

Research Article / Artículo de Investigación

***Hiranetis vanderheydeni* sp. nov. (Hemiptera: Reduviidae: Harpactorinae), an example of how a superficial evaluation may impair the taxonomy**

Hiranetis vanderheydeni sp. nov. (Hemiptera: Reduviidae: Harpactorinae), un ejemplo de como una evaluación superficial puede perjudicar la taxonomía

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Abstract. *Hiranetis vanderheydeni* sp. nov. (Hemiptera: Heteroptera: Reduviidae: Harpactorinae) is described from Brazil based on females and male specimens. This species, from Brazilian Atlantic Forest, has remained undescribed for at least about a century, because of two previous mistakes involving the taxonomy of species with similar general aposematic coloration.

Key words: *Graptocleptes bicolor*; Harpactorini; *Hiranetis atra*; *Reduvius coleopteroides*; wasp mimicry.

Resumen. *Hiranetis vanderheydeni* sp. nov. (Hemiptera: Heteroptera: Reduviidae: Harpactorinae) se describe de Brasil a partir de especímenes hembras y machos. Esta especie, de la Mata Atlántica brasileña, no ha sido descrita durante al menos un siglo, debido a dos errores previos relacionados con la taxonomía de especies con similar coloración aposemática general.

Palabras clave: *Graptocleptes bicolor*; Harpactorini; *Hiranetis atra*; mimetismo de avispa; *Reduvius coleopteroides*.

Introduction

The subfamily Harpactorinae has the largest number of genera and species of Reduviidae (Hemiptera: Heteroptera) and is composed by the tribes Apiomerini and Harpactorini in the Neotropical region (Gil-Santana *et al.* 2015). Harpactorini is the most diverse group within Reduviidae, containing about 53 genera in the Neotropics (Forero 2011; Gil-Santana 2015; Gil-Santana *et al.* 2015, 2017; Gil-Santana and Oliveira 2023). Several taxa of Harpactorini are recognized as mimicking with Hymenoptera, resembling bees or wasps in general body and wing coloration as well as characteristics of physical proportions (*e.g.*, Maldonado and Lozada 1992; Gil-Santana 2015, 2016, 2022; Gil-Santana *et al.* 2013, 2015, 2017; Castro-Huertas and Forero 2021; Gil-Santana and Oliveira 2023). Maldonado and Lozada (1992) presented a key to Neotropical wasp-mimicking Harpactorinae genera, which in their view helps to quickly sort out specimens from unidentified material, although this is a somewhat artificial way of grouping genera. An updated version of this key and a summary of more recent works dealing with these genera were presented by Gil-Santana and Oliveira (2023). In

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this key, with exception of *Coilopus* Elkins 1969, which is regarded as mimicking species of Vespidae (Elkins 1969; Forero and Giraldo-Echeverry 2015), all other genera are considered as mimetic of Braconidae and/or Ichneumonidae. When stating such alleged mimicry between Harpactorini and certain Ichneumonidae and Braconidae, most authors have only mentioned or given attention to the pattern of yellowish or straw-colored hemelytra with a median transverse black or dark band (e.g., Champion 1899; Haviland 1931; Maldonado and Lozada 1992; Hogue 1993). However, Gil-Santana (2015, 2016), Gil-Santana *et al.* (2017) and Gil-Santana and Oliveira (2023) emphasized that other wasp-mimicking Harpactorini, like *Parahiranetis salgadoi* Gil-Santana, 2015 and *Quasigraptocleptes maracristinae* Gil-Santana & Oliveira, 2023, show a pattern of darkened to reddish general coloration with yellowish 'pterostigmata' on the hemelytra, which is similar to the similar coloration exhibited in the hemelytra by several other species of Ichneumonidae and Braconidae. This pattern was also recorded for instance in *Graptocleptes bicolor* (Burmeister, 1838), *G. haematogaster* (Stål, 1860), and an undescribed species of *Hiranetis* Spinola, 1840 (Gil-Santana 2016; Gil-Santana *et al.* 2017; Gil-Santana and Oliveira 2023). Yet, in some other species of wasp-mimicking Harpactorini, the hemelytra are almost or completely dark, such as in *Hiranetis atra* Stål, 1872 (Gil-Santana 2016). Another common feature among all these species with a darkened general coloration on the hemelytra, with or without yellowish 'pterostigmata', is the presence of pale bands on the middle and hind femora (Gil-Santana 2015, 2016; Gil-Santana and Oliveira 2023). It is noteworthy that in those species in which the nymphs have been found, they have showed to have a coloration which is cryptic in relation to the substratum but not resembling hymenopterans, as the adults do (Gil-Santana *et al.* 2017).

An intraspecific variation in color, occasionally at extreme range, was documented in many harpactorines (e.g., Stål 1872; Champion 1899; Gil-Santana 2008, 2022; Zhang *et al.* 2016), including in some wasp-mimicking Harpactorini (Champion 1899; Gil-Santana *et al.* 2013, 2017; Gil-Santana and Oliveira 2023). However, at least in the species with the pattern of darkened or blackish hemelytra with yellowish pterostigmata, there is no variation in this pattern. The yellowish pterostigmata are always present (e.g., Gil-Santana *et al.* 2013, 2017; Gil-Santana and Oliveira 2023).

Sexual dimorphism has been recorded in several species of Harpactorini. In a number of species belonging to *Zelus* Fabricius, 1803, for example, males and females differ drastically in size, body configuration, and coloration (Zhang *et al.* 2016). In *Acanthischium* Amyot & Serville, 1843 the pattern of coloration was found as being sexually dimorphic in most species of the genus (Castro-Huertas and Forero 2021). In addition to the bigger size and larger abdomen of females, males in several genera have larger eyes and/or a basally-thickened third antennal segment. The latter has been considered to be among the diagnostic features at generic level (Stål 1872; Champion 1899; Martin-Park *et al.* 2012; Gil-Santana *et al.* 2013; Gil-Santana 2016). However, sexual dimorphism may also be limited to minor differences in coloration and size, as in many species of *Zelus* (Zhang *et al.* 2016).

The male genitalia has been found to provide useful diagnostic characteristics for distinguishing species within the genera of Harpactorini by diverse authors (e.g., Elkins 1954a, b; Hart 1975, 1986, 1987; Zhang *et al.* 2016; Gil-Santana *et al.* 2017; Castro-Huertas and Forero 2021). Among wasp-mimicking Neotropical Harpactorini, they have been described for species of *Acanthischium* (Castro-Huertas and Forero 2021), *Graptocleptes bicolor* (Gil-Santana *et al.* 2013), *Hiranetis atra* (Gil-Santana 2016), *Parahiranetis salgadoi* (Gil-Santana *et al.* 2017), and *Quasigraptocleptes maracristinae* (Gil-Santana and Oliveira 2023). The genera to which the latter four species belong, *Graptocleptes* Stål, 1866, *Hiranetis*, *Parahiranetis* Gil-Santana, 2015, and *Quasigraptocleptes* Gil-Santana & Oliveira, 2023 are considered to be closely related to each other (Stål 1872; Champion 1899; Gil-Santana 2015, 2016; Gil-Santana *et al.* 2017; Gil-Santana and Oliveira 2023), allowing for important comparisons of several diagnostic traits of male genitalia.

Data on natural enemies or parasitoids, such as Tachinidae (Diptera) of Neotropical Harpactorinae are lacking. Phasiinae (Diptera: Tachinidae) eggs on external portions of the body of a male *Apiomerus mutabilis* Costa Lima, Seabra & Hathaway, 1951, on several individuals of *Heniartes jaakkoi* Wygodzinsky, 1947 (Harpactorinae: Apiomerini) (Gil-Santana and Forero 2010), and on a female of *Zelus versicolor* (Herrich-Schäffer, 1848) (Harpactorinae: Harpactorini) were recorded by the author (HRG-S), in Nova Friburgo, Rio de Janeiro State, Brazil (Gil-Santana and Forero 2010; Gil-Santana and Dios 2023). In the same latter locality, a female adult of *Xanthomelanodes* cf. *brasiliensis* Townsend, 1929 (Diptera: Tachinidae: Phasiinae: Gymnosomatini) emerged from an adult female of *Heniartes jaakkoi*, which had a Phasiinae egg on its thorax, being considered the first record of such parasitoidism in Reduviidae in the Neotropical region as well as the proof of the fact that the presence of those eggs may indicate such parasitoidism (Gil-Santana and Dios 2023).

Walker (1873a) described *Reduvius coleopteroides* based on a single female specimen (erroneously stated as male in the original description). The species was then transferred to *Hiranetis* by Distant (1903), without justification, and subsequent authors (Wygodzinsky 1949; Maldonado 1990) followed the new systematic placement (*H. coleopteroides*) (Gil-Santana *et al.* 2013). The latter authors, however, showed that *Hiranetis coleopteroides* (Walker, 1873) was in fact a species of *Graptocleptes* and a junior synonym of *Graptocleptes bicolor* (Burmeister, 1838). Because of this long unrecognized synonym, specimens belonging to a species of *Hiranetis*, which has the same coloration pattern of *G. bicolor*, have been wrongly identified as *H. coleopteroides* and has remained undescribed so far. In fact, specimens deposited in the former Entomological Collection of the National Museum of the Federal University of Rio de Janeiro (MNRJ) (entirely destroyed by the fire on the September 2, 2018; Escobar 2018) of this undescribed species of *Hiranetis* were determined [wrongly] as "*Hiranetis coleopteroides*". This is the species which is formally described here as *Hiranetis vanderheydeni* sp. nov.

Material and Methods

The type specimens of *Hiranetis vanderheydeni* sp. nov. will be deposited in the Entomological Collection of the "Museu Nacional da Universidade Federal do Rio de Janeiro", Rio de Janeiro, Brazil (MNRJ). Dissections of the male genitalia of three type-specimens were made by removing the pygophore from the abdomen with a pair of forceps and then clearing in NaOH solution for 24 hours. The dissected structures were studied and photographed in glycerol. The images of non-type specimens deposited in MNRJ before the September 2, 2018, when a fire destroyed most of the zoological collections, including the entire Heteroptera collection (Escobar 2018), were taken in 2012, using digital cameras Sony DSC H-10 and Sony DSC-HX200V (Figs. 1-5). Most of the images of external and genital structures were taken using digital cameras (Nikon D5600 with a Nikon Macro Lens 105 mm, Sony DSC-W830 and Sony DSC-HX400V) (Figs. 6-12, 19-20, 23-41). Drawings were made using a camera lucida. The vestiture (setation) was omitted in the ink drawings of Fig. 15, only to make the shape and/or structure of these portions better visible. Images were edited using Adobe Photoshop CS6. Observations were made using a stereoscope microscope (Zeiss Stemi) and a compound microscope (Leica CME). Measurements were made using a micrometer eye piece. The total length of the head was measured excluding the neck, for better uniformity of this measurement. General morphological terminology mainly follows Schuh and Weirauch (2020). Currently, there is a lack of consensus about the terminology to be applied to female and male genitalia in Reduviidae (*e.g.*, Rédei and Tsai 2011). Therefore, in order to maintain uniformity with previous works about species of Harpactorini, the terminology of the male and female genitalia structures generally follows Gil-Santana *et al.* (2013, 2017), Gil-Santana (2016) and Gil-Santana and Oliveira (2023). When describing label data, a slash (/) separates the lines and a double slash (//) different labels; acronyms of the depository collection and comments or translations to English of the label data are provided in square brackets ([]).

