Egg parasitoids of *Megamelus* spp. (Hemiptera: Delphacidae) in Argentina

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Parasitoides oófagos de *Megamelus* spp. (Hemiptera: Delphacidae) en la Argentina

■ **RESUMEN.** Se revisaron los parasitoides oófagos (Hymenoptera: Eulophidae, Mymaridae, y Platygastridae) de *Megamelus* spp. (Hemiptera: Delphacidae) de la Argentina, y se presenta una clave para su identificación. Se describen cuatro especies nuevas: *Anagrus* (*Anagrus*) *empanadus* Triapitsyn, sp. nov. (Mymaridae, parasitoide de *M. scutellaris* Berg que se alimenta de camalote, *Eichhornia crassipes* (Martius) Solms-Laubach; *Aprostocetus* (*Ootetrastichus*) *riverplaticus* Triapitsyn, sp. nov. (Eulophidae: Tetrastichinae, parasitoide de *M. bellicus* Marino de Remes Lenicov & Sosa); *A.* (*Ootetrastichus*) *yerbamatei* Triapitsyn, sp. nov. (parasitoide de *M. bellicus*, *M. scutellaris* y *Megamelus* sp.), todos de la provincia de Buenos Aires (*A.* (*Ootetrastichus*) *yerbamatei* también se encuentra en Formosa); y *Parascelio sabcli* Triapitsyn, sp. nov. (Platygastridae: Scelioninae, parasitoide de *M. scutellaris* en Formosa, la asociación con el huésped es tentativa). Se incluyen otros parasitoides oófagos conocidos de *Megamelus* spp. en la Argentina, tales como *Kalopolynema* (*Kalopolynema*) *poema* Triapitsyn & Berezovskiy (Mymaridae, parasitoide de *M. scutellaris* en Buenos Aires) y también *Cremastobaeus atratus* Loiácono & Mulvani (Platygastridae: Scelioninae, parasitoide de *M. scutellaris* en Formosa, la asociación con el huésped es tentativa).

PALABRAS CLAVE. Delphacidae. *Megamelus*. Eulophidae. Mymaridae. Platygastridae.

■ **ABSTRACT.** Egg parasitoids (Hymenoptera: Eulophidae, Mymaridae, and Platygastridae) of *Megamelus* spp. (Hemiptera: Delphacidae) in Argentina are reviewed and keyed. Four new species are described: *Anagrus* (*Anagrus*) *empanadus* Triapitsyn, sp. nov. (Mymaridae, parasitoid of *M. scutellaris* Berg feeding on water hyacinth, *Eichhornia crassipes* (Martius) Solms-Laubach, *Aprostocetus* (*Ootetrastichus*) *riverplaticus* Triapitsyn, sp. nov. (Eulophidae: Tetrastichinae, parasitoid of *M. bellicus* Marino de Remes Lenicov & Sosa), *A.* (*Ootetrastichus*) *yerbamatei* Triapitsyn, sp. nov. (parasitoid of *M. bellicus*, *M. scutellaris* and *Megamelus* sp.), all from Buenos Aires Province (*A.* (*Ootetrastichus*) *yerbamatei* also occurs in Formosa Province), and *Parascelio sabcli* Triapitsyn, sp. nov. (Platygastridae: Scelioninae, parasitoid

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of *M. scutellaris* in Formosa, the host association is tentative). Other known egg parasitoids of *Megamelus* spp. in Argentina include *Kalopolynema* (*Kalopolynema*) *poema* Triapitsyn & Berezovskiy (Mymaridae, parasitoid of *M. scutellaris* in Buenos Aires), and also *Cremastobaeus atratus* Loiácono & Mulvani (Platygastridae: Scelioninae, parasitoid of *M. scutellaris* in Formosa, the host association is tentative).

KEY WORDS. Delphacidae. *Megamelus*. Eulophidae. Mymaridae. Platygastridae.

INTRODUCTION

Five species of the planthopper genus *Megamelus* Fieber (Hemiptera: Delphacidae) are known from South America, these were recently reviewed by Sosa *et al.* (2007b). They are frequently associated with aquatic plants, particularly the Pontederiaceae. *Megamelus scutellaris* Berg is considered a candidate for biocontrol of water hyacinth, *Eichhornia crassipes* (Martius) Solms-Laubach, an invasive aquatic weed that clogs waterways, lakes, and channels in several countries beyond its native range (Sosa *et al.*, 2004, 2005, 2007a, 2007b).

There are few records of egg parasitoids of *Megamelus* spp. in South America: *Kalopolynema* (*Kalopolynema*) *poema* Triapitsyn & Berezovskiy (Mymaridae) was reported from eggs of *M. scutellaris* on water hyacinth (Triapitsyn & Berezovskiy, 2002; Sosa *et al.*, 2004, 2005), and *Aprostocetus* (*Ootetrastichus*) sp. from eggs of *M. bellicus* Marino de Remes Lenicov & Sosa (Mariani *et al.*, 2007; Sosa *et al.*, 2007b), both in Buenos Aires Province, Argentina. The latter is described here as *A.* (*Ootetrastichus*) *riverplaticus* Triapitsyn, sp. nov. Extralimital records include *Kalopolynema* (*Kalopolynema*) *ema* (Schauff & Grissell) in Florida (USA) on *M. davisi* Van Duzee (Triapitsyn & Berezovskiy, 2002), and *Anagrus incarnatus* Haliday (Mymaridae) in Wales (UK) on *Megamelus notulus* (Germar) (Whalley, 1956).

Megamelus scutellaris has been recently approved for release in Florida, thus a study of its egg parasitoid fauna in the native range was a necessity. In the course of this study, a number of both internal and internal/external egg parasitoids from three families of Hymenoptera (Eulophidae, Mymaridae, and Platygastridae) were discovered in Argentina, and these are keyed and reviewed herein.

MATERIAL AND METHODS

Most of the specimens were reared from the delphacid (*Megamelus* spp.) eggs, stored in ethanol, then dried using a critical point drier and point-mounted; selected specimens were dissected and slide-mounted in Canada balsam. The collections from Formosa Province were made by incubating (in the laboratory) the petioles of water hyacinth in opaque bottles with a translucent vial in the cap; the emerging parasitoids (if any) were collected daily.

Terms for morphological features follow Gibson (1997); we also use the abbreviation F for an antennal funicle (or flagellar in males of Mymaridae) segment. Unless indicated otherwise, measurements are given in micrometers (µm) as length or, where appropriate (e.g. for the wings), as length: width ratios.

Abbreviations for depositories of specimens are as follows: CNCI, Canadian National Collection of Insects, Ottawa, Ontario, Canada; MLPA, Museo de La Plata, La Plata, Buenos Aires, Argentina; UCRC, Entomology Research Museum, University of California, Riverside, California, USA; USNM, National Museum of Natural History, Washington, DC, USA.

The first author is solely responsible for most of the text; the second and the third authors provided the reared material for this study and contributed to the introduction and description of the collecting methods.

RESULTS

Taxonomy

Key to egg parasitoids of *Megamelus* spp. in Argentina

1. Forewing with venation short, extending at most to about 0.3x length of wing 2
1´. Forewing with venation longer, extending at least to about 0.5x length of wing 3

2. Forewing at least 9.8x as long as wide, with only one, median, row of setae on disc (Fig. 21) ..... *Anagrus* (*Anagrus*) *empanadus* Triapitsyn, sp. nov.
2´. Forewing about 7.3x as long as wide, with disc densely setose beyond venation (Fig. 25) ..... *Kalopolynema* (*Kalopolynema*) *poema* Triapitsyn & Berezovskiy

3. Antenna (excluding 3 or 4 anelli) 7- or 9-segmented; body smooth 4
3´. Antenna 12-segmented (anelli absent, F1 and F2 may be almost fused); body with reticulate sculpture 7

4. Antenna (excluding 4 anelli) 7-segmented, with scape not expanded (female) 5
4´. Antenna (excluding 3 anelli) 9-segmented, with scape notably expanded (male) 6

5. Head mostly brown; midlobe of mesoscutum with 1 pair of setae ..... *Aprostocetus* (*Ootetrastichus*) *riverplaticus* Triapitsyn, sp. nov.
5´. Head mostly yellow and light brown; midlobe of mesoscutum with 2 pairs of setae ..... *Aprostocetus* (*Ootetrastichus*) *yerbamatei* Triapitsyn, sp. nov.

