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PARASITISM OF *ISCHNURA POSITA* (ODONATA: COENAGRIONIDAE) IN FLORIDA BY TWO SPECIES OF WATER MITES

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Many damselfly species in the family Coenagrionidae are parasitized by water mites in the genus *Arrenurus*. For example, several species of *Enallagma* and *Ischnura* are hosts of the water mites *Arrenurus major* Marshall and *Arrenurus americanus* Marshall (Conroy & Kuhn 1977). In particular, the damselfly species *Ischnura posita* (Hagen) is parasitized by *A. major* larvae on its thorax and abdomen (Munchberg 1951, Mitchell 1964).

In Florida, *I. posita* is a common damselfly species, and it was checked for parasitism by water mites. Preliminary sampling in 1977 from Lake Alice, Gainesville, Florida, showed *Arrenurus* larvae on both thorax and abdomen. These larvae, removed from the host and inspected, were found to be virtually indistinguishable from one another with the exception of their stylostomes. Stylostomes, membranous extensions of larval-mite mouthparts that enter the body cavity of the host, have been found to be species-specific in other water mites (Lanciani & Smith 1989). The stylostomes found in these sampled *I. posita* were of 2 distinct types: a long type attached to the thorax and anterior segments of the abdomen and a much shorter type attached to the middle and posterior segments of the abdomen. These observations suggested that 2 species of site-segregated water mites parasitize this host species.

Accordingly, 5 samples of *I. posita* were taken from Lake Alice from 28-X-1981 to 30-XI-1981 and included hosts parasitized by mites on the thorax and abdomen. These damselflies were brought to the lab and maintained in vials containing water until mites were fully engorged. Then we removed each mite, recorded its precise attachment site, and placed it in a culture dish containing 20 ml of aged tap water. The culture dishes were kept in an environmental chamber with a temperature of 26.5 °C and a photoperiod of 12 h light: 12 h dark. After mite larvae metamorphosed to the nymphal stage, they were fed ostracods. Later these mite nymphs metamorphosed to the adult stage and were also fed ostracods. After 8 d, adult mites developed fully expanded and hardened exoskeletons and were preserved in a solution of 10 parts acetic acid, 40 parts water, and 50 parts glycerin for later identification. Identification of *Arrenurus* species is based primarily on adult male morphology, so only males reared from the sampled damselflies could be used. Adult males were identified to species from the key, descriptions, and diagrams in Cook (1954).

Seven males reared from attachment sites on the thorax and abdominal segments 1 to 3 of the host were tentatively identified as *A. major*. Five of these 7 mites were attached to the thorax. Sixty-one males reared from attachment sites on abdominal segments 5 through 8 were tentatively identified as *A. americanus*. Forty-seven of these 61 mites were attached to abdominal segments 6 and 7.

Conroy & Kuhn (1977) reported that *A. major* and *A. americanus* attach to both thoracic and abdominal segments of many of their damselfly host species. While *A. major* observed in our study attached to both thoracic and abdominal sites, the abdominal sites used were restricted to only the first 3 segments. We never found the other species, *A. americanus*, on the thorax or on the first 4 abdominal segments. Thus, our observations suggest a specificity of host attachment sites with no overlap, a phenomenon that occurs commonly in water mites in the genera *Eylais* and *Hydrachna* (Lanciani 1970, Reilly & McCarthy 1993).

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SUMMARY

Two species of water mites, tentatively identified as *Arrenurus major* and *Arrenurus americanus*, were found to parasitize the damselfly *Ischnura posita* in Florida. The 2 mites attached to different host sites: *A. major* attached to the thorax and abdominal segments 1 through 3 while *A. americanus* attached to abdominal segments 5 through 8.

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