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A New Species of *Ismarus* Haliday (Hymenoptera: Ismaridae) from Brazil and a New Occurrence Record for *Ismarus gracilis* Masner

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Abstract. A new species of *Ismarus* Haliday (Hymenoptera: Ismaridae) from Brazil is described, illustrated and a key to females of *Ismarus* of the New World is given. The geographic range of *Ismarus gracilis* Masner, 1976, is extended about 5,200 km farther to southeast.

Keywords: Atlantic Rainforest; Diaprioidea; Ismarinae; Neotropic; *Rex* Species-group.

Uma Nova Espécie de *Ismarus* Haliday para o Brasil e novo Registro de Ocorrência de *Ismarus gracilis* Masner

Resumo. Uma nova espécie de *Ismarus* Haliday (Hymenoptera: Ismaridae) do Brasil é descrita, ilustrada e é fornecida chave de identificação para fêmeas de *Ismarus* do Novo Mundo. A distribuição geográfica de *Ismarus gracilis* Masner, 1976 é estendida por cerca de 5.200 km em direção ao sudeste.

Palavras-Chave: Diaprioidea; Ismarinae; Floresta Atlântica; Grupo de espécies-rex; Neotrópico.

Ismaridae is small family of Diapriidae (Diaprioidea) characterized by the rather low insertion of antennae, transverse head, reduced notauli, fore legs with a peculiar combing apparatus, fore tibiae with a false second spurand carapace-like metasoma (Masner 1976).

Masner (1976) reviewed the Ismarinae (which was raised the family by Sharkey *et al.* 2012) of New World and organized species *Ismarus* in four species groups: *rugulosus*, *halidayi*, *rex* and *dorsiger*, the last two includes species occurrences reported to Brazil. Subsequently, only three species of Ismaridae been described by Liu *et al.* (2011), from samples collected in China.

Masner (1995) stated that ismarids are rare and infrequent in samplings and there are few of them in entomological collections. Ismaridae includes only a widespread genera, *Ismarus* Haliday, 1835, with 32 species described (Masner 1976; Liu *et al.* 2011), of which 12 are known to occur in the Neotropics and two of those, *Ismarus neotropicus* Masner, 1976 and *Ismarus varicornis* Masner, 1976, in Brazil (Masner 1976; Johnson, 1992; Liu *et al.* 2011; Sharkey *et al.* 2012). Adults of *Ismarus* act as secondary parasitoids of Dryinidae (Hymenoptera) larvae; *Ismarus flavicornis* (Thomson) is secondary parasitoids of *Anteon flavicorne* (Dalman), *Ismarus halidayi* Förster, 1850 of *Anteon* sp. is *Ismarus dorsiger* (Haliday), year *Aphelopus* sp. (Chambers 1955; Nixon 1957; Jervis 1979; Chambers 1981).

Here, a new species of *Ismarus* from Brazil is described, illustrated and a key to females of *Ismarus* of the New World is given; it is also reported the expansion of the geographic range of *Ismarus gracilis* Masner, 1976.

MATERIAL AND METHODS

One exemplar of a new species of *Ismarus* was collected with Moericke trap by M. T. Tavares in area of Atlantic Rainforest at Estação Biológica de Santa Lúcia, Santa Tereza municipality, Espírito Santo State, Brazil in October 2010 (19°58'25.0"S/40°31'44.6"W). The exemplar was identified using a key of identification proposed by Masner (1976).

One female of *I. gracilis* was collected in October 2010, with a Townes' style Malaise traps (Townes 1972) at Parque Estadual Intervales (PEI) (24°16'23.6"S/48°25'21.8"W). The exemplar was identified using a key of identification proposed by Masner (1976).

Morphological terminology follows Masner (1976) and the integument sculpture follows Eady (1967).

Observations and descriptions were made using a Leica MZ 9.5 stereomicroscope with a fluorescent light source. Color images were obtained with a Leica DFC295 digital camera attached to a Leica M205C APO stereomicroscope; the specimen was illuminated with high diffuse dome illumination Leica LED5000 HDI. The serial images from different layers were combined with Helicon Focus software (version 5.3). The figures were prepared using Adobe Photoshop (version 11.0).