6. Scape about 2.0x as long as wide ..... *Aprostocetus* (*Ootetrastichus*) *riverplaticus* Triapitsyn, sp. nov.
6´ Scape about 2.9x as long as wide ..... *Aprostocetus* (*Ootetrastichus*) *yerbamatei* Triapitsyn, sp. nov.

7. Forewing with postmarginal vein present and longer than stigmal vein (Fig. 28) [female antenna with F1 and F2 almost fused and clava 4-segmented (Fig. 26)]..... *Cremastobaeus atratus* Loiácono & Mulvani
7´. Forewing with postmarginal vein absent (Fig. 32) [female antenna with F1 and F2 not fused and clava 5-segmented (Fig. 30)] .... *Parascelio sabcli* Triapitsyn, sp. nov.

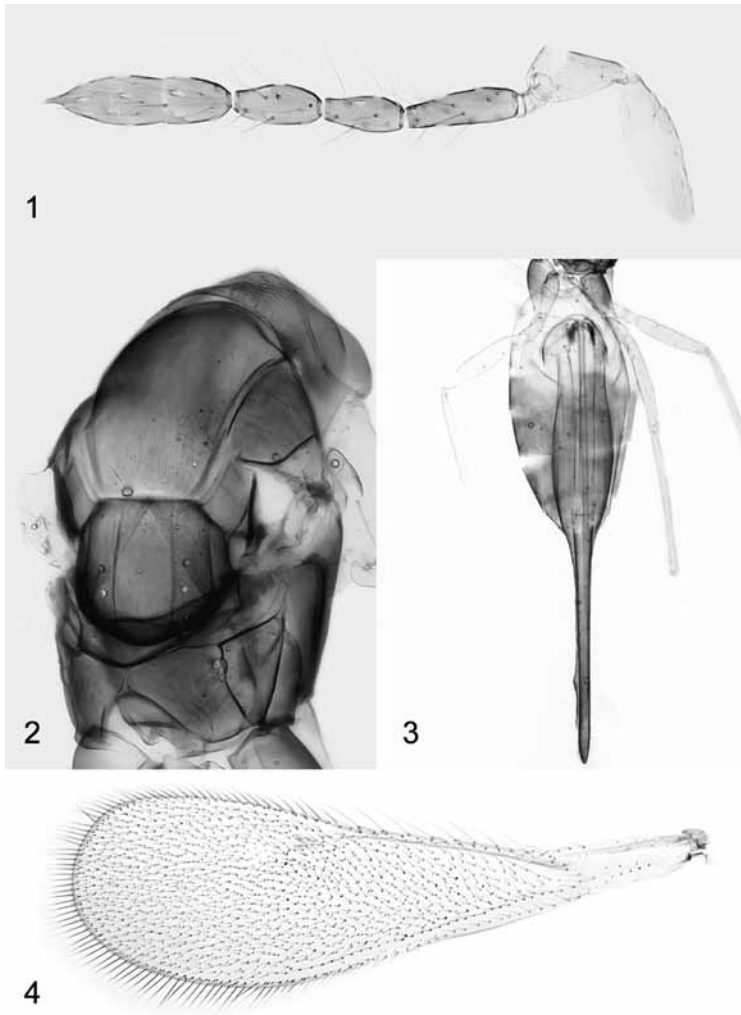
Eulophidae: Tetrastichinae

Aprostocetus* (*Ootetrastichus*) *riverplaticus Triapitsyn, sp. nov.
(Figs 1-7)

Aprostocetus (*Ootetrastichus*) sp.: Mariani *et al.*, 2007: 189-190, 195 (information on the host and egg parasitism); Sosa *et al.*, 2007b: 801, 803 (host information, biology).

Description. Female (holotype and paratypes). Body length 1650-2245 µm (dry-mounted paratypes). Head mostly brown except eyes and ocelli dirty pink; mesonotum greenish with bright metallic sheen, mesopleura mostly shining brown, tegula bright yellow; two basal gastral segments mostly yellow, remainder of gaster brown; scape, sometimes pedicel partially, and anelli yellowish, remainder of antennal segments a little darker (light brown); legs mostly yellow or yellowish brown except metacoxa shining brown and all apical tarsomeres brown.

Antenna (Fig. 1) with scape minus short radicle about 4.6x as long as wide and almost smooth; funicle (excluding 4 anelli, second anellus very short) 3-segmented, F1 the longest funicle segment, slightly longer than pedicel, F2 about as long as F3; clava 2-segmented, apical claval segment with a spicula and about 1.8x length of basal claval segment; funicle and claval segments with long hairs and each with at least 2 hair-like longitudinal sensilla.



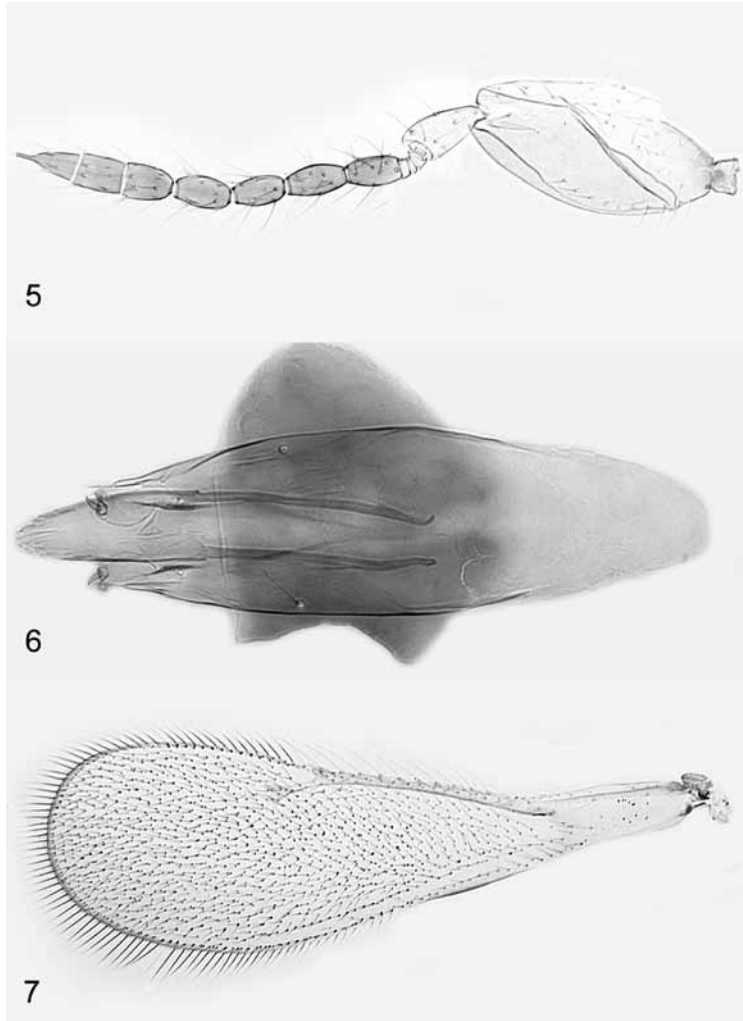
Figs. 1-4. *Aprostocetus* (*Ootetrastichus*) *riverplaticus* sp. nov., female (holotype): 1, antenna; 2, mesosoma; 3, metasoma; 4, forewing.

Mesosoma (Fig. 2) with pronotum entire, with more or less conspicuous sculpture; mesoscutum and scutellum faintly longitudinally striate, midlobe of mesoscutum with 1 pair of setae, scutellum with 2 pairs of setae, scutellar placoid sensilla about in the middle of scutellum. Metanotum and propodeum with inconspicuous sculpture, almost smooth.

