

Taxonomic notes on the *Oomyzus sempronius* species group (Hymenoptera: Eulophidae, Tetrastichinae), with descriptions of new species

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Abstract. Two new species, *Oomyzus hemerobii* sp. nov. and *O. rujumensis* sp. nov. from Yemen, both belonging to the *sempronius* group of the genus *Oomyzus* Rondani, 1870, are described. The diagnostic characters of this species group that are used for taxonomic purposes are illustrated in 18 figures and the relationships of this species group with that of other groups are discussed. A key to species of the *sempronius* group is provided and new geographical records cited.

Taxonomy, new species, key, Hymenoptera, Eulophidae, *Oomyzus, sempronius* species group, Palaearctic and Afrotropical regions

INTRODUCTION

The genus *Oomyzus* was described by Rondani in 1870. Species of this genus are larval and pupal parasitoids of Coleoptera (families Curculionidae and Coccinellidae), occasionally of Neuroptera, Diptera and Lepidoptera (Graham 1991). Genus *Oomyzus* includes 20 species worldwide (Noyes 2009). In the Afrotropical region, *Oomyzus sokolowskii* (Kurdjumov, 1912) (Burks 1979, Domenichini 1966, Fry 1989, Graham 1991, Harten 1991, Kfir 1997, La Salle 1993) and *Oomyzus sempronius* (Erdős, 1954) are described from Yemen (Yefremova & Yegorenkova 2009). Five species are known from the Oriental region (Khan & Shafee 1981, Husain & Khan 1986, Graham 1991, Kamiyo 2000, Narendran et al. 2001), sixteen from the Palaearctic region (Graham 1991, Hedqvist 2003, Kostjukov 1978, Sheng & Zhu 1998), three from Australasian region (Bouček 1988, Meiners & Hilker 2000) and four from the Nearctic region (Peck 1963, La Salle 1994). Two species, *Oomyzus incertus* (Ratzeburg, 1844) and *O. gallerucae* (Fonscolombe, 1832), were introduced into USA.

The Palaearctic species are keyed out by Graham (1991). This genus is quite distinctive in having the following characters: mid lobe of mesoscutum lacks a median line, with 1 row of 2–5 adnotaular setae on each side; submedian lines on scutellum weak or absent; propodeum medially longer than dorsellum; SMV with 1 seta; gaster ovate, shorter than thorax; body black or brown with a metallic tint. Graham (1991) established three species-groups within the genus *Oomyzus*: the *sempronius*-group, the *incertus*-group and the *gallerucae*-group. In the *sempronius*-group he includes only one species, *Oomyzus sempronius*, but mentions several species from Asia and Africa, which were examined by him and could be also be included in this group. The species from Yemen, newly described in this paper, belong to the *sempronius*-group.

ABBREVIATIONS

DEPOSITORY. ZISP – Zoological Institution of Russian Academy of Sciences, St. Petersburg, Russia.

Morphology and terminology follows that of Askew & Bouček (1968), Gibson (1997) and Graham (1991). F1, F2 and F3 (first, second and third funicle segments); SMV, MV, PMV, and SV (maximum length of submarginal, marginal, postmarginal and stigmal vein), POL (the minimum distance between posterior ocelli); OOL (the minimum distance between the margin of each eye and the adjacent posterior ocellus); OD (ocellar diameter). Absolute measurements are given in millimetres.

TAXONOMY

Females of *Oomyzus sempronius* (*sempronius*-group) differ from those of the *incertus*-group and *gallerucae*-group by following characters: propodeal spiracle with strong paraspiracular carina (propodeal spiracle lacks a distinct paraspiracular carina in the *incertus*-group and *gallerucae*-group), callus with 4–10 setae (callus with 2–3 setae in the *incertus*-group and *gallerucae*-group), thorax 1.55–1.70 times as long as broad (thorax 1.35–1.50 times as long as broad in the *incertus*-group and 1.20–1.25 times in the *gallerucae*-group), gaster slightly shorter than thorax (gaster longer than thorax in the *incertus*-group and *gallerucae*-group), POL 2.3–2.6 OOL, OOL 1.0–1.1 OD (POL 1.5–1.65 OOL, OOL 2.3–2.5 OD in the *incertus*-group and POL 2.0 OOL, OOL 1.5 OD in the *gallerucae*-group).