Abbreviations used in the species descriptions: A*n* = antenomere (*n* = number of antenomere); POL (postocellar line) =the shortest distance between the inner margins of lateral ocelli; OOL (ocular-ocellar line) =the shortest distance from outer margin of lateral

ocellus to margin of compound eye; T*n* = metasomal tergum (*n* = number of metasomal tergum).

REPOSITORIES

Coleção de Hymenoptera da Universidade Federal do Espírito Santo, UFES, Espírito Santo, Brazil. M.T. Tavares, curator.

Coleção Entomológica do Laboratório de Sistemática e Bioecologia de Parasitoides e Predadores, LRRP, Ribeirão Preto, SP, Brazil. N.W. Perioto, curator.

TAXONOMY

Ismarus capixabae Comério, Perioto & Lara **sp. nov.**

(Figures 1-5)

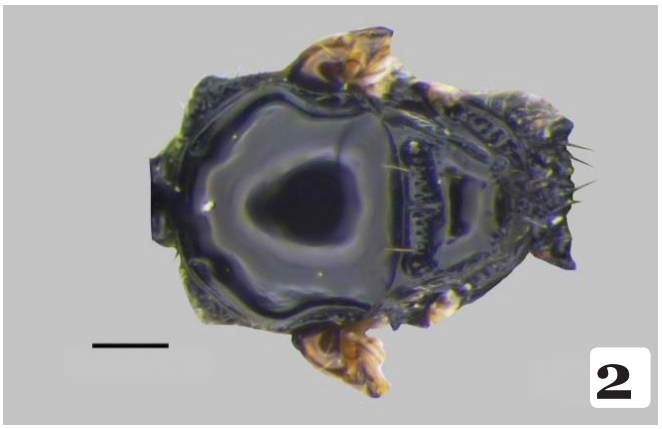
Diagnose. Antennae distinctly short, POL strongly longer than OOL, anterior scutellar pit tranverse, crenulate inside, divided into two parts by fine median keel petiole slightly transverse and radiall cell 2.1 X longer than marginal vein.

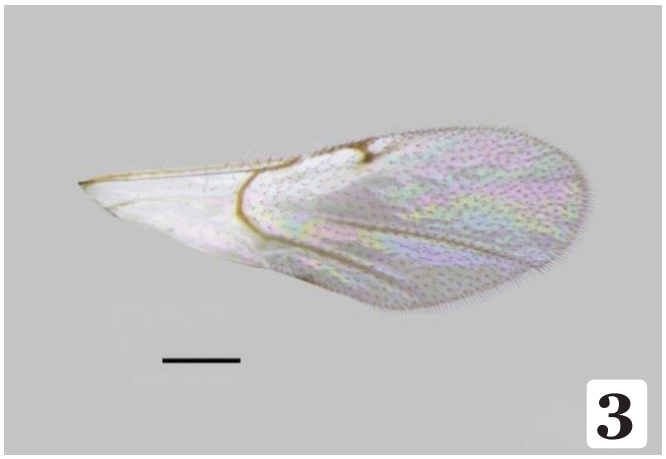
Description. Holotype female (Figure 1). Body length 1.7 mm; fore wing length 1.6 mm.

Body black except: scape and pedicel yellow; A3 and A4 yellowish brown, A5-15 blackish brown; palpi, labrum and tips of mandibles yellowish brown; legs yellowish brown, hind coxae apically dark brown; hind femur and incrassate part of hind tibia dark brown; last tarsomeres dark brown; tegulae yellowish brown. Wings hyaline, veins yellowish brown.

Head. In dorsal view 2.2 X as wide as long, smooth and shiny; fronts along inner orbits, temples, cheeks and area below antennal insertion with abundant silvery hairs; POL only distinctly longer than OOL (12.5:7.5); antennae 0.5 X as long as body length, A1 (17:5.5), A2 (9.5:4.5) A3 (8.5:3) A4 (7:5.4) A5 (7:4) A6 (5.5:4) A7 (7.5:6) A8 (5.5:5.5) A9 (5:6) A10 (6:6.5) A11 (6.5:6.5) A12 (6:6.5) A13 (6:6.5) A14 (6.5:6.5) and A15 (10:6).