Wings. Forewing (Fig. 4) 3.3-3.4x as long as wide; venation extending to about 0.6x length of wing, disc almost hyaline, mostly bare behind base of submarginal vein and densely setose elsewhere; the longest marginal seta 0.23-0.32x greatest width of disc. Hind wing 10.4-10.8x as long as wide; disc hyaline, bare behind base of venation and densely setose elsewhere; the longest marginal seta 1.2-1.4x greatest width of disc.

Metasoma (Fig. 3) with gaster elongate (particularly the apical gastral tergum), notably longer than mesosoma. Ovipositor occupying almost entire length of gaster, a little exserted beyond gastral apex; ovipositor length: metatibia length ratio 2.9-3.1:1.

Measurements (µm) of the holotype. Body: 1906; head: 271; mesosoma: 492; gaster: 1156; ovipositor: 1057. Antenna: scape: 155; pedicel: 74; F1: 79; F2: 67; F3: 67; clava: 157. Forewing: 1236:366; longest marginal seta: 118. Hind wing: 1045:97;



Figs. 5-7. *Aprostocetus* (*Ootetrastichus*) *riverplaticus* sp. nov., male (paratype): 5, antenna; 6, genitalia; 7, forewing.

longest marginal seta: 136.

Male (paratypes). Body length 1024-1321 µm (dry-mounted paratypes). Similar to female except for the normal sexually dimorphic features such as color, antenna, and genitalia, as follows. Head mostly yellow except eyes and ocelli dirty pink and area between posterior ocelli brown; pronotum brown dorsally, rest of metanotum shining brown with greenish metallic tinge; basal gastral segments yellow, apical segments brown; scape yellow to light brown, pedicel and anelli light brown, remainder of antennal segments slightly darker (brownish); legs mostly yellow except all apical tarsomeres brown. Antenna (Fig. 5) with scape about 2.0x as long as wide; funicle (excluding 3 anelli) 4-segmented, F1-F4 more or less subequal in length; clava 3-segmented, apical segment with a spicula; funicle and claval segments with long hairs and each with at least 2 hair-like longitudinal sensilla. Forewing (Fig. 7) about 3.2x as long as wide, the longest marginal seta about 0.27x greatest forewing width; hind wing about 9.4x as long as wide; discs of forewing and hind wing hyaline. Genitalia (Fig. 6) typical for the subgenus, digitus with a spine.

Diagnosis. In addition to the characters mentioned in the keys above and below, female of *A.* (*Ootetrastichus*) *riverplaticus* sp.

nov. differs from that of *A.* (*Ootetrastichus*) *yerbamatei* sp. nov. in having a relatively wider forewing (3.3-3.4x as long as wide) with relatively shorter marginal setae (the longest marginal seta is 0.23-0.32x greatest width of the disc) whereas in *A.* (*Ootetrastichus*) *yerbamatei* the female forewing is 3.6-3.8x as long as wide and the longest marginal seta is 0.4-0.5x greatest width of the disc. The male of (*Ootetrastichus*) *riverplaticus* differs from that of *A.* (*Ootetrastichus*) *yerbamatei* in also having a relatively wider forewing (about 3.2x as long as wide) with relatively shorter marginal setae (the longest marginal seta is about 0.27x greatest width of the disc) whereas in *A.* (*Ootetrastichus*) *yerbamatei* the male forewing is about 4.0x as long as wide and the longest marginal seta is about 0.5x greatest width of the disc.

The females of *A.* (*Ootetrastichus*) *riverplaticus* and *A.* (*Ootetrastichus*) *yerbamatei* differ from that of *A.* (*Ootetrastichus*) *infulatus* (De Santis), the only species of the subgenus *Ootetrastichus* Perkins of the genus *Aprostocetus* Westwood that was previously described from Argentina (De Santis, 1957), in having the antennal flagellum with 4 anelli and a relatively longer ovipositor, as indicated in the key below. In *A.* (*Ootetrastichus*) *infulatus*, flagellum of the female antenna (Fig. 15) has 3 anelli (Luft Albarracin & Triapitsyn, 2007) and the ovipositor (Fig. 16) is notably shorter (the ovipositor length:metatibia length ratio is 1.5:1 in the holotype). The longest marginal seta on the forewing (Fig. 17) of the holotype female of *A.* (*Ootetrastichus*) *infulatus* is 0.27-0.28x maximum forewing width.

The only other two species of the subgenus *A.* (*Ootetrastichus*) registered for the Neotropical region are the little known *A.* (*Ootetrastichus*) *coxalis* (Howard) (Grenada) and *A.* (*Ootetrastichus*) *cupreus* (Ashmead) (Grenada and Saint Vincent and the Grenadines) (Ashmead, 1894; Howard, 1897; De Santis, 1979; LaSalle & Schauff, 1992). Female head and mesosoma are mostly dark brown dorsally with a dark green metallic sheen in *A.* (*Ootetrastichus*) *cupreus*, and its apical gastral tergum is notably less elongate than in *A.* (*Ootetrastichus*) *riverplaticus* or *A.* (*Ootetrastichus*) *yerbamatei*. Because identification of the Neotropical species of *A.* (*Ootetrastichus*) is currently very problematic (prior to this study there were no keys available to separate them), a partial key is provided here (*A.* (*Ootetrastichus*) *coxalis* is excluded because the original description of its holotype, which was not available to us, is poor).

Key to the Neotropical species of *Aprostocetus* (*Ootetrastichus*) (females)

1. Ovipositor length:metatibia length ratio about 1.5:1 ....*A.* (*O.*) *infulatus* (De Santis)
1´. Ovipositor length:metatibia length ratio at least 1.8:1 2

2. Head mostly brown or dark brown with or without dark green metallic sheen 3
2´. Head mostly yellow and light brown ..... *A.* (*O.*) *yerbamatei* Triapitsyn, sp. nov.

3. Gaster with two basal terga mostly yellow .... *A.* (*O.*) *riverplaticus* Triapitsyn, sp. nov.
3´. Gaster with two basal terga brown .... *A.* (*O.*) *cupreus* (Ashmead)

Etymology. The species is named after La Plata River (Río de la Plata, sometimes rendered River Plate in British English) in which basin it occurs.

Host. *Megamelus bellicus* Remes Lenicov & Sosa. Mariani *et al.* (2007) reported a 25.1% egg parasitism of this host in Argentina by *A.* (*Ootetrastichus*) *riverplaticus* [as *Aprostocetus* (*Ootetrastichus*) sp.], which is an internal/external egg parasitoid: the eulophid larvae develop within the host's egg and once emerged, they consume the other eggs in the scar (Sosa *et al.*, 2007b), i.e. acting as egg predators. Its possible ability to attack also eggs of *M. scutellaris* Berg has yet to be demonstrated.

Type material. Holotype female [MLPA] on slide labeled: "ARGENTINA: Buenos

Aires, Hurlingham, USDA-ARS South American Biol. Control Lab., 20.v.2005, A. Sosa & J. Dorado. Egg predator of *Megamelus* sp. (*bellicus* ms name of A. Sosa) colony on *Pontederia cordata*. Mounted at UCR/ERM by V. V. Berezovskiy 2005 in Canada balsam". Paratypes: ARGENTINA, Buenos Aires: Hurlingham, USDA-ARS South American Biological Control Laboratory: 22.i.2003, S. V. Triapitsyn, M. C. Hernández (from eggs of *Megamelus* sp. [later described as *M. bellicus* Remes Lenicov & Sosa (Sosa *et al.*, 2007b)] on water hyacinth) [2 females, 4 males on points, UCRC]; 23.i.2003, M. C. Hernández, S. V. Triapitsyn (yellow pan traps in an artificial pond with water hyacinth infested with colonies of *Megamelus scutellaris* Berg and *Megamelus* sp. (later described as *M. bellicus*) [8 females, 3 males on points, UCRC, 1 male on point, MLPA, and 1 female, 1 male on slides, UCRC]; 20.v.2005, A. J. Sosa, J. Dorado ("egg predator" of *Megamelus* sp. [later described as *M. bellicus*] colony on *Pontederia cordata*) [9 females on cards, CNCI (1), MLPA (2), UCRC (5), USNM (1), 1 male on card, UCRC]. "Summer 2005", A. J. Sosa, J. Dorado ("egg predator" of *Megamelus* sp. [later described as *M. bellicus*]) [3 males on cards, UCRC].