Taxonomy

Subfamily Harpactorinae

Tribe Harpactorini

Hiranetis Spinola, 1840

Hiranetis Spinola 1840a [1837]: 112-113 [description]; 1840b: 112-113 [description]; Stål 1859: 367 [key], 371 [citation, species included]; Stål 1866: 294 [key]; Stål 1872: 69 [diagnosis, key], 82-83 [catalog]; Walker 1873a: 64 [key]; Walker 1873b: 129 [catalog]; Lethierry and Severin 1896: 178 [catalog]; Champion 1899: 280 [comments]; Wygodzinsky 1949: 40 [catalog]; Elkins 1969: 459 [citation]; Putshkov and Putshkov 1985: 46 [catalog]; Maldonado 1990: 218 [catalog]; Maldonado and Lozada 1992: 165 [key]; Froeschner 1999: 206 [catalog]; Forero 2011: 15 [checklist]; Gil-Santana *et al.* 2013: 348, 358 [citations], 359 [separation from *Graptocleptes*]; Gil-Santana 2015: 29-30 [citations], 35-36 [separation from *Graptocleptes* and *Parahiranetis*], 37 [key]; Gil-Santana 2016: 92, 107 [citations, comments], 94 [bibliographical list]; Gil-Santana *et al.* 2017: 20, 41-42 [comments with related genera], 43 [separation from *Graptocleptes* and *Parahiranetis*]; Gil-Santana and Oliveira 2023: 164 [citation], 165 [comments with related genera], 198-199 [separation from *Graptocleptes*, *Quasigraptocleptes* and *Parahiranetis*], 200 [key].

Type species. *Hiranetis membranacea* Spinola, 1840a [1837]: 113-114, by monotypy.

Diagnosis. *Hiranetis* can be separated from other Neotropical wasp-mimicking Harpactorini genera by the key provided by Gil-Santana and Oliveira (2023) and the following set of characteristics: General appearance: wasp-mimetic. Head gibbous, large, swollen ventrally, subequally as long as wide across eyes; densely covered with long setae on ventral and postocular portions; postantennal tubercles very short to almost imperceptible or even absent, acute or rounded; in dorsal view, postocular portion clearly separated from a distinct neck; legs elongated, slender; fore femur longer than head and pronotum together, thicker basally. Hemelytra long, surpassing the abdomen by about half of the length of the membrane.

Currently, three species considered as valid are included in *Hiranetis*: *H. atra*, *H. braconiformis* (Burmeister, 1835) and *H. membranacea* Spinola, 1840 (Maldonado 1990; Gil-Santana *et al.* 2013; Gil-Santana 2016). While *H. atra* can be securely separated from the other species of the genus by its coloration, which is predominantly blackish, including the entirely dark hemelytra, the other two species (*H. braconiformis* and *H. membranacea*), which have the pattern of yellowish or straw-colored hemelytra, with a median, transverse band and a dark apex, have uncertain validity or limits (Gil-Santana 2016). As discussed by the latter author, although some synonymies have been proposed to *H. braconiformis* and *H. membranacea*, the lost of the type specimens of *H. membranacea* does not allow to be sure about the validity or an accurate definition of this situation without a taxonomic review, even more taking into consideration the intraspecific variation in color that occurs in Harpactorini in general (e.g., Stål 1872; Champion 1899; Gil-Santana 2008, 2022; Zhang *et al.* 2016), including in some wasp-mimicking Harpactorini (Champion 1899; Gil-Santana *et al.* 2013, 2017; Gil-Santana and Oliveira 2023). *Hiranetis atra*, however, because of its distinct pattern of dark general coloration with yellowish bands on middle and hind femora may be distinguished from other species of the genus. The male of *H. atra* was described and compared with the female of the species by Gil-Santana (2016), allowing a good comparison with the new species described here. *Hiranetis atra* has been recorded from Ecuador, Colombia and Costa Rica (Stål 1872; Gil-Santana 2016).

Hiranetis vanderheydeni sp. nov.

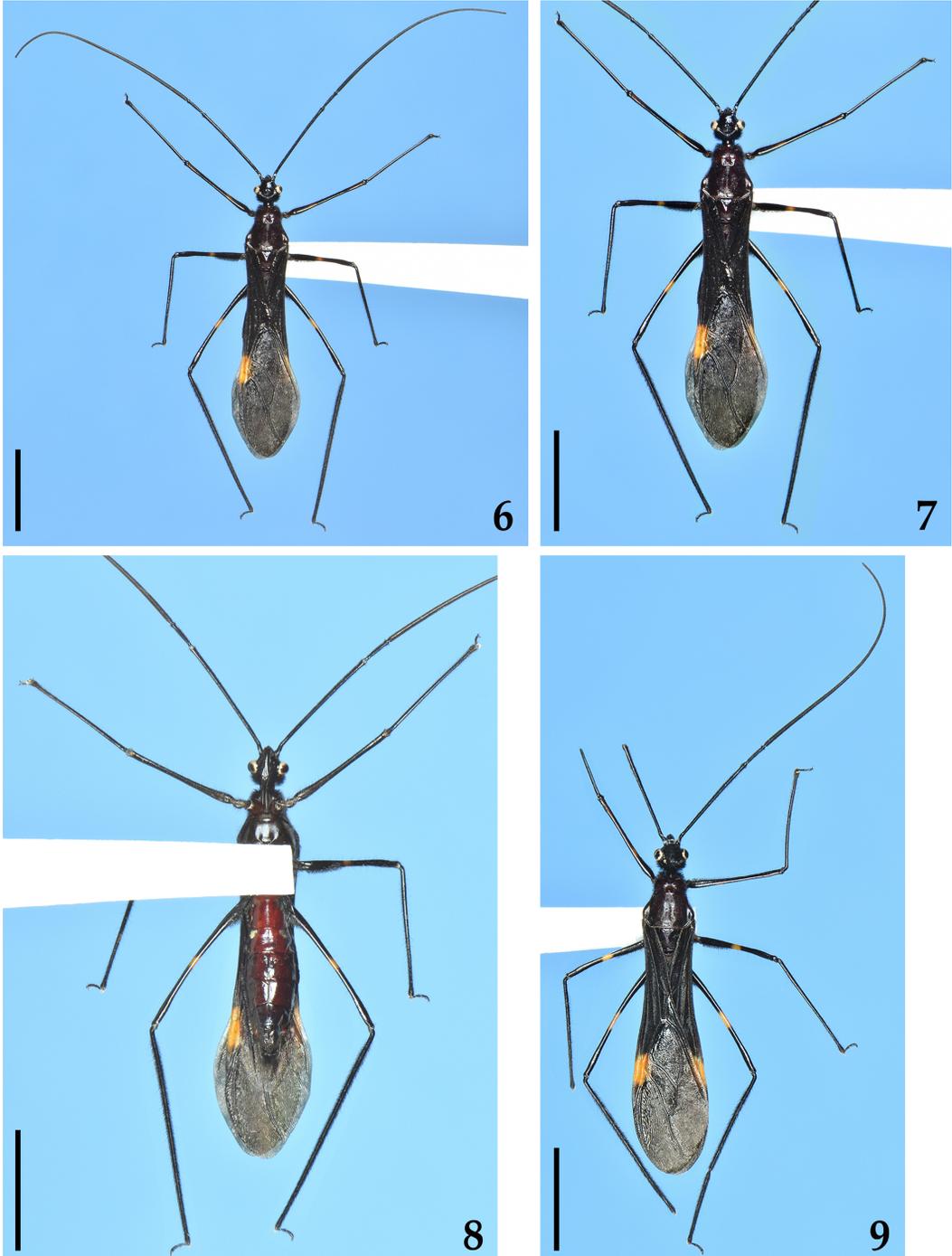
(Figs. 6-43)

Notes. As commented above, in the former Entomological Collection of the MNRJ, among specimens of wasp-mimicking Harpactorini (Fig. 1), there were a lot of specimens belonging to *Hiranetis* identified [wrongly] as *Hiranetis coleopteroides*, actually a junior synonym of *Graptocleptes bicolor* (Gil-Santana *et al.* 2013), which in most part were in fact specimens of the new species described here. One of these specimens was photographed separately by the author (Figs. 2-5), supporting this assertive. Unfortunately, because all these specimen were destroyed (Escobar 2018), they were not included in the present study.

