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The morphology of hypopygia and its importance in taxonomy of the genera of Torymidae (Hymenoptera), with review of the genera and species of Turkey

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Abstract

The morphology of hypopygia of 19 genera, *Megastigmus* DALMAN, *Bootanomyia* GIRAULT, *Podagrion* SPINOLA, *Podagrionella* GIRAULT, *Torymus* DALMAN, *Diamorus* WALKER, *Monodontomerus* WESTWOOD, *Oopristus* STEFFAN, *Torymoides* WALKER, *Pseudotorymus* MASI, *Ditropinotus* CRAWFORD, *Eridontomerus* CRAWFORD, *Pseuderimerus* GAHAN, *Idiomacromerus* CRAWFORD, *Adontomerus* NIKOL'SKAYA, *Microdontomerus* CRAWFORD, *Glyphomerus* FÖRSTER, *Exopristus* RUSCHKA, *Exopristoides* BOUCEK, and 37 species of Torymidae (Hymenoptera) were studied. Three genera, *Diamorus* WALKER, *Chalcimerus* STEFFAN & ANDRIESCU and *Palachia* BOUCEK, and nine species, *Diomorus calcaratus* (NEES), *D. cupreus* (SPINOLA): *Monodontomerus aeneus* WALKER, *M. rugulosus* THOMSON, *M. dentipes* (DALMAN), *Palachia pulchra* BOUCEK, female of which described, *Chalcimerus borceai* STEFFAN & ANDRIESCU, *Podagrion pachymeron* WALKER, *P. bouceki* DELVARE, were newly recorded from Turkey. An identification key for genera based on the characters of hypopygia was provided.

Key words: Hymenoptera, Torymidae, hypopygia, Palearctic genera, species.

Zusammenfassung

Die Morphologie der Hypopygia von 19 Gattungen, *Megastigmus* DALMAN, *Bootanomyia* GIRAULT, *Podagrion* SPINOLA, *Podagrionella* GIRAULT, *Torymus* DALMAN, *Diamorus* WALKER, *Monodontomerus* WESTWOOD, *Oopristus* STEFFAN, *Torymoides* WALKER, *Pseudotorymus* MASI, *Ditropinotus* CRAWFORD, *Eridontomerus* CRAWFORD, *Pseuderimerus* GAHAN, *Idiomacromerus* CRAWFORD, *Adontomerus* NIKOL'SKAYA, *Microdontomerus* CRAWFORD, *Glyphomerus* FÖRSTER, *Exopristus* RUSCHKA, *Exopristoides* BOUCEK und 37 Arten, der Torymidae (Hymenoptera) wurden untersucht. Drei Gattungen, *Diamorus* WALKER, *Chalcimerus* STEFFAN & ANDRIESCU und *Palachia* BOUCEK und neun Arten, *Diomorus calcaratus* (NEES), *D. cupreus* (SPINOLA), *Monodontomerus aeneus* WALKER, *M. rugulosus* THOMSON, *M. dentipes* (DALMAN), *Palachia pulchra* BOUCEK, sowie die erstmalig beschrieben Weibchen, *Chalcimerus borceai* STEFFAN & ANDRIESCU, *Podagrion pachymeron* WALKER, *P. bouceki* DELVARE wurden neu für die Türkei bekannt. Ein Bestimmungsschlüssel wurde der Arbeit beigestellt.

Introduction

The morphology of hypopygia in the taxonomy of Pteromalidae (Hymenoptera: Chalcidoidea) has been studied for separating the species of *Mesopolobus* WESTWOOD, 1833 by GRAHAM (1969), for the species of *Pachyneuron* WALKER, 1833 and *Euneura* WALKER, 1844 by DOĞANLAR (1986) and for the species of *Dibrachys* FÖRSTER, 1856 by DOĞANLAR (1987). In the taxonomy of Eulophidae (Hymenoptera: Chalcidoidea) GRAHAM (1987, 1991) used the morphology of hypopygia in the classification of species of some genera in Tetrastichinae, DOĞANLAR (1991a,b) for some species of Ormyridae, and TARLA et al. (2010) for species of genus *Oopristus* STEFFAN, 1968 in Monodontomerinae (Torymidae). DOĞANLAR & DOĞANLAR (2012, 2013a, b; DOĞANLAR et al.2013) used the morphology of hypopygia in the classification of some species groups of *Entedon* DALMAN (Hymenoptera: Eulophidae) in Turkey and some European species.

Material and methods

This study is based upon examination and identification of the specimens collected from several parts of Turkey. The examined specimens and types were deposited in Insect Museum of Biolocical Control Station, Yüreğir, Adana, Turkey (IMBC). Specimens were collected by sweeping net and putting the whole contents of the swept materials directly in 96 % ethanol. After sorting the material, individuals were mounted on cards for further morphological studies. The species were identified by following the keys of GRISSELL (1995) and ZEROVA & SEREGINA (1999). The hypopygia were separated from metasoma by dissecting and slide mounted in Canada balsam, the other parts of the metasoma were replaced on its own card near its mesosoma. Photographs of diagnostic

characters of the species were taken by using of Leica DM 500 microscopes with a digital Leica ICC 50 camera attached to it.

Morphological terminology follows GRAHAM (1969) and TARLA et al. (2010).

In this work the morphology of hypopygia of the some palearctic genera were studied, The characters of hypopygia of some genera of Torymidae were illustrated. The distinctions of the genera based on hypopygia were given and differences between the genera were discussed and an identification key was provided.

The name of some parts of hypopygium given in Fig. 1.

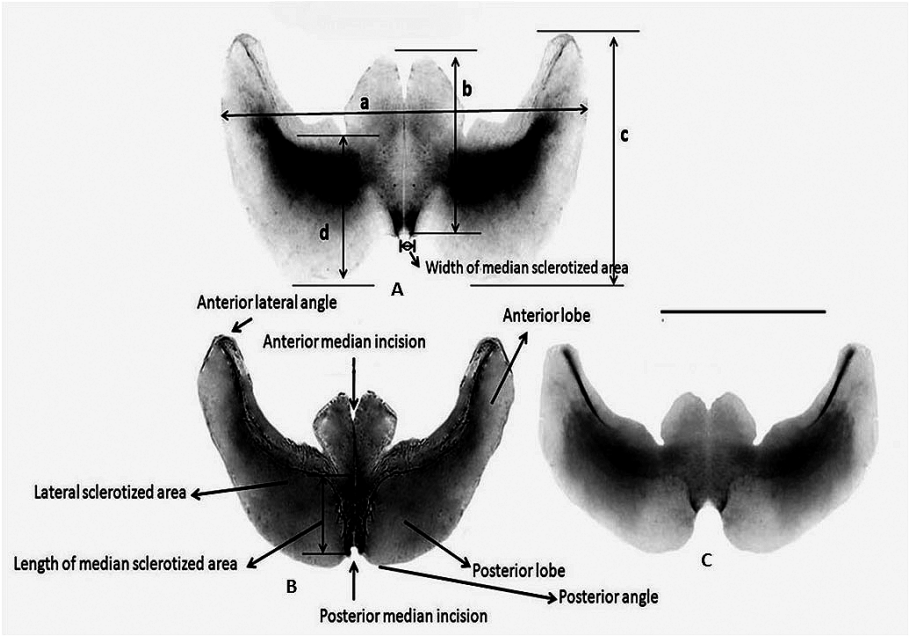

Fig. 1: Hypopygia of Incertea sedis group of GRISSELL (1995): (A) *Glyphomerus stigma* (FABRICIUS); (B) *Exopristus trigonoderus* RUSCHKA; C. *Exopristoides dentatus* BOUCEK. a, width of hypopygium; b, distance between anterior margin of median lobe and posterior edge of median sclerotized area; c. lateral length of hypopygium; d. median length of hypopygium. (scale bar = 0.125 mm).

