Two new species of *Pirhosigma* Giordani Soika (Vespidae, Eumeninae), with an updated catalog for the genus

Wellington D. Ferreira¹, Marcel G. Hermes¹, Bolivar R. Garcete-Barrett²,³, James M. Carpenter⁴

¹ Laboratório de Sistemática e Biologia de Insetos, Departamento de Biologia, Universidade Federal de Lavras, 37200-000 Lavras, Minas Gerais, Brazil ² Museo Nacional de Historia Natural del Paraguay, Km 10 y 1/2, Sucursal 1 Campus UNA, 2169 CDP, Central XI, San Lorenzo, Paraguay ³ Departamento de Biología Clo Dirección de Investigación, FaCEN, Universidad Nacional de Asunción, Casilla de Correo 1039, Campus U.N.A., 2160 CDP, Central XI, San Lorenzo, Paraguay ⁴ Division of Invertebrate Zoology, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024, USA

Corresponding author: Wellington D. Ferreira (wellingtondonizet@hotmail.com)

Academic editor: Michael Ohl | Received 30 April 2019 | Accepted 27 June 2019 | Published 30 August 2019

http://zoobank.org/CCAA9BDD-C4F7-4986-A788-7741361E71C5

Citation: Ferreira WD, Hermes MG, Garcete-Barrett BR, Carpenter JM (2019) Two new species of *Pirhosigma* Giordani Soika (Vespidae, Eumeninae), with an updated catalog for the genus. Journal of Hymenoptera Research 70: 225–240. https://doi.org/10.3897/jhr.71.35754

Abstract

Two new species of eumenine wasps were described from Panama and Peru, namely *Pirhosigma abregoii* Garcete-Barrett & Hermes sp. nov. and *P. cambrai* Garcete-Barrett & Ferreira sp. nov. Lectotypes are designated for *Eumenes deformata barberoi* Bertoni and *Eumenes superficialis mondaiensis* Bertoni. *Pirhosigma meirimense putumayense* Giordani Soika stat. nov. is treated as a color variation of the typical *P. meirimense* (Zavattari). Additions to the key by Ferreira et al. (2017) are made and an updated catalog for species included in the genus is provided.

Keywords

New species, Panama, Peru, Potter wasps, Taxonomy
Introduction

Recently, the Eumeninae, the so-called potter wasps, have been receiving much attention in studies regarding the higher-level phylogenetic relationships of their main lineages, especially with the aid of novel molecular data (Hines et al. 2007; Pickett and Carpenter 2010; Hermes et al. 2014; Bank et al. 2017; Piekarski et al. 2018). The most recent results based on large-scale genomic datasets (Bank et al. 2017; Piekarski et al. 2018) have implied paraphyly of Eumeninae *sensu* Carpenter (1982), whose monophyly was corroborated by Pickett and Carpenter 2010 and Hermes et al. 2014.

Despite this recent phylogenetic progress, the Neotropical fauna of potter wasps remains little explored, a fact that is particularly noticeable by the poor representation of the group in most Latin American entomological collections. In fact, the group is not as abundant as the social vespids, and few experts are carrying out research within the group. Nevertheless, the number of described species has been increasing constantly for the Neotropics (e.g. Hermes 2012; Lopes and Noll 2014; Lopes and Hermes 2015; Cooper, 2016a, b; Lopes et al. 2017), indicating the need for more research to be carried out for the taxon.

*Pirhosigma* is a somewhat small genus of eumenine wasps, currently comprising nine described species. Of these, two were described within the last three years (Ferreira et al. 2015, Ferreira et al. 2017). Recently, Hermes et al. (2013) provided an insightful study on the nesting biology of two species of *Pirhosigma*, with special reference to the use of vegetable matter for potentially camouflaging the mud nests. Such biological strategies are scarcely known for the potter wasps as a whole, but recent available data are showing them to be very plastic regarding nesting strategies (e.g. Hermes et al. 2015, Auko et al. 2015). We hereby propose the description of two new species of *Pirhosigma*, along with an updated catalog for all species included in the genus.

Material and methods

Material from the following institutions was examined (the acronyms follow Evenhuis (2018) when available):

**MIUP** Museo de Invertebrados Graham B. Fairchild, Universidad de Panama, Panama (Dr. Roberto Cambra, Dr. Diomedes Quintero and Jean Carlos Ábrego);

**MSNG** Museo Civico di Storia Naturale “Giacomo Doria”, Genova, Italy (Dr. Maria Tavano);

**INPA** Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (Dr. Márcio L. de Oliveira).

Additional acronyms mentioned in the catalog of species of *Pirhosigma* are:

**AMNH** American Museum of Natural History, New York, USA;

**CMNH** Carnegie Museum of Natural History, Pittsburgh, USA;
Two new species of Pirhosigma Giordani Soika, with an updated catalog for the genus

Type specimens of species potentially closely related to the new species were examined from the cited institutions (details in the taxonomic catalog). All examined specimens were dry pinned preserved ones. Examination was undertaken with a Leica S8 APO stereomicroscope. Photographs of structures of interest were obtained with a Canon EOS Rebel T6 digital camera attached to the stereomicroscope. The same camera with a Canon Macro 100 mm lens and a Yongnuo 2x Extensor were used for photographing specimen habitus. All images were captured using Canon EOS Utility software and using a light dome modified from Kawada and Buffington (2016). The final stacking of multiple layers was carried out with the Helicon Focus software.