Mesosoma. In dorsal view 1.4 X as long as width (Figure 2); sides of pronotum with irregular rugulosity and fine hairs; notauli reduced to small pit anteriorly; scutellar rim strongly cut off posteriorly, posterolateral corners of scutellum acute





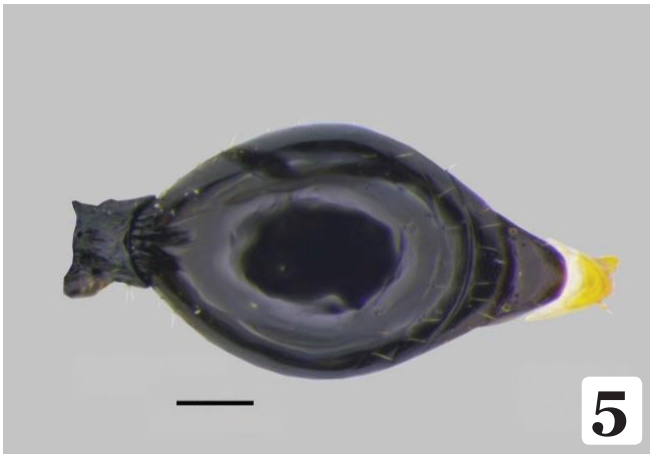


Figure 1. *Ismarus capixabae* sp. nov. Female. Habitus (scale: 1.0 mm).

Figure 2. *Ismarus capixabae* sp. nov. Mesossoma, dorsal view (scale: 0.5 mm).

Figure 3. *Ismarus capixabae* sp. nov. Fore wings (scale: 0.5 mm).

Figure 4. *Ismarus capixabae* sp. nov. Hind leg (scale: 0.5 mm).

Figure 5. *Ismarus capixabae* sp. nov. Metassoma, dorsal view (scale: 0.5 mm).

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and projecting; anterior scutellar pit tranverse, crenulate inside, subdivided into two parts by fine median keel; mesopleuron below wing insertion with strong longitudinal striation, lower half of mesopleuron smooth and shining; metapleuron and propodeum reticulate-rugose, setose.

Wings. Veins of fore wing tubular radial cell 2.1 X as long as marginal vein (Figure 3).

Legs. Fore and middle legs slender; hind tibia strongly incrassate (Figure 4).

Metasoma. Petiole slightly transverse, 1.2 X as wide as long, with irregular longitudinal carinae (Figure 5); T2 smooth and shiny, with median groove not exceeding the basal third of tergite and small longitudinal sulcus above; sutures between T2 and T3, and T3 and T4 incompletes, weakly indicated medially, obsolete at sides; T3 with scattered punctures, T4 and T5 dorsally punctured, T6 dorsally punctured with distinct lateral keels; sternites with sparse hair.

Male. Unknown.

Distribution. Espírito Santo State, Brazil.

Material examined. Holotype female. BRAZIL / E*[spírito]* S*[anto]*, Santa Tereza, E*[stação]* E*[cológica]* S*[anta]* L*[úcia]*, 19°58'25.0"S/40°31'44.6"W, Moericke trap, 19.X.2010, M.T. Tavares and team. (UFES).

Etymology. The specific name refers to the gentilic of Espírito Santo State, where the species was collected.

Comments. This species belongs to *Ismarus rex* species-group (*sensu* Masner 1976) and is similar to *Ismarus helavai* Masner, 1976, which differs from the smaller body and antennae, by the proportion POL:OOL, morphology of scutellum and scutellar pit, length of petiole and radial cell and marginal vein.

Key to species of *Ismarus* (females) of the New World, adapted of Masner (1976).

1. Metasoma after large T2 with 5 distinct sutures, i.e. suture between T2 and T3 as complete and well impressed as the following sutures 2

- Metasoma after large T2 with at most 4 distinct sutures (or fewer), i.e. suture between T2 and T3 incomplete or obliterate, in some species metasoma after T2 with only 1 distinct suture 7

2. Posterior part of scutellum (after the pit) finely coriaceous; pleura coriaceous rugulose; metasoma deeply scaly-reticulate, the only smooth parts of body being the upper part of head, mesoscutum, and tegulae; Europe, Canada, U.S.A .... *I. rugulosus* Foerster

- Posterior part of scutellum (after the pit) perfectly smooth, sculptureless, and highly shining; pleura predominantly smooth; metasoma without reticulation 3