Key to the genera of Toymidae based on the characters of metasomal sterna, especialy on hypopygia

1 First sternit of metasoma (Figs 2a-d) almost reaching to tip of hypopygium; median sclerotized (Figs 3a-e) area at most 0.25x as long as posterior median incision; length of posterior median incision at least 4.0x as long as length of anterior median incision (except *Pseuderimerus*) 2

- First sternit of metasoma (Figs 4a-c) at most reaching to half of total length of sterna; median sclerotized area (Figs 1a-c; 5a-c) at most 0.4x as long as posterior median incision; length of posterior median incision at most 3.0x as long as length of anterior median incision (excepts *Pseuderimerus* 6x, and in Monodontomerini anterior median incision absent) 3

2 Hypopygium (Figs 3a-c) with a/d= 2.7; a/c= 1.6; a/b= 4.8. Median sclerotized area at most 0.10x as long as posterior median incision; length of posterior median incision 5.0x as long as length of anterior median incision; median length of hypopygium 7x length of anterior lobe; median sclerotized area 0.2x as long as its own minimum width ..... *Megastigmus* DALMAN

- Hypopygium (Figs 3d,e) with a/d= 4.0; a/c= 1.6; a/b= 4.35. Median sclerotized area at most 0.25x as long as posterior median incision; length of posterior median incision 4.0x as long as length of anterior median incision; median length of hypopygium 3.6x length of anterior lobe; median sclerotized area 0.3x as long as its own minimum width ..... *Bootanomyia* GIRAULT

3 First sternit of metasoma (Figs 4a,b) reaching to half of total length of sterna 4

- First sternit of metasoma (Fig. 4c) reaching to at most 0.33 of total length of sterna 5

4 Hypopygium (Figs 5a,b) with a/d= 2.3; a/c= 0.93; a/b= 2.12; Median sclerotized area twice as long as posterior median incision; length of posterior median incision 0.83x as long as length of anterior median incision; median length of hypopygium 15.5x length of anterior lobe; median sclerotized area as long as its own minimum width ..... *Podagrion* SPINOLA

- Hypopygium (Fig. 5 c) with a/d= 3.7; a/c= 1.65; a/b= 3.7; Median sclerotized area 0.63x as long as posterior median incision; length of posterior median incision 1.1x as long as length of anterior median incision; median length of hypopygium 2.6x length of anterior lobe; median sclerotized area 1.6x as long as its own minimum width ..... *Podagrionella* GIRAULT

5 Anterior median incision (Figs 6a-c) absent 6

- Anterior median incision (Figs 7a-c) at least slightly present 7

6 Hypopygium (Figs 6a,b) with a/d= 3.33; a/c= 2.22; a/b= 3.3; median sclerotized area 0.45x as long as posterior median incision; median length of hypopygium 3.33x length of anterior lobe; median sclerotized area as long as its own minimum width .... *Oopristus* STEFFAN

- Hypopygium (Fig. 6 c) with a/d= 2.0; a/c= 1.54; a/b= 1.8; median sclerotized area 7.66x as long as posterior median incision; median length of hypopygium 1.95x length of anterior lobe; median sclerotized area 5.75x as long as its own minimum width ..... *Monodontomerus* WESTWOOD

7 Hypopygium (Fig. 9 c) with a/d= 3.04; a/c= 1.67; a/b= 2.5. Length of posterior median incision 6.0x as long as length of anterior median incision; median sclerotized area 0.4x as long as posterior median incision; median length of hypopygium 1.8x length of anterior lobe; median sclerotized area 0.5x as long as its own minimum width ..... *Pseuderimerus* GAHAN

- Hypopygium (Figs 9d-i) with length of posterior median incision at most 3.0x as long as length of anterior median incision 8

8 Width of hypopygium (Figs 1A-C; 9i) at least 1.86x lateral length of hypopygium..... 9

- Width of hypopygium (Figs 8a-k) at most 1.7x lateral length of hypopygium 14

9 Width of hypopygium (Figs 9i; 1 a) 1.86x lateral length of hypopygium..... 10

- Width of hypopygium (Figs 1b,c) at least 1.9x lateral length of hypopygium..... 11

10 Hypogium (Fig. 9 i) with a/d= 3.5; a/c= 1.86; a/b= 3.2; median sclerotized area 3x as long as posterior median incision; median length of hypopygium 3.3x length of anterior lobe; median sclerotized area 5.75x as long as its own minimum width; posterior median incision 5x as long as anterior median incision .... *Microdontomerus* CRAWFORD

- Hypogium (Fig. 1 A) with a/d= 3.12; a/c= 1.86; a/b= 2.6; Median sclerotized area 1.16x as long as posterior median incision; median length of hypopygium 1.8x length of anterior lobe; median sclerotized area 3.5x as long as its own minimum width; posterior median incision 1.1x as long as anterior median incision .... *Glyphomerus* FÖRSTER

11 Hypogium (Fig. 1 B) with a/d= 3.93; a/c= 1.96; a/b= 2.7. Median sclerotized area 3.33x as long as posterior median incision; median length of hypopygium 1.5x length of anterior lobe; median sclerotized area 3.33x as long as its own minimum width; posterior median incision 0.86x as long as anterior median incision .... *Exopristus* RUSCHKA

- Median sclerotized area (Figs 1C; 7a-c) at most 1.5x as long as posterior median incision; other characters variable..... 12

12 Hypogium (Fig. 1 C) with a/d= 3.75; a/c= 1.94; a/b= 3.43. Posterior median incision 3.0x as long as anterior median incision; median sclerotized area at most 0.6x as long as posterior median incision; median length of hypopygium 2.3x length of anterior lobe; median sclerotized area as long as its own minimum width .... *Exopristoides* BOUCEK

- Posterior median incision (Figs 7a-c) at most 0.86x as long as anterior median incision; other characters variable..... 13

13 Hypopygium (Figs 7a-b) with a/d= 3.0; a/c= 1.9; a/b= 2.4; Anterior lobe triangular interiorly; Median sclerotized area 1.5x as long as posterior median incision; median length of hypopygium 1.33x length of anterior lobe; median sclerotized area 2.16x as long as its own minimum width; length of posterior median incision 0.67x as long as length of anterior median incision ..... *Torymus* DALMAN

