2018, *Entomologist's Gazette* **69**: 25–27

A novel host of *Itoplectis viduata* (Gravenhorst) (Hymenoptera: Ichneumonidae, Pimplinae), with some wider rearing records

MARK R. SHAW

Honorary Research Associate, National Museums of Scotland, Chambers Street, Edinburgh, EH1 1JF, U.K.
markshaw1945@gmail.com

NATALIA V. BORISOVA

Researcher, Prisursky Nature Reserve, Cheboksary, Chuvashia, Russia
natborisova18@yandex.ru

Synopsis

The apparently regular use of cocoons of a species of Pompilidae, *Homonotus sanguinolentus*, by the ichneumonid parasitoid *Itoplectis viduata* at a site in Russia is reported, and seen in the context of the host range of *I. viduata* as revealed by reared material in the National Museums of Scotland (NMS).

Key words: *Cheiracanthium erraticum*, *Homonotus sanguinolentus*, pseudohyperparasitism, host range, niche generalist, Russia, western Europe

Introduction

In the western Palaearctic the idiobiont endoparasitoid genus *Itoplectis* Foerster contains a few niche generalist (cf. Shaw, 2017, for definition) species, such as *I. maculator* (Fabricius) and *I. alternans* (Gravenhorst), that search in a wide span of habitats where a broad range of hosts (typically Lepidoptera pupae and Ichneumonoidea cocoons) are attacked, for which small-to-medium size seems to be the main restriction on host range (cf. Fitton, Shaw & Gauld, 1988). Other species, such as *I. melanocephala* (Gravenhorst) in fens, *I. aterrima* Jussila in moorland and *I. enslini* (Ulbricht) among conifers, have strong habitat preferences and some, such as the woodland species *I. clavicornis* (Thomson), seem specialised to parasitising ichneumonoid cocoons (Fitton *et al.*, 1988; M. R. Shaw, pers. obs.). When behaving as a pseudohyperparasitoid in this way it has been ascertained that the *Itoplectis* larva develops as a genuine endoparasitoid of its ichneumonoid host (Shaw, 2009). The few other European species have less well-understood habitat and host associations, but the genus clearly contains an interesting array of species showing various forms of specialisation, including one univoltine species, *I. maculator*, that overwinters as an adult (Cole, 1967).

Itoplectis viduata (Gravenhorst) is potentially a moderately large species of the genus (forewing length up to about 12 mm, though very much smaller specimens are frequent) and is widespread in the Holarctic region. Here we report an unexpected but apparently regular (at least in one area) host association, from Russia, which we interpret in the context of its known western Palaearctic hosts.

Methods

During the course of an investigation by one of us (NVB) at Cheboksary, Chuvashia, Russia of the biology and field mortality of the spider *Cheiracanthium*

erraticum (Walckenaer) (Eutichuridae), which makes its egg-nests in the seed heads of tall grasses, cocoons of parasitoids were collected from egg-nests and kept isolated in the laboratory until adult parasitoids emerged. Included among them were four specimens of *Itoplectis viduata* reared from cocoons of *Homonotus sanguinolentus* (Fabricius), some of which were sent to MRS for determination and comment.

Attempting to understand and summarise the host range of *I. viduata* by reference to literature abstractions such as Taxapad (Yu, van Achterberg & Horstmann, 2012) is difficult because the 56 species of host from 15 families of Lepidoptera (plus one each of Symphyta and Coleoptera) recorded in that work are given in a way that is unquantitative and neither weeds out repeated citations nor distinguishes between primary and secondary parasitism, quite apart from untested reliability as to both host and parasitoid determinations (cf. Shaw, 1994). Indeed, although many people naïvely (even foolishly) cite host records or surmise host ranges direct from Taxapad, it was neither designed nor intended for this purpose, being simply an unfiltered portal to the published literature for which it is undoubtedly a hugely valuable resource. Approaching the question of host range from the viewpoint of a large collection rich in reared material such as that in the National Museums of Scotland (NMS) wherein determinations can be reviewed is, while not free from bias, a more suitable approach and is taken here.

Results

The reared material of *I. viduata* in the collection of the National Museums of Scotland (NMS) is given in Table 1. When host remains were present, the possibility of secondary parasitism, in this case pseudohyperparasitism, could be assessed. On this basis all five of the relevant specimens reared from *Zygaena* and the specimen from *Malacosoma* had developed as primary parasitoids, while one male from *Euphydryas* was possibly a pseudohyperparasitoid along with the cases tabulated as such (i.e. ex Ichneumonidae and Pompilidae).

Table 1. Hosts of reared specimens of *Itoplectis viduata* in the NMS collection. HR indicates whether or not host remains are present.