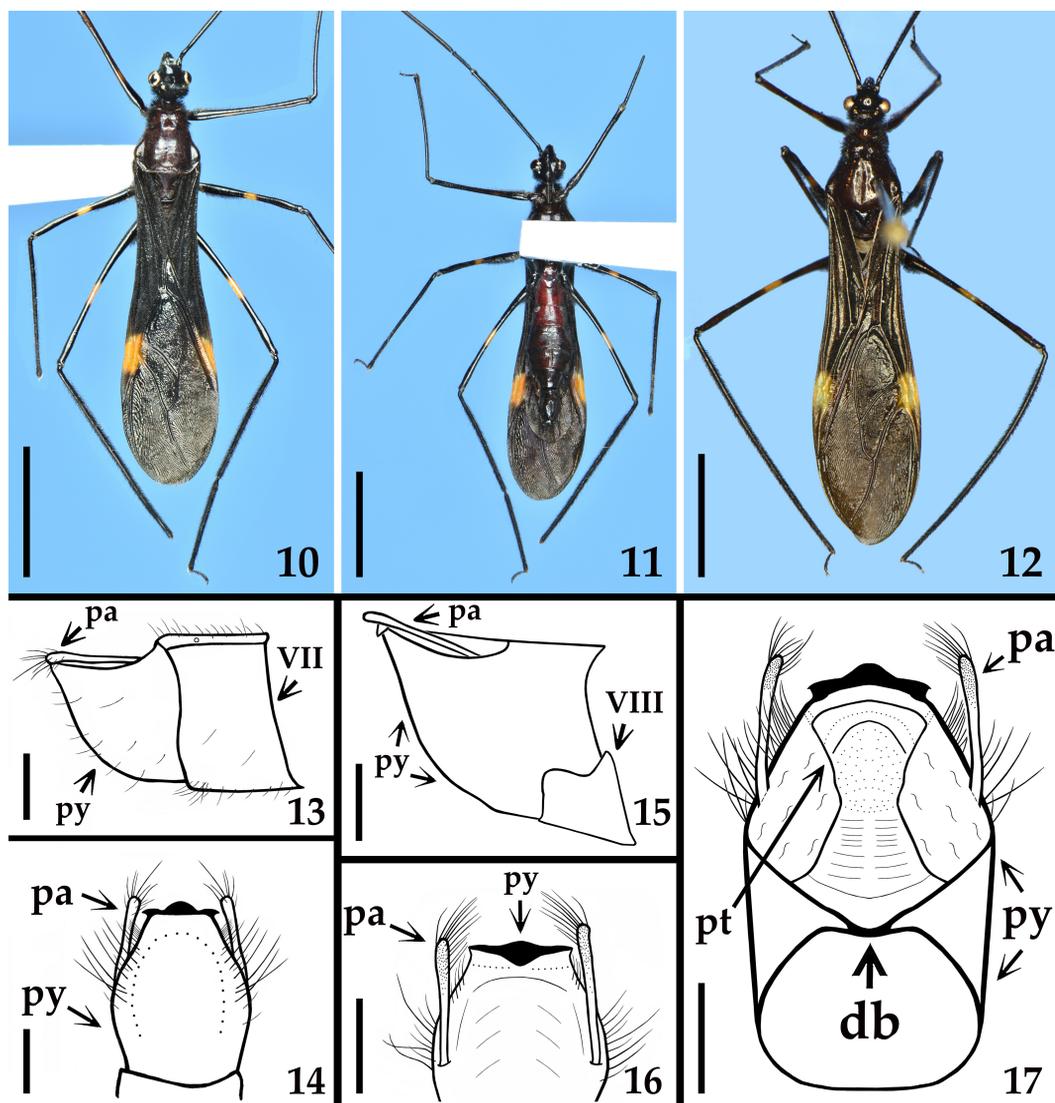


Figures 1-5. Non-type specimens of wasp-mimicking Harpactorini previously deposited in the former Entomological Collection of MNRJ. 1. Drawer with specimens of several genera and species. 2-5. Non-type male of *Hiranetis vanderheydeni* sp. nov. labeled as *Hiranetis coleopteroides*. 2. Dorsal view. 3-4. Lateral views. 5. Labels. / **Figuras 1-5.** Especímenes no tipo de Harpactorini que imitan avispas depositados previamente en la antigua Colección Entomológica del MNRJ. 1. Caja con ejemplares de varios géneros y especies. 2-5. Macho no tipo de *Hiranetis vanderheydeni* sp. nov. etiquetado como *Hiranetis coleopteroides*. 2. Vista dorsal. 3-4. Vistas laterales. 5. Etiquetas.

Type material. BRAZIL, Minas Gerais, Juiz de Fora Municipality, iii. 1997, J. da Silva leg. 1 male holotype, 2 male paratypes, 6 female paratypes; Rio de Janeiro, Cachoeiras de Macacu Municipality, xii.1995, 1 male paratype, N. Tangerini leg.; Nova Friburgo Municipality, 1 female paratype.



Figures 6-9. *Hiranetis vanderheydeni* sp. nov., male. Scales: 5.0 mm. 6-8. Holotype. 6-7. Dorsal view. 8. Ventral view. 9. Paratype, dorsal view. / **Figuras 6-9.** *Hiranetis vanderheydeni* sp. nov., macho. Escalas: 5,0 mm. 6-8. Holotipo. 6-7. Vista dorsal. 8. Vista ventral. 9. Paratipo, vista dorsal.

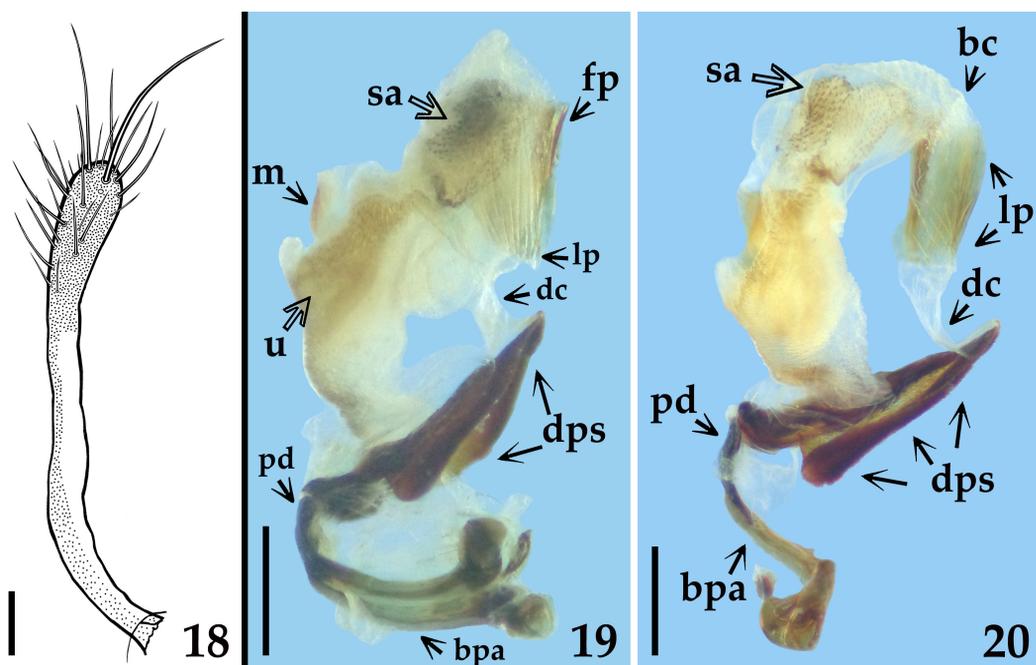


Figures 10-17. *Hiranetis vanderheydeni* sp. nov., male. 10-12. Paratypes. Scales: 5.0 mm. 10-11. Same specimen. 10, 12. Dorsal view. 11. Ventral view. 13-17. Male terminalia. Scales: 0.5 mm. 13-14. Apex of VII abdominal segment and genital capsule. 13. Lateral view. 14. Ventral view. 15. Pygophore and apex of segment VIII, lateral view. 16. Apex of pygophore, phallus extracted, dorsal view. 17. Pygophore, dorsal view. / **Figuras 10-17.** *Hiranetis vanderheydeni* sp. nov., macho. 10-12. Paratipos. Escalas: 5,0 mm. 10-11. Mismo ejemplar. 10, 12. Vista dorsal. 11. Vista ventral. 13-17. Terminalia masculina. Escalas: 0,5 mm. 13-14. Ápice del VII segmento abdominal y cápsula genital. 13. Vista lateral. 14. Vista ventral. 15. Pigóforo y ápice del segmento VIII, vista lateral. 16. Ápice del pigóforo, falo extraído, vista dorsal. 17. Pigóforo, vista dorsal.

Etymology. The new species is named in honor of the German entomologist Torsten van der Heyden because of his valuable contributions to the knowledge of Heteroptera.

Diagnosis. The new species most closely resembles *Hiranetis atra*, both of which with a general blackish coloration and yellowish submedian anulli on middle and hind femora. However, while the adults of *H. atra* have the hemelytron completely blackish, those of *H.*

vanderheydeni sp. nov. have a conspicuous yellowish spot on external and mid-distal portion of corium, reaching adjacent part of membrane, especially in basal portion of distal cell of membrane. The males of both species may be easily separated by their male genitalia. The apex of the pygophore of *H. atra* is subtriangular, while that of *H. vanderheydeni* sp. nov. has an almost straight margin, in which the median portion is globose and subhemispherical and the lateral angles are prominently acute. In the phallus, the basal plate arms are more elongated in *H. vanderheydeni* sp. nov. and the dorsal phallosclerite (dps) is very different between them. While the dps is weakly sclerotized, flat, suboval in shape, with apical margin almost transverse and straight in *H. atra*, it is quite sclerotized, less flattened, triangular, with lateral margins thickened and covered by numerous thin sclerotizations in *H. vanderheydeni* sp. nov. and acutely shaped at apex. Additionally, while in *H. vanderheydeni* sp. nov. the arms of the struts are separated only basally, becoming enlarged and completely fused, tapering apically, forming an arrow shaped structure, the arms of the struts of *H. atra* are parallel and expanded at apex, forming a pair of asymmetrical suboval/subsquared structures.



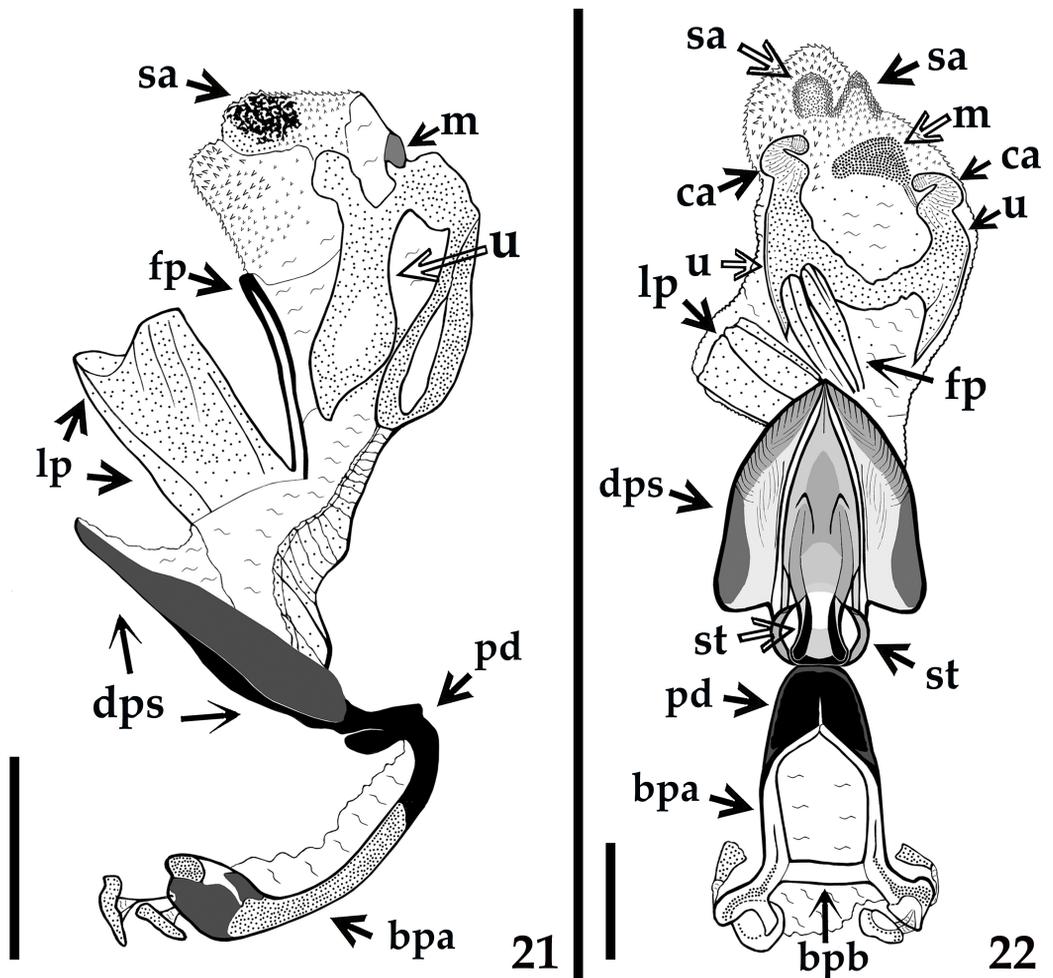
Figures 18-20. *Hiranetis vanderheydeni* sp. nov., male genitalia. **18.** Right paramere, dorsal view. Scale: 0.1 mm. **19-20.** Phallus almost completely expanded, lateral view. Scale: 0.5 mm. / **Figuras 18-20.** *Hiranetis vanderheydeni* sp. nov., genitalia masculina. **18.** Parámetro derecho, vista dorsal. Escala: 0,1 mm. **19-20.** Falo casi completamente expandido, vista lateral. Escala: 0,5 mm.

