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A preliminary classification of the Mymaridae
(Hymenoptera: Chalcidoidea) based on the external
male genitalic characters

The Mymaridae, or Fairy Flies, are common, minute egg-parasitoids of insects, whose average size is less than 1 mm. They represent one of the largest families of the Chalcidoidea, including about 1,350 species in 90 genera.

The taxonomic, biological and evolutionary aspects of the Mymaridae have been poorly investigated. Particular need of further studies is required for the generic delimitation and the higher classification of the family (SCHAUFF, 1984; HUBER, 1986).

In previous papers (VIGGIANI, 1970, 1973, 1987), the author pointed out the taxonomic importance of the variations found in the male genitalia, which appear rather similar to those observed in other microhymenoptera as Trichogrammatidae and Aphelinidae (VIGGIANI, 1971; VIGGIANI & BATTAGLIA, 1984). Subsequently further unpublished data have been accumulated.

In the present paper (*) a new approach for the classification of the Mymaridae, based on the characters of the male genitalia, is proposed and compared with the previous systems.

TYPES OF MALE GENITALIA IN THE MYMARIDAE

The study of 60 species belonging to 26 genera, mostly carried out by the author, revealed the following main types of male genitalia:

type 1. Aedeagus not encapsulated inside a sac-like phallobase, but largely connected to the genital sternite and provided with two apodemes articulated on its basal body (Fig. I,1-2);

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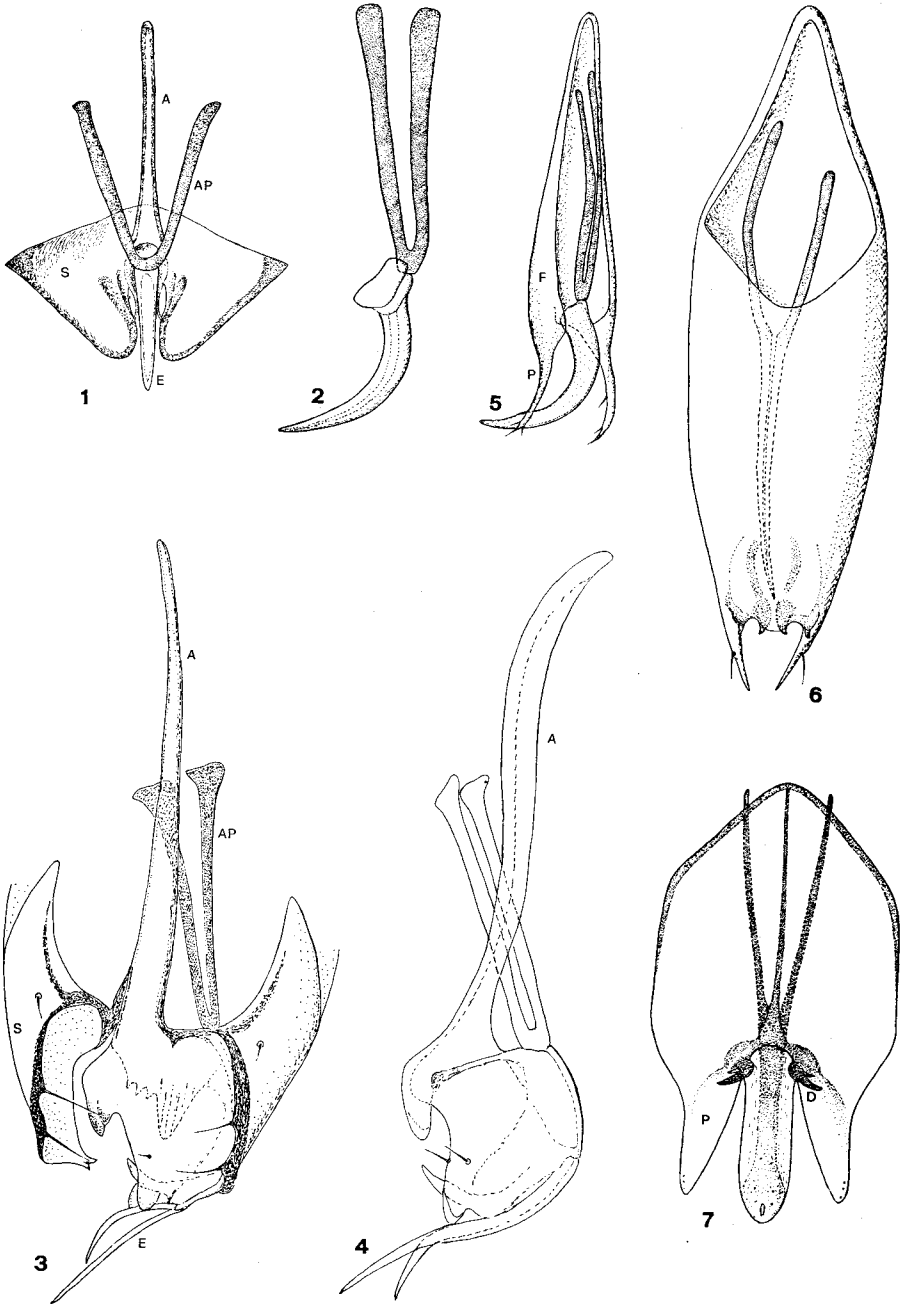