- Hypopygium (Fig. 7 c) with a/d= 4.24; a/c= 2.0; a/b= 3.3; Anterior lobe inverted-U shaped; Median sclerotized area 0.67x as long as posterior median incision; median length of hypopygium 1.65x length of anterior lobe; median sclerotized area 1.33x as long as its own minimum width; posterior median incision 0.86x as long as anterior median incision..... *Diamorus* WALKER

14 Median sclerotized area (Figs 8a-k) at least 2.75x as long as posterior median incision; other characters variable 15

- Median sclerotized area (Figs 9a-i) at most 2.33x as long as posterior median incision; other characters variable 16

15 Hypopygium (Figs 8a-c) with a/d= 3.9; a/c= 1.67; a/b= 2.1. Median sclerotized area at least 2.75x as long as posterior median incision; median length of hypopygium equal to length of anterior lobe; median sclerotized area 2.2x as long as its own minimum width; posterior median incision 0.44x as long as anterior median incision..... ..... *Torymoides* WALKER

- Hypopygium (Figs 8d-k) with a/d= 2.43; a/c= 1.5; a/b= 2.52. Median sclerotized area at least 3.0x as long as posterior median incision; median length of hypopygium 2.33x length of anterior lobe; median sclerotized area 2.5x as long as its own minimum width posterior median incision 0.6x as long as anterior median incision ..... *Pseudotorymus* MASI

16 Width of hypopygium (Figs 9d-h) at least 3x median length, and about twice distance between anterior margin of median lobe and posterior tip of median sclerotized area 17

- Width of hypopygium (Figs 9a,b) at most 2.14x median length, and at most 1.67x distance between anterior margin of median lobe and posterior tip of median sclerotized area 18

17 Width of hypopygium (Figs 9g-h) at least 3.05x median length, and 1.7x lateral length; median sclerotized area at least 2.33x as long as posterior median incision; median length of hypopygium 0.9x length of anterior lobe; median sclerotized area 2.3x as long as its own minimum width; posterior median incision 0.3x as long as anterior median incision ..... *Adontomerus* NIKOL'SKAYA

- Width of hypopygium (Figs 9d-f) at least 3.87x median length, and 1.57x lateral length; median sclerotized area at least 1.5x as long as posterior median incision; median length of hypopygium 1.5-1.7x length of anterior lobe; median sclerotized area 1.3-1.7x as long as its own minimum width; posterior median incision 0.7x as long as anterior median incision ..... *Idiomacromerus* CRAWFORD

18 Posterior median incision (Fig. 9 a) 1.16x as long as anterior median incision; median sclerotized area at least 1.7x as long as posterior median incision; median length of hypopygium 1.5x length of anterior lobe; median sclerotized area 2.0x as long as its own minimum width width of hypopygium 2.14x median length, 1.66x lateral length, and 1.67x distance between anterior margin of median lobe and posterior tip of median sclerotized area ..... *Ditropinotus* CRAWFORD

- Posterior median incision (Fig. 9 b) 0.5x as long as anterior median incision; median sclerotized area at least 2.0x as long as posterior median incision; median length of hypopygium 1.56x length of anterior lobe; median sclerotized area 2.25x as long as its own minimum width; width of hypopygium 2.12x median length, 1.55x lateral length, and 1.51x distance between anterior margin of median lobe and posterior tip of median sclerotized area ..... *Eridontomerus* CRAWFORD

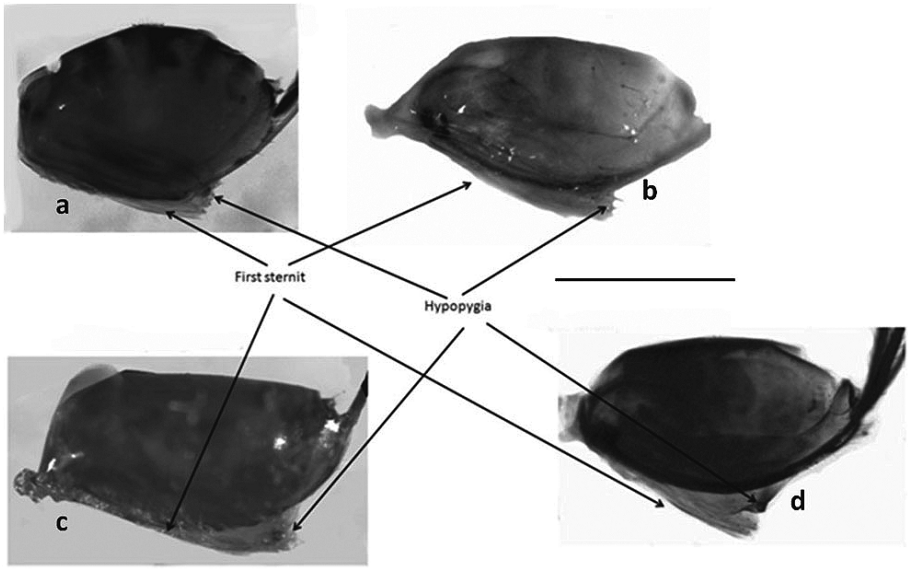

Fig. 2: Metasoma of Megastigminae. a-b. *Megastigmus* spp., (**a**) *M. aculeatus* (SWEDERUS), (**b**) *M. thailandiensis* DOĞANLAR & HASSAN; (**c-d**) *Bootanomyia* spp., a. *B. stigmatizans* (FABRICIUS) d. *B. almusensis* DOĞANLAR. (scale bar for a= 1.35 mm; for b= 0.56 mm; for c= 1.5 mm; for d= 0.9 mm).

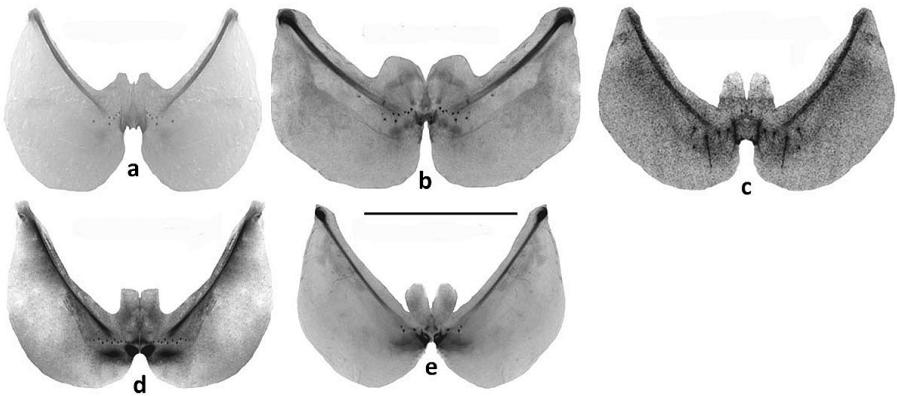

Fig. 3: Hypopygia of Megastigminae. a-c. *Megastigmus* spp., (**a**) *M. rosae* BOUCEK, (**b**) *M. aculeatus*, (**c**) *M. thailandiensis* DOĞANLAR & HASSAN; (**d-e**) *Bootanomyia* spp., (**d**) *B. stigmatizans* FABRICIUS (e. *B. almusensis* DOĞANLAR. (scale bar = 0.125 mm).