Males of the *sempronius*-group have a ventral plaque that is 0.60–0.72 length of scape. The lengths of the plaque vary from 0.6 to 0.85 in the *incertus*-group and from 0.18 to 0.75 in the *gallerucae*-group.

Key to species of the *Oomyzus sempronius* species group (females)

- 1 Propodeum 1.5–2.0 times as long as dorsellum, POL 2.25–2.60 OOL, speculum large. 2
- Propodeum 3.0 times as long as dorsellum, propodeum with small round spiracles, callus with 5 setae, POL 1.9 OOL, F1 2.5 times as long as broad, speculum small and closed below. *O. rujumensis* sp. nov.
- 2 F1 1.7–2.0 times as long as broad, POL 2.3–2.6 OOL, speculum open below and extends along 1/3 MV, spiracle sub-circular, callus with 4–8 setae. *O. sempronius* (Erdős)
- F1 1.25 times as long as broad, POL 2.25 OOL, speculum relatively large, closed below and extends along MV, spiracle rounded, callus with 10 setae. *O. hemerobii* sp. nov.

Oomyzus sempronius (Erdős, 1954) (Figs 1–5)

Tetrastichus sempronius Erdős, 1954: 361.

Aprostocetus sempronius (Erdős, 1954): Graham 1961: 40.

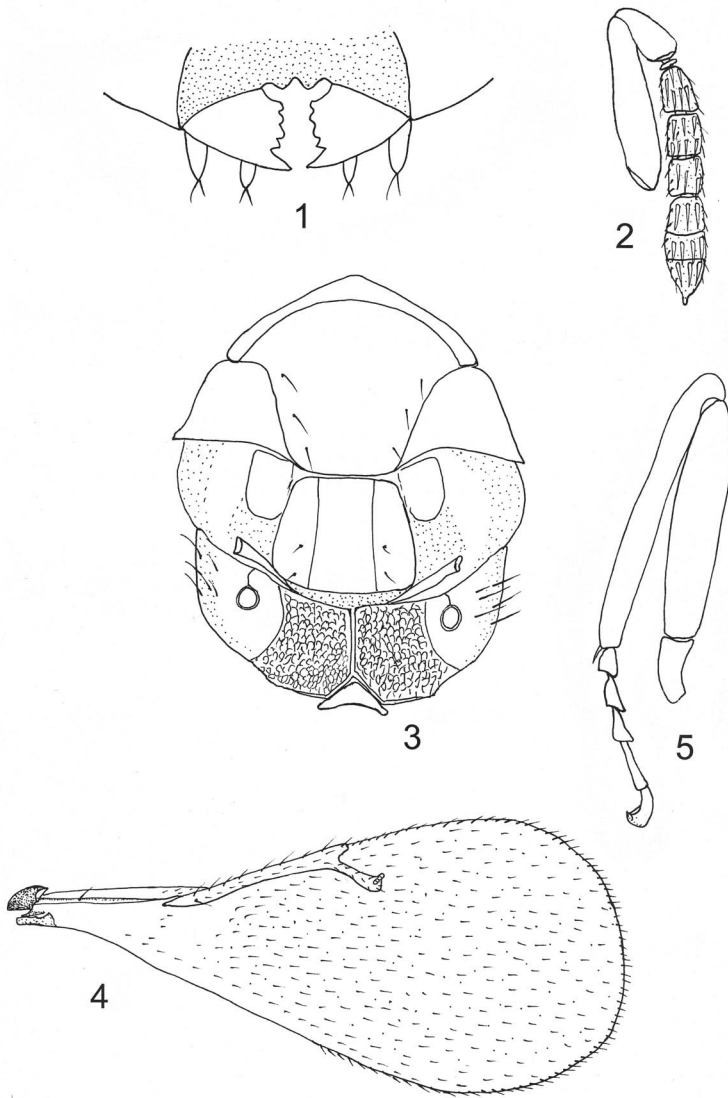
Oomyzus sempronius (Erdős, 1954): Graham 1991: 195.

TYPE MATERIAL. Lectotype (HNHN) Hungary, designated by Thuroczy (1992) (Noyes 2009).

