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A new record of hymenopterous parasitism of an immature blackfly (Diptera: Simuliidae)

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Blackflies suffer predation and parasitism from many different and diverse taxa at each stage of their life history. As adults, they are major dietary items for many species of birds and bats. It is, however, in their aquatic larval stage that predation mortality has its biggest impact.

Predators of immature simuliids generally themselves inhabit the same aquatic habitat as their food. The Trichoptera (caddisflies) are usually credited as the most important of the invertebrate predators (Davies, 1981). Predatory Odonata, Ephemeroptera and Plecoptera are also considered as significant consumers of blackfly larvae. Other dipterous species have frequently been recorded feeding on Simuliidae, and cannibalism occurs both inter- and intraspecifically (Davies, 1981; Crosskey, 1990).

Perhaps the greatest, yet the most frequently overlooked, of the simuliid predators are water mites of the family Hydrachnellidae which, due to their small size and difficulties in field observation and taxonomy, have without doubt, been neglected in studies of larval mortality. The nymphal stage feeds by puncturing the soft-bodied simuliid larva and sucks the body fluids from its victim. The true effect of mite predation, however, remains to be quantified (Dr R. Wiles, pers. comm.).

Hymenopterous parasitoids have been extremely rarely recorded from immature Simuliidae. The turbulent water habitat of the larvae and pupae must act as a highly effective refuge from searching parasitoid wasps. The only previous record of such parasitism came from Enderlein (1921) who reared two braconids from pupae of *Simulium aureum* Fries, which he identified as belonging to the subfamilies Opiinae and Alysiinae (Dacnusini). Gauld & Bolton (1988) stated, however, that records of alysiines from nematocerous Diptera are believed to be erroneous.

Lewis (1953, 1960) described ectoparasitic chalcid larvae (planidia) attached to the heads of *Simulium* adults in Sudan, but noted that the larvae failed to develop fully. Crosskey (1990) suggested that the adult simuliids accidently acquired these highly active planidia while taking sugar meals from floral nectaries where the larvae await their usual hosts: ants.

Here we report the first record of a pteromalid parasitoid of an immature simuliid. The wasp was identified by Dr John Noyes (BMNH) as a species of *Mesopolobus* (Hymenoptera: Pteromalidae), possibly *M. nobilis* (Walker), which emerged from a pupa of *Simulium (Wilhelmia) pseudequinum* Séguy. The parasitoid is a solitary female. The wasp emerged from the pupa by cutting a clean circular hole through the head plate of the pupa between the basal trunks of the gills at the anterior of the pupal case.

The simuliid pupa was collected on 12.vii.1990 from the River Windrush near Witney, Oxfordshire (O.S. ref: SP 388 067). The pupa was attached to one of the silicone rubber tubes which were regularly placed in the local rivers as part of a study of simuliid ecology. The tubes were located at various depths, but always several centimetres below the surface and were changed each week. If the *pupal* stage of the simuliid was attacked, then the parasitoid would have had to complete its development from egg to adult within seven days, which seems unlikely at the fairly cool temperatures of these lowland rivers (typically 14–18°C in mid-summer). Parasitoid attack of larval stages which may have attached to vegetation trailing on the water surface, and subsequently have drifted downstream and attached to the tube samplers before pupating, seems a more plausible scenario.

S. (W.) pseudequinum constituted 82% of the pupal sample from the River Windrush on 12.vii.1990. *S. ornatum* s.l. and *S. (W.) equinum* were also present at that time. The frequency of such parasitism must be extremely low, as no pupae of any species which we have examined before or since this observation have shown evidence of parasitoid occupation.

Most species of *Mesopolobus* are parasitoids of Curculionidae (Coleoptera), of gall-inhabiting insects (Diptera, Scolytidae, Cicidomyciidae, Eurytomidae) and some are primary and secondary parasitoids of Lepidoptera or Symphyta (Hymenoptera). Graham (1969) described *M. nobilis* as a phytophage of grass seeds (*Avena* and *Bromus* species) so, in reality, the *Mesopolobus* specimen from *Simulium* is unlikely to be *M. nobilis*.

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References

Crosskey, R. W. 1990. *The Natural History of Blackflies* 711 pp.

Davies, D. M. 1981. Predators upon Blackflies. *In* Laird, M. (Ed.), *Blackflies – the future for biological methods in integrated control*. 399 pp.

Enderlein, G. 1921. Das System der Kriebelmücken (Simuliidae). *Dts. Tierärztle. Wochenschr.* **29**: 197–200.

Gauld, I. D. & Bolton, B. 1988. *The Hymenoptera* 332 pp. Oxford.

Graham, M. W. R. de V. 1969. Pteromalidae of north western Europe. *Bull. Br. Mus. nat. Hist. Ent.* (Suppl.) **16**: 655–657.

Lewis, D. J. 1953. *Simulium damnosum* and its relation to onchocerciasis in the Anglo-Egyptian Sudan. *Bull. ent. Res.* **43**: 597–644.

——— 1960. Observations on *Simulium damnosum* in the southern Cameroons and Liberia. *Ann. trop. Med. Parasit.* **52**: 216–231.