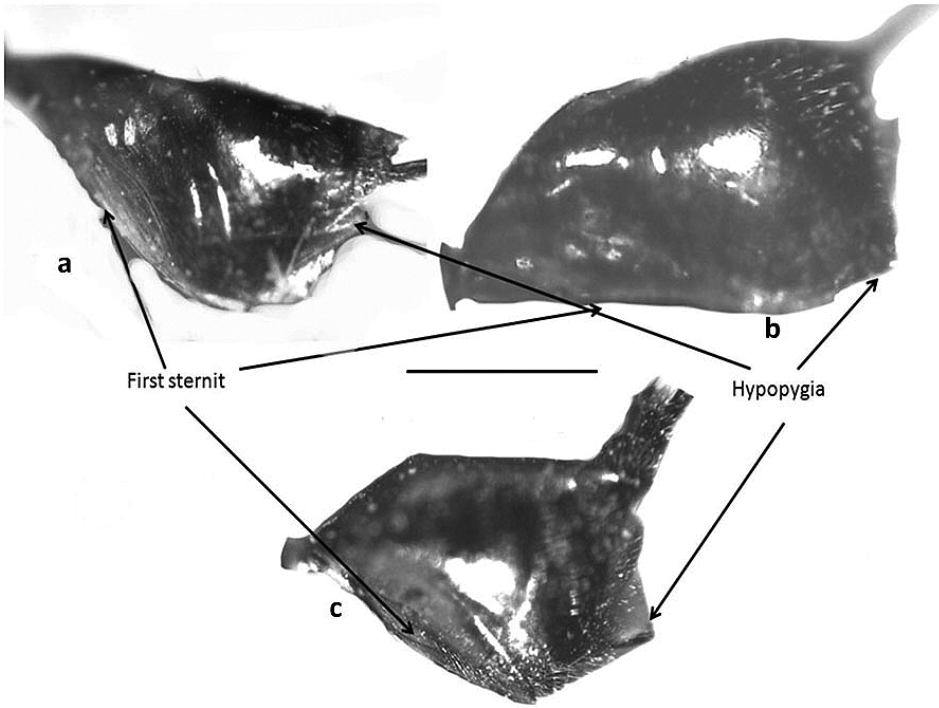

Fig. 4: Metasoma of Podagrionini and Microtontomerini. (**a**) *Podagrion* sp., (**b**) *Podagrionella eremiphilae* DOĞANLAR (**c**) *Microtontomerus annulata* (SPINOLA) (scale bar for a= 1.75 mm; for b= 1.2 mm; for c= 0.8 mm).

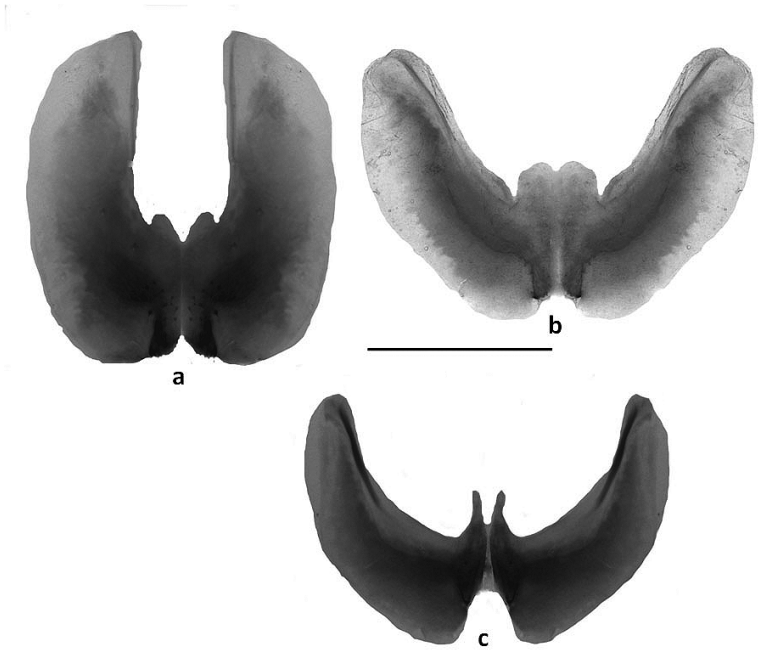

Fig. 5: Hypopygia of Podagrionini. (**a**) *Podagrion pachymeron* WALKER, (**b**) *Podagrion splendes* SPINOLA, (**c**) *Podagrionella eremiphilae* DOĞANLAR. (scale bar = 0.125 mm).

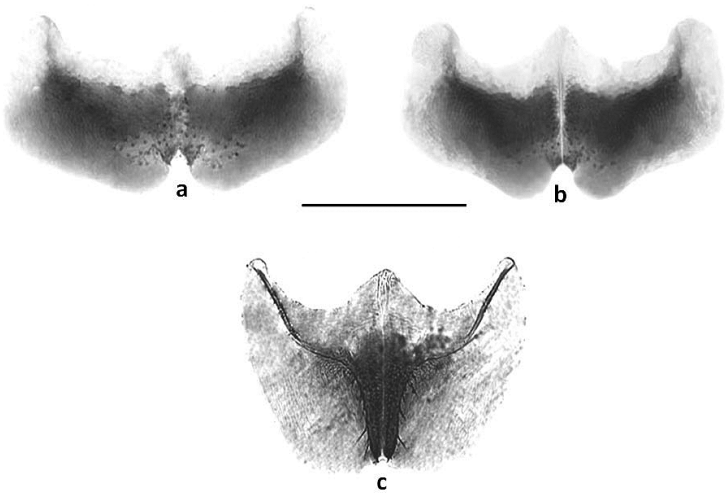

Fig. 6: Hypopygia of Monodontomerini. a-b. *Oopristus* spp., (**a**) *O. turkestanicus*; (**b**) *O. erganicus* TARLA & DOĞANLAR; (**c**) *Monodontomerus aereus* WALKER. (scale bar = 0.125 mm).

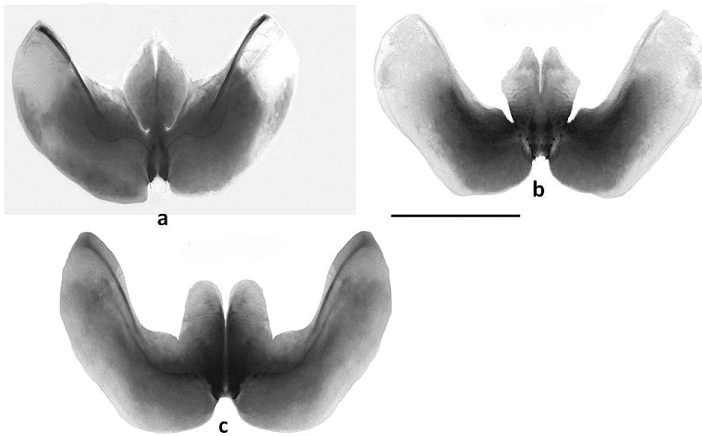

Fig. 7: Hypopygia of Torymini. a-b. *Torymus* spp. (**a**) T. Phillyreae RUSCHKA; (**b**) *T. sinensis* KAMIJO; (**c**) *Diamorus calcaratus* (NEES). (scale bar = 0.125 mm).

