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Parasitism of *Entedon costalis* (Hymenoptera: Eulophidae) in *Glocianus punctiger* (Coleoptera: Curculionidae): an example of intentional discovery of the parasitoid-host association

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Abstract

The biology and morphology of early larval instars of *Entedon costalis* Dalman (Hymenoptera: Eulophidae), are described in detail for the first time. The parasitoid-host association of *E. costalis* was revealed as a result of selection of candidate host based on combination of assumptions based on biology of related species and field surveys. *E. costalis* proved to be an egg-larval parasitoid of the weevil *Glocianus punctiger* (Gyllenhal), which is associated with dandelion (*Taraxacum officinale* G.H. Weber ex Wiggers). Parasitism rate of *G. punctiger* by *E. costalis* was 25% in the model patch which was sampled in May, where infestation of dandelion inflorescence by *G. punctiger* was 27%. The female of *E. costalis* lays her egg into the host egg, but the first instar larva hatches within the first instar host. Larvae of *G. punctiger* start their feeding as internal flower-stalk borers, continue as seed-eaters in flowerheads, and then pupate underground when matured coincident with seed dispersal (generally in the end of May). Parasitized and unparasitized mature larvae of *G. punctiger* pupate underground, in earthen cells, where the parasitoid larvae finally consume their hosts and pupate 2–3 days thereafter. Adults of *E. costalis* emerge the following spring (about mid April), as dandelions being flowering. The morphology of immature stages and behaviour of adults is described. Various peculiarities of parasitoid-host relationships superparasitism, siblicide, host immune response are described and discussed. DNA sequences of the nuclear 28S D2 rDNA gene were obtained for *E. costalis.*

Key words: Chalcidoidea, Entedoninae, *Entedon costalis*, *Glocianus punctiger*, dandelion, preimaginal and adult morphology, superparasitism, siblicide

Introduction

Species of *Entedon* Dalman (Eulophidae, Entedoninae) are endoparasitoids of eggs or larvae of various beetles. The most reliable host records concern weevils (Curculionidae, Brentidae) (Bouček and Askew 1968; Noyes, 2003) and Chrysomelidae (Bruchinae) (mostly in Afrotropical region: Rasplus 1990). In Europe, adults of most species may be collected in the field from late May through early July when immature stages of their hosts are abundant (Graham 1971; Gumovsky & Boyadzhiev 2003). Unlike the majority of the European species of its genus, adults of *Entedon costalis* occur between mid April and mid May, i.e. much earlier than its congeners. In Eastern Europe adults of most insects emerge after hibernation in late spring, but start breeding much later. Since many adult parasitoids have relatively short life span, the appearance of adults of *E. costalis* in the time when immature stages of most beetles are not abundant, was considered by the author as an intriguing challenge.

Entedon costalis and *E. cyanellus* were described by Dalman (1820) in the newly proposed genus *Entedon*. Later Ashmead (1904) designated *E. cyanellus* as a type species of the genus. *E. costalis* has gained little

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