3. Scutellum distinctly truncate posteriorly, with hind margin straight cut, posterolateral corners acute; scutellum divided by strong median keel into two square pits; metasoma perfectly smooth, shining, without microsculpture; Brazil .... *I. neotropicus* Masner

- Scutellum rather rounded posteriorly; if posterolateral corners moderately prominent then scutellar pit without median keel and T2 with distinct microsculpture 4

4. Antennae uniformly bright golden-yellow 5

- Antenna1 segments 1-3 orange-yellow, rest of flagellum dark brown 6

5. Lower half of mesopleura with a continuous zone of sculpture (mainly longitudinalwrinkles) extending from its anteroventral corner up to meso-metapleural suture; sides of prothorax posteriorly with weak striation near pro-mesopleural suture; median furrow on T2 very deep, extending to T3 of the tergite; Europe, Canada, U.S.A. ..... *I. flavicornis* (Thomson)

- Lower half of mesopleura smooth and shining except for a minute patch of punctures situated in extreme anteroventral corner; sides of prothorax anteriorly with strong band of longitudinal wrinkles; median furrow on T2 very shallow, almost nonexistent; U.S.A. ..... *I. nevadensis* Kieffer

6. Pro and mesopleura and T2 mat and not shining due to very dense microsculpture composed of microcupules; scutellar rim moderately excised posteriorly, posterolateral corners slightly protruding; Mexico ..... *I. masoni* Masner

- Pro- and mesopleura and T2 lustrous, without microsculpture, predominantly smooth except for some setigerous punctures or crenulae; scutellar rim not excised posteriorly, posterolateral corners not prominent; Europe, Canada, U.S.A. .... *I .halidayi* Foerster

7. Scutellum posteriorly truncate, straight cut, or moderately excavate, with posterolateral corners more or less pointed and protruding 8

- Scutellum posteriorly rounded, posterolateral corners hence not developed 11

8. Suture between T2 and T3 incomplete, consisting of interrupted shallow line, metasoma thus with 1 incomplete and 4 distinct sutures after large T2; scutellar pit divided by strong median keel into two parts; very large species 3.5-4 mm; Mexico .... *I. rex* Masner

- Suture between T2 and T3 completely obsolete or indicated at most by series of scattered punctures, metasoma thus with at most 4 (or fewer) distinct sutures after large T2; scutellar pit usually undivided or median keel not well developed; smaller species well under 3 mm 9

9. Upper part of mesopleura longitudinally striate; antennae very short, dark; 3 distinct sutures after large T2 16

- Upper part of mesopleura not longitudinally striate; antennae very long and slender, light colored at least in basal part; scape as long as A4 or nearly so; 4 distinct sutures after large T2 10

10. Antennal segments 1-7 as well as hind coxae bright yellow; metasoma dorsally smooth, shining, without distinct microsculpture; Mexico ..... *I. flavicrus* Masner

- Antennae (except for yellow scape and pedicel) and hind coxae dark brown; metasomadorsally with very fine dense micropunctures; Mexico ..... *I. mexicanus* Masner

11. Body predominantly stramineous whitish yellow, with only a few darker areas such as mesoscutum and scutellum 12

- Body predominantly dark, brownish or black 13

12. Scutellum and whole mesoscutum uniformly dark chestnut-brown; hind femora uniformly yellow; ocelli wider apart, POL = OOL; Canada ..... *I. clarkae* Masner

- Scutellum and only posterior part of mesoscutum at meson dark brown, most of mesoscutum yellow; hind femora yellow with distinct dark band sub apically; ocelli closer together, POL < OOL (8: 13); Mexico ..... *I. orion* Masner

13. Sides of prothorax smooth and polished with no punctures on its anterolateral corners (in front of tegulae); antennae contrastly varicolored, A1-A9 bright yellow, AIO-A15 dark brown; Brazil ..... *I. varicornis* Masner

- Sides of prothorax and particularly its anterolateral corners (in front of tegulae) coarsely punctured; antennae not contrastlyvaricolored, light brown except for lighter scape and pedicel or uniformly yellow 14