Fig. I - Male genitalia. - 1. *Lymaenon terebrator* (Foerster). 2. Same, aedeagus. 3. *Stethynium triclavatum* Enoch. 4. Same, aedeagus. 5. *Arescon* sp. 6. *Ooctonus* sp. 7. *Erythmelus* sp. - (A = apodeme of the genital sternite; AP = aedeagal apodeme; D = volsellar digitus; E = aedeagus; F = phallobase; P = paramere; S = genital sternite).

type 2. Aedeagus encapsulated inside a sac-like phallobase, which has parameres and/or volsellar digiti (Figs. I,5-7; II,1-8; III,1-7; IV,1-5);

type 3. Aedeagus neither encapsulated inside a sac-like phallobase, simple, nor largely connected to the genital sternite and without bacilli-form apodemes (Fig. IV,6-7).

The male genitalia type 1 appears unique to a group of Mymaridae which includes the genera *Lymaenon* Walker (= *Gonatocerus* Auct., nec Nees) and *Stethynium* Enock.

The type 2, which can be defined as the Chalcidoid type, is found in most of the mymarid genera. It shows several remarkable variations.

Rather rare is the type 3, which has also been found in several genera of Trichogrammatidae (VIGGIANI, 1971).

A PRELIMINARY CLASSIFICATION OF THE MYMARIDAE

Based on the types of male genitalia, the following classification is proposed:

subfam. *Lymaenoninae*, including genera with male genitalia of type 1;

subfam. *Mymarinae*, including genera with male genitalia of type 2;

subfam. *Camptopterinae*, including genera with male genitalia of type 3.

For the subfamily *Lymaenoninae* the following tribes are recognized:

Lymaenonini, with aedeagus simple, tubular; included genus: *Lymaenon* Walker (Fig. I,1);

Stethynini, with aedeagus complex, not tubular; included genus: *Stethynium* Enock (Fig. I,3-4).

For the subfamily *Mymarinae* the following tribes are proposed:

Aresconini, with phallobase long, boat-shaped, provided with parameres, but without volsellar digiti, aedeagus with bacilliform apodemes articulated to its basal body; included genus: *Arescon* Walker (Fig. I,5);

Ooctonini, with phallobase long, tubular, distally with parameres and some denticles; aedeagus very narrow if compared with the phallobase width, apodemes not articulated but distally fused with its body; included genus: *Ooctonus* Haliday (Fig. I,6);

Erythmelini, with phallobase boat-shaped, with parameres and volsellar digiti; aedeagus not fused with the phallobase and apodemes not articu-