Body length is taken from the frons to the hind border of T2 and expressed as an approximate measurement, as body position can modify it more or less substantially. Wing length is taken from the humeral angle of the wing at the border of the tegula to the wing tip and expressed as an approximate measurement, as wing position can affect the total measurement.

Taxonomy

Pirhosigma abregoi Garcete-Barrett & Hermes, sp. nov.  
http://zoobank.org/A50BFD49-2125-49E6-88D2-873FDC30EEA9  
Figs 1–7

Comments and diagnosis. This is the only species of Pirhosigma that does not present a preapical fossa in T1 (Fig. 5), which is present in all other species of this genus. However, this species presents all the other diagnostic features of Pirhosigma, such as the shape of T1, apically flask-shaped, with the apical lamella not preceded by a transverse swelling, and the basal portion with two laterally longitudinal carinae (Giordani Soika 1978; Carpenter and Vecht 1991) (Fig. 6). Pirhosigma abregoi differs from all other species of Pirhosigma by the following set of features: (i) absence of an evident preapical fossa on T1 (Fig. 5); (ii) pronotal carina in the shape of an inverted “V” in frontal view (Fig. 3), with a well-developed lateral lamella (Fig. 4); (iii) T2 oval, longer than wide, with evident, deep and spaced punctures (Fig. 7); (iv) lateral portion of the pronotum greatly shortened (Fig. 4); (v) short clypeus, wider than long (Fig. 2).

Description. Holotype female.

Measurements. Body length (from head to apex of T1): 5.5 mm; Forewing length (from mid tegula to apex): 6.07 mm.

Color. Body with predominantly brown-yellowish tegument. Yellow head, with a wide oval black mark on the frons, connected to a narrow black band extending to
Figures 1–6. *Pirhosigma abregoi* Garcete-Barrett & Hermes, holotype female 1 habitus 2 head, frontal view 3 pronotum, frontal view, arrow pointing to the pronotal carina in the shape of an inverted “V” 4 pronotum, lateral view, arrow pointing to the well-developed lateral lamella in the pronotal carina 5 T1, dorsal view, arrow pointing to the apical portion without a well-developed preapical fossa 6 T1, lateral view, arrow pointing to the well-developed longitudinal carina. Scale bars: 1 mm (1); 0.5 mm (2–6).

the occiput; brownish mark in the center of the clypeus. Mesosoma and metasoma with predominantly brown-yellowish tegument. Antennae with brownish scape and pedicel; progressively darker flagellum from the base to the apex. Mesoscutum totally
Two new species of Pirhosigma Giordani Soika, with an updated catalog for the genus

blackened. Scutellum with a central black-brown spot. Brownish propodeum. Black mark in the basal portion of T1. Yellow marks more prominent in the regions that follow: parategulae; apical margin of T1; lateral and apical margins of T2; apical margin of S1. Brown wings.

**Structure.** Labrum truncated. Clypeus broader than long, with short and emarginated apex; small and not carinate apical teeth present. Interantennal region without cariniform elevation. Pronotal carina well developed in all its extension, in the shape of an inverted “V” in frontal view, with a well-developed lateral lamella. Lateral surface of pronotum narrow, with the distance between pronotal fovea and the mesepisternum smaller than the size of the fovea itself; pronotal fovea slit-shaped. Pretegular carina absent. Parategulae triangular. Sulcus between the scutellum and metanotum obsolete. T1 elongated, with basal portion longer than the apical portion; two lateral longitudinal carinae present, not reaching half of the segment; preapical fossa absent. T2 oval, longer than wide, with lamella well developed. S2 without abrupt basal elevation.

**Sculpture.** Clypeus without evident punctation. Frons and vertex with deep, coarse and abundant punctures, with space between them smaller than the size of a puncture. Pronotum with granular punctation, with shallow, abundant and slightly thickened punctures, distance between them smaller than the size of a puncture. Mesepisternum with deep punctures, denser in its upper portion; shallow and slightly evident punctures in its lower portion. Mesoscutum, scutellum and propodeum with deep and coarse punctures. Apex of T1 with evident shallow punctation. T2 with well-marked deep punctation, distance between them smaller than the size of a puncture.