MATERIAL EXAMINED. **Moldova:** 16 ♀♀, Kishenev, ex. cocoon of *Chrysopa* sp. on *Cydonia* sp. 19.iv.1962 (lgt. Bouček) (ZISP). **Yemen:** 1 ♀, Sana'a, light trap, vi.1999 (lgt. A. van Harten); 1 ♀, Sana'a, light trap, v.1999 (lgt. A. van Harten). **Russia:** 18 ♀♀, 2 ♂♂, Tushna, 32 km SE from Ul'yanovsk, 54°7'N, 48°40'E, 19.vii.2003 (lgt. Yegorenkova); 1 ♀, 7 ♂♂, Zhedyayevka, 72 km NE from Ul'yanovsk, 54°44'N, 49°15'E, 24.vii.2004 (lgt. Yegorenkova); 12 ♀♀, Silikatniy, 35 km S from Ul'yanovsk, 53°45'N, 48°04'E, 22.vi.2004 (lgt. Yegorenkova); 24 ♀♀, 1 ♂, Shikovka, 200 km S from Ul'yanovsk, 52°22'N, 47°28'E, 29.vi.2004 (lgt. Yegorenkova); 6 ♀♀, 1 ♂, Ul'yanovsk prov., Chernaya rechka, 16 km E of Dimitrovgrad, endoparasitoid of *Anisochrysa* sp. 28.v.2002 (lgt. A. Rochletsova); 25 ♀♀, Stariy Mostyak, 179 km S from Ul'yanovsk, 52°20'N, 47°28'E, 28.vi.2004 (lgt. Yegorenkova).

DIAGNOSIS. Female: POL 2.3–2.6 OOL; clypeus bidentate (Fig. 1), malar sulcus straight; antenna with scape not reaching median ocellus. F1 1.7–2.0 times as long as broad (Fig. 2). Thorax

1.30–1.65 times as long as broad; mid lobe of mesoscutum with 3–4 adnotaular setae on each side (Fig. 3); propodeum distinctly (up to 1.5 times) longer than dorsellum, with strong, slightly raised reticulation between lateral plicae (Fig. 3); propodeal callus with 4–8 setae; forewing with large speculum, extending along 1/3 MV (Fig. 4), apical marginal cilia very short; gaster 1.6 times as



Figs 1–5. *Oomyzus semproniusi* (Erdős), female. 1 – clypeus and mandibles; 2 – left antenna; 3 – thorax; 4 – right forewing; 5 – mid leg.

long as broad. Male: antenna with ventral plaque 0.6 length of scape; pedicel plus funicle slightly longer than mesoscutum; clava not broader than F4, and 2.5 times as long as broad; first tarsal segment of mid leg shorter than second (Fig. 5), gaster shorter and slightly narrower than thorax.

HOSTS. Larval-pupal parasitoid of *Chilocorus bipustulatus* (Linnaeus, 1758) (Coccinellidae, Coleoptera) (Domenichini 1964, Graham 1991), *Chrysopa carnea* (Stephens, 1836), *Chrysopa flavifrons* (Brauer, 1851), *Chrysopa ventralis* (Curtis, 1834) (Chrysopidae, Neuroptera) (Domenichini 1964, Graham 1991, Herting 1975); *Anisochrysa* sp. (Chrysopidae, Neuroptera) – new host record.

DISTRIBUTION. Palaearctic (Bouček 1966, Domenichini 1966, Graham 1991). Russia: Stavropol Kray, Kuban (Kostjukov et al. 2004), Middle Volga region (Yefremova & Yegorenkova 2005, Yegorenkova et al. 2007). New record for Yemen.

***Oomyzus hemerobii* sp. nov.**
(Figs 6–13)

TYPE MATERIAL. **Holotype:** ♀, Yemen, Sana'a, reared from pupa of Hemerobiidae, 16.vi.2000 (lgt. A. van Harten) (ZISP). **Paratypes:** 9 ♀♀, 2 ♂♂, same data as holotype (ZISP).

