

PREDATION OF *MICROVELIA PULCHELLA* (HEMIPTERA: VELIIDAE) ON MOSQUITO LARVAE

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Veliid bugs are the most conspicuous inhabitants of the surface film of quiet ponds, pools, rice fields and streams in California. Although they are closely related to the Gerridae, they are much smaller and less conspicuous than Gerridae.

In the vicinity of Fresno, the most abundant veliids belong to the genus *Microvelia* (Fig. 1) which lack the specialized plume of tarsal hairs of the genus *Rhagovelia* and, therefore, prefer quieter water surface and are quite comfortable on land near the margins (Usinger 1956).

Although *Microvelia* have been known to prey on a variety of small aquatic organisms that occur in their habitat (Usinger 1956) including ostracods, *Daphnia*, *Drosophila* (Polhemus and Chapman 1979) and planthoppers (Reissig et al. 1986), they seem to be most adapted to prey on the organisms which frequent the surface film. Various mosquito larvae certainly exhibit this behavior. Jenkins (1964) cited several studies of predation of *Microvelia* spp. on the mosquito larvae and also on the adults as they emerged. Laird (1956) described *Microvelia* assaults on newly laid egg rafts of the mosquito *Culex femineus* Edwards.

Our observations of *Microvelia pulchella* Westwood show that this genus preys on mosquito larvae. Five observations were made of *Microvelia* feeding on *Culex quinquefasciatus* Say larvae after which only empty exoskeletons remained (Fig. 1). In addition, one observation was made of a surface-entrapped, live leafhopper adult being preyed upon by a swarm of *Microvelia*, both adults and nymphs. Reissig et al. (1986) reported that this genus preys on leafhoppers in Philippine rice fields.

To demonstrate that the *Microvelia pulchella* are able to derive nutrients from mosquito larvae in order to survive, grow and reproduce, 2 male and 2 female adults were introduced in an enamel pan containing ca. 2 liters of water. Two 1 x 10 cm diam plastic foam rings were floated atop the water for oviposition sites. About 100 mixed stages of immature mosquito larvae and 3 to 5 egg rafts were added to the pan every other day. In order to entrap emerging adult mosquitoes from the pan, the pan was then placed in a 1-foot³ mosquito rearing cage. For control purposes, an identical set-up with 2

males and 2 females but no mosquitoes, was established.

All the *Microvelia* in the pan with no mosquito larvae died within 7 days. In contrast, those in the pan with mosquito larvae continued to survive and produce another generation after about 25 days. This colony multiplied until the observation was terminated and the predators counted 60 days after the start of the observation.

The population of the colony contained the following stages and numbers of *Microvelia*:

Stage	Condition	Number
Eggs	eyespot of embryo visible	1,022
Nymphs	less than ½ size of adults	137
Nymphs	greater the ½ size of adults	76
Adults		17

Many more eggs were laid underneath those counted on the plastic foam rings. Only the surface layer of eggs were counted.

These observations showed that *Microvelia pulchella* is not only capable of preying on mosquito larvae but also survives and reproduces using the mosquito larvae as their only source of food. However, because of their small size and somewhat limited habitat (in terms of microenvironment) they are probably not a major predator of mosquitoes. When observed they seem to have difficulty handling the larger larvae and appeared most successful when their prey was either subdued as when mosquito adults emerge, or disabled as when terrestrial invertebrates fall into the water.

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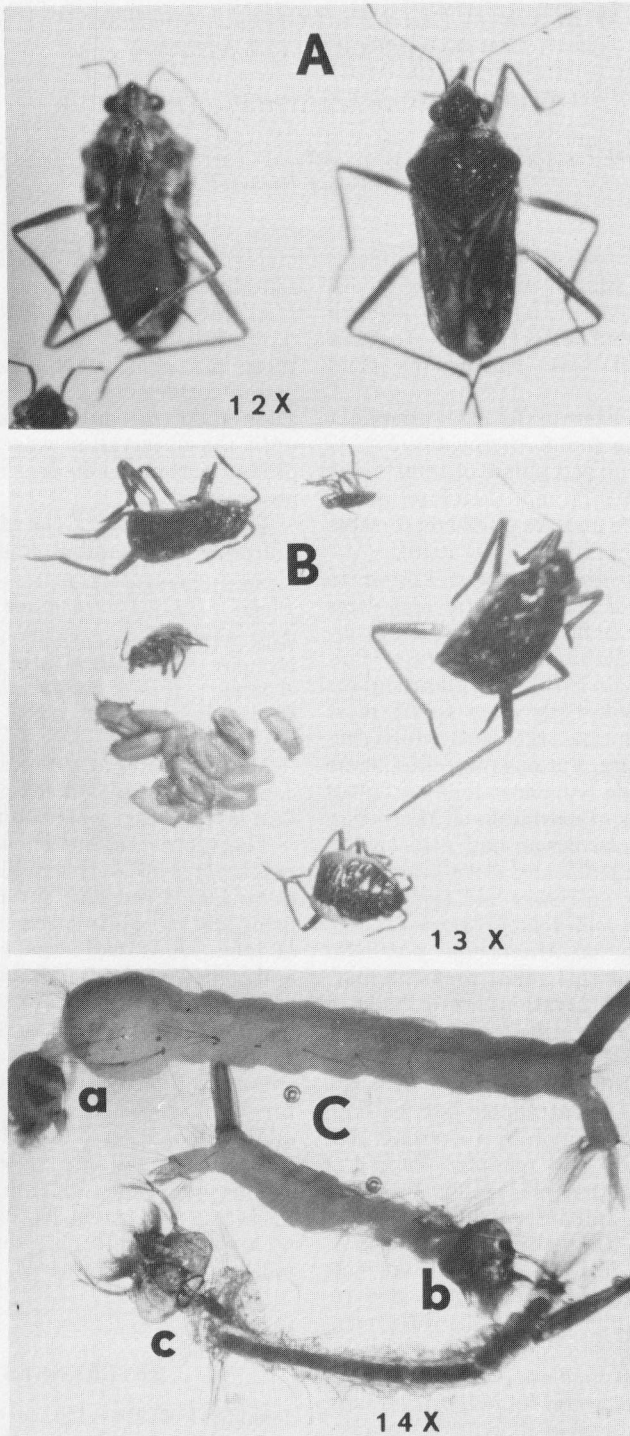


Fig. 1. *Microvelia pulchella* and mosquito larvae. A. Adult *M. pulchella*; B. Eggs and nymphs of *M. pulchella*; C. Mosquito larva (*Culex* spp.): a. Normal larva; b. Larva, partially consumed by *M. pulchella*; c. Larva completely consumed by *M. pulchella*. Note, head capsule, exoskeleton with setae and alimentary canal.

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