**Pilosity.** Golden pubescence covering the entire surface of the body. Bristles shorter, thick and abundant on clypeus, frons, vertex, and mesosoma. Elongated, delicate and thin bristles in the metasoma.

**Male.** Unknown.

**Type material.** Holotype: PANAMA • 1 ♀; Peninsula Gigante, Barro Colorado Nature Monument; 30 Jul. 1990; A. Mena leg. (MIUP).

**Type locality.** Peninsula Gigante: Barro Colorado Nature Monument; Panama.

**Etymology.** This species is named after the Panamanian Biologist Jean Carlos Ábrego.

**Pirhosigma cambrai** Garcete-Barrett & Ferreira, sp. nov.

http://zoobank.org/73F75F9A-9304-437D-A8F6-957E2A33BF33

Figs 8–15

**Comments and diagnosis.** *P. cambrai* is quite similar to *P. mearimense* (Zavattari) and *P. sulcata* Ferreira & Hermes, sharing with them the S2 without a basal slope followed by an elevation (Fig. 14); T1 distinctly filiform with basal region of greater length than the apical portion (Figs 12–13); T2 wider than long (Fig. 15); pronotal carina well developed dorsally (Fig. 11); and a black body color, with few yellow marks (Fig. 8). *Pirhosigma cambrai* is distinguished from *P. mearimense* and *P. sulcata*...
Figures 7–12. *Pirhosigma abrego* Garcete-Barrett & Hermes, holotype female 7 T2 with an evident punctuation, dorsal view. *Pirhosigma cambrai* Garcete-Barrett & Ferreira, holotype female 8 habitus 9 head, frontal view 10 head, lateral view, arrow pointing to the curved clypeus apex 11 pronotum, dorsal view, arrow pointing to the well-developed dorsally pronotal carina 12 T1, lateral view, arrow pointing to the well-developed longitudinal carina. Scale bars: 1 mm (8); 0.5 mm (7, 9–12).
Two new species of Pirhosigma Giordani Soika, with an updated catalog for the genus

Figures 13–17. Representatives of Pirhosigma species 13–15 Pirhosigma cambrai Garcete-Barrett & Ferreira, holotype female 13 T1, dorsal view, arrow pointing to the apex with a pre-apical fossa well-developed 14 T1 and S2, lateral view, arrow pointing to the S2 without a basal slope followed by an elevation 15 T2, dorsal view 16 Pirhosigma mearimense (Zavattari), female head, frontal view 17 Pirhosigma sulcata Ferreira & Hermes, holotype male head, frontal view. Scale bars: 0.5 mm (13–17).
Ferreira & Hermes by the presence of a short, wider than long clypeus (Fig. 9), curved backwards (Fig. 10).

**Description.** Holotype female.

**Measurements.** Body length (from head to apex of T1): 5.10 mm; Forewing length (from mid tegula to apex): 6.50 mm.

**Color.** Body with predominantly blackish tegument. Yellow marks as follows: stripes on inner margin of compound eyes; upper surface of the gena; narrow range in the antero-dorsal region of pronotum; narrow bands in the distal portions of the T1–T6 and S2–S6. S1 brownish. Antennae brownish. Yellow-brownish legs. Brownish wings.

**Structure.** Labrum rounded, narrow. Clypeus broader than long, apically curved backwards and with short, concave and emarginated apex; small and ecarinate apical teeth present, with small distance between each other. Interantennal region without cariniform elevation. Pronotal carina well developed dorsally, gently and roundly recurved in the humeral region. Lateral surface of pronotum narrow, with the distance between pronotal fovea and the mesepisternum smaller than the size of the fovea itself. Preterminal carina absent. Parategulae pointed. Sulcus between scutellum and metanotum obsolete. T1 distinctly filiform with basal region of greater length than the apical portion; two lateral longitudinal carina present; preapical fossa present. T2 wider than long, outlined as a half oval in dorsal view; well-developed apical lamella. S2 without basal slope followed by an elevation.

**Sculpture.** Clypeus without evident punctuation. Frons and vertex with evident and abundant punctures, with distance between them approximately smaller than the size of a puncture; micro-punctuation evident. Pronotum, upper portion of the mesepisternum, mesoscutum, scutellum, metanotum and propodeum with deep and abundant punctures, with distance between punctures smaller than the size of a puncture. Lower portion of the mesepisternum with shallow and sparse punctures, distance between them approximately greater than the size of a puncture. T1 unpunctate. T2 with micro-punctuation evident.

**Pilosity.** Fine whitish pubescence covering the entire body. Whitish bristles covering the head, concentrated in the clypeus. Brownish, short and thin bristles on mesosoma. Brownish and long bristles on T1–T6 and S2–S6.

**Male.** Unknown.

**Type material.** Holotype: PERU • 1 ♀; Madre de Dios, Manu Reserve, Pakitza Station; 1–2 Mar. 1992; R. Cambra leg. (MIUP).