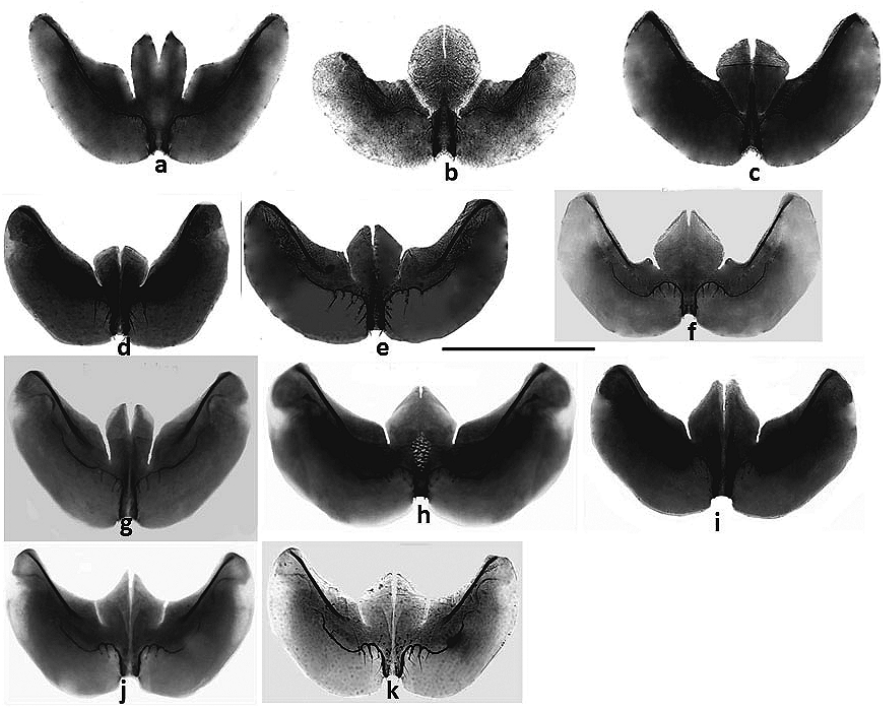

Fig. 8: Hypopygia of Torymoidini. a-c. Torymoides spp. (**a**) *T.* (*Ameromicrus*) *yumurtalikensis* DOĞANLAR, (**b**) *T.* (*Dimeromicrus*) *Kiesenwetteri* (MAYR); (**c**) *Torymoides* sp.; (**d-k**) *Pseodotorymus* spp. (scale bar = 0.125 mm).

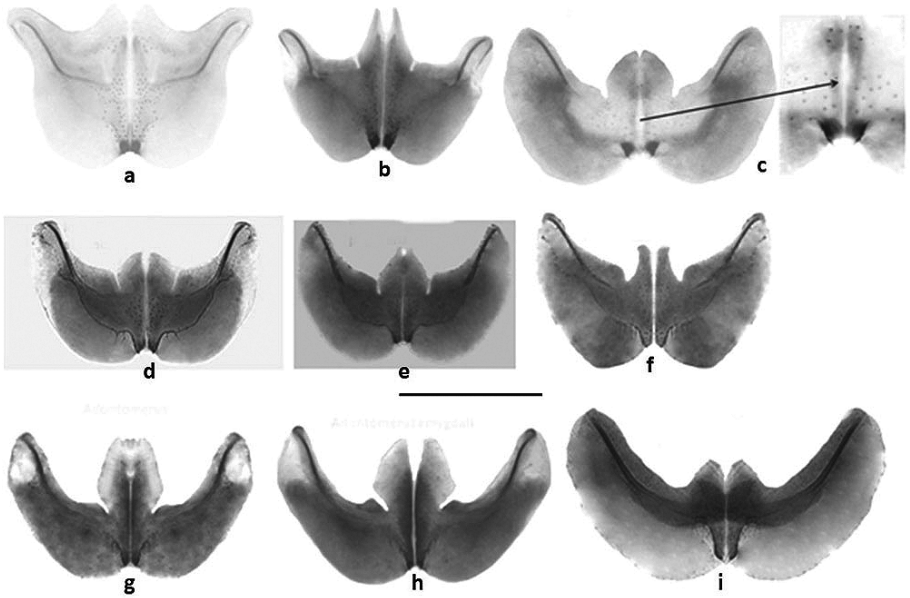

Fig. 9: Hypopygia of genera in Microdontomerini. (**a**) *Ditropinotus golbasinensis* DOĞANLAR; (**b**) *Eridontomerus* sp.; (**c**) *Pseuderimerus* sp.; d-f. *Idiomacromerus* spp. (**d**) *I. akdenizeus* DOĞANLAR; (**e**) *I. papaveris* FÖRSTER; (**f**) *Idiomacromerus oguzhani* DOĞANLAR; g-h. *Adontomerus* spp., (**g**) *Adontomerus* sp. (**h**) *A. amygdali* (BOUCEK); (**i**) *Microdontomerus annulata* (SPINOLA). (scale bar = 0.125 mm).

M e g a s t i g m i n a e THOMSON 1876

Megastigmus DALMAN 1820

Torymus (*Megastigmus*) DALMAN 1820: 178. Type species: *Pteromalus bipunctatus* SWEDERUS, by subsequent designation of CROSBY 1913: 155.
Megastigmus juniperi NIKOL'SKAYA (RAQUES & SKRZYPCZYNSKA 2003).
Megastigmus leptocybus DOĞANLAR & HASSAN: (DOĞANLAR & HASSAN 2010).
Megastigmus Pistaciae WALKER: (BODENHEIMER, 1941; ÇELIK 1975; DOĞANLAR & ÇAM 1991; ÇANAKÇIOĞLU & MOL 1998; DOĞANLAR et al. 2009).
Megastigmus rosae BOUCEK (DOĞANLAR 1984; ÖNCÜER 1991; GENCER 2003; DANESHVAR et al. 2009).
Megastigmus Schimitscheki NOVICKY: (NOVICKY 1954; LESSMANN 1962; FABRE et al. 1994; RAQUES & SKRZYPCZYNSKA 2003; AUGER-ROZENBERG et al. 2006).
Megastigmus suspectus BORRIES: (HUSSEY 1957; RAQUES & SKRZYPCZYNSKA 2003; AYBERK & CEBECI 2010).
Megastigmus wachtli SEITNER: (RAQUES ET AL. 1999; RAQUES & SKRZYPCZYNSKA 2003).
Megastigmus zvimendeli DOĞANLAR & HASSAN (DOĞANLAR & HASSAN 2010).
Bootanomyia GIRAULT, 1915
Megastigmus (*Bootanomyia*) GIRAULT, 1915: 304. Type species: *Megastigmus smaragdus* GIRAULT original designation.