Comments. Although some authors recently regarded *Ootetrastichus* as a valid genus separate from *Aprostocetus* (Kostjukov, 2004; Yegorenkova *et al.*, 2007), we treat all these species in the subgenus *Aprostocetus* (*Ootetrastichus*) to ensure stability in this difficult group, until the status of *Ootetrastichus* is clarified based on a rigorous study of its species worldwide, and its relationships with other subgenera of *Aprostocetus* as well as other genera of Tetrastichinae are better understood.

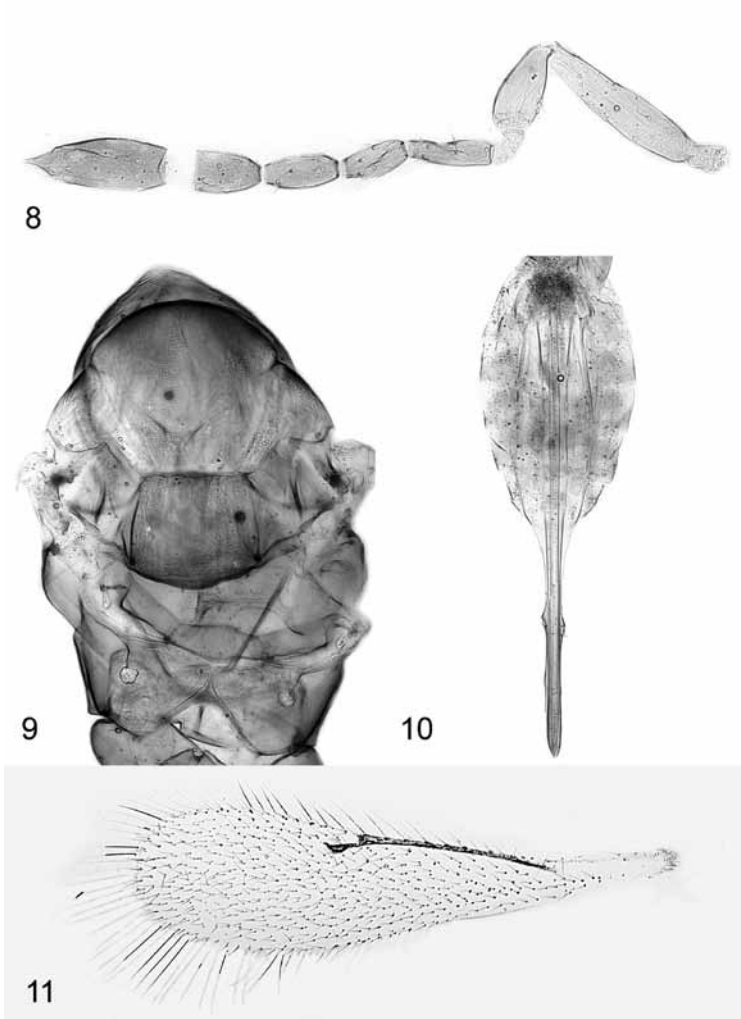
The holotype of *A.* (*Ootetrastichus*) *infulatus* [in MLPA] was examined, it is poorly mounted (the body is fragmented) on slide labeled: 1. "*Ootetrastichus infulatus* Det. De Santis HOLOTIPO 1913/1 MUSEO DE LA PLATA", 2. "PUNTA LARA (Pcia. Buenos Aires") Col: De Santis II/1955 ♀". Female of this species was redescribed, and male newly described, by Luft Albarracin & Triapitsyn (2007), who also indicated *Chlorottetix fraterculus* (Berg), *Dalbulus maidis* (DeLong & Wolcott), *Exitianus obscurinervis* (Stål), *Syncharina punctatissima* (Signoret) (Cicadellidae), and *Peregrinus maidis* (Ashmead) (Delphacidae) as its hosts in Tucumán Province, Argentina.

One female (lacking both antennae) and one male paralectotypes of *A.* (*Ootetrastichus*) *cupreus* [both in USNM] were also examined, they were designated by LaSalle & Schauff (1992) and are labeled as follows: 1. "Sea Level.", 2. "Windward side St. Vincent, W. I. H. H. Smith", 3. "*Tetrastichodes cupreus* Ashm ♀ Type", 4. [red] "Cotype No. 2480 U.S.N.M.", 5. [blue] "Paralectotype *Aprostocetus cupreus* LaSalle + Schauff 1992" (female glued to a short pin inserted in a small card); and 1. "St. Vincent, W. I. H. H. Smith 241", 2. "*Tetrastichodes cupreus* Ash ♂ Type", 3. [red] "Cotype No. 2480 U.S.N.M.", 4. [blue] "Paralectotype *Aprostocetus cupreus* LaSalle + Schauff 1992" (male on a point).

Aprostocetus* (*Ootetrastichus*) *yerbamatei Triapitsyn, sp. nov.
(Figs 8-14)

Description. Female (holotype and paratypes). Body length 1288-1300 µm (dry-mounted paratypes) or 1304-1636 µm (slide-mounted paratype and holotype, respectively). Head mostly yellow and light brown except eyes and ocelli dirty pink; mesosoma and metasoma dorsally mostly brownish (brown to dark brown with some greenish metallic sheen) except two basal gastral terga partially yellowish to light brown, tegula bright yellow; scape and anelli light brown, remainder of antennal segments brown; legs mostly yellowish except metacoxa and all apical tarsomeres darker (brownish).

Antenna (Fig. 8) with scape minus short radicle 4.4-4.6x as long as wide and almost smooth; funicle (excluding 4 anelli, second anellus very short) 3-segmented, F1 the longest funicle segment, a little longer than pedicel and notably longer than F2 or F3; clava 2-segmented, apical claval segment



Figs. 8-11. *Aprostocetus* (*Ootetrastichus*) *yerbamatei* sp. nov., female (holotype): 8, antenna; 9, mesosoma; 10, metasoma; 11, forewing.

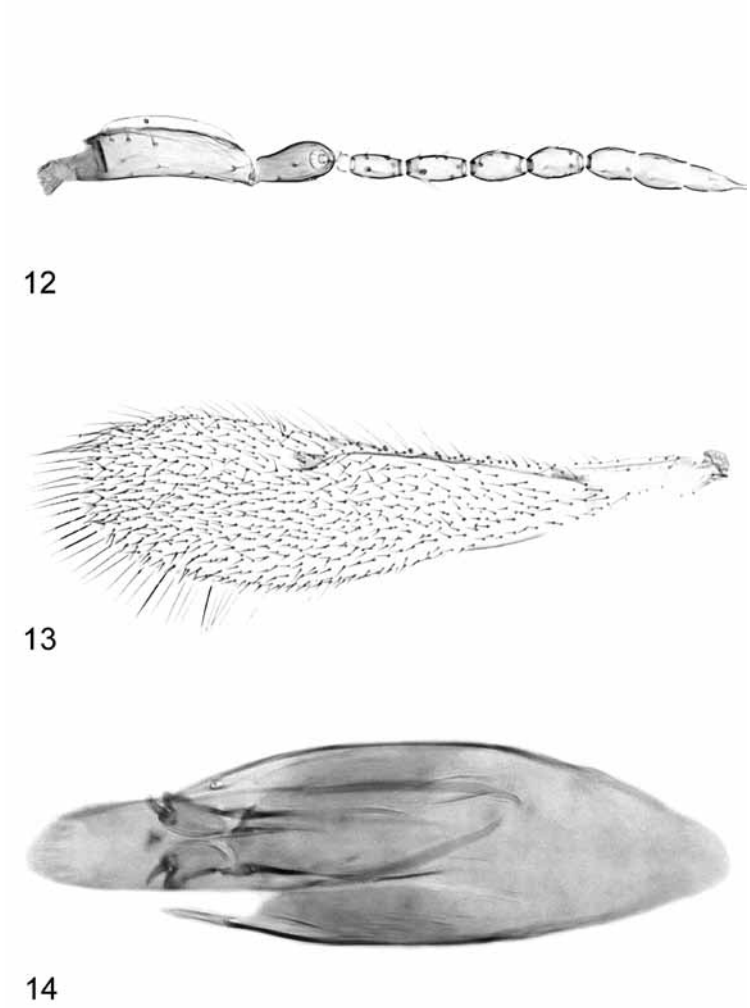
with a spicula and 1.8-2.2x length of basal claval segment; funicle and claval segments with long hairs and each with at least 2 hair-like longitudinal sensilla.

