

Notes on *Anagrus* group of genera (Hymenoptera: Mymaridae) of Western Palaearctic

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Abstract. In this paper, *Anagrus* group of genera (Hymenoptera: Mymaridae) of Western Palaearctic is reviewed. Only *Anagrus*, *Omyomymar* and *Stethynium* are recorded from this region. We illustrate the morphology of these three genera and discuss the importance of some taxonomic characters. The key to genera published by Pricop (2013), being the most recent, is modified to accommodate *Omyomymar* Schauff.

Key words: *Anagrus*, *Omyomymar*, *Stethynium*, morphology, taxonomy, key to genera.

Abstract. În această lucrare revizuim grupul de genuri *Anagrus* (Hymenoptera: Mymaridae), din partea de vest a regiunii Palearctice. *Anagrus*, *Omyomymar* și *Stethynium* sunt până în prezent singurele genuri ale grupului *Anagrus* semnalate din această regiune. Ilustrăm morfologia acestor trei genuri, aducând în discuție importanța unor caractere taxonomice. Cea mai recentă cheie a genurilor, publicată de Pricop (2013), este modificată pentru a putea fi introdus genul *Omyomymar* Schauff.

Cuvinte cheie: *Anagrus*, *Omyomymar*, *Stethynium*, morfologie, taxonomie, cheia genurilor.

Introduction. *Anagrus* group of genera from Western Palaearctic is reviewed. Regarding *Anagrus*, *Omyomymar* and *Stethynium*, some taxonomic notes are given. Pricop (2013) illustrated in his paper an unidentified genus, identified now as *Omyomymar* Schauff. Morphological terms follow Yoshimoto (1990), Lin et al (2007) and Noyes (2003). Genus diagnosis is provided from literature (Schauff 1983, 1984; Yoshimoto 1990; Lin & Chiappini 1996; Huber 1997; Lin et al 2007), but also on the basis of our material. Regarding *Omyomymar* Schauff, we propose to broaden genus definition (diagnosis). *Omyomymar* Schauff is introduced in the most recent identification key to the Mymaridae genera from Western Palaearctic. Our aim is to publish an updated identification key.

Materials and Methods. All examined specimens are from different collections, from the insect collection of the Department of Biology, "Alexandru Ioan Cuza" University of Iasi, from the collection of Natural History Museum of Iasi (Romania), from the Museum of Natural History of Vienna (Austria), from Station Linné (Sweden) and also from a few private collections. Almost all examined specimens are mounted on slides in Canada balm, a few are mounted on slides in Faure's medium. Photographs were taken using a Canon digital camera attached to an IOR optical microscope. For the scanning electron microscopy we used Vega Tescan, an important electron microscope.

Abbreviations. FWL/FWW = forewing length/forewing wide ratio; F1-F6 = funicular articles; mps = multi porous plate sensillae (sensory ridges); UAIC - "Alexandru Ioan Cuza" University of Iasi, Romania. All characters are defined on the basis of our material and also on the basis the scientific literature. The morphology is illustrated in Figure 1a, b, c, d, e, f, g, h, i, j, k, l, m.

Results and Discussion

Diagnosis. *Anagrus* group of genera is defined by the combination of characters: tarsi 4-segmented (Figure 1a); female funicle 6-segmented (Figure 1d); head and mesosoma not dorsoventrally flattened (Figure 1e); gaster is broadly attached to mesosoma, mesophragma projecting into gaster (Figs. 1e, f); posterior scutellum (postscutellum) longitudinally divided medially (Figure 1f, g, i, j), sometimes incompletely divided, or rarely not divided (Schauff 1983, 1984; Huber 1997; Lin et al 2007). Face is often with subantennal grooves, body is not sclerotized and often pale coloured (Lin et al 2007). Forewing is with posterior margin at most slightly lobed behind venation. Some longitudinal striations can be observed on posterior scutellum in these three genera. In Table 1 are presented the main morphological characters for genus identification. *Anagrus* group in West Palaearctic - genera: *Anagrus*, *Omyomymar* and *Stethynium*.

Important References. Schauff (1983, 1984), Yoshimoto (1990), Chiappini et al (1996), Lin & Chiappini (1996), Huber (1997), Noyes (2003), Lin et al (2007), Huber et al (2009), Pricop (2011, 2012, 2013).

