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# A review of the genus *Chalcocopris* Burmeister, 1846 (Coleoptera: Scarabaeidae: Scarabaeinae), with description of a new species

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## Abstract

Species included in the genus *Chalcocopris* Burmeister, 1846 are reviewed, including the description of a **new species** (*Chalcocopris inexpectatus* **sp. nov.**) from Central Brazil, and the designation of a **neotype** for *Copris hesperus* Olivier, 1789. Pictures, diagnostic characters and an identification key are provided.

**Key words:** Scarabaeinae, Brazil, dung beetles

## Introduction

*Chalcocopris* Burmeister, 1846, was originally introduced as a subgenus of *Copris* Geoffroy, 1762 (as *Copris* Latreille), for two species: *Scarabaeus hesperus* Olivier, 1789, and *Copris smaragdina* Perty, 1830. Harold (1869a), when considering *C. hesperus* (Olivier, 1789) as the only species in that genus, designated this as the type-species of *Chalcocopris* by subsequent monotypy (ICZN, 1999, art. 69.3).

The genus *Chalcocopris* has been so far considered as monospecific and its included species, *C. hespera,* is an endemic of the Atlantic Forest of the South and Eastern States of Brazil and neighboring areas of Argentina and Paraguay. Along with *Isocopris* Pereira & Martínez, 1960, *Chalcocopris* shares an eight-segmented antenna, unique among Western Hemisphere Coprini, being distinguished from *Isocopris* by the costate lateral elytral stria (flat in *Isocopris*) and unbordered pronotal posterior margin (bordered in *Isocopris*). While working on a revision of the genus *Isocopris*, we were surprised by the finding of a tiny, dark brown new species that in fact belongs to *Chalcocopris.* Therefore, the aim of this work is to present a taxonomic synopsis of the genus *Chalocopris*, describing the second species.

## Material and methods

A large sample of individuals of *C. hesperus* and *C. inexpectatus* **sp. nov.** was studied, with special emphasis on external body characters and male genitalia. Several dry-pinned specimens were dissected for the study of their genital structures and, according to the standard methodologies, individuals were firstly softened in hot water for about 5 minutes and then dissected. Male genitalia were cleaned in a 5% KOH solution for 10 minutes and glued in a card-point for a further detailed morphological study. Specimens and male genitalia were then photographed with a camera attached to a stereomicroscope.

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The following collections provided material (local contacts in parenthesis):

| | |
|---|---|
| CEMT | Seção de Entomologia da Coleção Zoológica. Universidade Federal de Mato Grosso, Cuiabá, Brazil (F. Z. Vaz-de-Mello) |
| MNRJ | Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil (M. and M. Monné and M. Cupello) |
| NHML | The Natural History Museum, London, United Kingdom (M. Kerley and M. Barclay) |
| ZFMK | Zoologisches Forshungsmuseum Alexander Koenig, Bonn, Germany (D. Ahrens) |
| MNHN | Muséum National d'Histoire Naturelle, Paris (O. Montreuil and A. Mantilleri) |
| IRSN | Institut Royale des Sciences Naturelles de Belgique, Bruxelles (A. Drumont) |

The neotype of *C. hesperus* is herein designated and deposited at the Natural History Museum, London, while the holotype of *C. inexpectatus* is housed at Seção de Entomologia da Coleção Zoológica, Universidade Federal de Mato Grosso, Cuiabá, Brazil.

## Results and discussion

### *Chalcocopris* Burmeister, 1846

*Copris (Chalcocopris)*: Burmeister, 1846 (un-paginated) (original description); Erichson, 1847: 108 (*syn. of Pinotus*); Lacordaire, 1856: 97 (*syn. of Copris*)

*Chalcocopris*, Harold, 1869a: 124 (as genus); *Chalcocopris*, Harold in Gemminger & Harold, 1869b: 1008; Gillet, 1911: 63; Luederwaldt, 1929: 612; Luederwaldt, 1931: 367; Paulian, 1938: 233; Pessôa & Lane, 1941: 437, 465; Blackwelder, 1944: 208; Lange, 1947: 313 (as *Calcocopris*); Pereira, 1954: 57; Martínez, 1959: 93; Pereira & Martínez, 1960: 49; Halffter & Matthews, 1966: 17, 257; Halffter & Edmonds, 1982: 137; Vaz-de-Mello, 2000: 186; Vaz-de-Mello *et al.* 2011: 4, 13, 20, 28, 35, 43, 44.