**Type locality.** Madre de Dios: Manu Reserve, Pakitza Station; Peru.

**Etymology.** This species is dedicated to the Panamanian entomologist Roberto Cambra.

**Comments.** The holotype of *P. cambrai* sp. nov. (female, MIUP) was compared with the holotypes of *P. mearimense* (Zavattari) (male, MSNG) and *P. sulcata* Ferreira & Hermes (male, INPA). Additional material of *P. mearimense*, two males and two females, were also analyzed (MSNVE). Unfortunately, the female of *P. sulcata* remains unknown, but by the uniformity of the clypeus between the sexes of *Pirhosigma*, we consider the comparison of this structure valid for the distinction between the species *P. sulcata/P. mearimense* from *P. cambrai*. 
Additional examined material. *Pirhosigma mearimense* (Zavattari): Holotype: BRAZIL • 1 ♂; Miarim; Gribodo leg. (MSNG). SURINAME • 1 ♂; Republiek; 6 May. 1963; J. v. d. Vecht leg. (MSNVE). 1 ♀; Republiek; 24 Sep. 1963; D. C. Geyskes leg. (MSNVE) PERU • 1 ♂; El Campamiente, Colonia Perene; 21 Jun. 1920; Giordani Soika leg. (MSNVE). BOLIVIA • 1 ♀; Buenavista, Dep. Sta Cruz; alt. 450 m. (MSNVE). *Pirhosigma sulcata* Ferreira & Hermes: Holotype: BRAZIL • 1 ♂; Amazonas, KM31 AM-010, CEPLAC; 18 Jun. 1976; Joselita M. Santos leg. (INPA).

Updated key to the species of *Pirhosigma*, adapted from Ferreira et al. (2017)

The species *P. abregoi* is readily differentiated from all other species in the key of Ferreira et al. (2017), since it is the only species that does not present a preapical fossa in T1 – compare Fig. 5: *P. abregoi*, without a preapical fossa on T1; and Fig. 13: *P. cambrai*, with a preapical fossa on T1.

1' Preapical fossa on T1 absent (Fig. 5) .................................................................
– Preapical fossa on T1 present (Fig. 13) .................................................. (*couplet 1 in Ferreira et al. 2017*)

The species *P. cambrai* runs to couplet 6 of Ferreira et al. (2017), which is modified as follows:

6 Pronotal carina well developed dorsally (Fig. 11); black, with a few yellow spots (Fig. 8) ........................................................................................................6'
– Pronotal carina not evident dorsally; yellowish with black marks and bands ....8

6' Short clypeus, wider than long (Fig. 9) ........................................................................................................
– Clypeus longer than wide or almost as long as wide (Figs 16, 17) .......... 7

7 Male with a well-marked groove between the metanotum and the scutellum [female unknown] .................................................. *P. sulcata* Ferreira & Hermes
– Male without a well-marked groove between the metanotum and the scutellum .......................................................... *P. mearimense* (Zavattari)

A Catalog of the genus *Pirhosigma* Giordani Soika (only taxonomic and nomenclatural procedures are indicated where they apply)

*Pirhosigma* Giordani Soika, 1978: 11, 229.

Type species: *Eumenes simulans* de Saussure, 1875, by original designation.

*Tricomenes* Giordani Soika, 1978: 10, 254.

Type species: *Eumenes pilosus* Fox, 1899, by original designation and monotypy.

*Pirhosigma*; Giordani Soika 1978: 10, 230–231. Carpenter and van der Vecht 1991: 230 (Tricomenes rejected, acting as first reviser).
Pirhosigma aenigmaticum Giordani Soika, 1978

*Eumenes simulans*; Zavattari 1906: 19; Zavattari 1912: 118. Misidentification.

*Pirhosigma aenigmaticum* Giordani Soika, 1978: 231, 250.

- **Type Data:** Holotype female **RMNH**.
- **Type Locality:** Valle Anchicaya, Cali, Colombia.

*Pirhosigma aenigmaticum*; Carpenter and van der Vecht 1991: 229 (probable synonym of *P. simulans* (de Saussure)). West-Eberhard et al. 1995: 574. Rodríguez-West-Eberhard et al. 1995: 574. Rodríguez-Palafox 1996: 480. Ferreira et al. 2017: 277.

**Distribution:** Mexico, Costa Rica, Panama, Colombia, Venezuela, Ecuador.

Pirhosigma deforme (Fox, 1899)

*Eumenes deforma* Fox, 1899: 453, 461.

- **Type Data:** Lectotype female **CMNH**.
- **Type Locality:** Corumbá, Mato Grosso do Sul, Brazil.

*Eumenes deforma*; Dalla Torre 1904: 22. Brèthes 1906: 335. Bertoni 1918: 206.

- **Type Data:** Lectotype female by present designation (**MNHNPY**).
- **Type Locality:** Puerto Bertoni, Paraguay.