Bootanomyia GIRAULT, 1915, GIRAULT, 1928: 262. New status for *Megastigmus* GIRAULT.
Bootanomyia almusiensis (DOĞANLAR): (DOĞANLAR 1989; 2011 a).
Bootanomyia balikesirensis DOĞANLAR: (DOĞANLAR 2011 a).
Bootanomyia dorsalis (FABRICIUS): (DOĞANLAR 1984; 2011 a).
Bootanomyia emrezaferi DOĞANLAR: (DOĞANLAR 2011 a).
Bootanomyia hepturgunae DOĞANLAR: (DOĞANLAR 2011 a).
Bootanomyia mehmeti DOĞANLAR: (DOĞANLAR 2011 a).
Bootanomyia onuri DOĞANLAR: (DOĞANLAR 2011 a).
Bootanomyia shebnemae DOĞANLAR: (DOĞANLAR 2011 a).
Bootanomyia stigmatizans (FABRICIUS): (DOĞANLAR 2011 a; ASKEW et al. 2013).

Westralianus BOUCEK, 1988

Westralianus BOUCEK, 1988: 130. Type species: *Westralianus microstigma* BOUCEK, original designation and monotypy.
Westralianus altinoezus DOĞANLAR: (DOĞANLAR 2011b).

T o r y m i n a e

T o r y m i n i

Torymus DALMAN, 1820

Torymus DALMAN, 1820: 135. Type species: *Ichneumon bedeguaris* LINNAEUS, by subsequent designation of, ASHMEAD, 1904: 242.
Torymus arcella GRAHAM & GIJSWIJT: (GRAHAM & GIJSWIJT 1998; ZEROVA & SERYOGINA 2003).
Torymus auratus (MÜLLER) (ASKEW et al. 2013).
Torymus bedeguaris (LINNEAEUS): (BAYRAM et al. 1998; ÖZBEK et al. 1999; GENCER 2003; DANESHVAR et al. 2009).
Torymus Calcaratus NEES: (ASKEW et al. 2013).
Torymus cultratus GRAHAM & GIJSWIJT: (GRAHAM & GIJSWIJT 1998; ZEROVA & SERYOGINA 2003).
Torymus Cultriventris RATZEBURG: (ÖNCÜER 1991; URAL & KURT 1973).
Torymus Cyaneus WALKER: (ASKEW et al. 2013).
Torymus Fastuosus BOHEMAN: (ASKEW et al. 2013).
Torymus geranii (WALKER): (ASKEW et al. 2013).
Torymus nitidulus (WALKER): (ÖNCÜER 1991).
Torymus Phillyreae RUSCHKA: (DOĞANLAR 2011; DOĞANLAR et al. 2011).
Torymus rubi (SCHRANK): (GENCER 2003).

Diamorus WALKER, 1834

Diamorus WALKER, 1834: 159. Type species: *Diomorus nobilis* WALKER, by monotypy
Diomorus calcaratus (NEES): Turkey: 4 females, 6 males, Tokat, Gümenek, reared from cynipid galls on *Rubus* sp., H. Çam; 2 females, 4 males, Tokat, Almus, reared from *Andricus* sp. galls on *Quercus* sp., M. Doğanlar (New record).
Diomorus cupreus (SPINOLA): 2 females, 5 males, Tokat, Artova, reared from stems of *Rubus* sp., M. Doğanlar (New record).

Torymoidini

Torymoides WALKER, 1871

Torymoides WALKER,1871: 37. Type species: *Torymoides amabilis* WALKER, by monotypy.
Torymoides dispar (MASI): (BOUCEK 1952; DOĞANLAR 1984 as *Didactyliocerus dispar* Masi; ÖNCÜER 1991).
Torymoides kiesenwetteri (MAYR) : (DOĞANLAR 1984 as *Dimeromicrus kiesenwetteri*; ÖNCÜER 1991; GRISSELL 1995).
Torymoides yamurtalikiensis (DOĞANLAR): (DOĞANLAR 1989).

Pseudotorymus MASI, 1921

Pseudotorymus MASI, 1921: 235. Replacement name for *Holaspis* MAYR, 1874 nec GRAY, 1863.
Pseudotorymus militaris (BOHEMAN): (DOĞANLAR 1984; ÖNCÜER 1991; GRISSELL 1995).
Pseudotorymus pannonicus (MAYR): (DOĞANLAR 1984; ÖNCÜER 1991; GRISSELL 1995).
Pseudotorymus sapphyrinus (FONSCOLOMBE): (GENCER 2003).
There are many more species from Turkey. They will be revised in the near future.

M o n o d o n t o m e r i n i

Monodontomerus WESTWOOD, 1833

Monodontomerus WESTWOOD, 1833: 443. Type species: *Monodontomerus obscurus* WESTWOOD, by monotypy.

Monodontomerus Aereus WALKER

(OILB 1971; DOĞANLAR 1984; ÖNCÜER et al. 1978; ÖNCÜER 1991; GRISSELL 1995; KILIC & ALAOĞLU 1996; AVCI 2009; POLAT & TOZLU 2010).

S t u d i e d m a t e r i a l s : Turkey: Erzurum, 14 females, 20 males, 03.vii-25.vii. 1976, reared from pupae of *Leucoma salicis*, M. Doğanlar; 10 females, 13 males, Tokat, 30.vi. 1988, H.Çam; 19 females, 10 males, Tokat, Gümenek, reared from pupae of *Euproctis* sp. on *Quercus* spp., M. Doğanlar.

Monodontomerus minor (RARZEBURG)

(POLAT & TOZLU 2010).

S t u d i e d m a t e r i a l s : Turkey: Erzurum, 3 males, Uni.Campus, Atatürk Univ., 07.- 14. 31.vii. 2004, *Archips* sp. pupae, A. Polat.

Monodontomerus obscurus WESTWOOD

(ÖNCÜER 1991).

S t u d i e d m a t e r i a l s : Turkey: Tokat, 1Female, 23.vi.1986; 3 Females,1 Male, 01.vi. 1986; 1 Female, 4.vi. 1986; 2 Females, 1 Male, 23-24.iv. 1986, H:Çam; 1 Male, Adana,23.viii. 1986, MD; 1 Female, Erzurum, Uni.Campus, Atatürk Univ., 1 Female, 21.vii. 2004; *Archips* sp. pupae, A. Polat.