DIAGNOSIS. Female. Antenna: length F1, F2 and F3 equally long; F1 1.25 times as long as broad, malar sulcus slightly curved; propodeum 1.6 times as long as dorsellum; callus with 10 long setae, spiracle large. Male. Antenna: length F1 equal to F3, F2 1.27 times as long as F1. Gaster about 1.72 times as long as broad, and much shorter than thorax.

DESCRIPTION. Female (Figs 6, 7, 10–13). Body length 1.35 mm, length of the forewing 1.25 mm. Head height: breadth: length (16:18:8). POL 2.25 OOL. Face smooth. Eye: length and breadth (8:8), lacks setae. Malar sulcus 1.25 times as long as length of eye, slightly curved. Toruli placed below level of the lower margin of eyes. Scrobes slightly depressed and connecting 0.75 distance from median ocellus. Antenna (Fig. 6), relative measurements (length and breadth): scape (7:2), pedicel (3:2) and one discoid anellus and funicle. F1 (2.0:1.6), F2 (2.0:1.7), F3 (2.0:1.9), clava 3-segmented (6.1:3.0) with apical sensilla (0.1).

Mesosoma (Fig. 10) 1.4 times as long as broad. Pronotum (3.2:16.0). Mesoscutum (10:4) alutaceous, with distinct median line and with one row of 4 long white pairs of adnotaular setae. Scutellum (9.0:11.5) alutaceous, with submedian and sublateral lines, with 2 pairs of setae; submedian lines closer to each other than to the sublateral line. First pair of setae situated in middle of scutellum. Dorsellum (3.0:11.3). Propodeum (4.8:12.2) reticulate between plicae, with complete simple median carina, spiracle round and large (0.8–1.0) with paraspiracular carina, callus also reticulate with areola smaller than on propodeum, with 10 long setae; forewings (Fig. 7) (51:22), 2.32 times as long as broad, speculum relatively large and extending along MV, SMV with 1 seta, MV with 10 setae. Relative measurements of SMV: MV: SV = 10: 15: 4. Cilia 1.4. Basitarsus of fore tarsus not shorter than second (Fig. 11) and mid and hind tarsi 1.66 times shorter than second (Fig. 12, 13). Hind tibial spur as long as basitarsus.

Metasoma. Gaster (25:12) (Fig. 10), 2.08 times as long as broad. Seventh tergite, 2.7 times as long as broad. Ovipositor occupies 0.45 length of gaster, sheaths slightly extended.

Colour. Head, thorax and gaster dark brown. Eyes grey. Ocelli white. Antenna yellow, and pedicel and scape brown dorsally. Venation yellow. Forewing hyaline. Tegulae pale yellow. Coxae, femora of legs and last tarsal segments dark brown, tibia of fore-, mid- and hind legs and 1–3 segments of each tarsus yellow.

DESCRIPTION. Male (Figs 8, 9). Body length 0.95 mm, length of the forewing 0.75 mm. Male almost identical to female in colour but differs in structure of antennae and fore wings. Head height 12, head breadth 12, length 5. Antenna (Fig. 8), relative measurements (length and breadth): scape