*Eumenes deformata barberoi* Bertoni, 1926: 76.

- **Type Data:** Lectotype female by present designation (**MNHNPY**).
- **Type Locality:** Puerto Bertoni, Paraguay.

*Pirhosigma deforme*; Giordani Soika 1978: 230, 231. Hermes and Köhler 2004: 74, 86. Somavilla et al. 2010: 260. Hermes et al. 2013: 434. Hermes et al. 2014: 456, 470, 471, 475. Ferreira et al. 2017: 276.

**Distribution:** Brazil, Paraguay.

**Remarks.** In the original description (Bertoni, 1926) of *Eumenes deformata barberoi*, the author did not mention how many specimens were part of the type series nor the locality where they were collected. Furthermore, Bertoni labelled seven specimens as *Eumenes deformata paranensis* (unpublished subspecific name), and the name *barberoi* was never attached to any specimen whatsoever. The lack of a locality, in this case, poses no issue, since all individuals bear a label with the locality “Puerto Bertoni”, where the author lived for many years and collected many of his specimens. Also, the only subspecific name proposed by Bertoni under the specific name *deformata* is indeed *barberoi*, which leaves no doubt about the members of the type series. Finally, the description matches these specimens, and one well-preserved female was chosen as the lectotype and labelled accordingly; the remainder of the specimens (two males and four females) are to be treated as paralectotypes.

Here we have the opportunity to correct the date of Bertoni’s paper “Hymenópteros nuevos o poco conocidos”. Though considered as published in December of 1925, as suggested in the heading of its cover, issue 2(1) of the “Revista de la Sociedad Científica del Paraguay”, was actually printed in 1926, as indicated in the foot of the very same cover. This paper contains the original descriptions of the species-level names *Zetamenes rufomaculata* ssp. *meridionalis* Bertoni, *Zetamenes filiformis* var. *costarricensis* Bertoni, *Discoelius strigosus* ssp. *costarricensis* Bertoni, *Pachymenes atra* var. *ornatissima*.
Bertoni, *Eumenes deformata barberoi* Bertoni, *Amphimenes totonacus* var. *manateci* Bertoni, *Monobia paraguayensis* Bertoni, *Odynerus migonei* Bertoni and the generic name *Protozethus* Bertoni.

**Pirhosigma limpidum** Giordani Soika, 1978

*Pirhosigma limpidum* Giordani Soika, 1978: 230, 240.
  
  **Type Data:** Holotype female **MSNVE**.
  
  **Type Locality:** Espírito Santo, Brazil.

*Pirhosigma limpidum,* Hermes et al. 2013: 434. Hermes et al. 2014: 472. Ferreira et al. 2017: 272, 277.

**Distribution:** Brazil.

**Pirhosigma mearimense** (Zavattari, 1912)

*Eumenes mearimensis* Zavattari, 1912: 101.

**Type Data:** Holotype male **MSNG**.

**Type Locality:** Vitoria do Mearim, Maranhão, Brazil (Penati and Mariotti 2015).

*Pirhosigma mearimense,* Giordani Soika 1978: 231, 243. Ferreira et al. 2015: 118, 119. Ferreira et al. 2017: 277.

*Pirhosigma mearimense mearimense,* Santos et al. 2015: 41.

*Pirhosigma mearimense putumayense* Giordani Soika, 1978: 245. **New status.**

**Type Data:** Holotype female **CUIC**.

**Type Locality:** Putumayo, Peru.

*Pirhosigma mearimense putumayense,* Rasmussen & Asenjo, 2009: 42.

**Distribution:** Suriname, Brazil, Peru, Bolivia.

**Remarks.** It is widely acknowledged by the vespid experts that Antonio Giordani Soika was very fond of proposing subspecies based solely on coloration (see Carpenter (1987) for a good example). We hereby treat *P. mearimense putumayense* as a mere color variation of the typical form.

**Pirhosigma pilosa** (Fox, 1899)

*Eumenes pilosa* Fox, 1899: 454, 461.

**Type Data:** Lectotype female **CMNH**.

**Type Locality:** Chapada dos Guimarães, Mato Grosso, Brazil (15°26’S 55°45’W) (Papavero 1973, Carpenter and van der Vecht 1991).

*Eumenes pilosa,* Dalla Torre 1904: 24. Bertoni 1934: 112, 117.

*Tricomenes pilosus,* Giordani Soika 1978: 254 (inadvertent designation of lectotype).

*Pirhosigma pilosa,* Carpenter and van der Vecht 1991: 230. Ferreira et al. 2017: 277.

**Distribution:** Ecuador, Brazil.

**Pirhosigma simulans** (de Saussure, 1875)

*Eumenes simulans* de Saussure, 1875: 91.