Monodontomerus dentipes (DALMAN)

Studied materials: Turkey: Erzurum, Uni.Campus, Atatürk Univ., 1 Female, 02.vii. 2004; 2 Females, 05.vii. 2004; 1 Female,17.vii. 2004; *Archips* sp. pupae, A. Polat **(New record).**

Monodontomerus rugulosus THOMSON

Studied materials: Turkey: 1 Female, Erzurum, Uni.Campus, Atatürk Univ., 1 Female, 17.vii. 2004; 1 Female, 1M, 07.vii. 2004; 1 Female, 31 .vii. 2004; *Archips* sp. pupae, A. Polat; 1 Female, Pomak Vill. Şenyurt, Tokat, 5.vii. 1982, *Yponomeuta malinella*, MD **(New record).**

Monodontomerus aeneus WALKER

Studied materials: Turkey: 9 Females, Pazar, Tokat, 28.ii. 1986, Lab reared, *Euproctis chryssorrohae*, M. Koparan; Tokat: 3 Females, 2.vi. 1986; 1 Male, 27.v. 1987, *Prunus cerasi*, H.Çam; 1 Female, Erzurum, 8.vii. 1965, pupa of *Malacosoma* sp., M. Doğanlar; 4 Females, 2 Males, Erzurum, 15-20.viii. 1981, pupa of *Stilpnotia salicis*, M. Doğanlar; 1 Male, Erzurum, 04.vii. 1984, M. Doğanlar; 1 Female, 1 Male, Oltu, Erzurum,13.vii. 1971, hyperparazitoit on Ichneumonid pupa, ex. *Malacosoma franconica* pupae, M. Doğanlar; 7 Females, 1 Male, Tufanbeyli, Adana, 06.vii. 1989, *Euproctis chryssorrohae,* pupae, H. Bolu **(New record)**; GERMANY: 1 Female, 3 Males, BadSoden-Salzmünster, 27.vii. 1983, M. Doğanlar.

Oopristus STEFFAN, 1968

Oopristus STEFFAN, 1968: 212. Type species: *Oopristus safavii* STEFFAN, by monotypy.
Oopristus erganicus TARLA & DOĞANLAR: (TARLA et al. 2010).
Oopristus tayfursokmeni TARLA & DOĞANLAR: (TARLA et al. 2010).
Oopristus turkestanicus (SKRIPTSHINSKY): (TARLA et al. 2010).

Palachini

Palachia BOUCEK, 1969

Palachia BOUCEK, 1969: 38. Type species: *Palachia pulchra* BOUCEK, original designation and monotypy.

Palachia pulchra BOUCEK, 1969

Palachia pulchra BOUCEK, 1969: 40. New species, figs, Holotype Male, BMNH, Croatia.
Up to now, the female of *P. pulchra* has not known. 1 Female was swept from leaves of *Olea europea* by B. Hepdurgun on 23.viii. 2005, Turkey, Balıkesir as **New record.** The female was described and illustrated as follows:

Description:

Female. Body (Figs 10a,b) black with greenish-coppery reflection, except neck of pronotum, legs, base of metasoma testaceous, except ovipositor apically black; antenna

with scape and pedicellus, 4-6. flagellar segments yellow, other segments of antenna black, wings hyaline, veins yellow. Length 2.4 mm + ovipositor 2.5 mm.

Head (Figs 10c,d) in dorsal view 1.24 broader than mesoscutum, width to length 62:25; POL 2.33x OOL; OOL 1.5x diameter of lateral ocellus, in frontal view slightly wider than high in ratio 42:30; dorsal margin of torulus about midway between torulus and level of lower edge of eyes; malar space consists 0.27x hight of eye; face with fine sculpture. Antenna (Fig. 10 e) with flagellum distincly clavate, comprising no anellus, 8 flagellar segments and a non-segmented clava; scape reaching above median ocellus, 5.33x as long as broad; 0.94x as long as club; antenna with pedicel plus flagellum 3.1x as long as scape; pedicel 1.54x as long as width; 1st flagellar segment 1.5x as long as width and 0.75x as long as pedicel; 2nd flagellar segment the longest one, twice as long as width, 1.8x as long as 1st flagellar segment, flagellar segments gradually widening and shortening towards tip, 8th flagellar segment distictly transverse, about 2.5x as wide as long, 2.5x as wide as F1; 3rd flagellar segment 1.7x, 4th 1.2x, as long as width, 5th 1.12x,6th and 7th almost same size, 1.8x as wide as long; clava 3.2x as long as width, almost conical, linear sensilla numerous on each funicle segment.

.

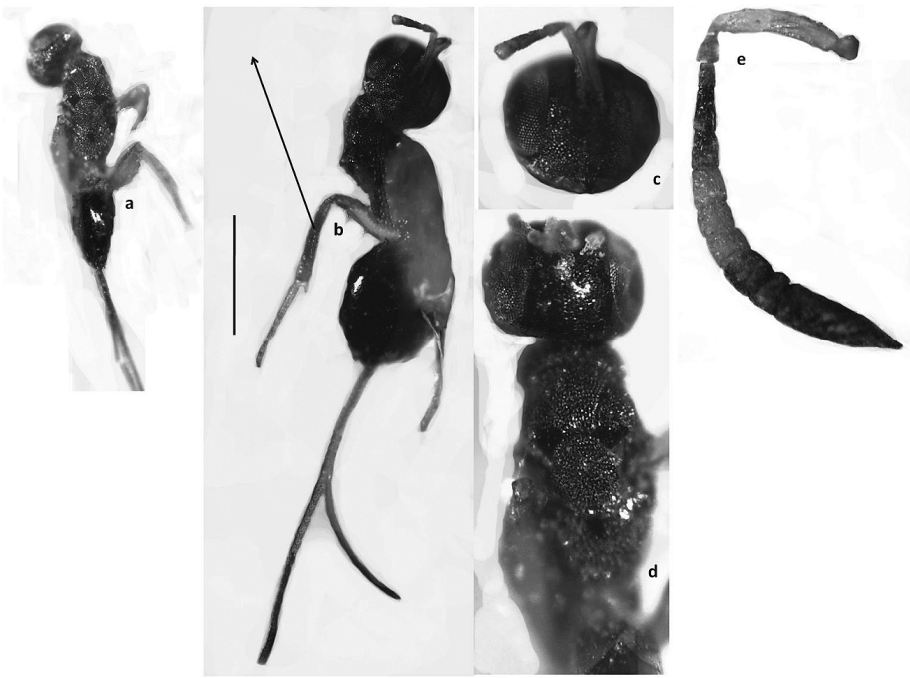

Fig. 10: *Palachia pulchra* BOUCEK, female. a,b. body, (**a**) dorsal view, (**b**) lateral view; (**c**) head, in frontal view; (**d**) head and mesosoma, in dorsal view; (**e**) antenna. (scale bar for a= 1.2 mm; for b= 0.92 mm; for c and d= 0.54 mm; for e= 0.5 mm).

Mesosoma (Fig. 10 b) distinctly bulged in profile; propodeum declined, distinctly visible from above; sculpture of pronotum, mesoscutum and scutellum with fine reticulation (Fig. 10 d); pronotum long, 0.66x as long as mesoscutum; scutellum slightly longer tham width, as long as mesoscutum; propodeum with fine reticulation,0.66x as long as scutellum; mesosternnum finely reticulated. All coxae with fine reticulation, fore and hind femora with two teeth, hind femora 3.4x as long as wide. Forewing lost.