Anagrus Haliday, 1833

Diagnosis. Female antennal clava is entire (Figure 1d), scape is with transverse folds (Figure 1h), protibial spur is comblike. Posterior scutellum is short and divided by a longitudinal sulcus in two lobes, each lobe is about as long as wide (Figure 1g). Posterior scutellum is about as long or slightly longer than anterior scutellum. Forewing is with posterior margin (behind venation) only slightly lobed. Each mandible is with 3 teeth. Axillae of mesosoma are advanced into side lobes of mesoscutum (Schauff 1984; Yoshimoto 1990; Chiappini et al 1996; Huber 1997; Huber et al 2009; Pricop 2012).

Distribution. Worldwide.

Notes. *Anagrus* is a very diverse genus. *Anagrus* is found in almost all types of ecosystems, from terrestrial to aquatic. Morphology: funicular segments are always with mps. (sensory ridges), mps. are at most on F3 to F6. Mandibles are overlapping (Figure 1k). In most *Anagrus*, mesophragma is narrow towards apex (Figure 1e). Mesophragma is projecting deep into gaster. Ovipositor length can vary from species to species. More than 26 species of *Anagrus* are recorded from Western Palaearctic, and there are also a few undescribed species. Species of *Anagrus* are abundant, a few of them are common, ex. *Anagrus atomus* L. I had the good opportunity to examine material from different European countries. Chiappini et al (1996) have reviewed the Holarctic *Anagrus*, publishing a useful identification key.

Omyomymar Schauff, 1983

Diagnosis. Female antennal clava is 2-segmented (Figure 1b), the apical segment in almost all described species is like a digit sometimes with a variable distinct nipple like process at apex of this second segment (Schauff 1983, 1984; Lin & Chiappini 1996; Huber 1997; Lin et al 2007). Mandibles are reduced and not overlapping (Figure 1l). Posterior scutellum is partially or totally divided medially by a longitudinal sulcus (Schauff 1983, 1984). The ovipositor of *Omyomymar* is distinctly exerted beyond gastral apex (Schauff 1983; Lin et al 2007). In almost all described species F1 is longer than the pedicellus. Radicle is fused to scape. The forewings are narrow and somewhat apically pointed, with one or two parallel lines of setae on membrane beyond venation (Schauff 1983, 1984; Huber 1997; Lin et al 2007). The forewings are uniformly to densely setose only in the apical part.

Distribution. Worldwide.

Notes. In Western Palaearctic, *Omyomymar* is rarely collected. The unidentified specimens illustrated in Figures 4b and 5l from Pricop (2013) clearly belong to *Omyomymar* Schauff. Morphology: in this few examined specimens a single line of setae is more evident on forewing disk (Figure 1c). The cubital row of setae is not evident. Mandibles with rudimentary teeth. Posterior scutellum is slightly longer than anterior

scutellum. Posterior scutellum is partially divided medially (Figure 1j). Mesophragma is not projecting deep into gaster. The broad mesophragma of *Omyomymar* is illustrated in Figure 5l from Pricop (2013). Broadening the definition of this genus is a good idea, because are some characters that vary, the characters of antenna and ovipositor vary between different species (a broad variation is certainly encountered). In these few examined specimens, clava is without this apical digit (Figure 1b) and the ovipositor is short (ovipositors length is about equal to gastral length), not long as stated by Lin et al (2007). Tip of ovipositor is only slightly exerted past tip of metasoma. I had the good opportunity to examine several specimens belonging to *Omyomymar* Schauff. *Omyomymar* is informally recorded here from Western Palaearctic. We will treat *Omyomymar* separately in a future paper. *Omyomymar* Schauff is very close to *Palaeopatasson* Witsack. Lin & Chiappini (1996) published the most recent identification key to species, but a taxonomic review is needed.

***Stethynium* Enoch, 1909**

Diagnosis. Female antennal clava is 3-segmented and compact, the sutures are oblique. Scape is with transverse folds. Mandibles apparently are with 4 teeth. Posterior scutellum is about twice as long as width of each lobe (Figure 1i). Forewing is with a distinct, rounded basal lobe and smoothly rounded apex, usually the cubital row of setae is present and is more or less evident. The marginal vein is very short. Mesophragma is projecting deep into base of gaster (Schauff 1984; Yoshimoto 1990; Huber 1997; Lin et al 2007; Huber et al 2009).