**Type Data:** Lectotype female **MHNG**.
Type Locality: Orizaba, Mexico.
*Zeteumenes simulans*; Bertoni 1934: 110.

*Pirhosigma simulans*; Giordani Soika 1978: 231, 247. Rodríguez-Palafox 1996: 480. Ferreira et al. 2017: 277.

Distribution: Mexico.

*Pirhosigma sulcata* Ferreira & Hermes, 2015

*Pirhosigma sulcata* Ferreira et al. 2015: 118.

Type Data: Holotype male **INPA**.

Type Locality: Km 31 AM-010, Ceplac, Amazonas, Brazil.

*Pirhosigma sulcata*; Ferreira et al. 2017: 277.

Distribution: Brazil.

*Pirhosigma superficiale* (Fox, 1899)

*Eumenes superficialis* Fox, 1899: 441, 460.

Type Data: Lectotype female **CMNH**.

Type Locality: Chapada dos Guimarães, Mato Grosso, Brazil (15°26'S 55°45'W) (Papavero 1973, Carpenter and van der Vecht 1991).

*Eumenes superficialis*; Dalla Torre 1904: 25. Brèthes 1906: 335. Bertoni 1911: 106. Zavattari 1911: 49. Zavattari 1912: 99. Bertoni 1918: 206. Bertoni 1934: 113, 118. Carpenter and van der Vecht 1991: 225 (syn: *Pirhosigma superficiale impurum* Giordani Soika).

*Eumenes superficialis mondaiensis* Bertoni, 1934: 118.

Type Data: Lectotype female by present designation (**MNHNPY**).

Type Locality: Puerto Bertoni, Paraguay.

*Pirhosigma superficiale*; Giordani Soika 1978: 230, 236 (inadvertent designation of lectotype). Garcete-Barrett 1999: 8. Hermes and Köhler 2004: 74, 86. Somavilla et al. 2010: 260. Hermes et al. 2013: 433, 434. Hermes et al. 2014: 456, 472, 475. Ferreira et al. 2017: 270, 272, 276.

*Pirhosigma superficiale impurum* Giordani Soika 1978: 230, 239.

Type Data: Holotype female **MCZ**.

Type Locality: Oran, Abra Grande, Salta, Argentina (MCZ Type Database, [http://140.247.96.247/mcz/Species_record.php?id=25550](http://140.247.96.247/mcz/Species_record.php?id=25550)).

*Pirhosigma superficiale impurum*; Carpenter and van der Vecht 1991: 211, 225 (synonym of typical *P. superficiale*).

Distribution: Brazil, Paraguay, Argentina.

**Remarks.** Bertoni (1934) mentioned 20 specimens, both males and females, which he randomly chose to provide the description of *Eumenes superficialis mondaiensis*. Fifteen out of these twenty specimens were found at the MNHNPy to be part of the type series. Seven specimens are labelled as from Puerto Bertoni, two from Assuncion and five from Vista Alegre. These localities were all mentioned in the original description, except for the latter. Bertoni (1934) also mentioned having examined specimens from
“Amambái (Norte)” which undoubtedly correspond to Vista Alegre, which is in the upper part of the Aguaray Guazu river in the Amabay Department and, according to Brèthes (1924), on the approximate coordinates 23°40’S, 55°50’W (though Brèthes indicated 33 degrees for the coordinate south, which was no doubt just a lapsus ending in an inadvertent error of 10 degrees). One well preserved female from Puerto Bertoni was chosen as the lectotype and labelled accordingly; the remainder of the specimens (six males and eight females) are to be treated as paralectotypes.

_Pirhosigma transfluvium_ Ferreira & Oliveira, 2017

_Pirhosigma transfluvium_ Ferreira et al. 2017: 270, 277.

Type Data: Holotype male AMNH.

Type Locality: Beni: Rio Itenez, Bolivia.

Distribution: Bolivia.

**Acknowledgements**

We thank the curators in charge of the collections from which specimens were borrowed. FAPEMIG process APQ-02784-17 provided financial support. WDF and MGH are supported by CNPq grants 141168/2018-8 and 304102/2018-0, respectively.

**References**

Auko TH, Trad BM, Silvestre R (2015) Bird dropping masquerading of the nest by the potter wasp _Minixi suffusum_ (Fox, 1899) (Hymenoptera: Vespidae: Eumeninae). Tropical Zoology 2015: 1–10. https://doi.org/10.1080/03946975.2015.1027103

Bank S, Sann M, Mayer C, Meusemann K, Donath A, Podsiadlowski L, Kozlov A, Petersen M, Krogmann L, Meier R, Rosa P, Schmitt T, Würdack M, Liu S, Zhou X, Misof B, Peters RS, Michiels O (2017) Transcriptome and target DNA enrichment sequence data provide new insights into the phylogeny of vespid wasps (Hymenoptera: Aculeata: Vespidae). Molecular Phylogenetics and Evolution 116: 213–226. https://doi.org/10.1016/j.ympev.2017.08.020

Bertoni AW (1911) Contribución á la biología de las avispas y abejas del Paraguay (Hymenoptera). Anales del Museo Nacional de Historia Natural de Buenos Aires 22: 97–146.

