Eubadizon*) *extensor, Mesochorus pictilis* and *M. sylvarum, Mesopolobus* sp. (possibly n. sp.), and *Meteorus* sp. (possibly n. sp.), which previously had not been reported attacking this host in British Columbia or Alaska. These species may be capable of changing hosts as the opportunity arises. Of the sixteen species identified during this outbreak six species were first records for British Columbia.

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Sex pheromone components of an undescribed *Choristoneura* species (Lepidoptera: Tortricidae) on lodgepole pine in British Columbia

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ABSTRACT

*E*11-tetradecenyl acetate (*E*11-14 OAc) and Z11-tetradecenyl acetate (*Z*11-14 OAc) are sex pheromone components of an undescribed, pine-feeding *Choristoneura* (*C.* n. sp. CPG=Prince George) in British Columbia. Compounds were identified by coupled gas chromatographic-electroantennographic (GC-EAD) and coupled gas chromatographic-mass spectroscopic (GC-