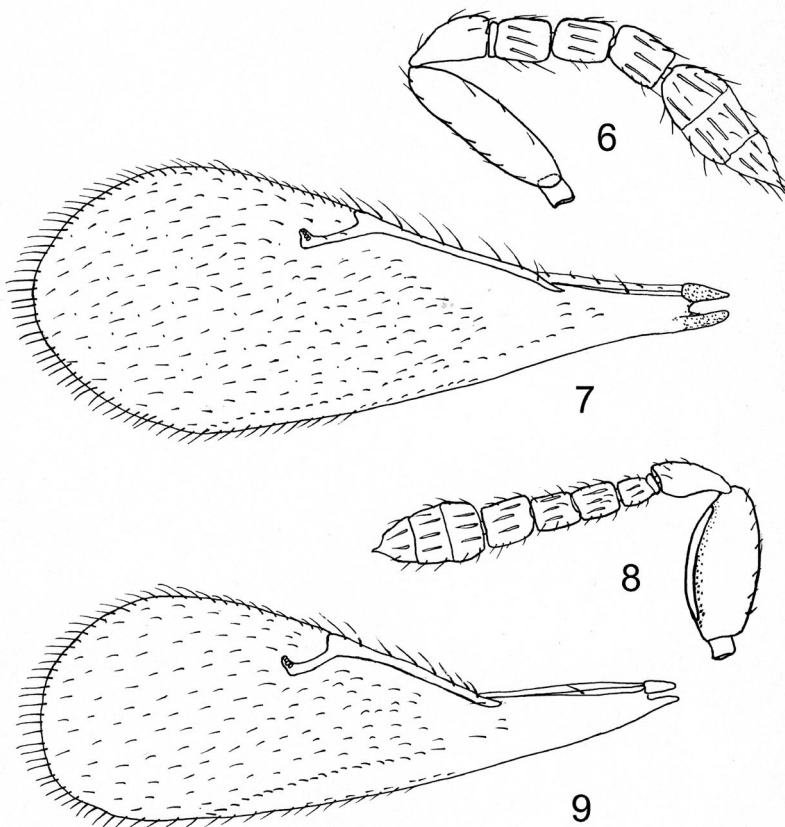
(5.9:2.2) with ventral plaque (0.72 length of scape), pedicel (2.0:1.5), one anellus and funicle with F1 (1.1:1.0), F2 (1.4:1.0), F3 (1.3:1.1), F4 (1.5:1.3) and 3-segmented clava (4.0:2.1). Pedicel plus funicle 1.4 times as long as breadth of mesoscutum. Forewing (Fig. 9) (41:18), 2.28 times as long as broad. Speculum smaller and narrower than in female. SMV:MV:SV = 7.4:13:3.4. Gaster (19:11), 1.72 times as long as broad, much shorter than thorax.

VARIATION. Size of female varies from 1.1 to 1.4 mm; colour of tegulae and tarsi from yellow to pale brown. Callus of propodeum with 8–10 setae.

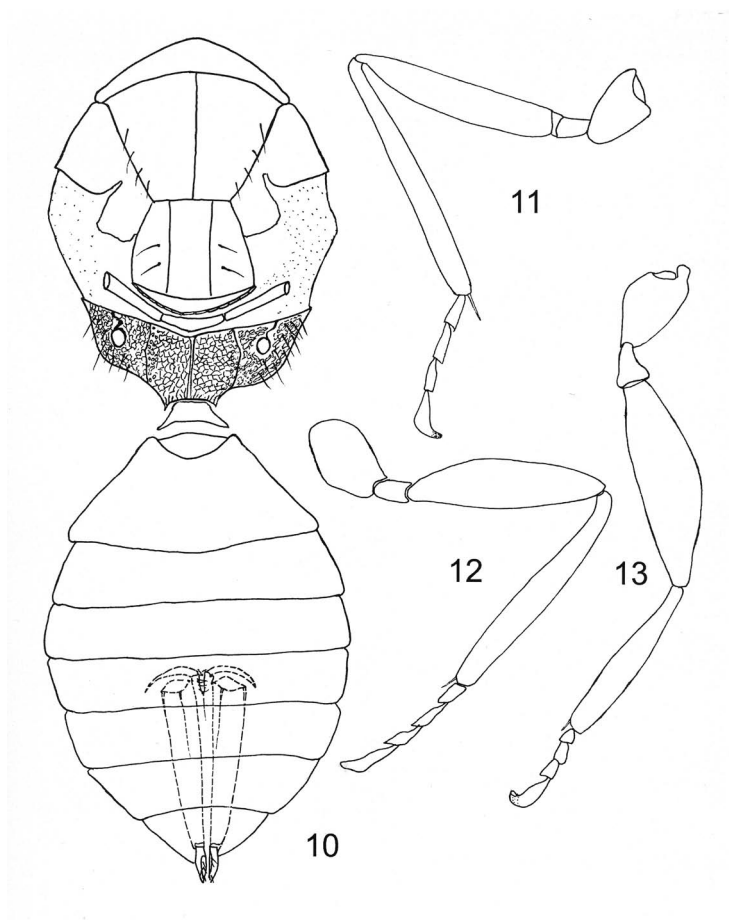
DISTRIBUTION. Yemen.

HOSTS. Undetermined species of the family Hemerobiidae.