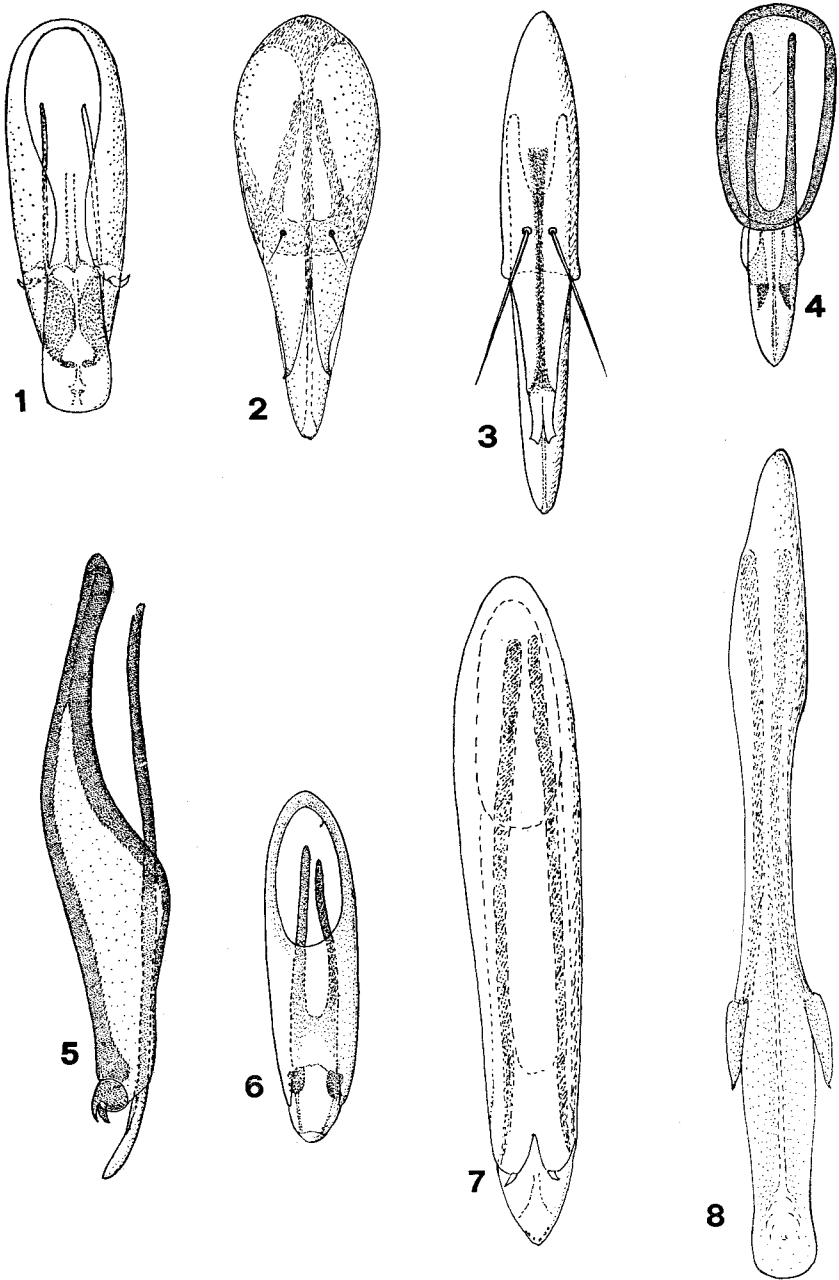


Fig. II - Male genitalia. - 1. *Paralleleptera panis* Enoch. 2. *Alaptus pallidicornis* Foerster. 3. *Litus cynipseus* Hal. 4. *Anagrus atomus* (L.). 5. *Anagrus incarnatus* Haliday. 6. *Cleruchus bakkendorfi* Deb. 7. *Schizophragma* sp. 8. *Acmopolynema hervali* Gomes.

lated at its base; included genera: *Erythmelus* Enoch, *Paralleleptera* Enoch (Figs. I,7; II,1);

Alaptini, with phallobase rather short, without parameres, but with long, laminar volsellar digiti; aedeagus with apodemes not articulated to its body; included genera: *Alaptus* Westwood, *Litus* Haliday (Fig. II,2-3);

Anagrini, with phallobase tubular, without parameres and with rather short volsellar digiti; aedeagus not fused with the phallobase and with apodemes not articulated; included genera: *Anagrus* Haliday, *Cleruchus* Enoch, *Schizophragma* Ogloblin (part.) (Fig. II,4-7);

