A REVIEW OF THE PTEROMALIDAE (HYMENOPTERA: CHALCIDOIDEA) PARASITIZING SYNANTHROPIC FLIES IN ROMANIA

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Abstract. The pteromalid genera that have been reared from synathropic flies in Romania are reviewed. An illustrated identification key for the six genera (*Spalangia* Latreille, *Muscidifurax* Girault & Sanders, *Pachycrepoideus* Ashmead, *Nasonia* Ashmead, *Urolepis* Walker, and *Trichomalopsis* Crawford) is provided. For each genus, the species that have been reared in Romania are listed together with the corresponding references.

Keywords: Hymenoptera, Chalcidoidea, Pteromalidae, Diptera, synanthropic flies, parasitoids, key.

Rezumat. Pteromalidele (Hymenoptera: Chalcidoidea) care parazitează muște sinantrope în România. Genurile de pteromalide care au fost obținute din muște sinantrope în România sunt trecute în revistă. Este prezentată o cheie ilustrată de identificare pentru cele șase genuri (*Spalangia* Latreille, *Muscidifurax* Girault & Sanders, *Pachycrepoideus* Ashmead, *Nasonia* Ashmead, *Urolepis* Walker și *Trichomalopsis* Crawford). Pentru fiecare dintre acestea se menționează speciile care au fost obținute din creșteri în România, împreună cu bibliografia corespunzătoare.

Cuvinte cheie: Hymenoptera, Chalcidoidea, Pteromalidae, Diptera, muște sinantrope, parazitoizi, cheie.

The synanthropic flies (Diptera) are insect pests that develop in relation to some major human activities such as food processing and conservation, and animal husbandry. They include the common stable fly (*Stomoxys calcitrans* (L.), the house fly (*Musca domestica* L.), the face fly (*Musca autumnalis* De Geer) and the horn fly (*Haematobia irritans* (L), and cause major health problems to both humans and livestock e.g. nuisance and irritation, pain, weight loss due to avoidance behaviour (the “fly worry” syndrome), transmission of various pathogens etc. (e.g. Ballesteros *et al.*, 2011).

The control of these insects is usually problematic since it is based mainly on chemical insecticides that are also a threat to humans and livestock and usually cause resistance of the pest. An ecological alternative to chemical control is biological control, which uses the natural enemies of the pest. In the case of the synanthropic flies, most natural enemies are small parasitoid wasps (Hymenoptera) that develop as larvae mainly in flies’ puparia and finally kill them.

The parasitoid wasps of the synanthropic flies in Romania belong to seven families: Braconidae, Ichneumonidae (Ichneumonoidea), Chalcididae, Pteromalidae (Chalcidoidea), Figitidae, Eucoilidae (Cynipoidea), and Diapriidae (Diaprioidea), and have been reviewed by Fabritius (1990). The main goal of this note is to give an illustrated key to the genera of Pteromalidae that attack the synanthropic flies in Romania in order to facilitate their identification by the non-specialist. In addition, all species that have been reared from synanthropic flies in Romania are listed for each genus, followed by references.

For other species in these genera, which have not been obtained from hosts, as well as for field records of the reared species, see Mitroiu (2008). Terminology follows Gibson (1997).

Key to genera of Pteromalidae reared from synanthropic flies in Romania (both sexes)

1 Antennae inserted very close to clypeus, almost touching it; head subprognathous; body entirely black, except sometimes the tarsi; head; pronotum and mesoscutum with conspicuous piliferous punctures; gaster petiolate; antenna 1171; marginal vein long, stigmal and postmarginal veins short (Fig. 1) ...……...***Spalangia*** **Latreille**

- Antennae inserted at least slightly above clypeus, although sometimes distinctly lower than ocular line; head usually not subprognathous; body rarely black; pronotum and mesoscutum usually without conspicuous piliferous punctures; gaster usually sessile; antennal formula and wing venation usually different (Figs 2-6) …….……..**2**

2 Marginal vein distinctly thickened in anterior part, but normal distally, hence its lower margin sinuate; female antenna 11173, male antenna 11263 and hairy; posterior margin of first gastral tergite trilobed (Fig. 3) ……..…….***Muscidifurax*** **Girauld and Sanders**