14. Metasoma varicolored, dark brown with wide yellow band across middle of T2 and yellow apex (T7); A3 and A4 equally long; propodeum medially with irregular wrinkles; POL = OOL; all sutures between tergites obsolete but the one separating T6

and T7; Canada, U.S.A. ..... *I. gibsoni* Masner

- Metasoma uniformly dark brown or black, without lighter bands; A3 always shorter than A4; propodeal carinae meeting diagonally at meson to form a tiny point 15

15. Petiole distinctly slender, as long as wide, attenuate anteriorly; A4 only slightly longer than A3 (14: 12); body always ebony-black; Mexico, Panama ..... *I. gracilis* Masner

- Petiole more robust, transverse (13:19), not distinctly attenuate anteriorly; A4 distinctly longer than A3 (16:11); body sometimes dark brown; Canada, U.S.A. ..... *I. americanus* Fouts

16. Scutellar rim slightly cut off posteriorly; petiole strongly transverse (12:19); POL slightly longer than OOL; Panama .... *I. helavai* Masner

- Scutellar rim strongly cut off posteriorly; petiole slightly transverse (10.5:12.5); POL strongly longer than OOL; Brazil ..... *I. capixabae* Comério, Perioto & Lara **sp. nov.**

Ismarus gracilis Masner, 1976

Report of expansion of the geographic range

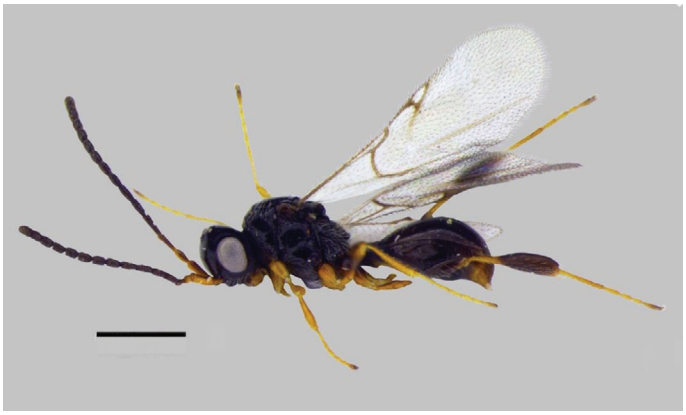

Figure 6. *Ismarus gracilis* Masner, 1976. Female. Habitus (scale: 0.5 mm).

Ismarus gracilis (Figure 6) was described by Masner (1976) based on three females and five males from Mexico (Type locality: San Cristobal de Las Casas, Chiapas State, 2,200 m above sea level - asl); apart from the type locality there are records of their occurrence to Yerba Buena (1,700 m asl), and Cuauhtemoc, Chiapas State and to Panama (Chiriqui, 1,720 masl). The specimen examined matches the description of *I. gracilis*.

Ismarus from area of the Atlantic Rainforest of São Paulo State, Brazil, were sampled at Parque Estadual Intervales (PEI) (24°16'23.6"S, 48°25'21.8"W), located in the municipality of Ribeirão Grande municipality, São Paulo State, Brazil, between October 2009 and March 2011. Habitats of the PEI include phytophysiognomies of Ombrophilous Dense Forest, secondary forest derived from Ombrophilous Montanae and Submontanae Dense Forest; the climate at PEI is classified as Cwa (Köpen): subtropical climate characterized by hot, humid summers and generally mild to cool winters; with annual average temperatures between 15 and 22°C (Bonadio 2013). The surveys were authorized by the Sistema de Autorização e Informação em Biodiversidade (SISBIO), permanent license #10632-1.

Five Townes' style Malaise traps (Townes 1972) were set at PEI to collect continuously. The insects were removed every two weeks. One female of *I. gracilis* was collected in October 2010.

The distribution range of *I. gracilis* is extended about 5,200 km to the southeastfrom the previous records.

The examined specimen was deposited at the Coleção Entomológica do Laboratório de Sistemática e Bioecologia de Parasitoides e Predadores (LRRP) of APTA Ribeirão Preto, Ribeirão Preto, SP, Brazil (N.W. Perioto, curator).

Material examined. 1 female, BRAZIL / S*[ão]* P*[aulo]*, Ribeirão Grande, P*[arque]* E*[stadual]* I*[ntervales]*, 24°16'28.7"S/48°25'21.8"O, Malaise, 22.X.2010, N.W. Perioto and team. (LRRP).

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