COMMENTS. This new species belongs to the *sempronius*-group, but differs from females of *Oomyzus sempronius* Erdős in the following characters: median line distinct and complete (median line on posterior half of mesoscutum in *O. sempronius* absent); spiracle round (subcircular in *O. sempronius*); speculum open (closed below in *O. sempronius*); F1 1.25 times as long as broad (2.0 times as long as broad in *O. sempronius*); scape 0.62 length of eye (0.85 length of eye



Figs 6–9. *Oomyzus hemerobii* sp. nov. (paratype). 6 – left antenna, female; 7 – left forewing, female; 8 – right antenna, male; 9 – left forewing, male.



Figs 10–13. *Oomyzus hemerobii* sp. nov. (paratype), female. 10 – body; 11 – fore leg; 12 – mid leg; 13 – hind leg.

in *O. sempronius*); and from males in ventral plaque 0.72 length of scape (0.6 length of scape in *O. sempronius*); antenna without whorled setae (with whorled setae in *O. sempronius*).

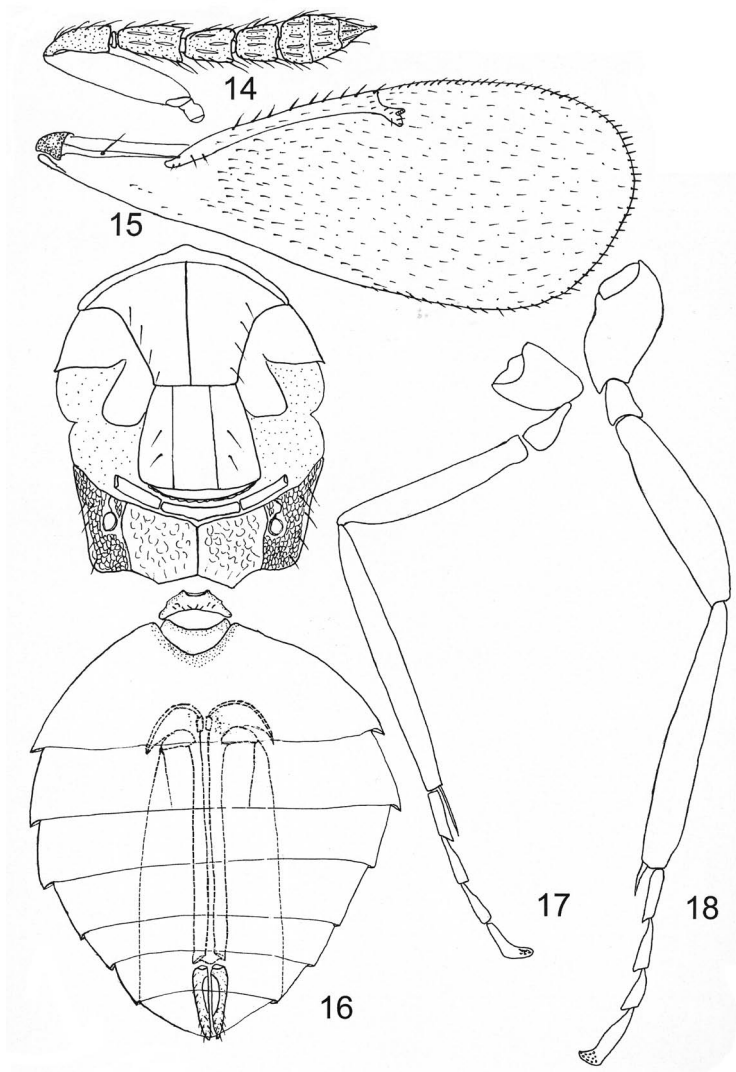
ETYMOLOGY. The species epithet refers to the host (Hemerobiidae) from which the holotype and paratypes were reared.

***Oomyzus rujumensis* sp. nov.**
(Figs 14–18)

TYPE MATERIAL. **Holotype:** ♀, Yemen, al Rujum, in Malaise-trap, 16.x.2000/15.i.2001 (lgt. A. van Harten & A. M. Haget) (ZISP). **Paratypes:** 5 ♀, same data as in the holotype (ZISP).

DIAGNOSIS. Female. POL 1.9 OOL; malar sulcus straight; propodeum 3 times as long as dorsellum with small round spiracles; callus with 5 setae; speculum of forewing small, closed below.

