



NOTES ON THE BIOLOGY OF *PUKLINA ASPHODELINAE* (HYMENOPTERA: EULOPHIDAE)

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Abstract: During studies of material reared from seed capsules of *Asphodeline lutea* collected in Kaliakra Cape had been established that seedeater *Eurytoma sp.* (rosae group) (Hymenoptera: Eurytomidae) is a host of *Puklina asphodelinae* (Hymenoptera: Eulophidae). *P. asphodelinae* is gregarious ectoparasitoid and its larval, pupal and imaginal morphology are presented. The differential diagnosis of two *Eurytoma* species that could be reared from *Asphodeline lutea* in Bulgaria is given.

Keywords: *Asphodeline lutea*, Hymenoptera, Eurytomidae, *Eurytoma asphodeli*, *Eurytoma sp.*, rosae group, host, Eulophidae, *Puklina asphodelinae*.

INTRODUCTION

Genus *Puklina* Graham, 1991 (Hymenoptera: Eulophidae) consists 5 species distributed in Western Palaearctics. Four species of them have been reared from seed capsules of Liliaceae plants: *P. depilata* reared from *Asphodelus aestivus* Brot. and *A. cerasiferus* J. Gay (GRAHAM, 1991); *P. dillerae* Doğanlar reared from *Asphodelus aestivus* and *A. cerasiferus*; *P. gelincika* Doğanlar – reared from *Asphodelus sp.* (DOĞANLAR, 1993) and *P. asphodelinae* – reared from *Asphodeline lutea* Reichb. (BOYADZHIEV, 2001, 2003).

P. depilata, *P. gelincika* and *P. asphodelinae* have been reared together with Eurytomidae (Hym.: Chalcidoidea) species, that are their possible hosts, but host-parasitic relationships were not investigated in details.

MATERIAL AND METHODS

The material for presented research was collected in 2007 from two localities in Bulgaria: Black Sea Coast, Varna Region, 20 m, Kaliakra Cape, 43°21'45''N; 28°27'57''E; 22.VIII.2007 (A. Stojanova); Rhodope Mts., Novo Selo Vill., 250 m, 42°06'05''N; 24°27'11''E; 18.IX.2007 (P. Boyadzhiev) – type locality of *Puklina asphodelinae* Boyadzhiev.

One hundred seeds of *Asphodeline lutea* were dissected from Kaliakra Cape locality, as well as the same number of seeds from Novo Selo Vill. locality. Every found Eurytomidae larvae was put in separated tube with data label. Larvae of host and parasitoid were preserved in ethanol.

Additional material – seed capsules of *A. lutea* from the both localities was stored under laboratory conditions.

For observation the shape of larval mandibles of two *Eurytoma* species, a series of microscope slides was prepared from uninfected and infected larvae, as well as from larval exuvium of emerged adults.

Pictures were taken by Nikon Coolpix S710 camera.

The reared material is preserved in the collection of the Department of Zoology, University of Plovdiv.

RESULTS

Material collected in Kaliakra Cape locality

As a result of dissection of the separated 100 seeds we found 42 host larvae, that were in almost all inner space of the seeds. Nine of these larvae were infected with *P. asphodelinae*. Later, the host larvae emerged in *Eurytoma sp.* (rosae group) adults. In two empty seeds we found remainders of host larva, meconium and pupal exuvium of the parasitoids.

P. asphodelinae develops as gregarious ectoparasitoid. We observed that on one host larva could feed 5 to 10 parasitoid larvae and the infection of the host reach up to 25 %. The sex ratio of *P. asphodelinae* was 0.29.

We found another Eurytomidae species – *Eurytoma asphodeli* Hedqvist, but only with one male.

Larval morphology of last instar of *Eurytoma sp.* (rosae group) is shown on Fig. 1. Figures 2-7 presented different developmental stages of *P. asphodelinae* – last instar larva, meconium, pupa and adult.

Material collected in Novo Selo Vill. locality

We found only 2 *E. asphodeli* larvae as result of dissection of 100 seeds and none parasitoid larvae. The mandibles of one larva were mounted on microscope slide, but the second one emerged in male adult.

The results of rearing from seed capsules of *A. lutea* in previous years (2000 and 2001) show that *E. asphodeli* is predominant species compared with *Eurytoma sp.* (rosae group) that was established only with 1 female and 1 male.

The main morphological characters for distinguishing larvae and adults of both *Eurytoma* species (*Eurytoma sp.* (rosae group) and *E. asphodeli*) that develop in seed capsules of *A. lutea* in Bulgaria are given in Table 1.



Fig. 1-5: *Eurytoma* sp. (*rosae* group): (1) last instar larva; *Puklina asphodelinae*: (2) last instar larva; (3) meconium; (4) pupa, ♀; (5) pupa, ♂. Scale: 0.5 mm.