Description. Male (Figs. 6-33). Measurements are given in Tab. 1. **Coloration:** general coloration black, brownish black, with reddish portions (Figs. 6-12). Head, including antennae, black. Thorax mostly blackish; hemelytra generally black to brownish black, with a yellowish spot on external and mid-distal portions of corium (Figs. 6-12), reaching adjacent part of membrane, especially in basal portion of distal closed cell of membrane (Fig. 12). Hind wing mostly black to brownish-black, with clear area at basal portion and in three lines parallel to veins. Fore femur black to dark brown, dorsal surface faintly paler on a submedian narrow basal marking and on distal dorsal portion, in holotype and three paratypes, and almost completely faintly paler in one paratype. Middle and hind femora

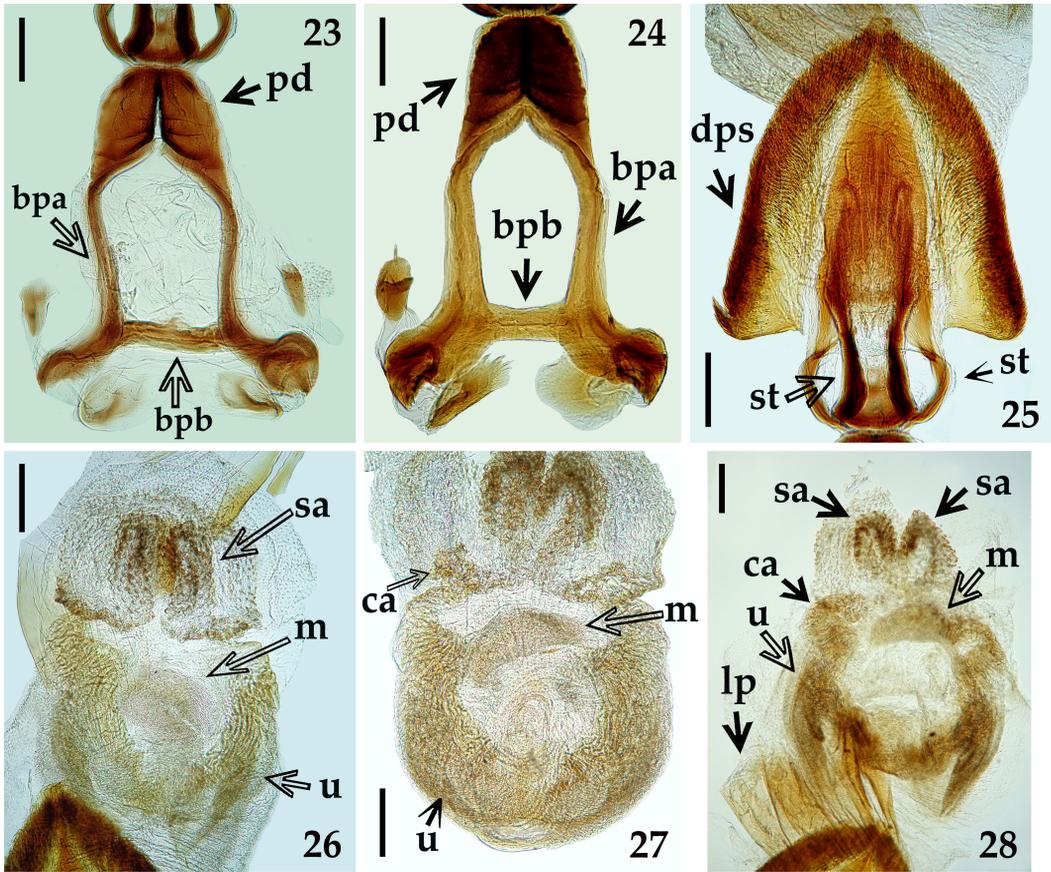
black, with a well marked yellowish annulus situated somewhat basally to midportion of each femur (Figs. 6-12). On both femora, the annuli are approximately 1/6 to 1/7 as long as the segment and its midpoint is about 8 to 9% basal from midpoint of the segment, respectively. Tibia and tarsi black. Abdomen: sternites II-III mostly reddish brown to light reddish (Figs. 8, 11); connexivum of segment II dark basally; sternite IV with variable extension of reddish color on its median portion; remaining segments with ill defined and variable reddish portions or completely blackish; genital capsule blackish. **Structure and vestiture:** integument mostly shiny, smooth. **Head:** gibbous, large, approximately or as long as wide across eyes; integument shiny, with sparse long and short, straight or somewhat curved blackish setae; the latter much denser, forming pubescence of long blackish thick setae on tubercle between ocelli, postocular portion and gula; almost completely glabrous between eyes. Anteocular portion longer than postocular; the latter, in dorsal view, shortly narrowing to form the neck. Postantennal tubercles very small, blunt, almost imperceptible or absent. Clypeus straight and curved in dorsal and lateral views, respectively. Antenna inserted at level of upper half of eye, in lateral view. Scape and pedicel straight, with shiny and smooth integument, ventral surface of scape and base of both segments almost or completely glabrous; ventral surface of pedicel with less numerous setae; remaining portions of scape and pedicel covered with very numerous darkened short setae and scattered few slightly longer setae; flagellomeres curved, with opaque and somewhat rugose integument; covered with dense, very short and somewhat lighter colored pubescence, with short darkened setae scattered on first flagellomere and few of these on second flagellomere; first flagellomere slightly thickened in basal half; distal half of first flagellomere and second flagellomere thinner than pedicel. Eyes globose, glabrous, projecting laterally, prominent in dorsal view, reaching dorsal margin of head at interocular sulcus in approximately the distal portion of its middle third; not reaching ventral margin of head, which is far from inferior margin of the eye. Interocular sulcus thin, curved moderately deep, reaching eyes at their approximately middle third; just anterior to it, on midline, a longitudinal short thin shallow sulcus, which may seem imperceptible. Ocelli and portion between them elevated, small, rounded, much closer to eyes than to each other. Labium stout, curved, with scattered and somewhat curved, longer and thinner dark setae, which are longer and more numerous on basal portion of anterior surface of first visible segment; segment II (first visible) thickest, straight, reaching level of middle portion of eyes, slightly longer than segment III; segment III somewhat curved; segment IV shortest, triangular, tapering, reaching level of posterior portion of prosternum. Neck thin. **Thorax:** with shiny and mostly smooth integument. Anterior collar inconspicuous; anterolateral angles subtriangular; prothorax densely covered with very numerous blackish thick setae on forelobe, propleura and prosternum. Transverse sulcus moderately deep, interrupted before middle by a pair of submedian shallow carina. Midlongitudinal sulcus on forelobe of pronotum becoming abruptly deeper at transverse sulcus to form a depression; posteriorly to the latter, a blunt short rounded prominence. Hind lobe of pronotum with sparse long setae at dorsal portion or, almost glabrous, except on midline, where thinner, somewhat shorter and light yellowish to whitish setae, which sometimes are associated with a small amount of white wax-like substance, forming a faint midlongitudinal line on hind lobe; the latter is completely absent or only partially present among individuals; midlongitudinal furrow very shallow, absent on basal and distal portions or almost not evident; lateral longitudinal sulci well marked at posterior half to posterior two-thirds. Humeral angle slightly elevated, rounded at lateral margin. Scutellum elevated at disc, rounded posteriorly; glabrous on elevated portion, with scattered blackish long setae laterally. Mesopleura and metapleura with sparse and long blackish setae, which are much shorter and less numerous at center of mesosternum and metasternum; mesosternum with a median U-shaped carina posteriorly. Legs: coxae

almost completely glabrous on basal and dorsal portions, with few to numerous dark stout setae on distal half to distal third, and ventrally; trochanters densely covered with long setae laterally; all femora thicker basally and slightly subapically too, covered with scattered few long and strong dark setae and with a dense group of long and thick setae and some thinner and even longer setae on ventral portion of the basal enlarged portion of femora. Fore tibiae somewhat curved to straight, with uniform thickness, except at apex, which is somewhat enlarged, and where there is a short dorsal spur and a small mesal comb. Middle tibiae straight; hind tibiae variable, slightly curved at median portion to straight as observed in holotype. All tibiae with scattered long thin blackish setae; fore and middle tibiae covered with shorter dark setae on ventral surface, which become progressively more numerous towards apex, where they also cover lateral and dorsal surface; hind tibiae, except at base, densely covered with short dark setae, which are less numerous basally. Tarsi with moderately long dark setae. Hemelytra long, surpassing abdomen by about half length of membrane; corium with curved scattered adpressed short dark setae, which are much more numerous over costal and subcostal veins, becoming less numerous on distal half of corium, including over those veins; membrane glabrous. **Abdomen:** elongate; spiracles rounded; sternites with shiny integument and sparse long thin setae, which are light on reddish portions and dark on the blackish segments, and thicker, longer and more numerous on parts adjacent to genitalia and on the latter too. Patches of minute, short, adpressed, thin, whitish setae present on basal half of midlateral portions of sternites III, IV and sometimes V; these setae are frequently covered with a variable amount of white wax. On sternite III the patch is small and subrounded; on sternite IV and V (when present), larger and elongated. Abdominal segment VIII completely concealed, blackish and sclerotized only on ventral face, which is subrectangular, with a small rounded prominence on median portion of posteroventral margin in one individual, and a small prolongation on basal portion, directed dorsad; dorsal portion entirely membranous and narrower; spiracles on dorsal margin of ventral portion. **Male genitalia** (Figs. 13-33): pygophore (py) blackish, suboval in ventral view, with an enlarged apex in which the posterior margin is almost straight, slightly curved laterally, its median portion globose and subhemispherical, and lateral angles prominently acute and slightly curved (Figs. 14, 16-17); between anterior and posterior genital openings, a very well sclerotized dorsal (transverse) bridge (db) with a conspicuous median rounded dorsal prominence (Fig. 17); proctiger (pt), enlarged toward its apex, posterior margin curved (Fig. 17); exposed surface of pygophore with long, thick and dark setae ventrally; these setae are somewhat more numerous on apicolateral portions (Figs. 13-14, 16-17). Parameres (pa) symmetrical (Figs. 14, 16-17), rod-like in shape, somewhat curved (Fig. 18); apices rounded, somewhat thickened, mostly blackish; glabrous in basal two-thirds and with long, stout, dark setae in apical third (Figs. 16-18); those setae at apicomедial margins even longer (Fig. 18). Phallus elongated; articulatory apparatus with long and narrow basal plate arms (bpa); basal plate bridge (bpb) narrow, shorter than basal plate arms; pedicel (pd) moderately short, slightly converging towards apex, sclerotized (Figs. 19-24). Dorsal phallothecal sclerite (dps) triangular in shape, sclerotized, with lateral margins thickened and covered by numerous thin sclerotizations, acute apically (Figs. 22, 25); struts (st) with curved lateral arms and subparallel somewhat curved median arms basally, all of them becoming completely fused and enlarged at approximately distal two-thirds, tapering apically, forming a very conspicuous arrow shaped structure (Figs. 22, 25). Endosoma wall smooth on basal half, becoming progressively more densely, minutely, spiny towards apex, with a subapical pair of prominent spiny subrounded to subtriangular lobes (sa) (Figs. 19-22, 26-29, 33). The following endosomal processes were observed: - a larger U-shaped basal process (u) formed by diffuse thickening and distal double curved elongated arms (ca) (Figs. 19, 21-22, 26-28); - a median subhemispherical process (m),