- Marginal vein either equally widened or slender throughout, hence its lower margin more or less straight; antenna in both sexes 11353 or 11263; posterior margin of first gastral tergite not or slightly trilobed (Figs 2, 4-6) ...……**3**

3 Occipital carina absent; antenna 11353; marginal vein widened throughout; mesopleuron completely reticulate; gaster petiolate; first and second gastral tegites enlarged, posterior margin of first gastral tergite slightly trilobed (Fig. 2) ……...***Pachycrepoideus*** **Ashmead**

- Occipital carina present; antenna 11263; marginal vein slender throughout; mesopleuron partly shiny; gaster sessile; first and second gastral tegites not enlarged, posterior margin of first gastral tergite not trilobed (Figs 4-6) ……**4**

4 Mesoscutum shiny, reticulation shallow, mostly engraved; lower face strongly receding from toruli to mouth (Fig. 4) .....……..***Nasonia*** **Ashmead**

- Mesoscutum duller, reticulation stronger, raised; lower face not strongly receding from toruli to mouth (Figs 5, 6) ……**5**

5 Fore wing almost entirely pilose except very small speculum (Fig. 5) ……***Urolepis*** **Walker**

- Fore wing extensively bare in proximal part, speculum large (Fig. 6) ……..……***Trichomalopsis*** **Crawford**