Mymarini, with phallobase of variable shape, with parameres and without volsellar digiti; aedeagus not fused with the phallobase and with apodemes not articulated; included genera: *Acmopolynema* Ogloblin, *Anneckia* Subba Rao, *Caraphractus* Walker, *Chaetomyar* Ogloblin, *Eustochus* Haliday, *Mymar* Curtis, *Neomymar* Crawford, *Omyomymar* Schauff, *Polynema* Haliday, *Stephanodes* Enoch, (Figs. II,8; III,1-7; IV,1-2);

Anaphini, with phallobase short, trunk-conic, frequently with long parameres, but without volsellar digiti; aedeagus at least partially fused with phallobase and apodemes not articulated at its base; included genera: *Anaphes* Haliday, *Richteria* Girault (Fig. IV,3-4);

Ptilomymarini, with phallobase long, boat-shaped, basally very narrow, without parameres but with volsellar digiti; aedeagus with fused apodemes at its base; included genus: *Ptilomymar* Annecke & Doutt (Fig. IV,5).

In the subfamily Campptopterinae the genera *Campptoptera* Foerster and *Camppteroidea* Viggiani are included (Fig. IV,6-7).

Two main classifications of the Mymaridae have been previously proposed. The study published by DEBAUCHE (1948) recognizes the Lymaenoninae (as tribe Lymaenonini), including genera with 5-segmented tarsi, and Mymarinae (as tribe Mymarini), including genera with 4-segmented tarsi. The classification proposed by ANNECKE & DOUTT (1961) splits the family into Alaptinae (genera with sessile gaster and mesophragma projecting into the gaster) and Mymarinae (genera with petiolate gaster and mesophragma not projecting into the gaster).

The Alaptinae includes the tribes Alaptini (genera with 5-segmented tarsi) and Anagrini (genera with 4-segmented tarsi); the Mymarinae includes the tribes Ooctonini (genera with 5-segmented tarsi), Anaphini (genera with 4-segmented tarsi and subsessile gaster) and Mymarini (genera with 4-segmented tarsi and petiolate gaster).

The classification based on the male genitalia proposed in this paper is more congruent with Debauche's groups than with those of Annecke & Doutt. The congruence is complete within the subfamily Mymarinae (the