Metasoma (Figs 1a,b) excluding ovipositor 0.77x as long as mesosoma; basal tergite with posterior margin deeply incised medially; tip of hypopygium about 1/2 length metasoma; ovipositor 2.7x as long as metasoma, and as long as rest of body; ovipositor index 3.33.

C h a l c i m e r i n i

Chalcimerus STEFFAN & ANDRIESCU, 1962

Chalcimerus STEFFAN & ANDRIESCU, 1962: 225. Type species: *Chalcimerus borceai* STEFFAN & ANDRIESCU, by monotypy.
Chalcimerus borceai STEFFAN & ANDRIESCU: 1 Male, from Nurdağ 15 km to Gaziantep, Forest Dept. tree plantation area, 15.v. 2007, MD; 1 Male, Sincanköy, İskenderun, Hatay, 13.v.2007; 1 Male, Kömürçukuru, Belen, Hatay, 05.v. 2012; 1M, Gölbaşı 20mk to Malatya, 24.v. 2007, pasture, M. Doğanlar (New record).

P o d a g r i o n i n i

Podagrion SPINOLA, 1811

Podagrion SPINOLA, 1811: 147. Type species: *Podagrion splendens* SPINOLA, by monotypy.

Podagrion Splendens SPINOLA

(DELVARE 2005).
S t u d i e d m a t e r i a l s : 1 Female, Kırşehir, 19.v.2005, pasture, M. Doğanlar; 1 Female, Balıkesir, 09.ix. 2004, swept from leaves of *Olea europea*, B. Hepdurgun.

Podagrion pachymeron WALKER

S t u d i e d m a t e r i a l s : 1 Male, Atatürk Dame, Bozova, Şanlıurfa, reared from ootheca of Eremiaphilidae, 15.iv. 2002, M. Doğanlar; 1 Male, Adana, Kadirli, 04.vii.1979, A. Beyarslan; 1 Male,, Sivrice, Diyarbakır, 22.v. 2002; swept from leaves *Prunus amygdali*, H.Bolu **(New record).**

Podagron bouceki DELVARE

S t u d i e d m a t e r i a l s : 1 Female, Yenice, Yayladağ, Hatay, 25.vi.2001, Ootheca of *Mantis* sp., M. Doğanlar 1 Female, Tokat, 24.vi.1989, H.Çam **(New record).**

Podagrionella GIRAULT 1913

Podagrionella GIRAULT, 1913: 96. Type species: *Podagrionella bella* Girault, by monotypy.
Podagrionella eremiaphilae DOĞANLAR & DOĞANLAR: (DOĞANLAR & DOĞANLAR 2009).
Podagrionella konyaensis DOĞANLAR & DOĞANLAR: (DOĞANLAR & DOĞANLAR 2009).

M i c r o d o n t o m e r i n i

Microdontomerus CRAWFORD, 1907

CRAWFORD,1907: 179. Type species: *Torymus anthonomi* CRAWFORD, by monotypy.
Microdontomerus annulatus (SPINOLA): (BOUCEK 1952; DOĞANLAR 1984 as *Paraholaspis* cothurnata Masi).
There are some more species from Turkey. They will be revised in the near future.

Idiomacromerus CRAWFORD, 1914

Idiomacromerus CRAWFORD 1914: 124. Type species: *Idiomacromerus bimaculipennis* CRAWFORD, by monotypy, USNM, United States of America-Utah.
The species of *Idiomacromerus* CRAWFORD from Turkey were revised by M. Doğanlar (in press, Munis Entomology & Zoology 2016).

Idarnotorymus MASI, 1916

Idarnotorymus MASI, 1916: 59. Type species: *Idarnotorymus pulcher* MASI, by monotypy.
Idarnotorymus burdurensis DOĞANLAR & DOĞANLAR: (DOĞANLAR & DOĞANLAR 2008).

Adontomerus NIKOL'SKAYA, 1955

Adontomerus NIKOL'SKAYA, 1955: 339. Type species: *Adontomerus eriogasteris* NIKOL'SKAYA by monotypy.
Adontomerus amygdali (BOUCEK, 1958): (DOĞANLAR et al. 2006).
Adontomerus impolitus (ASKEW & NIEVES ALDREY): (ASKEW et al.2004; ASKEW et al. 2006).

Incertae Sedis (GRISSELL 1995)

Exopristus RUSCHKA 1923

Exopristus RUSCHKA, 1923: 400. Type species: *Cryptopristus trigonomerus* MASI, by monotypy.
RUSCHKA F. 1923, Die europäischen Arten der mit *Monodontomerus* WESTW. verwandten Gattungen. (Chalcidienstudien IV. Teil.) Zeitschrift für Angewandte Entomologie **9**: 400.

Exopristus trigonomerus (MASI)

(ÖNCÜER 1991)

S t u d i e d m a t e r i a l s : 1 female, Kömürçukuru, Belen, Hatay, August, 1998, reared from stem galls of Gymnetron asellus ex. Verbascum; 3 females, 1 Male, Sivrice, Elazığ, 24. ii.-01.iii. 2004, ex. Coenorhinus aequatus (L.), H. Bolu; 2 Males, Tokat,27.iv.1989, pasture, H.Çam; 2 Males, 29.vi. 1986, H.Çam; 1 female, 19.vi.-17.vii.1989, H.Çam; 1 female, Taşlıciftlik, Tokat, 02.viii. 1989; pasture, H. Çam; 1 female, Tokat, 10.viii.1989, Swept

from Centauria sp., H.Çam; 2 females, 1 Male, Tokat, 14.viii.1989, swept from Altea pallida, H.Çam; 1 female, 2 Males, Çiftlik, Çukurova Univ., 12.viii.2001, swept from Chickpea(Nohut) field, Ş. Tarla.

Exopristoides BOUCEK, 1982

Exopristoides BOUCEK, 1982: 184-186. Type species: *Exopristoides dentatus* BOUCEK,, original designation and monotypy.

Exopristoides dentatus BOUCEK, 1982

(BOUCEK 1982; ZEROVA et al. 2004).

Studied materials: 1 female, from Gölbaşı to Adıyaman Araban road connection, 02.v. 2008, swept from lent field; 5 Males, Tokat, 21.-27. iv. 1989, H.Çam; 1 Male, 05.v. 1989, H.Çam.

Glyphomerus FÖRSTER, 1856

Glyphomerus FÖRSTER, 1856: 43. Type species: *Ichneumon stigma* FABRICIUS, original designation.

Glyphomerus stigma (FABRICIUS)

(DOĞANLAR 1984; ÖNCÜER 1991; GRISSELL 1995; BAYRAM et al.1998; GENCER 2003; POPESCU et al. 2002; POPESCU 2006; DANESHVAR et al. 2009).

Studied materials: 2 Females, Hatay: Turfanda, Altınözü, 18.iii. 2008, Rosa gall; 1 Male, Hacıpaşa, 25.vi. 1998; many Female and Males, Kızıliniş, Tokat, 01-12.v. 1989, reared from galls of *Diblolepis rosae*, H.Çam.

Glyphomerus tibialis FÖRSTER: (ASKEW et al. 2006).

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