situated between the lateral arms of the U-shaped basal process, formed by a dense grouping of small thickenings (Figs. 19, 21-22, 26-28); - A pair of elongate, parallel, flat, median and weakly sclerotized processes (fp), wrapped in large smooth thin portion of endosoma wall (with fine longitudinal grooves) (Figs. 19, 21-22, 29-31), continuous with a larger lateral portion of endosoma (lp) (Figs. 19-22, 29-30, 32). The basal portion of these processes (fp) and the lateral portions (lp) lie apically in relation to the phallus and is connected largely basally by endosoma wall to the phallosoma (Figs. 19-20), forming a basal connection (bc) (Figs. 20, 29) and apically by a large thin membrane to the ventral portion of dorsal phallosomal sclerite, named here as a distal connection (dc) (Figs. 19-20, 29). When the latter connecting membrane is ruptured to achieve a complete expansion of the phallus, the set of flat processes (fp) and the lateral portion of endosoma (lp) was positioned near the subapical portion of phallus, partially connected to it (Figs. 29-30), or remained connected at median portion of the phallosoma as separated structures (Figs. 21-22, 28, 31-32).



Figures 21-22. *Hiranetis vanderheydeni* sp. nov., male genitalia, phallus completely expanded. Scales: 0.5 mm. 21. Lateral view. 22. Dorsal view. / Figuras 21-22. *Hiranetis vanderheydeni* sp. nov., genitalia masculina, falo completamente expandido. Escalas: 0,5 mm. 21. Vista lateral. 22. Vista dorsal.

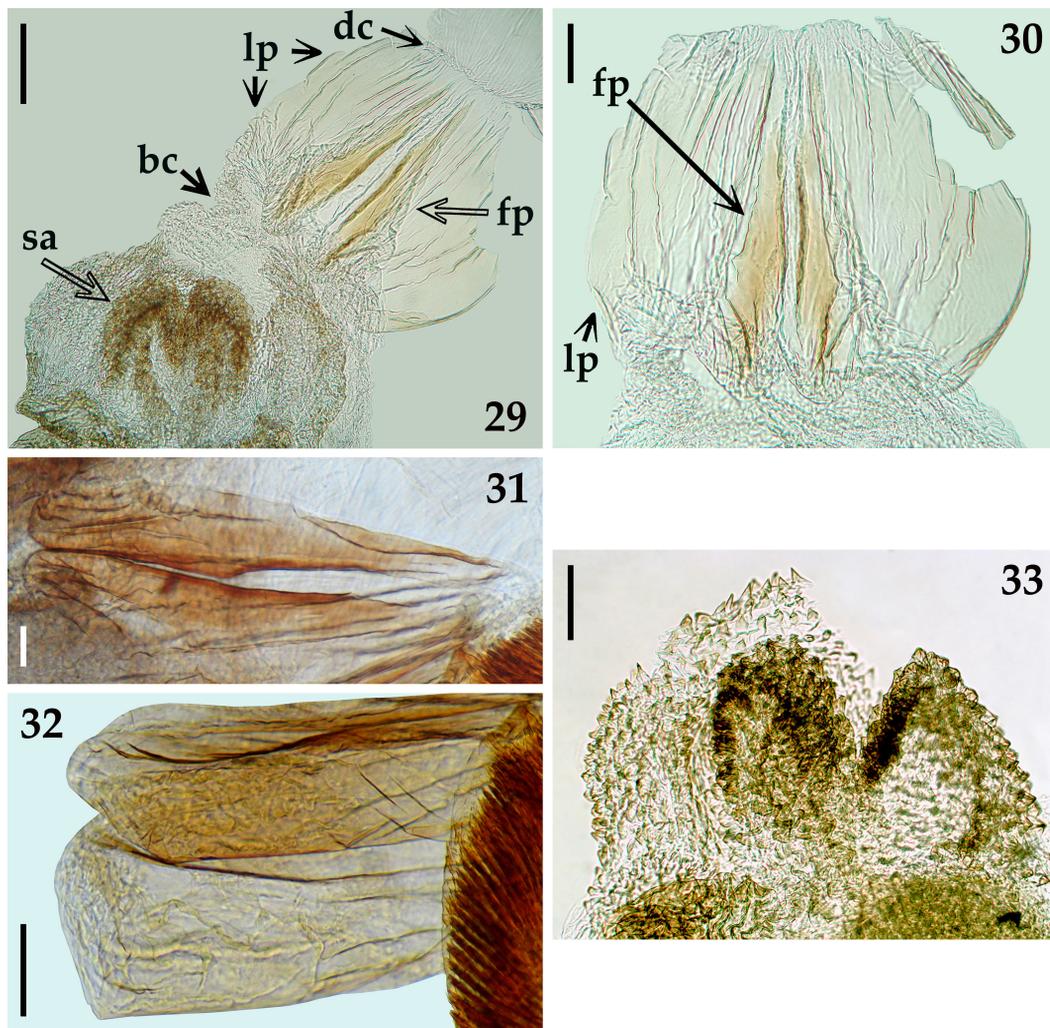


Figures 23-28. *Hiranetis vanderheydeni* sp. nov., male genitalia, phallic portions. Scales: 0.2 mm. 23-24. Articular apparatus. 23. Dorsal view. 24. Ventral view. 25-28. Dorsal view. 25. Dorsal phalothecal sclerite and struts. 26-28. Endosomal portions. 26-27. Apex not completely expanded. 26. Basal two thirds. 27. Basal third. 28. All portions completely extended. / **Figuras 23-28.** *Hiranetis vanderheydeni* sp. nov., genitalia masculina, porciones del falo. Escalas: 0,2 mm. 23-24. Aparato articular. 23. Vista dorsal. 24. Vista ventral. 25-28. Vista dorsal. 25. Plato falotecal dorsal y struts. 26-28. Porciones de endosoma. 26-27. Ápice no completamente expandido. 26. Dos tercios basales. 27. Tercio basal. 28. Todas las porciones, completamente extendidas.

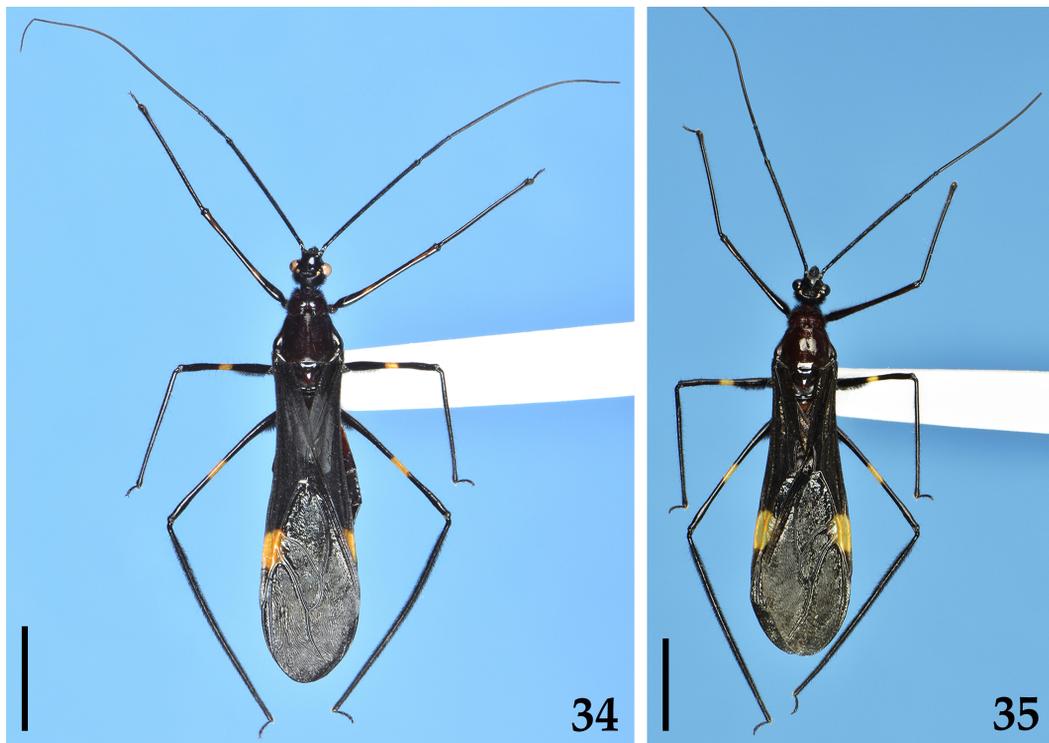
Female. (Figs 34-43). Measurements are given in Tab. 2. Similar to male, with the same general coloration or in some specimens with some variation such as: neck sometimes variably paler, dark reddish to bright reddish (Fig. 36); reddish tones on coloration variably and ill defined on fore lobe of pronotum, pleura, sterna and ventral portion of coxae (Fig. 36); disc of scutellum and/or apex variably paler, reddish brown in some specimens. Fore femora completely blackish in one individual, their dorsal surface faintly paler on a submedian narrow basal marking and on distal dorsal portion in four paratypes, almost completely faintly paler in one paratype and in other paratype, pale dorsal portion of femur is brighter. In the latter paratype, the hind femur has an additional smaller and faint yellowish annulus, between the base of the segment and the median annulus (Fig. 39). While the larger annulus, located at median position, was approximately 1/6 as long as the segment, the additional faint basal annuli, measured approximately 1/16 as long as the segment and located somewhat closer to the median

annulli than to the base of the femur (Fig. 39). First flagellomere not thickened in basal half. **External genitalia** (Figs. 42-43): blackish; tergite 9 with very long, sparse, strong blackish setae; paired gonoplac (g) and posterior margin of first gonapophysis (fg) with strong shorter setae.