Mesosoma (Fig. 9) with pronotum entire, with more or less conspicuous sculpture; mesoscutum and scutellum faintly longitudinally striate, midlobe of mesoscutum and scutellum each with 2 pairs of setae, scutellar placoid sensilla close to posterior margin of scutellum. Metanotum and propodeum with inconspicuous sculpture, almost smooth.

Wings. Forewing (Fig. 11) 3.6-3.8x as long as wide; venation extending to about 0.6x length of wing, disc almost hyaline, mostly bare behind base of submarginal vein and densely setose elsewhere; the longest marginal seta 0.4-0.5x greatest width of disc. Hind wing 10.7-13.0x as long as wide; disc hyaline, bare behind base of venation and densely setose elsewhere; the longest marginal seta 1.4-1.9x greatest width of disc.

Metasoma (Fig. 10) with gaster elongate (particularly the apical gastral tergum), notably longer than mesosoma. Ovipositor occupying almost entire length of gaster, slightly exserted beyond gastral apex; ovipositor length:metatibia length ratio 2.7-2.9:1.

Measurements (μm) of the holotype.



Figs. 12-14. *Aprostocetus* (*Ootetrastichus*) *yerbamatei* sp. nov., male (paratype): 12, antenna; 13, forewing; 14, genitalia.

Body: 1636; head: 197; mesosoma: 418; gaster: 984; ovipositor: 935. Antenna: scape: 148; pedicel: 70; F1: 77; F2: 58; F3: 57; clava: 151. Forewing: 1113:308; longest marginal seta: 127. Hind wing: 910:85; longest marginal seta: 115.

Male (paratypes). Body length 1023 µm (dry-mounted paratype). Similar to female except for the normal sexually dimorphic features such as color, antenna, and genitalia, as follows. Head yellow except eyes and ocelli dirty pink; mesosoma and metasoma dorsally mostly grayish-dark brown with some metallic sheen except dorsellum a little lighter and two basal gastral terga yellow; scape and anelli pale, remainder of antennal segments slightly darker (light brown); legs mostly yellowish except pro- and mesotibiae apically and all apical tarsomeres darker (brownish). Antenna (Fig. 12) with scape about 2.9x as long as wide; funicle (excluding 3 anelli) 4-segmented, F1, F3 and F4 subequal in length, F2 slightly longer; clava 3-segmented, apical segment with a spicula; funicle and claval segments with long hairs and each with at least 2 hair-like longitudinal sensilla (except only 1 such sensillum on F1). Forewing (Fig. 13) about 4.0x as long as wide, the longest marginal seta about 0.5x greatest forewing width; hind wing about 12.0x as long as wide; discs of forewing and hind wing hyaline. Genitalia

(Fig. 14) typical for the subgenus.

Diagnosis. In addition to the distinguishing characters mentioned in the keys above, also see the diagnosis of *A.* (*Ootetrastichus*) *riverplaticus* sp. nov.

Etymology. The specific name refers to "yerba mate" (*Ilex paraguariensis* A. Saint-Hilaire), from which mate, first author's favorite drink in Argentina, is prepared.

Hosts. *Megamelus bellicus* Marino de Remes Lenicov & Sosa, *M. scutellaris* Berg, and *Megamelus* sp.

Type material. Holotype female [MLPA] on slide labeled: "ARGENTINA: Buenos Aires, Otamendi, 5.vii.2005, A. Sosa and J. Dorado. Egg predator of *Megamelus scutellaris* Berg on water hyacinth, *Eichhornia crassipes*. Mounted at UCR/ERM by V. V. Berezovskiy 2005 in Canada balsam". The type locality is Ingeniero Otamendi. Paratypes: ARGENTINA, Buenos Aires: Ingeniero Otamendi, 5.vii.2005, A. J. Sosa, J. Dorado (from eggs of *M. scutellaris* on water hyacinth) [1 male on card and 1 male on slide, UCRC]. "Summer 2005", A. J. Sosa, J. Dorado ("egg predator" of *Megamelus* sp. [later described as *M. bellicus*]) [3 females on cards, MLPA, UCRC, USNM, and 1 female on slide, UCRC].

Other material examined. ARGENTINA, Formosa: Herradura, "Laguna del Vivero" (an unnamed old meander of Río Paraguay near a nursery), 26°29′27′′S 58°18′17′′W, 61 m: 23.xi.2004, G. J. Cabrera, M. C. Hernández (emerged from petioles of water hyacinth infested with eggs of *Taosa* sp. (Dictyopharidae) and likely also of *Megamelus* sp.) [1 female, 1 male, UCRC]; 18.ii.2008, G. J. Cabrera, M. C. Hernández (emerged from petioles of water hyacinth infested with eggs of *Megamelus* sp. and *Taosa* (*Cuernavaca*) *longula* Marino de Remes Lenicov (Hemiptera: Dictyopharidae)) [3 females, UCRC]. Palo Santo, 9.i.2002, H. A. Cordo, M. C. Hernández (from petiole of water hyacinth with eggs of *M. scutellaris*) [1 female, 2 males, UCRC].

Mymaridae

Anagrus* (*Anagrus*) *empanadus Triapitsyn, sp. nov.
(Figs 18-23)

Description. Female (holotype and paratypes). Body length 594-693 µm (dry-mounted specimens) or 836-873 µm (slide-mounted specimens). Face and vertex yellow except trabeculae and stemmaticum dark brown; scape and pedicel light brown, flagellum brown; pronotum pale, mesoscutum brown, anterior scutellum light brown, posterior scutellum lemon yellow, propodeum yellow except brown medially; legs mostly light brown; median and apical gastral terga yellow, remainder of gastral terga brown, ovipositor sheaths light brown.

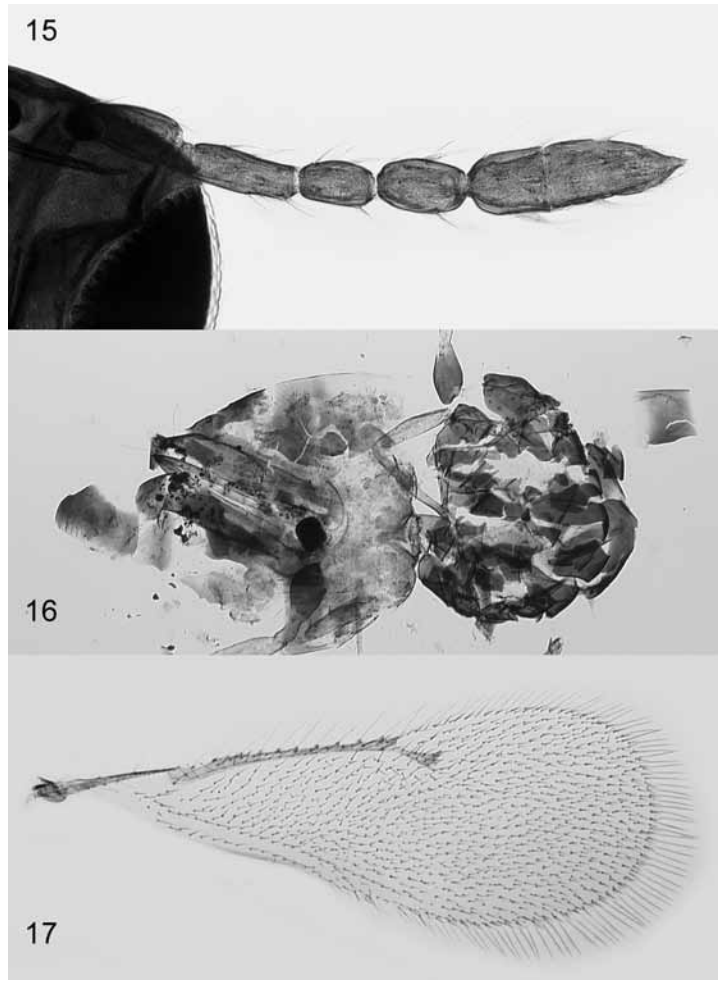
Head about as wide as mesosoma.