Distribution. Almost worldwide.

Notes. This basal lobe of the forewing is more prominent in *Stethynium* than in *Anagrus* or in *Omyomymar*. Mandibles are overlapping (Figure 1m). Posterior scutellum is much longer than anterior scutellum (Figure 1i). Mesophragma is not always broadly rounded apically (Figure 1f). Mesophragma is more broadly and also rounded apically in *Omyomymar* than in *Stethynium* or in *Anagrus*. From Western Palaearctic we have identified a single species, *Stethynium triclavatum* Enoch. Pricop (2012, 2013) illustrated the morphology of this species. *S. triclavatum* is a variable species, we observed variation in body color, from light brown to yellow. Some variations in forewing breadth and in the length of the two lobes of posterior scutellum were also observed. The cubital row of setae is more or less evident. A little variation in ovipositor length was also observed. I cannot find good characters to separate these variations.

***Omyomymar* Schauff can be keyed down smoothly up to couplet 12 in Pricop (2013). Use Pricop's key partially inserting a new section after couplet 11, which should read as follows:**

12. Phragma projecting into gaster (Figure 1e); metasoma sessile, without distinct petiole; clava entire (1-segmented), 2 or 3-segmented; posterior scutellum at least bilobed posteriorly, at most longitudinally divided, partially or totally, into two parallel lobes by a median groove **13**
 - Phragma not projecting into gaster; metasoma sessile to subsessile, at most with a short petiole, at least strangled at the base; clava entire or at most 2-segmented, not 3-segmented; posterior scutellum not bilobed or longitudinally divided, but certainly entire..... **16**

13. Clava entire (Figure 1d), with 3 or 5 sensory ridges; posterior scutellum with each lobe about as long as wide (Figure 1g); narrow forewings, about 7 to 11 times longer than wide; forewing disk is more or less densely pubescent, rarely with few setae..... ***Anagrus* Haliday** (= *Anagrella* Bakkendorf; = *Paranagrus* Perkins)
 - Clava 2 or 3-segmented, with many sensory ridges; posterior scutellum, when divided, with each lobe about twice as long as wide; forewings can be wider (forewings vary in width); forewing disk is usually densely pubescent, at least in the apical part..... **14**

14. Clava 2-segmented (Figure 1b), forewing membrane with a single line of setae beyond venation (Figure 1c) *Omyomymar* Schauff
 - Clava 3-segmented, forewing membrane without such a line of setae beyond venation, at most the cubital line of setae is present..... 15