DESCRIPTION. Female. Body length 1.5 mm, fore wing 1.5 mm. Head height: breadth: length (20: 22: 10). POL 1.9 OOL. Face finely granulate. Distance between eyes 13. Eye length and breadth



Figs 14–18. *Oomyzus rujumensis* sp. nov. (paratype), female. 14 – left antenna; 15 – right forewing; 16 – body; 17 – mid leg; 18 – hind leg.

(9:11), lack setae. Malar sulcus 1.38 times as long as length of eye, slightly curved. Toruli placed at level of the lower margin of eyes. Antenna (Fig. 14) (length and breadth): scape (10.2:3.0), pedicel (4.8:2.0) and one discoid anellus, and funicle, F1 (4:2), F2 (3.1:2.3), F3 (3.0:2.8) and clava 3-segmented (7.0:3.2) with apical sensilla 0.1.

Mesosoma (Fig. 16) 1.4 times as long as broad. Pronotum (2:18) short. Mesoscutum (10.5:13.5) alutaceous, with distinct median line and with one row of 4 long dark pairs of adnotaular setae. Scutellum (9x10) alutaceous, with submedian and sublateral lines; median lines closer to lateral lines than to each other; with 2 pairs setae, one pair on middle of scutellum and second pair on lower part. Dorsellum (2.2:12.0). Propodeum (6.5:17.0) rather dull, reticulate, with complete simple median carina. Spiracle small, round close to anterior margin of propodeum with paraspiracular carina. Callus strongly reticulated, with 5 long pale setae. Forewings (Fig. 15) (45:19), 2.37 times as long as broad. Speculum small and closed below. SMV with 1 seta. Relative measurements: SMV:MV:SV = 13:22:4. MV 1.7 times as long as SMV. PMV absent. Apical marginal cilia very short. Apical margin of hind wing rounded. Basitarsus of mid tarsi 1.5 times as long as second segment, and basitarsus of hind tarsi 1.25 times as long as second segment (Figs 17, 18).

Metasoma. Gaster (23:19), 1.21 times as long as broad. Seventh tergite 2.8 times as long as broad. Ovipositor 0.8 length of gaster, sheaths not extended.

Colour. Head, thorax, gaster brown with bluish tint. Eyes scarlet. Ocelli white. Antennal scape yellow, pedicel and funicle dark brown. Venation dark yellow. Forewing slightly infumate. Tegulae pale brown. Legs mostly dark yellow, coxae brownish, fore and hind femora and 4 segments of tarsi brown.

Male. Unknown.

DISTRIBUTION. Yemen.

HOST. Unknown.

COMMENTS. This new species is similar to *O. hemerobii* but the females differ in the following characters: F1 2.0 times as long as broad (1.25 times in *O. hemerobii*); F1 1.05 times as long as pedicel (1.50 times shorter than pedicel in *O. hemerobii*); toruli placed at level of the lower margin of eyes (below level of the lower margin of eyes in *O. hemerobii*); propodeum with small round spiracles (large round spiracles in *O. hemerobii*); speculum very small and closed below (speculum relatively large and extending along MV in *O. hemerobii*).

ETYMOLOGY. The species epithet refers to the place (al Rujum – *rujumensis*) where the holotype and paratypes were collected.

DISCUSSION

Oomyzus hemerobii sp. nov. and *O. rujumensis* sp. nov. are considered to be two new species within the *sempronius* group. They characteristically have a reticulate propodeum that is 1.5 times as long as the dorsellum; a paraspiracular carina, callus with 4–10 setae and forewing with a rather large speculum. Both species are characterized mainly by the long, relatively strongly reticulated propodeum with a distinct paraspiracular carina. Gaster is short and remains convex dorsally after drying. Basitarsus of mid- and hind tarsi slightly shorter than second tarsal segment. Forewing tends to be rather sparsely pilose.

Additional characters: clypeus bidentate, propodeum 1.5–2.0 times as long as dorsellum; callus with 4–10 long setae; fore wing speculum relatively large, extends along MV and sometimes reaches SV; male antenna with ventral plaque 0.60–0.72 length of scape, F4 not or only slightly longer than broad; clava hardly longer than F3 plus F4; gaster oval, much shorter than thorax.

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