Antenna (Fig. 18) with scape 3.0-3.4x as long as wide, with cross-ridges, a little shorter than clava; pedicel much longer than F1 (the shortest funicle segment); F2, F6, and often F4 the longest funicle segments (F6 sometimes slightly longer than F2 and F4), F3 and F5 slightly shorter (F5 sometimes almost as long as F4); F1-F3 and F5 without longitudinal sensilla, F4 with 1 longitudinal sensillum, and F6 with 2 such sensilla; clava 2.7-2.8x as long as wide (in lateral view), with 5 longitudinal sensilla.

Mesosoma (Fig. 19) about 0.5x as long as metasoma. Mesoscutum with a pair of short, weak adnotaular setae.

Forewing (Fig. 21) a little shorter than body, 10.1-10.7x as long as wide; disc slightly, inconspicuously infumate, with an incomplete median row of setae and a few additional setae in the middle; the longest marginal seta about 3.3x maximum wing width. Lengths of distal and proximal macrochaetae in ratio 3.2-3.4:1. Hind wing 29-32x as long as wide, disc with a row of setae along each margin; the longest marginal seta 7.2-7.5x maximum wing width.

Metasoma (Fig. 20). Ovipositor long, anteriorly usually overlapping mesophragma and posteriorly exserted beyond apex of



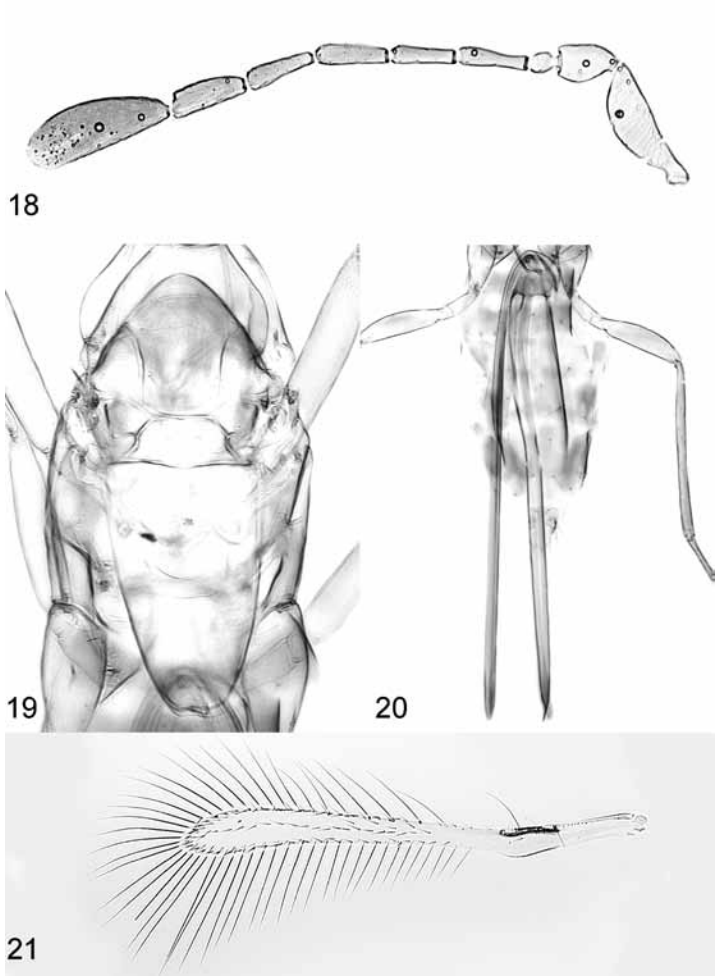
Figs. 15-17. *Aprostocetus* (*Ootetrastichus*) *infulatus* (De Santis), female (holotype): 15, antenna; 16, mesosoma and metasoma; 17, forewing.

gaster by 0.33-0.36x own length (ratio of total ovipositor length to length of its exserted part 2.7-2.8:1). External plate of ovipositor with 2 setae. Ovipositor length: protibia length ratio about 4.4:1.

Measurements (µm) of the holotype. Body: 836; head: 141; mesosoma: 246; metasoma: 449; ovipositor: 670. Antenna: scape: 94; pedicel: 42; F1: 18; F2: 55; F3: 46; F4: 52; F5: 48; F6: 55; clava: 106. Forewing: 652:61; longest marginal seta: 203. Hind wing: 615:21; longest marginal seta: 152.

Male (paratypes). Body length 528-561 µm (dry-mounted specimens). Similar to female except for the coloration and normal sexually dimorphic features such as antenna and genitalia, as follows. Color notably darker than in female: body mostly brown except posterior scutellum pale. Antenna (Fig. 22) with scape plus radicle about 2.8x as long as wide. Forewing about 9.8x as long as wide, a little wider than in female. Genitalia (Fig. 23) similar in shape and structure to those of the Neotropical species *A.* (*Anagrus*) *amazonensis* Triapitsyn, Querino & Feitosa, *A.* (*Anagrus*) *brasiliensis* Triapitsyn, *A.* (*Anagrus*) *lineolus* Triapitsyn, and *A.* (*Anagrus*) *urichi* Pickles (Triapitsyn, 1997, 2000, 2002; Triapitsyn *et al.,* 2008).

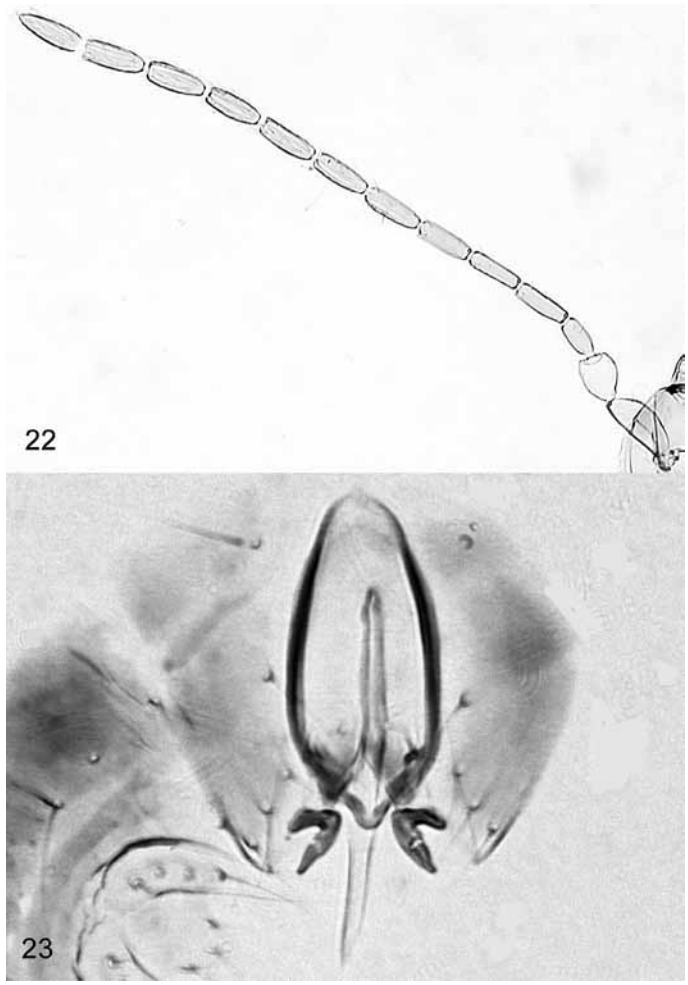
Diagnosis. Member of the *incarnatus* species group of the nominate subgenus *Anagrus* (*Anagrus* Haliday), as defined by Chiappini *et al.* (1996). In the keys to the



Figs. 18-21. *Anagrus* (*Anagrus*) *empanadus* sp. nov., female: 18, antenna (paratype); 19, mesosoma (holotype); 20, metasoma (holotype); 21, forewing (holotype).