Distribution. Brazil, in states of Minas Gerais and Rio de Janeiro.



Figures 29-33. *Hiranetis vanderheydeni* sp. nov., male genitalia, endosomal portions, dorsal view. **29.** Apical portion of endosoma, flat processes and lateral large contiguous portions. Scale 0.2 mm. **30.** Flat processes and lateral large contiguous portions. Scale 0.1 mm. **31-32.** Processes which remained in the middle portion of the endosoma in an individual. **31.** Flat paired processes. Scale: 0.05 mm. **32-33.** Scales: 0.1 mm. **32.** Large lateral processes. **33.** Subapical lobes of endosoma wall. / **Figuras 29-33.** *Hiranetis vanderheydeni* sp. nov., genitalia masculina, porciones do endosoma, vista dorsal. **29.** Porción apical del endosoma, procesos planos y grandes porciones contiguas laterales. Escala: 0,2 mm. **30.** Procesos planos y grandes porciones contiguas laterales. Escala: 0,1 mm. **31-32.** Procesos que permanecieron en la porción media del endosoma en un individuo. **31.** Procesos pareados planos. Escala: 0,05 mm. **32-33.** Escalas: 0,1 mm. **32.** Grandes procesos laterales. **33.** Lóbulos subapicales de la pared del endosoma.



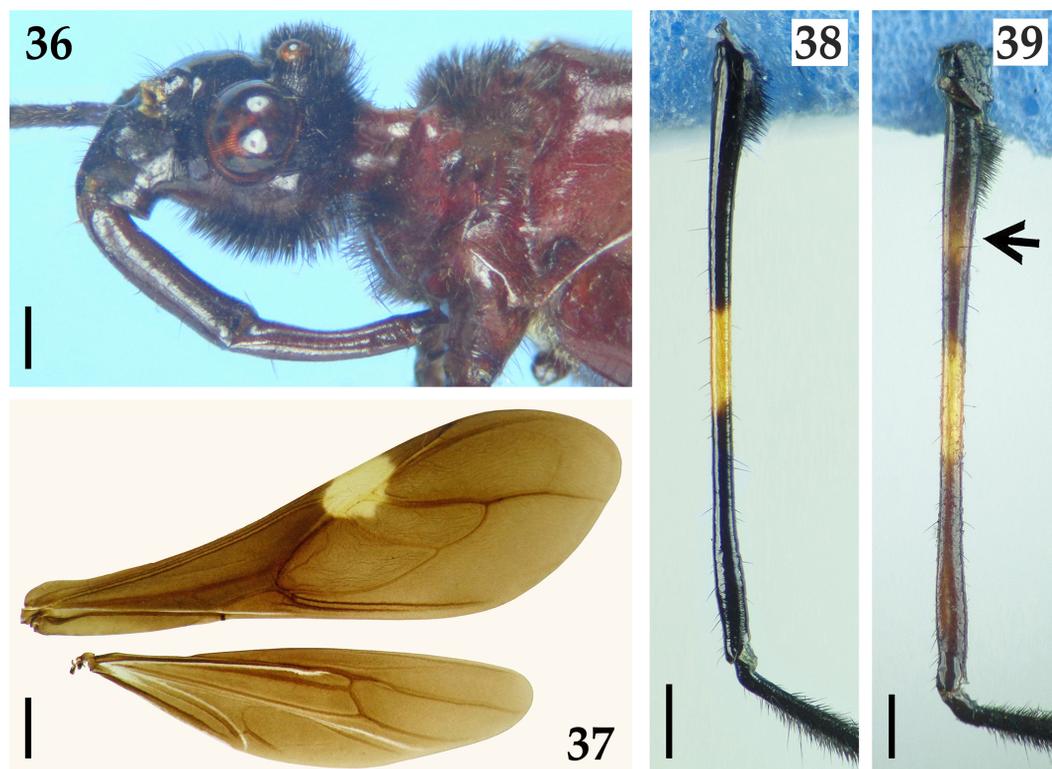
Figures 34-35. *Hiranetis vanderheydeni* sp. nov., female paratypes, dorsal view. Scales: 5.0 mm. / **Figuras 34-35.** *Hiranetis vanderheydeni* sp. nov., paratipos hembras, vista dorsal. Escalas: 5,0 mm.

Comments. Because two previous mistakes involving the taxonomy of species of Neotropical Harpactorini with similar general aposematic coloration, *i.e.*, 1 - the description of *Reduvius coleopteroides* Walker, 1873, in spite that it had already been described before as *Graptocleptes bicolor* (Burmeister, 1838) and, 2 – the unjustified transference of *R. coleopteroides* to *Hiranetis* in a new combination, *H. coleopteroides* by Distant (1903), resulted in the fact that further authors wrongly identified an undescribed species of *Hiranetis* as *H. coleopteroides* (*e.g.*, Figs. 2-5). Gil-Santana *et al.* (2013) clarified the actual status of *H. coleopteroides* by showing that it is in fact a junior synonym of *Graptocleptes bicolor* (Burmeister, 1838). After all, this species of *Hiranetis* is finally described as *H. vanderheydeni* sp. nov. here.

The slight variation in color recorded among the specimens of *H. vanderheydeni* sp. nov. studied here is considered as intra-specific variability. It is in accordance with the intraspecific variation in color, occasionally at extreme range, previously documented in many harpactorines (*e.g.*, Stål 1872; Champion 1899; Gil-Santana 2008, 2022; Zhang *et al.* 2016), including in some wasp-mimicking Harpactorini (Champion 1899; Gil-Santana *et al.* 2013, 2017; Gil-Santana and Oliveira 2023). On the other hand, about this subject, although females showed more examples of such differences, it is quite probably that it was recorded on them because more females were examined and not due to sexual dimorphism in coloration. Although the first flagellomere of the males have showed to be slightly thicker than those of the females (Tab. 1), the difference is not remarkable as recorded in other harpactorines and may remain unnoticed because of the small difference between both sexes, while the eyes did not show differences between male and females. The few males were slightly smaller than the females (Tabs. 1, 2), while the antennal pedicel was longer in the females (Tabs. 1, 2); some of the females showed larger abdomens, which is common in females in general. In regard to vestiture, no differences were noted too. However,

more specimens are in need to be examined in the future to ascertain if the few differences commented above are due to sexual dimorphism or interindividual variation.

Therefore, size of eyes, and thickness of the first flagellomere were not clear-cut enough to be considered as sexually dimorphic in *H. vanderheydeni* sp. nov. Despite the small number of measurements obtained for males (Tab. 1), it seemed enough to state that, unlike many other Harpactorini, adults of *H. vanderheydeni* sp. nov. can not be sexed readily with the naked eye, by observing these two traits.



Figures 36-39. *Hiranetis vanderheydeni* sp. nov., female paratypes. 36. Head and anterior portion of prothorax, lateral view. Scale: 0.5 mm. 37. Hemelytron and hind wing, dorsal view. Scale: 2.0 mm. 38-39. Hind left femora of two different paratypes, dorsal view. Scales: 1.0 mm. 39. The arrow points to an additional smaller annulus recorded in one paratype. / **Figuras 36-39.** *Hiranetis vanderheydeni* sp. nov., paratipos hembras. 36. Cabeza y porción anterior del protórax, vista lateral. Escala: 0,5 mm. 37. Hemelytron y ala trasera, vista dorsal. Escala: 2,0 mm. 38-39. Fémur posterior izquierdo de dos paratipos diferentes, vista dorsal. Escalas: 1,0 mm. 39. La flecha apunta a un anillo adicional más pequeño registrado en un paratipo.

Table 1. Measurements (mm) of male type specimens (N=4) of *Hiranetis vanderheydeni* sp. nov. / **Tabla 1.** Medidas (mm) de machos de la serie tipo (N=4) de *Hiranetis vanderheydeni* sp. nov.

	Holotype	Mean	SD	Maximum	Minimum
Length to tip of hemelytra	17.2	17.67	1.22	19.2	17.0
Length to tip of abdomen	13.0	13.65	0.91	15.0	13.0
Head length (excluding neck) ¹	1.8	1.85	0.1	2.0	1.8
Anteocular portion length ¹	0.7	0.75	0.05	0.8	0.7
Postocular portion length ¹	0.5	0.52	0.12	0.7	0.4

Head width across eyes	1.8	1.85	0.1	2.0	1.8
Interocular distance	1.0	1.02	0.05	1.1	1.0
Dorsal width of eye	0.4	0.4	0.0	0.4	0.4
Dorsal length of eye	0.6	0.65	0.05	0.7	0.6
Ocellar tubercle width	1.0	1.0	0.0	1.0	1.0
Ocellus width	0.1	0.1	0.0	0.1	0.1
Scape length	5.2	5.47	0.45	6.1	5.1
Pedicel length	1.2	1.2	0.08	1.3	1.1
Basiflagellomere length	13.0	12.37	0.75	13.0	11.5
Basiflagell. max. width	0.2	0.2	0.0	0.2	0.2
Distiflagellomere length (n=1)	-	-	-	0.4	0.4
Labial segment II length	1.5	1.4	0.1	1.5	1.3
Labial segment III length	1.2	1.2	0.08	1.3	1.1
Labial segment IV length	0.3	0.35	0.05	0.4	0.3
Fore lobe of pronotum length ²	0.8	0.72	0.09	0.8	0.6
Fore lobe of pronotum width ³	1.6	1.67	0.15	1.9	1.6
Hind lobe of pronotum length	1.6	1.85	0.25	2.2	1.6
Hind lobe of pronotum width	2.7	2.85	0.23	3.2	2.7
Scutellum basal width	1.2	1.0	0.14	1.2	0.9
Scutellum length	0.9	0.77	0.09	0.9	0.7
Fore femur length	5.0	5.17	0.49	5.9	4.8
Fore tibia length	5.5	5.45	0.25	5.7	5.1
Fore tarsus length	0.7	0.7	0.08	0.8	0.6
Middle femur length	4.8	4.82	0.12	5.0	4.7
Middle tibia length	5.5	5.85	0.45	6.5	5.5
Middle tarsus length	0.7	0.72	0.09	0.8	0.6
Hind femur length	7.0	7.07	0.29	7.5	6.8
Hind tibia length	9.5	9.8	0.85	11.0	9.0
Hind tarsus length	0.7	0.82	0.09	0.9	0.7
Abdomen length ⁴	7.2	7.75	0.37	8.0	7.2
Abdomen maximum width	2.4	3.05	0.69	4.0	2.4

¹Measured in lateral view; ²Measured at midline; ³Measured at distal portion; ⁴Measured on ventral view, at midline, from anterior margin of sternite II to posterior border of genitalia. / ¹Medido en vista lateral; ²Medido en la línea media; ³Medido en la porción distal; ⁴Medido en vista ventral, en la línea media, desde el margen anterior del esternito II hasta el borde posterior de los genitales.