FAMILY	SPECIES	HR	No. & sex	COUNTRY	REARER
Zygaenidae	*Zygaena carniolica* Scopoli	No	1♀	Turkey	C. Naumann
Zygaenidae	*Z. carniolica demavendi* Holik	No	1♀	Iran	C. Naumann
Zygaenidae	*Z. ephialtes* (Linnaeus)	Yes	1♀	Germany	Greminger
Zygaenidae	*Z. lonicerae* (Scheven)	Yes	2♀	Italy	W. G. Tremewan
Zygaenidae	*Z. lonicerae/viciae* (D. & S.)	No	2♀1♂	Denmark	S. M. Overgaard
Zygaenidae	*Z. pamira* Sheljuzhko	No	1♂	Turkey	C. Naumann
Zygaenidae	*Z. transalpina* (Esper)	Yes	1♀	Italy	E. Drouet
Zygaenidae	*Z. transpamirina nuksanensis* Koch	No	2♀	Afghanistan	A. Hofmann
Zygaenidae	*Zygaena* sp.	Yes	1♀	Poland	C. Bystrowski
Psychidae	*Phalacropterix grasinella* (Boisduval)	No	2♀	Poland	A. Malkiewicz
Nymphalidae	*Euphydryas aurinia* (Rottemburg)	No	1♀	Spain	R. Obregón
Nymphalidae	*Euphydryas cynthia* (D. & S.)	Yes	1♀1♂	Bulgaria	C. J. Luckens
Lasiocampidae	*Malacosoma* ?*castrensis* (Linnaeus).	Yes	1♀	France	M. R. Shaw
Ichneumonidae	*Hyposoter carbonarius* (Ratzeburg) / *Dicallomera fascelina* (Linnaeus)	Yes	1♀1♂	Netherlands	M. R. Shaw
Pompilidae	*Homonotus sanguinolentus* (Fabricius) / *Cheiracanthium erraticum* (Walckenaer)	Yes	2♀1♂	Russia	N. Borisova

The novel records of *I. viduata* from *Homonotus sanguinolentus* that prompted this contribution all arose from cocoons collected in *C. erraticum* nests in seed heads of *Poa pratensis*, from two sites in the same general region. These were a meadow at Lake Sergach near the town of Yadrin collected on 21.vii.2016 (3 cocoons produced females of *I. viduata* on dates between 24.vii and 8.viii.2016), and at the Batyrevsky cluster of meadows of the Prisursky Nature Reserve by the village Malyye Shikhirdani collected on 30.vii.2016 (1 cocoon produced a male, post-diapause, on 6.ii.2017 indoors). One female is deposited in the Zoological Institute, Russian Academy of Sciences, St Petersburg, and the remainder are in NMS. Further details in the context of the wider study on *C. erraticum* will be given by Borisova (in prep.).

Discussion

It is important to understand the role and reach of organisms in ecosystems if we are to understand our environment well enough to protect it. Parasitoids are a severely neglected group in this respect (Shaw & Hochberg, 2001) and integrating the results of deliberate rearing programmes with more casual field-work is a fruitful approach (Shaw, 2017).

The unifying feature behind all the host records for *I. viduata* in Table 1 is selection of moderately large, robust and prominent cocoons or cocoon-like structures found in tall field-layer vegetation in open habitats, and it is clear that both cocooned Lepidoptera pupae and apocritan Hymenoptera cocoons can be parasitised. Indeed, *I. viduata* seems often to behave as a pseudohyperparasitoid. The inclusion of the pompilid host *H. sanguinolentus* (Fabricius) is, at a family level, here reported apparently for the first time. This pompilid develops as a koniobiont ectoparasitoid of its eutichurid spider host *Cheiracanthium erraticum* (Walckenaer) (Day, 1988), then makes its cocoon in the grass-head nest of its host, and the record is thus quite easily explained although initially it had seemed surprising.

References

Cole, L. R. 1967. A study of the life-cycles and hosts of some Ichneumonidae attacking pupae of the green oak-leaf roller moth *Tortix viridana* (L.) (Lepidoptera: Tortricidae) in England. *Transactions of the Royal Entomological Society of London* **119**: 267–281.

Day, M. C. 1988. Spider wasps Hymenoptera: Pompilidae. *Handbooks for the Identification of British Insects* **6(4)**: 1–60.

Fitton, M. G., Shaw, M. R. & Gauld, I. D. 1988. Pimpline ichneumon-flies Hymenoptera, Ichneumonidae (Pimplinae). *Handbooks for the Identification of British Insects* **7(1)**: 1–110.

Shaw, M. R. 1994. Parasitoid host ranges. In Hawkins, B. A. & Sheehan, W. (eds) *Parasitoid Community Ecology*. Oxford University Press: 111–144.

——— 2009. Notes on the host-feeding and hyperparasitic behaviours of *Itoplectis* species (Hymenoptera: Ichneumonidae, Pimplinae). *Entomologist's Gazette* **60**: 113–116.

——— 2017. Anatomy, reach and classification of the parasitoid complex of a common British moth, *Anthophila fabriciana* (L.) (Choreutidae). *Journal of Natural History* **51** (19–20): 1119–1149.

Shaw, M. R. & Hochberg, M. E. 2001. The neglect of parasitic Hymenoptera in insect conservation strategies: The British fauna as a prime example. *Journal of Insect Conservation* **5**: 253–263.

Yu, D. S. K., Achterberg, C. van & Horstmann, K. 2012. Taxapad 2012, Ichneumonoidea 2011. Database on flash-drive. www.taxapad.com, Ottawa, Ontario, Canada.