

**PREDATION BY *CHEIRACANTHIUM MILDEI***  
**(ARANEAE, CLUBIONIDAE) ON LARVAL**  
***PHYLLONORYCTER BLANCARDELLA***  
**(LEPIDOPTERA, GRACILLARIIDAE)**  
**IN A GREENHOUSE**

The spotted tentiform leafminer, *Phyllonorycter blancardella* (F.) (Lepidoptera, Gracillariidae), has become an important pest in commercial apple orchards in eastern North America since its introduction from Europe (Pottinger and LeRoux 1971). The larvae form tentiform mines in leaf tissues of apple (*Malus pumila* Mill.) and other closely related plants (Pottinger and LeRoux 1971). Although many insect parasitoids of this insect have been recorded (Laing 1984, Ridgeway and Mahr 1985), little attention has been directed towards predators of larval *P. blancardella*.

*Cheiracanthium mildei* L. Koch, a native of Europe, is a clubionid spider commonly found in synanthropic habitats in eastern North America (Dondale and Redner 1982). In Israel, this species was found to be very common in unsprayed apple orchards where it is important for control of various insect pests, especially the larvae of *Spodoptera littoralis* (Boisd.) (Lepidoptera, Noctuidae) (Mansour et al. 1980a,b). Mansour et al. (1980a) indicated that *C. mildei* preys on larvae and adults of *P. blancardella* under laboratory conditions.

This note reports our observations of specialized predation by *C. mildei* on the larvae of *P. blancardella* in a greenhouse.

In the winter of 1985, as part of an ongoing parasitization study, larval *P. blancardella* were reared on young apple trees in the greenhouse of the Biological Control Laboratory, University of Guelph, Ontario. The trees were put in sleeve cages and adult *P. blancardella* were released into the cages for oviposition on apple leaves. A high level of predation on the larval leafminers was found in some cages, although the rate was not quantified. Predation was indicated by single triangular rents (1-2 X 2-3 mm) in the undersurfaces of mines and the absence of larvae. Larval losses in the greenhouse sleeve cages were severe and hampered the rearing program for the spotted tentiform leafminer.

Various unidentified species of Salticidae, Araneidae, Linyphiidae, Philodromidae, and Theridiidae were also present in the greenhouse, but only *C. mildei* was found regularly on leaves in the vicinity of attacked mines. Individuals of these clubionid spiders spun (and were found within) silken retreats on the lower surface of mined apple leaves. Many clubionids construct and inhabit similar retreats (Dondale and Redner 1982).

We suspected that *C. mildei* actively sought out trees infested with leafminers. *C. mildei* was rarely found on uninfested trees in the greenhouse. Although other species of spiders (unidentified salticids especially) were found in some sleeve cages, predation on larval leafminers was observed only in cages containing *C. mildei*.

Two or three individuals of each of the various hunting spiders found in the greenhouse were isolated in covered plastic petri plates with freshly picked apple leaves that contained mines formed by the tissue-feeding instars. Because of the relatively sedentary habits and the nature of prey capture behavior generally observed in web-building spiders, predation on leafminers by web-building species present in the greenhouse (such as araneids and linyphiids) was considered to be unlikely. Spider attacks on larvae were not observed directly, but only leaves isolated with *C. mildei* received characteristic mine damage and predation on the leafminer larvae.

Predation is typically difficult to quantify because predators often do not leave evidence of their work (J. E. Laing pers. comm.). However, predation on leaf-mining larvae is detectable because the mines are damaged (Pottinger and LeRoux 1971) and the type of damage often is characteristic of the predator. For example, the larvae of chrysopids feed on *P. blancardella* through the top surface of the mine and do not remove their prey (J. M. Heraty pers. comm.). Birds also attack the larvae through the top of the leaf leaving a large entrance hole (Pottinger and LeRoux 1971). On the other hand, *C. mildei* attacks through the bottom surface of the mine. Thus, it is possible to identify the predator *in absentia* by its mode of entry into the mine. Presently, predation by spiders may be incorrectly attributed to more obvious predators such as entomophagous birds.

Although larval *P. blancardella* are infrequently attacked by invertebrate predators because of the concealment afforded by their mines, *C. mildei* apparently is able to detect and attack the larvae through the leaf epidermis. This phenomenon of search and extraction of a cryptic food source has not been previously reported for *C. mildei*. Because of this specialized feeding behavior, we suspect that *C. mildei* may prove to be an important predator of *P. blancardella* and worth considering in integrated control programs for this insect.

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