Table 2. Measurements (mm) of female paratypes (N=7) of *Hiranetis vanderheydeni* sp. nov. / **Tabla 2.** Medidas (mm) de paratipos hembras (N=7) de *Hiranetis vanderheydeni* sp. nov.

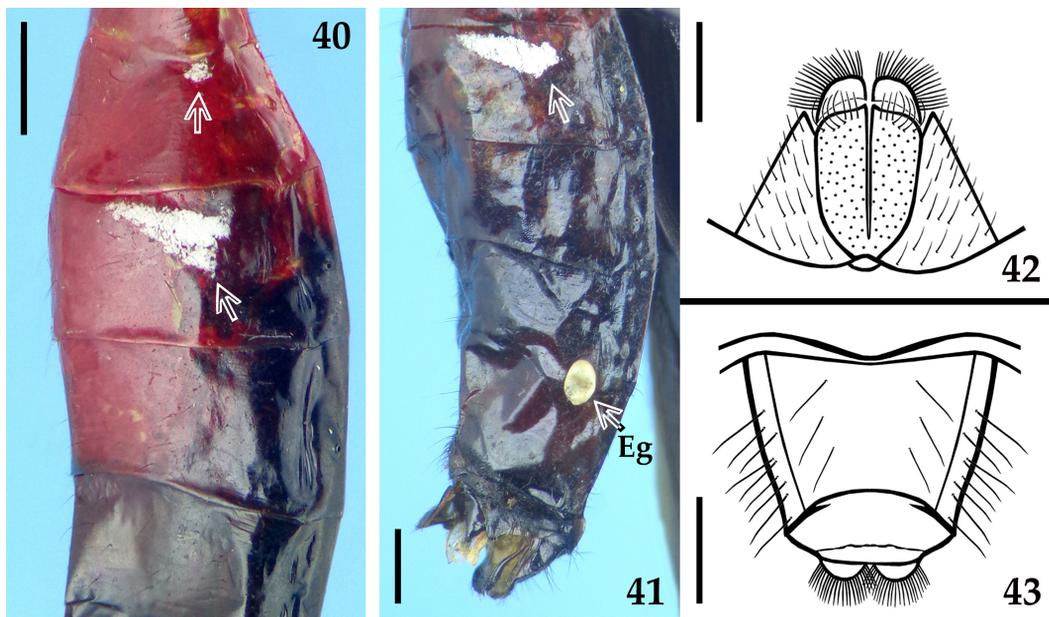
	Mean	SD	Maximum	Minimum
Length to tip of hemelytra	20.37	0.44	21.2	19.8
Length to tip of abdomen	15.78	0.26	16.0	15.0
Head length (excluding neck) ¹	2.01	0.12	2.2	1.8

Anteocular portion length ¹	0.78	0.08	0.9	0.7
Postocular portion length ¹	0.54	0.05	0.6	0.5
Head width across eyes	1.98	0.08	2.1	1.8
Interocular distance	1.18	0.03	1.2	1.1
Dorsal width of eye	0.42	0.04	0.5	0.4
Dorsal length of eye	0.65	0.05	0.7	0.6
Ocellar tubercle width	1.14	0.07	1.2	1.0
Ocellus width	0.15	0.05	0.2	0.1
Scape length	6.32	0.18	6.5	6.0
Pedicel length	1.82	0.04	1.9	1.8
Basiflagellomere length (n=5)*	13.75	2.32	16.0	11.5
Basiflagell. max. width	0.1	0.0	0.1	0.1
Distiflagellomere length (n=2)	2.0	0.28	2.2	1.8
Labial segment II length	1.54	0.05	1.6	1.5
Labial segment III length	1.2	0.06	1.3	1.1
Labial segment IV length	0.4	0.07	0.5	0.3
Fore lobe of pronotum length ²	0.71	0.10	0.9	0.6
Fore lobe of pronotum width ³	1.81	0.03	1.9	1.8
Hind lobe of pronotum length	2.2	0.11	2.4	2.0
Hind lobe of pronotum width	3.3	0.14	3.4	3.0
Scutellum basal width	1.08	0.06	1.2	1.0
Scutellum length	0.88	0.08	1.0	0.8
Fore femur length	5.52	0.23	5.9	5.2
Fore tibia length	5.77	0.14	6.0	5.5
Fore tarsus length	0.72	0.07	0.8	0.6
Middle femur length	5.1	0.25	5.5	4.7
Middle tibia length (n=6)	6.26	0.44	6.8	5.5
Middle tarsus length (n=5)	0.74	0.08	0.8	0.6
Hind femur length	8.05	0.42	9.0	7.8
Hind tibia length	10.78	0.35	11.0	10.0
Hind tarsus length	0.88	0.03	0.9	0.8
Abdomen length ⁴	9.21	0.26	9.5	9.0
Abdomen maximum width	3.5	1.14	4.9	2.5

¹Measured in lateral view; ²Measured at midline; ³Measured at distal portion; ⁴Measured on ventral view, at midline, from anterior margin of sternite II to posterior border of genitalia; *partially broken in two individuals. / ¹Medido en vista lateral; ²Medido en la línea media; ³Medido en la porción distal; ⁴Medido en vista ventral, en la línea media, desde el margen anterior del esternito II hasta el borde posterior de los genitales; *parcialmente roto en dos individuos.

The wax-like substance was sometimes absent from portions where it was observed on other specimens (*e.g.*, Figs. 40-41). It may be lost during the manipulation of the individuals, which may also include loss of the thin fragile short pale setae associated with it (Gil-Santana *et al.* 2017; Gil-Santana and Oliveira 2023). Body parts covered with

patches of setae with whitish wax-like material have been registered by several authors in some Harpactorini species, as summarized by Gil-Santana *et al.* (2017) and Gil-Santana and Oliveira (2023). It is noteworthy that the wax-like substance or the fragile white groupings of setae may be absent when specimens are examined and described, and thus the extent of their existence may remain unknown (Gil-Santana *et al.* 2017). Similarly, records of the presence or absence of these elements (groupings of whitish short setae and/or white wax), separately or together, may reveal as being additional features of systematic or taxonomic importance, in the same way as suggested for the “extensive sericeous areas on the abdominal sterna” of *Heza ventralis* Stål, 1872 (Maldonado 1976). Therefore, as stressed by Gil-Santana *et al.* (2017), future studies on Harpactorini should include careful handling of the specimens after collection, to avoid unintentional removal of these elements from their bodies. It is also recommended that this information should be included in the records and/or descriptions whenever present.



Figures 40-43. *Hiranetis vanderheydeni* sp. nov., female paratypes. **40-41.** Most portion of abdomen, lateral view; arrows point to the patches of whitish setae covered by white wax, small and subrounded on sternite III, larger and elongated on sternite IV. Scale: 1.0 mm. **41.** Eg, egg of Phasiinae (Diptera: Tachinidae) attached on the intersegmentar suture between sternites VI and VII, laterally. **42-43.** Female genitalia, external view. Scales: 0.5 mm. **42.** Ventral view. **43.** Posterior view. / **Figuras 40-43.** *Hiranetis vanderheydeni* sp. nov., paratipos hembras. **40-41.** La mayor parte del abdomen, vista lateral; las flechas apuntan las manchas de setas blanquecinas cubiertas por cera blanca, pequeñas y subredondeadas en el esternito III, más grandes y alargadas en el esternito IV. Escala: 1,0 mm. **41.** Eg, huevo de Phasiinae (Diptera: Tachinidae) adherido a la sutura intersegmentaria entre los esternitos VI y VII, lateralmente. **42-43.** Genitales de la hembra, vista externa. Escalas: 0,5 mm. **42.** Vista ventral. **43.** Vista posterior.

The male genitalia of *H. vanderheydeni* sp. nov. (Figs. 13-33) showed similarities to those of *G. bicolor* (Gil-Santana *et al.* 2013), *H. atra* (Gil-Santana 2016), *P. salgadoi* (Gil-Santana *et al.* 2017) and, *Q. maracristinae* (Gil-Santana and Oliveira 2023), such as: - parameres similar in shape and somewhat similar in vestiture (Figs. 13-18); - pedicel (pd) (= basal plate extension) short (Figs. 19-24); - struts with subparallel median arms and curved basal lateral arms (Figs. 22, 25), although with different shapes in each species; - a pair of elongate, parallel, flat, weakly sclerotized endosomal processes (fp) (Figs. 19, 21-22, 29-31), although with

different locations and shapes in each of these species. It is noteworthy that in most cited species such processes were recorded in the same position of the phallus, while in *G. bicolor* these processes were also recorded in different positions among diverse specimens; - a basal U-shaped and a median subspherical endosomal processes (Figs. 19, 21-22, 26-28) were recorded in *H. atra*, *P. salgadoi* and *Q. maracristinae*. In all these species, however, the distal double curved elongated arms of the former process, as recorded in *H. vanderheydeni* sp. nov. (Figs. 22, 27-28), were not present. Yet, variable, different, or not well evident spiny lobes or portions of endosoma wall were recorded in each of these species, making their comparison difficult. The apex of the pygophore is subtriangular in shape in *G. bicolor* and *H. atra*, and enlarged and arrow-shaped, with the lateral margins acutely pointed in *P. salgadoi* and *Q. maracristinae*, while in *H. vanderheydeni* sp. nov. is quite diverse, since the posterior margin is almost straight, slightly curved laterally, with a globose and subhemispherical median portion and lateral angles prominently acute and slightly curved (Figs. 14, 16, 17). The most remarkable differences, however, were found among the general shape and peculiarities of the dorsal phallothecal sclerite (Figs. 19-22, 25), which were quite different in all species (Gil-Santana *et al.* 2013, 2017; Gil-Santana 2016; Gil-Santana and Oliveira 2023).

Thus, in agreement with previous studies (Elkins 1954a, b; Hart 1975, 1986, 1987; Zhang *et al.* 2016), the features of the male genitalia of *H. vanderheydeni* sp. nov. that should especially be taken into consideration for comparative purposes are the shape of apex of the pygophore (Figs. 14, 16, 17) and the features of the dorsal phallothecal sclerite (Figs. 22, 25).