Bertoni AW (1918) Catálogo de los Véspidos sociales y solitarios del Paraguay. Anales Científicos Paraguayos 2: 203–208.

Bertoni AW (1926) Himenópteros nuevos o poco conocidos. Revista de la Sociedad Científica del Paraguay 2(1): 74–79.

Bertoni AW (1934) Contribución al conocimiento de los Eumenéidos. Revista de la Sociedad Científica del Paraguay 3: 109–122.

Brèthes J (1906) Véspidos y Eumenídidos Sudamericanos. Anales del Museo Nacional de Buenos Aires 3: 311–377.
Brèthes J (1924) Quelques insectes du Paraguay. Revista Chilena de Historia Natural Pura y Aplicada 28: 67–72.
Carpenter JM (1982) The phylogenetic relationships and natural classification of the Vespoidae (Hymenoptera). Systematic Entomology 7: 11–38. https://doi.org/10.1111/j.1365-3113.1982.tb00124.x
Carpenter JM (1987) A review of the subspecies concept in the eumenine genus Zeta (Hymenoptera: Vespidae). Psyche 94: 253–259. https://doi.org/10.1155/1987/82829
Carpenter JM, van der Vecht J (1991) A study of the Vespidae described by William J. Fox (Insecta: Hymenoptera), with assessment of taxonomic implications. Annals of Carnegie Museum 60: 211–241.
Cooper M (2016a) A new species and new records of Zethus Fabricius in the pallidus-group (Hymenoptera: Vespidae, Eumeninae). The Entomologist’s Monthly Magazine 152: 207–210.
Cooper M (2016b) New species of the genus Pararhaphidoglossa von Schulthess (Hymenoptera: Vespidae, Eumeninae): VI. The Entomologist’s Monthly Magazine 152: 271–287.
Dalla Torre KW (1904) Vespidae. Genera Insectorum 19: 1–108.
de Saussure H (1875) Synopsis of American wasps. Smithsonian Miscellaneous Collections 254: 1–392. https://doi.org/10.5962/bhl.title.60259
Evenhuis NL (2018) The insect and spider collections of the world website. http://hbs.bishop-museum.org/codens/
Ferreira WD, Grandinete YC, Lopes RB, Hermes, MG (2015) A new contribution to the knowledge of Neotropical Eumeninae (Hymenoptera, Vespidae). Zootaxa 3981: 117–124. https://doi.org/10.11646/zootaxa.3981.1.6
Ferreira WD, Oliveira LA, Inez, TG, Hermes, MG (2017) A new species of Pirhosigma Giordani Soika, 1978 (Hymenoptera, Vespidae: Eumeninae), with additional notes and a key to the species in the genus. Zootaxa 4300: 269–278. https://doi.org/10.11646/zootaxa.4300.2.8
Fox WJ (1899) Contributions to a knowledge of the Hymenoptera of Brazil, No. 7 – Eumeni-dae (genera Zethus, Labus, Zethoides, Eumenes, Montezumia and Nortonia). Proceedings of the Academy of Natural Sciences of Philadelphia 1899: 407–464.
Garcete-Barrett BR (1999) Guía ilustrada de las avispas sociales del Paraguay (Hymenoptera: Vespidae: Polistinae). The Natural History Museum, London, 44 pp.
Giordani Soika A (1978) Revisione degli eumenidi neotropicali appartenenti ai generi Eumenes Latr., Omicron (Sauss.), Pararhaphidoglossa Schulth. ed affini. Bolletino del Museo Civico di Storia Naturale di Venezia 29: 7–420.
Hermes MG (2012) Two new species of eumenine wasps in the genus Zethus Fabricius (Hymenoptera, Vespidae, Eumeninae) from the New World. Zootaxa 3401: 43–48. https://doi.org/10.11646/zootaxa.3401.1.3
Hermes MG, Araújo G, Antonini Y (2015) On the nesting biology of eumenine wasps yet again: Minixi brasilianum (de Saussure) is a builder and a renter… at the same time! (Hymenoptera, Vespidae, Eumeninae). Revista Brasileira de Entomologia 59: 141–142. https://doi.org/10.1016/j.rbe.2015.03.011
Hermes MG, Köhler A (2004) Chave ilustrada para as espécies de Vespidae (Insecta, Hymenoptera) ocorrentes no Cinturão Verde de Santa Cruz do Sul, RS, Brasil. Caderno de Pesquisa Série Biologia 16: 65–115.
Two new species of Pirhosigma Giordani Soika, with an updated catalog for the genus