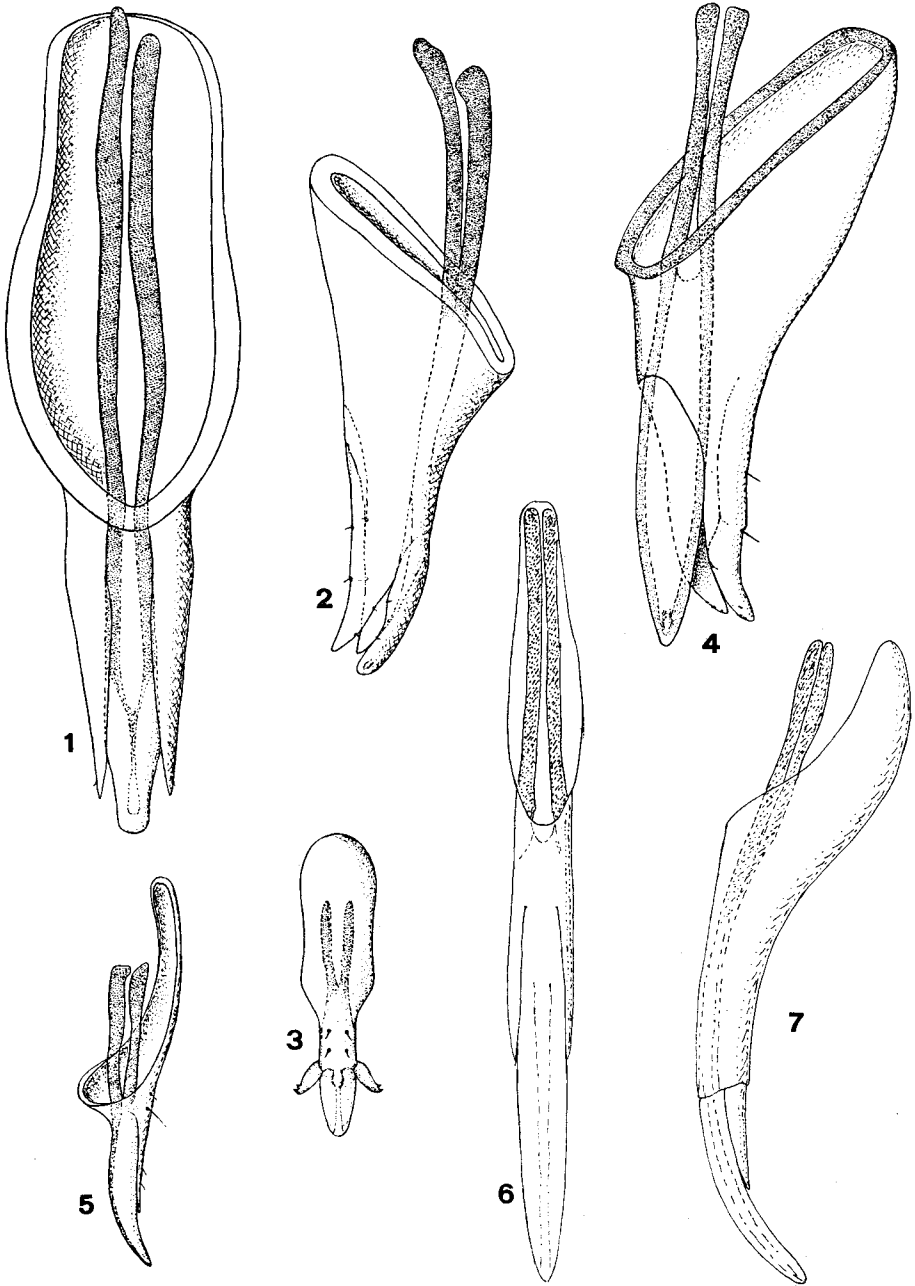


Fig. III - Male genitalia. - 1. *Anneckia oophaga* Subba Rao. 2. *Caraphractus cinctus* Walker. 3. *Chaetomyrmar lepidum* Annecke & Doutt. 4. *Eustochus atripennis* Haliday. 5. *Myrmar pulchellus* Curtis. 6. *Neomyrmar* sp. 7. *Omyomyrmar* sp.