Argentinean and Neotropical species of *Anagrus* Haliday by Triapitsyn (2000, 2002), respectively, *A.* (*Anagrus*) *empanadus* sp. nov. would key to the same couplet with *A.* (*Anagrus*) *lineolus*, to which it is most similar. The female of *A.* (*Anagrus*) *empanadus* differs from that of *A.* (*Anagrus*) *lineolus* in lacking a longitudinal sensillum on F5 of the antenna and also in having a much longer ovipositor, which is exserted beyond apex of the gaster by 0.33-0.36x own length (the ovipositor length: protibia length ratio is about 4.4:1). In *A.* (*Anagrus*) *lineolus*, which is known from Argentina, Brazil, Mexico, Peru, and Florida, USA (Triapitsyn, 2002), the ovipositor is exserted beyond apex of the gaster by at most 0.11x own length (the ovipositor length: protibia length ratio is 1.9-2.1:1) (Triapitsyn, 2000). *Anagrus* (*Anagrus*) *empanadus* is also similar to the recently described *A.* (*Anagrus*) *amazonensis* from Brazil, whose female has a longitudinal sensillum on F5 of the antenna and also a much shorter ovipositor, which is exserted beyond apex of the gaster by at most 0.07x own length (the ovipositor length: protibia length ratio is 2.0-2.1:1) (Triapitsyn *et al.*, 2008).

Etymology. The specific name refers to "empanada(s)", first author's favorite food in Argentina.



Figs. 22, 23. *Anagrus* (*Anagrus*) *empanadus* sp. nov., male (paratype): 22, antenna; 23, genitalia.

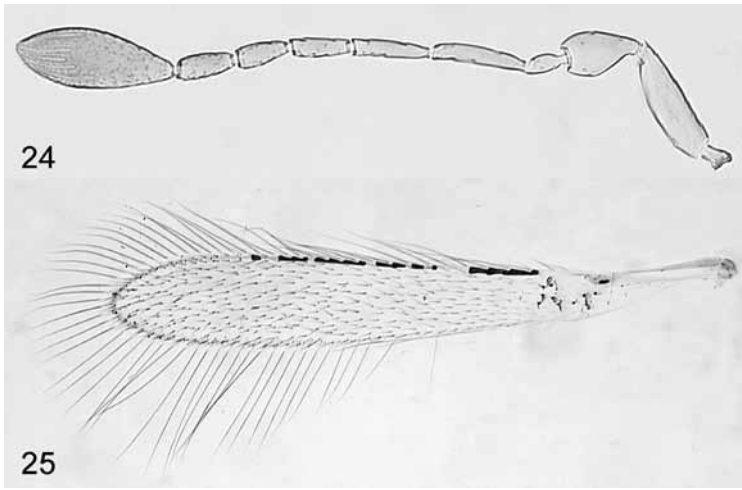
Host. *Megamelus scutellaris* Berg.

Type material. Holotype female [MLPA] on slide labeled: "ARGENTINA: Buenos Aires, Otamendi, 5.vii.2005, A. Sosa and J. Dorado. Ex eggs of *Megamelus scutellaris* Berg on water hyacinth (*Eichhornia crassipes*). Mounted at UCR/ERM by V. V. Berezovskiy 2005 in Canada balsam". The type locality is Ingeniero Otamendi. Paratypes: ARGENTINA, Buenos Aires: Ingeniero Otamendi, 5.vii.2005, A. J. Sosa, J. Dorado (from eggs of *M. scutellaris* on water hyacinth) [10 females on cards, CNCI (1), MLPA (2), UCRC (6), USNM (1), 2 males on cards, MLPA, UCRC, and 1 male on slide, UCRC]. Near Ingeniero Otamendi, Río Paraná de las Palmas shore, 34°10'52.7''S 58°52'12.8''W, 6 m, 23.i.2003, S. V. Triapitsyn, M. C. Hernández, total sweeping [1 female on slide, UCRC].

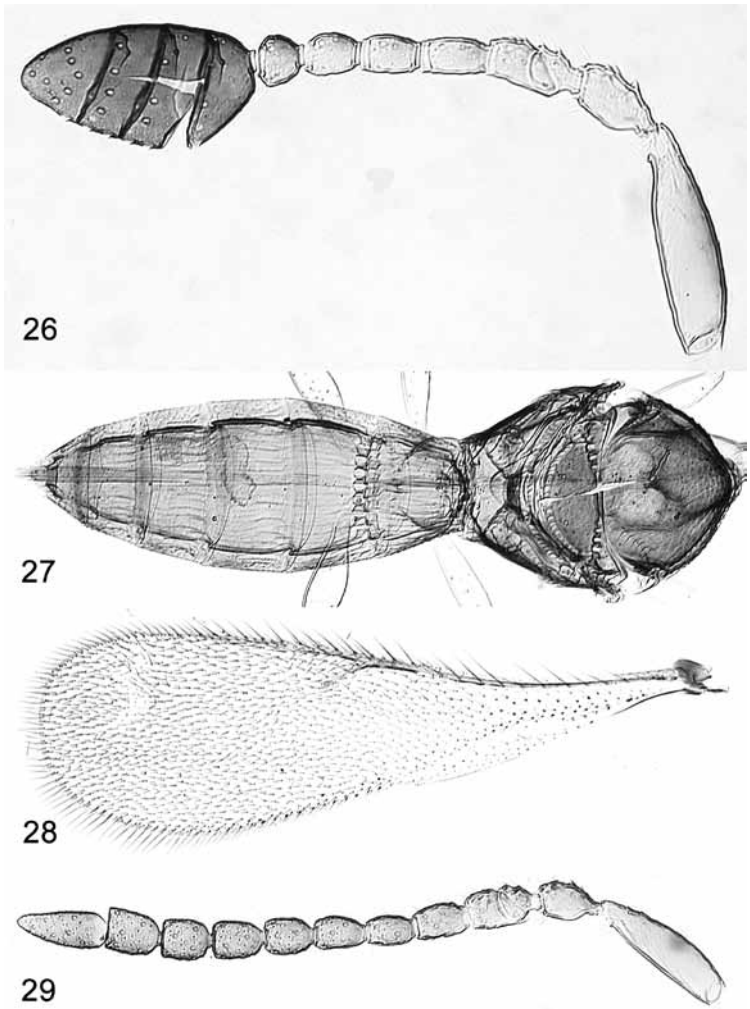
Kalopolynema* (*Kalopolynema*) *poema
Triapitsyn & Berezovskiy
(Figs 24, 25)

Kalopolynema (*Kalopolynema*) *poema* Triapitsyn & Berezovskiy, 2002: 614-616.