Hermes MG, Melo GAR, Carpenter, JM (2014) The higher-level phylogenetic relationships of the Eumeninae (Insecta, Hymenoptera, Vespidae), with emphasis on Eumenes sensu lato. Cladistics 30: 453–484. https://doi.org/10.1111/cla.12059

Hermes MG, Somavilla A, Garceze-Barrett BR (2013) On the nesting biology of Pirhosigma Giordani Soika (Hymenoptera, Vespidae, Eumeninae), with special reference to the use of vegetable matter. Revista Brasileira de Entomologia 57: 433–436. https://doi.org/10.1590/S0085-56262013005000044

Hines HM, Hunt JH, O’Connor TK, Gillespie JJ, Cameron, SA (2007) Multigene phylogeny reveals eusociality evolved twice in vespid wasps. Proceedings of the National Academy of Sciences 104: 3295–3299. https://doi.org/10.1073/pnas.0610140104

Kawada R, Buffington, ML (2016) A scalable and modular dome illumination system for scientific micophotography on a budget. Plos One 11: e0153426. https://doi.org/10.1371/journal.pone.0153426

Lopes, RB, Noll, FB (2014) Notes on the Neotropical Zethus Fabricius, 1804 (Hymenoptera, Vespidae, Eumeninae) with the description of two new species from Brazil. Zootaxa 3784: 179–186. https://doi.org/10.11646/zootaxa.3784.2.7

Lopes RB, Hermes MG (2015) A new species of Zethus (Zethusculus) de Saussure (Hymenoptera, Vespidae, Eumeninae) from southern Brazil. Revista Brasileira de Entomologia 59: 138–140. https://doi.org/10.1016/j.rbe.2015.03.010

Lopes RB, Noll, FB, Stange, LA (2017) Zethus (Zethus) wileyi (Hymenoptera, Vespidae, Eumeninae), a new species with its own species-group. Zootaxa 4231: 137–144. https://doi.org/10.11646/zootaxa.4231.1.1

Papavero N (1973) Essays on the history of Neotropical dipterology, with special reference to collectors (1750–1905), II. Museu de Zoologia, Universidade de São Paulo, São Paulo, 446 pp.

Penati F, Mariotti A (2015) Catalog of Hymenoptera described by Giovanni Gribodo (1846–1924) (Insecta). Zootaxa 3929: 1–183. http://dx.doi.org/10.11646/zootaxa.3929.1.1

Pickett KM, Carpenter, JM (2010) Simultaneous analysis and the origin of eusociality in the Vespidae (Insecta: Hymenoptera). Arthropod Systematics & Phylogeny 68: 3–33.

Pickarski PK, Carpenter JM, Lemmon AR, Lemmon EM, Sharanowski BJ (2018) Phylogenomic evidence overturns current conceptions of social evolution in wasps (Vespidae). Molecular biology and evolution 35: 2097–2109. https://doi.org/10.1093/molbev/msy124

Rasmussen C, Asenjo A (2009) A checklist to the wasps of Peru (Hymenoptera, Aculeata). ZooKeys 15: 1–78. https://doi.org/10.3897/zookeys.15.196

Rodríguez-Palafox A (1996) Vespidae (Hymenoptera). In: Llorente-Bousquets J, Aldrete ANG, Soriano EG (Eds) Biodiversidad, Taxonomía y Biogeografía de Artrópodos de México: hacia una síntesis de su conocimiento. Universidad Nacional Autónoma de Mexico, Instituto de Biología, 1–660.

Santos EF, Grandinete YC, Noll FB (2015) Additions to the checklist of Scoliidae, Sphecidae, Pompilidae and Vespidae of Peru, with notes on the endemic status of some species (Hymenoptera, Aculeata). Zookeys 519: 33–48. https://doi.org/10.3897/zookeys.519.6501

Somavilla A, Köhler A, Hermes MG (2010) Contribuição aos estudos dos Vespidae ocorrentes no estado do Rio Grande do Sul (Insecta, Hymenoptera). Revista Brasileira de Biociências 8: 257–263.
West-Eberhard MJ, Carpenter JM, Hanson P (1995) The vespid wasps (Vespidae) In: P. Hanson, P, Gauld I (Eds). The Hymenoptera of Costa Rica. Oxford Science Publications/The Natural History Museum, London, 920 pp.

Zavattari E (1906) Viaggio del Dr. Enrico Festa nel Darien, nell’Ecuador e regioni vicine. Bollettino dei Musei di Zoologia ed Anatomia Comparata della Universita di Torino 21: 1–20. https://doi.org/10.5962/bhl.part.9304

Zavattari E (1911) Beiträge zur kenntnis der Hymenopterenfauna von Paraguay VIII. Eumenidae. Zoologische Jahrbücher 31: 39–58.

Zavattari E (1912) Materialien für eine monographie der neotropischen Eumeniden. Archiv für Naturgeschichte 78A: 1–272.