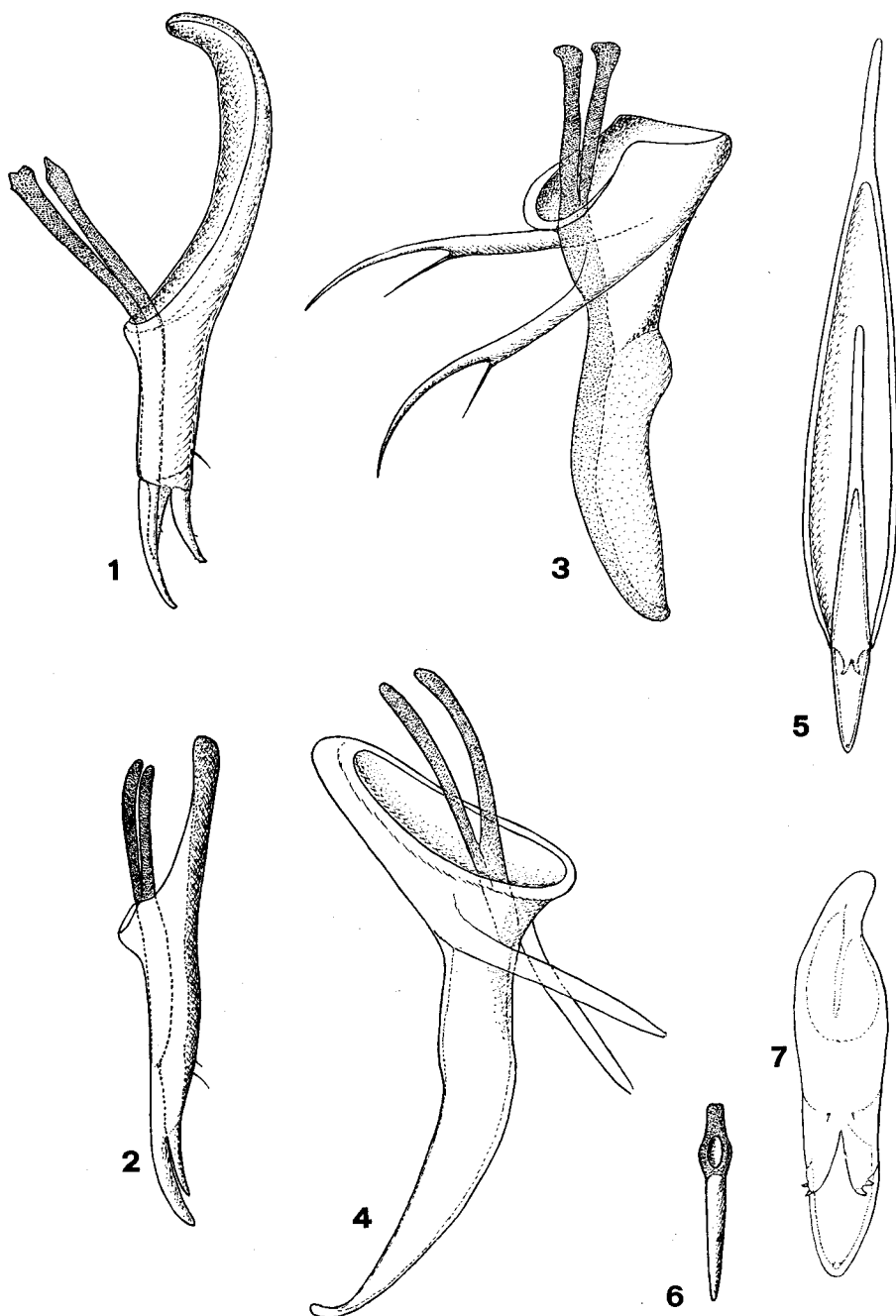


Fig. IV - Male genitalia. - 1. *Polynema* sp. 2. *Stephanodes similis* (Foerster). 3. *Anaphes* sp. 4. *Richteria* sp. 5. *Ptilomymar besucheti* Viggiani. 6. *Camptoptera pupaveris* Foerster. 7. *Camptopteroides armata* Viggiani.

only exception is *Stethynium*) and partial with Lymaenoninae. The latter subfamily as treated as such in a cladistic analysis of the Holarctic genera proposed by SCHAUFF (1984), is a heterogeneous assemblage in which genera with different types of male genitalia are included.

SUMMARY

A new classification of the Mymaridae (Hymenoptera: Chalcidoidea) based on the characters of the male genitalia is proposed and compared with previous systems.

According to the types of the male genitalia the following preliminary suprageneric categories are recognized: subfam. Lymaenoninae, tribe Lymaenonini (aedeagus not encapsulated into a phallobase and with jointed apodemes); subfam. Mymarinae (aedeagus encapsulated into a phallobase and with apodemes not jointed, but fused), including the tribes Aresconini, Ooctonini, Alaptini, Anagrini, Erythmelini, Mymarini and Anaphini; subfam. Camptopterinae (aedeagus not encapsulated into a phallobase and without bacilliform apodemes or other structures). The characterization of the tribes is given.

RIASSUNTO

E' proposta una nuova classificazione dei Mymaridae (Hymenoptera: Chalcidoidea), basata sui caratteri dell'organo copulatore, che viene comparata con quelle note.

In base ai tipi di organo copulatore sono riconosciute le seguenti categorie soprageneriche: subfam. Lymaenoninae, tribù Lymaenonini (edeago non incapsulato in una fallobase e con apodemi articolati alla sua base); subfam. Mymarinae (edeago incapsulato in una fallobase e con apodemi non articolati alla sua base, ma fusi), comprendente le tribù Aresconini, Ooctonini, Alaptini, Anagrini, Erythmelini, Mymarini e Anaphini; subfam. Camptopterinae (edeago non incapsulato in una fallobase e senza apodemi bacilliformi o altre strutture). Sono indicate le caratteristiche delle tribù.

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