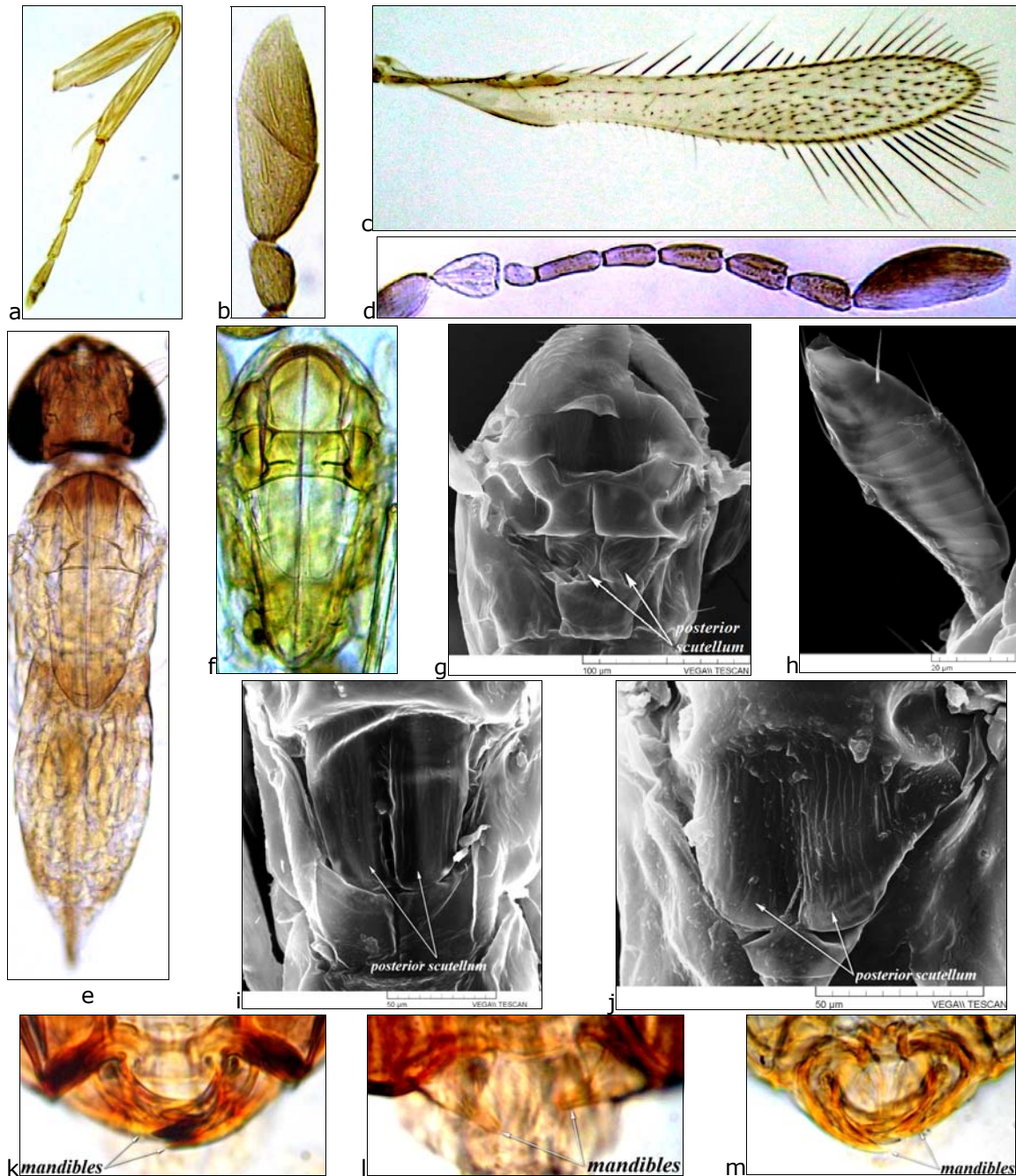


Figure 1. *Anagrus* group: a, b c, j, l – foreleg, F6 + clava, forewing, posterior scutellum and mandibles of *Omyomymar* sp.; d – female antenna in *Anagrus* sp.; e, g, h – body, mesosoma and scape of *Anagrus atomus*; f, i, m – mesosoma, posterior scutellum and mandibles of *Stethynium triclavatum*; k – mandibles of *Anagrus* sp. (original).

15. Head and mesosoma evidently and strongly dorsoventrally flattened; head much longer and wider than high, frons and face angled acutely backwards under toruli; mandibles more or less reduced and apparently not meeting or overlapping, teeth not evident; clava divided almost transversally into 3 segments (clava with transverse or only slightly oblique sutures); all the funicular segments are short and wide; scape without transverse lines or folds (without transverse striation-like lines), but with more than 3 longitudinal lines of setae; the cubital line of hairs is not evident; legs relatively short and robust..... *Pseudocleruchus* **Donev & Huber**
 - Head and mesosoma not dorsoventrally flattened; head higher than long, frons and face are vertical and straight; mandibles normal developed and overlapping (mandibles apparently with 4 teeth); clava evidently divided obliquely into 3 segments; almost all the funicular segments are much longer than wide; scape with transversal to oblique lines or folds (transversal striation-like lines) and at most with 2 longitudinal lines of setae; the cubital line of hairs more or less evident; legs normal developed, not robust..... *Stethynium* **Enock**

Table 1

Anagrus group – main morphological characters for genus identification (females)

No.	Characters	<i>Anagrus</i>	<i>Omyomymar</i>	<i>Stethynium</i>
1	Antenna	Clava entire (Figure 1d); scape with transverse folds; some funicular segments with mps.	Clava 2-segmented; scape without transverse folds; funicular segments without mps.	Clava 3-segmented; scape with transverse folds; funicular segments without mps.
2	Forewing	Narrow forewing; FWL/FWW = 7-11	Narrow forewing (Figure 1c); FWL/FWW = 7	Broad forewing; FWL/FWW = 5
3	Mesosoma	Each lobe of posterior scutellum about as long as wide	Posterior scutellum, when divided, with each lobe about twice as long as wide	Posterior scutellum with each lobe about twice as long as wide

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