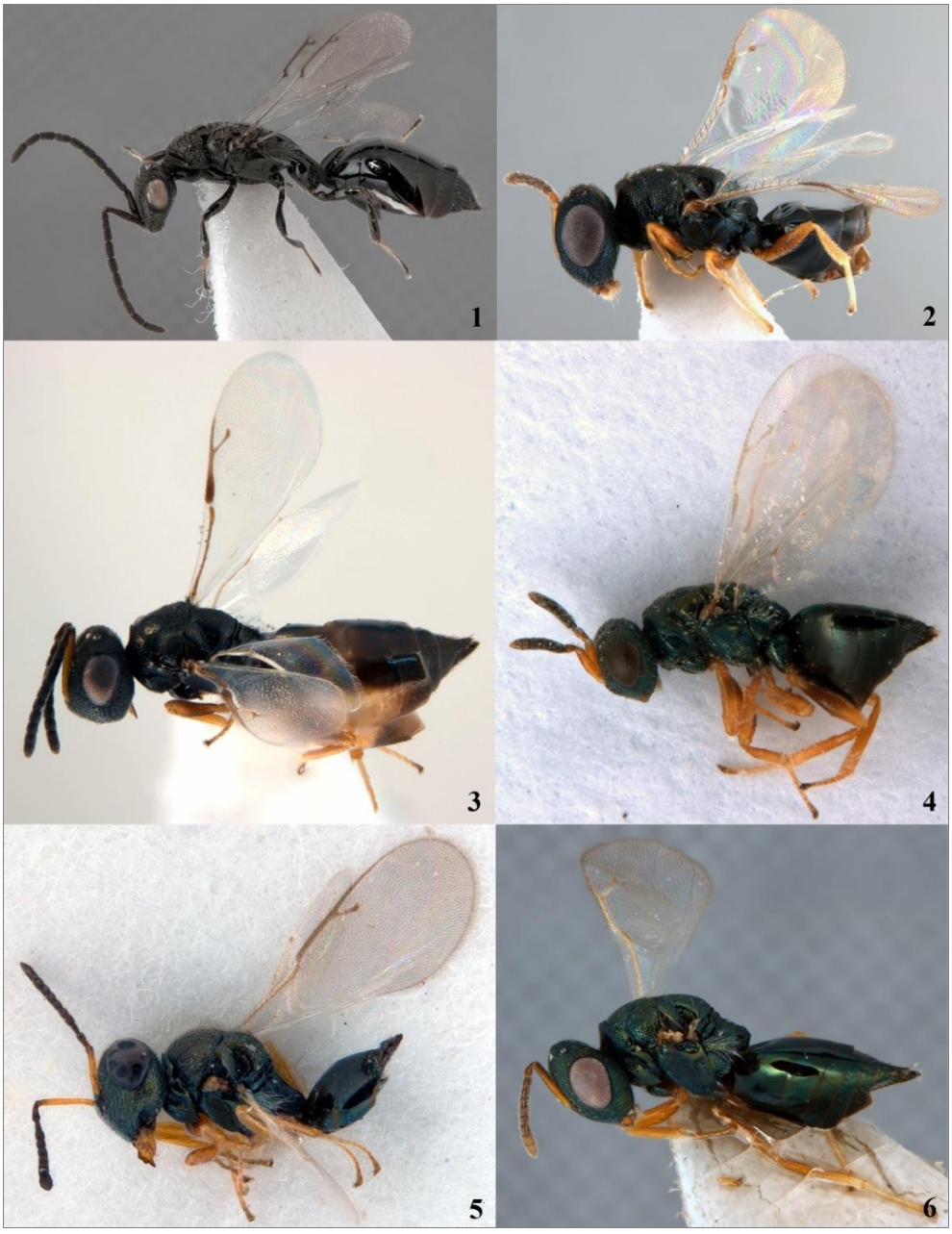
Subfamily Spalangiinae

Spalangia **Latreille, 1805** (13 species in Europe. Identification: Bouček, 1963; Graham, 1969; Gibson, 2009) – Fig. 1

S. cameroni Perkins, 1910 (Fabritius & Gherasim, 1976-1977; Fabritius, 1980a, 1981, 1983, 1987, 1990; Mihalaşcu, 2004);

S. endius Walker, 1839 (Fabritius & Gherasim, 1976-1977; Ursu & Tudor, 1979; Fabritius, 1980a, 1981, 1983, 1987, 1990; Fabritius & Andriescu, 1984; Mihalaşcu, 2004);

S. erythromera Förster, 1850 (Fabritius, 1980a, 1981);



Figures 1-6. Pteromalid parasitoids of synanthropic flies. 1. *Spalangia nigroaenea*, ♂; 2. *Pachycrepoideus* sp., ♀; 3. *Muscidifurax* sp., ♀; 4. *Nasonia vitripennis*, ♀; 5. *Urolepis* sp., ♀; 6. *Trichomalopsis* sp., ♀.

S. nigra Latreille, 1805 (Ursu & Tudor, 1979; Fabritius, 1981, 1983, 1987, 1990; Mihalașcu, 2004);
S. nigroaenea Curtis, 1839 (Ursu & Tudor, 1979; Fabritius, 1981, 1983, 1987; Mihalașcu, 2004);
S. slovaca Bouček, 1963 (Fabritius, 1980a);
S. subpunctata Förster, 1850 (Ursu & Tudor, 1979; Fabritius, 1981, 1983, 1987; Fabritius & Andriescu, 1984).

Subfamily Pteromalinae

***Muscidifurax* Girauld and Sanders, 1910** (1 species in Europe) – Fig. 3
M. raptor Girault & Sanders, 1910 (Fabritius & Gherasim, 1976-1977; Fabritius, 1978, 1980, 1980a, 1980b, 1981, 1981a, 1983, 1987, 1990; Ursu & Tudor, 1979; Mihalașcu, 2004).

***Pachycrepoideus* Ashmead, 1904** (1 species in Europe) – Fig. 2
P. vindemiae (Rondani, 1875) (Fabritius & Gherasim, 1976-1977; Fabritius, 1980a, 1981, 1983, 1987; Mihalașcu, 2004).

***Nasonia* Ashmead, 1904** (1 species in Europe) – Fig. 4
N. vitripennis (Walker, 1836) (Boțoc, 1967; Andriescu, 1972-1973; Fabritius, 1980a, 1981, 1983, 1987, 1990; Mihalașcu, 2004).

***Urolepis* Walker, 1846** (1 species in Europe) – Fig. 5
U. maritima (Walker, 1834) (Andriescu, 1972-1973; Fabritius, 1981, 1983, 1987; Fabritius & Andriescu, 1984).

***Trichomalopsis* Crawford, 1913** (30 species in Europe. Identification: Graham, 1969) – Fig.6
T. terginae (Andriescu & Fabritius, 1981) (Andriescu & Fabritius, 1981; Fabritius, 1981, 1983, 1987).

Acknowledgments

This study was funded by a grant of the Romanian National Authority for Scientific Research, CNCS–UEFISCDI, project number PN–II–RU–TE–2012–3–0057.

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