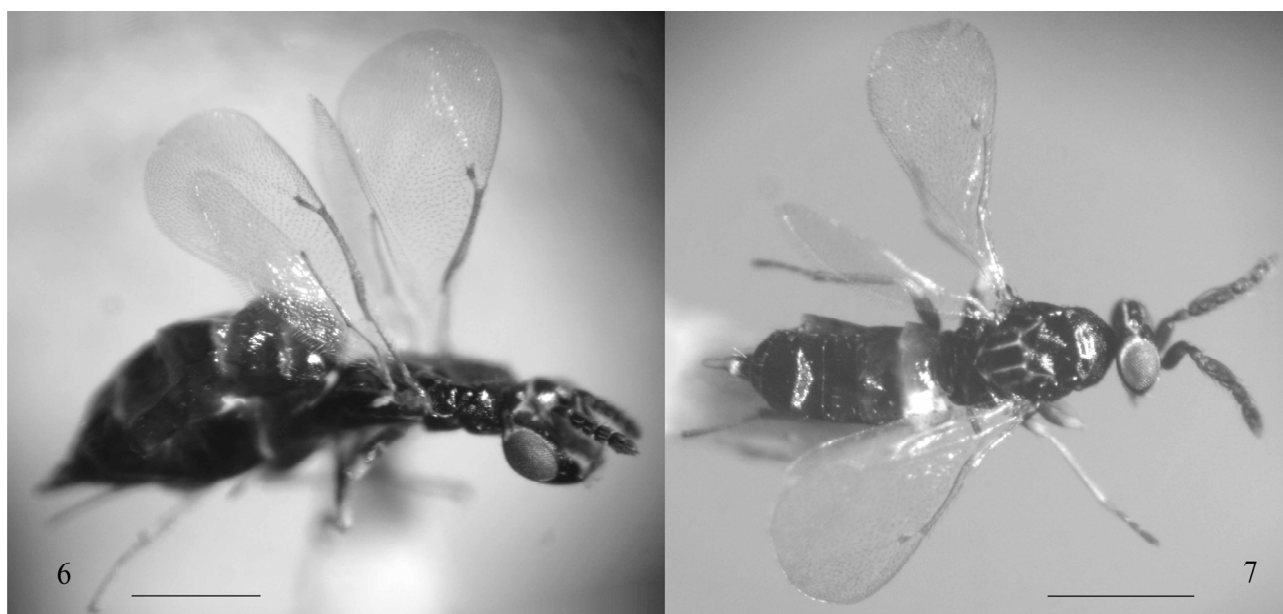


Fig. 6-7: *Puklina asphodelinae*: (6) laterally, ♀; (7) dorsally, ♂. Scale: 0.5 mm.

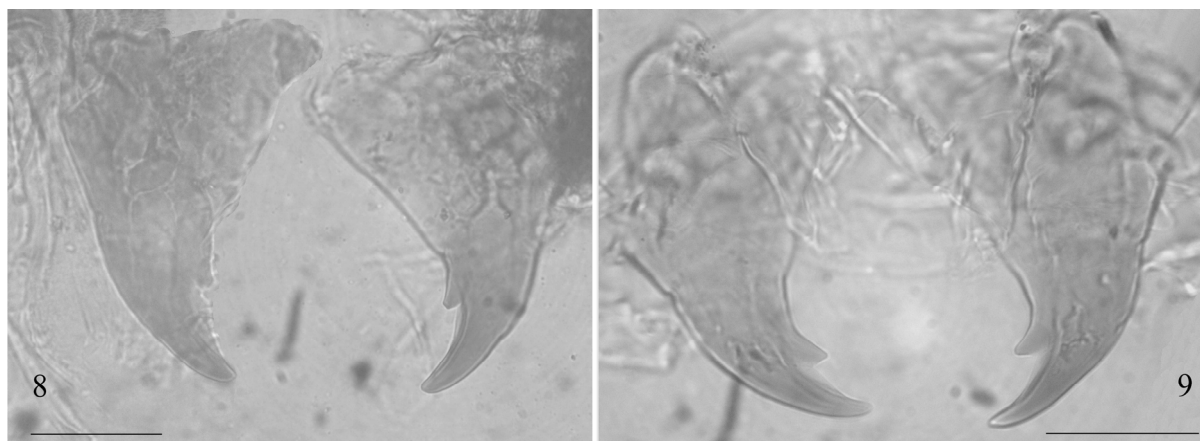


Fig. 8-9: Larval mandibles: (8) *Eurytoma asphodeli*; (9) *Eurytoma sp. (rosae group)*.
Scale: 0.05 mm.

Table 1. Differential diagnosis for distinguishing *Eurytoma asphodeli* and *Eurytoma sp. (rosae group)*, develop in seed capsules of *A. lutea*.

<i>Eurytoma asphodeli</i> Hedqvist	<i>Eurytoma sp. (rosae group)</i>
Larval mandible (Fig. 8) with 2 teeth; lateral tooth is wide; the second one is minute, short and blunt.	Larval mandible (Fig. 9) with 2 teeth; lateral tooth is slender and sharp; the second one is big and sharpened apically.
Imago with well developed mesosternal keel; face above clypeus with radial stripes, reaching nearly to lower margin of eyes; postgenal keel sharp; gaster of female laterally compressed and almost 2 times as long as thorax; gastral petiole of male almost 2 times as long as hind coxa.	Imago without mesosternal keel; face above clypeus without radial stripes; postgenal keel not conspicuous; gaster of female slightly laterally compressed, about 1.3 times as long as thorax; gastral petiole of male a little longer than hind coxa.

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БЕЛЕЖКИ ВЪРХУ БИОЛОГИЯТА НА *Puklina asphodelinae* (HYMENOPTERA: EULOPHIDAE)

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(Резюме)

По време на изследване на материал изведен от семенни капсули на *Asphodeline lutea* събрани от нос Калиакра, установихме, че семейда *Eurytoma* sp. (група *rosae*) (Hymenoptera: Eurytomidae) е гостоприемник на *Puklina asphodelinae* (Hymenoptera: Eulophidae). *P. asphodelinae* е множествен ектопаразитоид, чиято ларвна, какавидна и имагинална морфология са представени в настоящата статия. Дадена е диференциалната диагноза на двата вида *Eurytoma*, които могат да бъдат изведени от *Asphodeline lutea* в България.