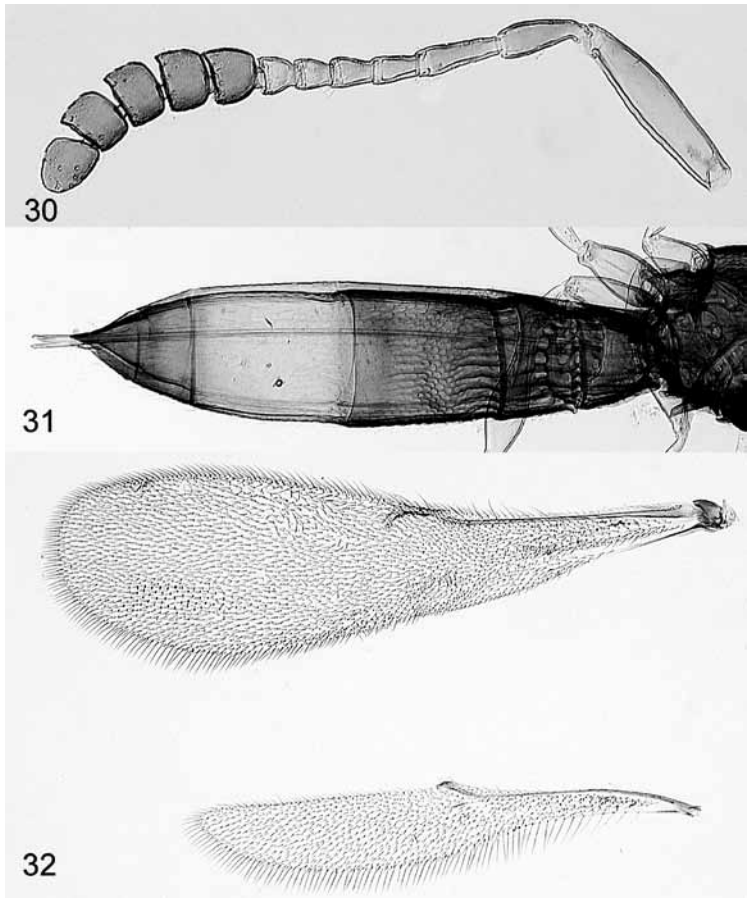
Kalopolynema poema: Sosa *et al.*, 2004: 274 (host information); Sosa *et al.*, 2005: 71 (host information).



Figs. 24, 25. *Kalopolynema* (*Kalopolynema*) *poema* Triapitsyn & Berezovskiy, female (paratype): 24, antenna; 25, forewing.



Figs. 26-29. *Cremastobaeus atratus* Loiácono & Mulvani (Palo Santo, Formosa, Argentina): 26, female antenna; 27, female mesosoma and metasoma; 28, female forewing; 29, male antenna.



Figs. 30-32. *Parascelio sabcli* sp. nov., female (holotype): 30, antenna; 31, mesosoma (posterior part only) and metasoma; 32, fore- and hind wings.

Comments. See Triapitsyn & Berezovskiy (2002) for the detailed description and diagnosis of *K.* (*Kalopolynema*) *poema*, originally described from two female specimens collected at the USDA-ARS South American Biological Control Laboratory in Hurlingham, Buenos Aires, Argentina. The female antenna (Fig. 24) and forewing (Fig. 25) are illustrated here to facilitate its recognition. The male of this species is unknown.

Host. *Megamelus scutellaris* Berg (Triapitsyn & Berezovskiy, 2002; Sosa *et al.*, 2004, 2005).

Material examined. ARGENTINA, Buenos Aires: near Ingeniero Otamendi, Río Paraná de las Palmas shore, 34°10′52.7′′S 58°52′12.8′′W, 6 m, 23.i.2003, S. V. Triapitsyn, M. C. Hernández [1 female, UCRC]. Tigre, 34°23′50′′S 58°34′32′′W, 5 m, G. A. Logarzo: 9-16.xi.2005 [1 female, UCRC]; 2–11.ii.2006 [2 females, MLPA, UCRC].

Platygastridae: Scelioninae

Cremastobaeus atratus Loiácono & Mulvani
(Figs 26-29)

Cremastobaeus atratus Loiácono & Mulvani, 1987: 16-18, 20 (measurements), 23-24 (illustrations); Johnson, 1992: 365 (catalog).

Comments. Species of the almost cosmopolitan genus *Cremastobaeus* Ashmead were reviewed by Loiácono & Mulvani (1987) mainly based on the material collected by A. A. Ogloblin in Loreto, Misiones, Argentina. This is the first record of *C. atratus* outside of its type locality in Loreto. To facilitate recognition of this species, here we provide illustrations of the female antenna (Fig. 26), mesosoma and metasoma (Fig. 27), and forewing (Fig. 28) as well as of the male antenna (Fig. 29).

Host. *Megamelus scutellaris* Berg. However, this host association is tentative due to the collecting method described in "Material and methods"; if confirmed, that would be the first known host record for the genus besides the possible host association with Gryllidae (Orthoptera) (Masner & Hanson, 2006).

Material examined. ARGENTINA, Formosa, Palo Santo, 9.i.2002, H. A. Cordo, M. C. Hernández (from petiole of water hyacinth with eggs of *M. scutellaris*) [2 females, 3 males, UCRC].

Parascelio sabcli Triapitsyn, sp. nov.
(Figs 30-32)

Description. Female (holotype and paratypes). Body length 2410–2520 µm. Body mostly dark brown except fourth gastral tergite and sternite almost entirely light brown, remainder of gaster contrastingly brown to dark brown. Scape, pedicel, and funicle light brown to brown, clava dark brown; legs light brown except tarsi a little darker (brown).

Head with punctate-reticulate sculpture, with short, weak hairs.

Antenna (Fig. 30) with scape about 4.5x as long as wide and smooth; F1 almost as long as pedicel and the longest funicle segment, F3-F5 a little wider than F1 or F2; clava about as long as funicle, with basal four segments wider than long and the apical segment a little longer than wide.

Mesosoma notably sculptured, with pronotum short; scutellum with dense pubescence (setae longer than on mesoscutum). Metanotum medially with a strong spine (Fig. 31).

Wings (Fig. 32). Forewing 3.5-3.6x as long as wide; disc almost hyaline (at most with a very slight brownish tinge), densely setose; the longest marginal seta about 0.13x greatest width of disc. Hind wing about 6.6x as long as wide; disc almost hyaline (at most with a very slight brownish tinge), densely setose; the longest marginal seta 0.34-0.35x greatest width of disc.

Legs. Coxae smooth.

Metasoma (Fig. 31) with strong sculpture on three basal tergites. Ovipositor occupying almost entire length of gaster, a little exserted beyond gastral apex (by 0.03–0.12x own length); ovipositor length:metatibia length ratio about 2.6:1.

Measurements (µm) of the holotype. Body: 2520; head: 363; mesosoma: 677; gaster: 1480; ovipositor: 1433. Antenna: scape: 230; pedicel: 100; F1: 97; F2: 51; F3: 48; F4: 40; F5: 40; clava: 279. Forewing: 1660:467; longest marginal seta: 62. Hind wing: 1298:197; longest marginal seta: 68.

Male. Unknown.

Diagnosis. The female of *P. sabcli* sp. nov. differs from those of the previously described congeneric species by the color of the gaster, as indicated in the key below.

The generic diagnoses of the Neotropical genus *Parascelio* Dodd were given by Masner (1976) and Austin & Field (1997). The genus has not been previously recorded from Argentina. Prior to this study there were no keys available to separate the three described species.

Etymology. The species is named after the USDA-ARS South American Biological Control Laboratory (SABCL).

Host. *Megamelus scutellaris* Berg. This host association is tentative due to the collecting method described in "Material and methods"; if confirmed, that would be the first known host record for the genus.

Type material. Holotype female [MLPA] on slide labeled: 1. "ARGENTINA: Formosa,

Palo Santo, 9.i.2002, C. Hernández "Prs./ *Megamelus* sp.". Mounted at UCR/ERM by V. V. Berezovskiy 2008 in Canada balsam"; 2. "*Parascelio* Det. L. Masner, 2006". Paratypes: same data as the holotype [2 females on points, CNCI, UCRC]. The collectors were H. A. Cordo (in the field) and M. C. Hernández (in the laboratory), parasitoids emerged from petioles of water hyacinth infested with eggs of *M. scutellaris*.

Key to the species of *Parascelio* (females)

1. Body mostly orange-yellow .... *P. ruber* (Szabó)
1´. Body mostly dark brown or black 2

2. Gaster entirely dark brown or black 3
2´. Gaster with fourth gastral tergite and sternite almost entirely light brown, remainder of gaster contrastingly brown to dark brown ..... *P. sabcli* Triapitsyn, sp. nov.

3. F3 and F4 yellow..... ..... *P. undulatus* Dodd
3´. F3 and F4 brown .... *P. molnari* (Szabó)

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