A female of *H. vanderheydeni* sp. nov. from Nova Friburgo municipality was found to have an egg of Phasiinae (Diptera: Tachinidae) on latero-distal portion of distal sternites (Fig. 41). This record is similar to the observation of the finding of similar eggs on the bodies of other species of Harpactorinae species of the same municipality, one of which proven to be associated to the parasitoidism by a female of *Xanthomelanodes cf. brasiliensis* (Gil-Santana and Forero 2010; Gil-Santana and Dios 2023). Therefore, future observations may clarify if *H. vanderheydeni* sp. nov. is another host of Phasiinae (Tachinidae) in Neotropical region.

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Literature Cited

- Castro-Huertas, V. and Forero, D. (2021)** Revision and phylogenetic analysis of the genus *Acanthischium* Amyot & Serville, 1843 (Hemiptera: Reduviidae: Harpactorinae). *Insect Systematics & Evolution*, 52(5): 524-574. <https://doi.org/10.1163/1876312X-bja10018>
- Champion, G.C. (1899)** Insecta Rhynchota. Hemiptera-Heteroptera, Vol II. *In: Biologia Centrali Americana* (eds. Godman, F.D. and Salvin, O.), pp. 193-304. Taylor and Francis, United Kingdom.
- Distant, W.L. (1903)** Rhynchotal notes. XVI. Heteroptera: Family Reduviidae (continued), Apiomerinae, Harpactorinae, and Nabinae. *Annals and Magazine of Natural History*, 11: 245-258. <http://dx.doi.org/10.1080/00222930308678761>
- Elkins, J.C. (1954a)** A new American Harpactorine genus (Hemiptera, Reduviidae). *Texas Reports on Biology and Medicine*, 12: 39-48.
- Elkins, J.C. (1954b)** A synopsis of *Atrachelus* (Hemiptera, Reduviidae). *Proceedings of the Entomological Society of Washington*, 56: 97-120.
- Elkins, J.C. (1969)** A new genus of hemipteran wasp mimics (Reduviidae, Harpactorinae). *Journal of the Kansas Entomological Society*, 42: 456-461.

- Escobar, H. (2018)** In a 'foretold tragedy,' fire consumes Brazil museum. *Science*, 361(6406): 960. <http://dx.doi.org/10.1126/science.361.6406.960>
- Forero, D. (2011)** Classification of Harpactorinae, assassin bugs Hemiptera: Heteroptera: Reduviidae. *Boletín del Museo Entomológico Francisco Luís Gallego*, 1: 9-24.
- Forero, D. and Giraldo-Echeverry, N. (2015)** First record of the assassin bug genus *Coilopus* Elkins, 1969 (Hemiptera: Heteroptera: Reduviidae) from Colombia. *Check List*, 11(3): 1634. <https://doi.org/10.15560/11.3.1634>
- Froeschner, R.C. (1999)** True bugs (Heteroptera) of Panama: a synoptic catalog as a contribution to the study of Panamanian biodiversity. *Memoirs of the American Entomological Institute*, 61: 1-393.
- Gil-Santana, H.R. (2008)** New records, and nomenclatural and biological notes on Reduviidae (Hemiptera: Heteroptera) from Bolivia and Brazil. *Zootaxa*, 1785(1): 43-53. <https://doi.org/10.11646/zootaxa.1785.1.2>
- Gil-Santana, H.R. (2015)** *Parahiranetis salgadoi*, a new genus and species of Harpactorini (Hemiptera: Heteroptera: Reduviidae), with a key to Neotropical wasp-mimicking harpactorine genera. *Acta Entomologica Musei Nationalis Pragae*, 55: 29-38.
- Gil-Santana, H.R. (2016)** First description of the male of *Hiranetis atra* Stål and new country records, with taxonomic notes on other species of *Hiranetis* Spinola (Hemiptera, Heteroptera, Reduviidae, Harpactorinae). *ZooKeys*, 605: 91-111. <https://doi.org/10.3897/zookeys.605.8797>
- Gil-Santana, H.R. (2022)** New records, taxonomic notes, and the description of a new species of Harpactorinae (Hemiptera: Heteroptera: Reduviidae) from French Guiana. *Zootaxa*, 5105(3): 381-400. <https://doi.org/10.11646/zootaxa.5105.3.3>
- Gil-Santana, H.R., Davranoglou, L.-R. and Neves, J.A. (2013)** A new synonym of *Graptocleptes bicolor* (Burmeister), with taxonomical notes (Hemiptera: Heteroptera: Reduviidae: Harpactorini). *Zootaxa*, 3700: 348-360. <https://doi.org/10.11646/zootaxa.3700.3.2>
- Gil-Santana, H.R. and Dios, R.V.P. (2023)** First record of parasitoidism of Reduviidae (Insecta: Hemiptera: Heteroptera) by *Xanthomelanodes* Townsend, 1893 (Insecta: Diptera: Tachinidae) in the Neotropical region. *Revista Chilena de Entomología*, 49(2): 221-226. <https://doi.org/10.35249/rche.49.2.23.01>
- Gil-Santana, H.R. and Forero, D. (2010)** Taxonomical and biological notes on Neotropical Apiomerini (Hemiptera: Heteroptera: Reduviidae: Harpactorinae). *Zootaxa*, 2331: 57-68.
- Gil-Santana, H.R., Forero, D. and Weirauch, C. (2015)** Assassin bugs (Reduviidae excluding Triatominae). In: *True bugs (Heteroptera) of the Neotropics, Entomology in Focus 2*. (eds. Panizzi, A.R. and Grazia, J.), pp. 307-351. Springer Science+Business Media, Netherlands.
- Gil-Santana, H.R. and Oliveira, J. (2023)** A new genus and a new species of wasp-mimicking Harpactorini (Hemiptera, Heteroptera, Reduviidae, Harpactorinae), with an updated key to the Neotropical genera. *ZooKeys*, 1152: 163-204. <https://doi.org/10.3897/zookeys.1152.96058>
- Gil-Santana, H.R., Salomão, A.T. and Oliveira, J. (2017)** First description of the male and redescription of the female of *Parahiranetis salgadoi* Gil-Santana (Hemiptera, Reduviidae, Harpactorinae). *Zookeys*, 671: 19-48. <https://doi.org/10.3897/zookeys.671.11985>
- Hart, E.R. (1975)** A new species of *Ischnoclopius* Stål, with notes on the systematic position of the genus (Hemiptera: Reduviidae). *Proceedings of the Entomological Society of Washington*, 94: 162-165.
- Hart, E.R. (1986)** Genus *Zelus* Fabricius in the United States, Canada, and Northern Mexico (Hemiptera: Reduviidae). *Annals of the Entomological Society of America*, 77(3): 419-425. <https://doi.org/10.1093/aesa/79.3.535>
- Hart, E.R. (1987)** The genus *Zelus* Fabricius in the West Indies (Hemiptera: Reduviidae). *Annals of the Entomological Society of America*, 80(2): 293-305. <https://doi.org/10.1093/aesa/80.2.293>

- Haviland, M.D. (1931)** The Reduviidae of Kartabo Bartica District, British Guiana. *Zoologica*, 7: 129-154.
- Hogue, C.L. (1993)** *Latin American insects and Entomology*. University of California Press, Berkeley and Los Angeles, California, USA, 536 pp.
- Lethierry, L. and Severin, G. (1896)** *Catalogue général des Hémiptères. Tome III. Hétéroptères*. R. Friedländer & Fils, Libraires-Éditeurs, Berlin, Germany, 275 pp.
- Maldonado, J.C. (1976)** The genus *Heza* (Hemiptera: Reduviidae). *The Journal of Agriculture of the University of Puerto Rico*, 60: 403-433. <https://doi.org/10.46429/jaupr.v60i3.10533>
- Maldonado, J.C. (1990)** Systematic catalogue of the Reduviidae of the world (Insecta: Heteroptera). *Caribbean Journal of Science University of Puerto Rico, Special Edition*: 1-694.
- Maldonado, J.C. and Lozada, R.P.W. (1992)** Key to the group of Neotropical wasp-mimetic harpactorine genera and the description of a new species (Hemiptera: Reduviidae). *Proceedings of the Entomological Society of Washington*, 94: 162-165.
- Martin-Park, A., Delfín-González, H. and Coscarón, M.C. (2012)** Revision of genus *Repipta* Stål 1859 (Hemiptera: Heteroptera: Reduviidae: Harpactorinae) with new species and distribution data. *Zootaxa*, 3501: 1-54.
- Putshkov, V.G. and Putshkov, P.V. (1985)** *A catalogue of the Assassin-bugs genera of the World (Heteroptera, Reduviidae)*. Published by the authors, Kiev, Ukraine, 137 pp.
- Rédei, D. and Tsai, J.-F. (2011)** The assassin bug subfamilies Centrocnemidinae and Holoptilinae in Taiwan (Hemiptera: Heteroptera: Reduviidae). *Acta Entomologica Musei Nationalis Pragae*, 51: 411-442.
- Schuh, R.T. and Weirauch, C. (2020)** *True bugs of the world (Hemiptera: Heteroptera). Classification and natural history*. Second Edition. Siri Scientific Press, Manchester, United Kingdom. 767 pp., 32 pls.
- Spinola, M. (1840a)** *Essai sur les genres d'insectes appartenants à l'ordre des Hémiptères, Lin. ou Rhyngotes, Fab. et à la section des Hétéroptères, Dufour*. Chez Yves Gravier, Gènes [currently Italy], 383 pp. <https://doi.org/10.5962/bhl.title.65481>. [1837]
- Spinola, M. (1840b)** *Essai sur les Insectes Hémiptères Rhyngotes ou Hétéroptères*. Chez J.-B. Baillièrre, Paris, France, 383 pp. <https://doi.org/10.5962/bhl.title.48511>
- Stål, C. (1859)** Till kändedom om Reduvini. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 16: 363-386.
- Stål, C. (1866)** Bidrag till Reduviidernas kändedom. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 23: 235-302.
- Stål, C. (1872)** Enumeratio Hemipterorum. Bidrag till en företeckning öfver alla hittills kända Hemiptera, jemte systematiska meddelanden. 2. *Kongliga Svenska Vetenskaps-Akademiens Handlingar*, 10(4): 1-159.
- Walker, F. (1873a)** *Catalogue of the specimens of Hemiptera Heteroptera in the Collection of the British Museum. Part VII*. Printed for the Trustees of the British Museum, London, 213 pp.
- Walker, F. (1873b)** *Catalogue of the specimens of Hemiptera Heteroptera in the Collection of the British Museum. Part VIII*. Printed for the Trustees of the British Museum, London, 220 pp.
- Wygodzinsky, P. (1949)** Elenco sistematico de los reduviiformes americanos. *Instituto de Medicina Regional de la Universidad Nacional de Tucumán, Monografía*, 1: 1-102.
- Zhang, G., Hart, E.R. and Weirauch, C. (2016)** A taxonomic monograph of the assassin bug genus *Zelus* Fabricius (Hemiptera: Reduviidae): 71 species based on 10,000 specimens. *Biodiversity Data Journal*, 4: e8150. <https://doi.org/10.3897/BDJ.4.e8150>