

## Parasitoids of blackheaded fireworm (*Rhopobota naevana* Hbn.) larvae on cranberries, and larval escape behaviour

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### ABSTRACT

The parasitoids *Hemisturmia tortricis* (Coq.) (Tachinidae), *Sympiesis bimaculatipennis* (Girault) (Eulophidae) and one male of the genus *Microplitis* (Braconidae) were reared from blackheaded fireworm larvae collected on a cranberry farm in the Fraser Valley, B.C. Fireworm larvae escape ovipositing parasitoid females by dropping from an "escape hatch" hole cut in the bottom of the feeding shelter.

**Key words:** *Vaccinium macrocarpon*, *Hemisturmia tortricis*, *Sympiesis bimaculatipennis*, *Microplitis*, Tortricidae, biological control, behaviour

### DISCUSSION

The blackheaded fireworm of cranberry, *Rhopobota naevana* Hbn. (Lepidoptera: Tortricidae) is an economically important pest for which biological and other non-chemical control measures are currently being sought. Two indigenous parasitoids, *Trichogramma minutum* Riley and *T. sp. nr. sibericum* Sorokina, are known to parasitize blackheaded fireworm eggs (Li *et al.*, 1993), and a granulosis virus is associated with larval mortality in the field (Fitzpatrick and Theilmann, unpublished data). Spiders of the genus *Pardosa*, *Xysticus* and *Tibellus* have been found preying upon fireworm moths in field cages (Fitzpatrick and Troubridge, 1993) and ladybird beetles, *Coccinella californica* Mann., have been observed feeding on fireworm larvae in the field (Plank, 1922). However, except for Plank's (1922) report that "numerous very small wasplike insects ... can be seen flying over the tops of the vines on badly infested bogs", there are no records of parasitoids attacking larvae.

In 1991, we collected ca. 200 blackheaded fireworm larvae from a cranberry farm in Pitt Meadows, B.C. that was seldom treated with insecticide. From these larvae, six parasitoids belonging to three species emerged. Two were *Hemisturmia tortricis* (Coq.), a tachinid fly known to parasitize nine other leafroller species as well as larvae in the moth families Glyphipterygidae, Nymphalidae, Olethreutidae, Pterophoridae and Pyralidae (Armand, 1978). Three parasitoids were *Sympiesis bimaculatipennis* (Girault), an eulophid wasp that attacks leafrollers but is reported to prefer blotchmining or skeletonizing lepidopterans (Krombein, 1979). The sixth parasitoid was a male of the genus *Microplitis* (Hymenoptera: Braconidae) that could not be keyed further because males of this genus cannot be identified to species (M. Sharkey, C.L.B.R.R., Ottawa, personal communication).

Blackheaded fireworm larvae feed at the tips of cranberry runners or upright shoots, although newly hatched first instars may mine into the underside of the leaf on which they hatch if no new growth is available (Plank, 1922). A larva webs three to five of the top leaves together and, protected within this "tent", feeds on new leaves and leaf primordia. We have observed female *S. bimaculatipennis* walking over the tents, tapping with their antennae and probing between leaf edges with their ovipositor. Although we have not observed the host-seeking behaviour of *H. tortricis*, other members of its tribe (Winthemiini) lay eggs directly on the host, so it too must somehow locate larvae within tents (D.M. Wood, personal communication). We have seen ladybird beetle larvae attempting to pry tents open using their legs and mandibles.

However, entry into a tent does not guarantee success for a parasitoid or predator, because the larva often drops on a silken thread through an "escape hatch" hole previously cut in the bottom of the tent. Larvae also use the holes to leave tents depleted of food. Holes range in size from

approx. 0.5 mm by 0.7 mm (made by early instars) to 4.6 mm by 1 mm (made by late instars). Larvae have been seen returning to tents from which they have previously escaped.

The tiny, leaf-mining first instars may also be subject to parasitism by *S. bimaculatipennis*, although this remains to be demonstrated or observed.

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