Body shiny black or brownish to emerald green and dull, legs and ventral side black-brownish to cupreous-purplish with metallic reflections, clypeus either evenly coloured or darker on the anterior region. Antennae with eight segments (Fig. 7), clypeal margin evenly curved to slightly sinuate in the middle, with two feeble and rounded teeth, margin either weakly reflexed or completely flat. Margins of both genae and clypeus evenly curved or genae slightly wider, distinctly notched in proximity of the clypeo-genal junction and anteriorly elongated with a blunt tooth. Genal suture slightly to distinctly marked, fronto-clypeal suture either with two small tubercles hump-like and a central conical horn or lacking ornaments. Pronotum without anterior protuberances, posterior margin not bordered, lateral margins well curved and almost obtusely angulated at middle to nearly parallel and straight, anterior margin with a smooth and thin bead slightly elevated over the pronotal surface, anterior angles with inner side either straight and weakly sinuated or outwardly curved, external sides obliquely straight to evenly curved, pronotal punctuation fine and equally distributed. Elytral striae with shallow punctures, deeper at the base and with shallow punctures separated by about three diameters, seventh stria larger, interstriae almost flat to much more convex, eighth interstria clearly swollen. Pygidium either completely bordered or without border at the apex, surface with fine and scattered punctures or with a deeper and homogeneous punctuation. Aedeagus with phallobase either short and strong or slender and thinner, parameres distinctly narrower or much wider and rounded at the apex, dorso-internal margins slightly to strongly concave.

Males and females are distinguished externally by clypeus (somewhat shorter in males) and last abdominal ventrite (medially constricted in males).

*Chalcocopris* is undoubtedly related to *Dichotomius, Isocopris* and *Holocephalus*, with which it shares the lack of external meso- and metatibial transverse carinae, and a coniform to bifurcate ventral clypeal process (Vaz-de-Mello *et al.*, 2011). It can be distinguished by the combination of eight-segmented antennae (shared only with *Isocopris*), the pronotal posterior margin unbordered and seventh elytral interstriae very convex at least in apical half (both unique).

Species can be distinguished as follows:

1. Body completely dark brown to black, bright and silky. Clypeus widely and evenly curved, external margin of genae distinctly notched in proximity to the clypeal junction, making anterior part of the genae with an anterad tooth-like projection, fronto-clypeal suture either with two small and rounded protuberances at middle or a simple protuberance. Lateral margins of pronotum almost parallel. Pygidium entirely bordered. Central Cerrado of Brazil and Paraguay . . . . . *Chalcocopris inexpectatus* **sp.nov.**

- Head, pronotum and elytra, dorsally, emerald green (in all but two known specimens), red (in only one known specimen) or black with some metallic tinge (in only one known specimen); Ventral side red in all but one (black) specimen, dull to bright above, shiny metallic below. Clypeus slightly sinuated at middle, with two feeble and blunt teeth, anterior external margin of genae lacking notch or any prolongation. Fronto-clypeal suture with a small tubercle either side and a central conical horn. Lateral margins of pronotum distinctly curved to almost angulate at middle. Pygidium apically without border (Fig. 8). Atlantic forest of South and Eastern Brazil and neighboring Paraguay and Argentina (Misiones) . . . . . *Chalcocopris hesperus*

### *Chacocopris hesperus* (Olivier, 1789)

(Fig. 1, 4, 5, 7, 8)

*Scarabaeus hesperus* Olivier, 1789: 158; Olivier, 1808: pl 14 (original description and plate).
*Copris hesperus:* Olivier, 1790: 173*;* Castelnau, 1840: 79 (redescriptions).
*Copris (Chalcocopris) hespera*: Burmeister, 1846: (unpaginated).
*Chalcocopris hesperus* (sometimes as *hespera*): Harold, 1869a: 124 (taxonomy); Harold in Gemminger & Harold, 1869b: 1008 (catalogue); Gillet, 1911: 63 (catalogue); Pessôa & Lane, 1941: 437, 465 (taxonomy, redescription, distribution); Blackwelder, 1944: 208 (checklist); Lange, 1947: 313 (distribution); Martínez, 1959: 93 (catalogue); Halffter & Matthews, 1966: 37, 174 (Natural History); Louzada & Lopes, 1997: 118 (Ecology); Louzada, 1998: 125, 126 (perching behavior); Vaz-de-Mello, 2000: 192 (checklist); Schiffler *et al.*, 2003: 208, 210 (species list and distribution); Falqueto *et al.*, 2005: 20 (species list); Almeida & Louzada, 2009: 38–39 (Ecology); Louzada & Silva, 2009: 48 (presence in pasture); Vaz-de-Mello *et al.* 2011: 44 (identification); Culot *et al.*, 2013: 80 (species list).

**Description. Colour.** Upper side of body either completely emerald green or red (one entirely black specimen known), dull to bright, lateral sides of the body with cupreous iridescences, seldom completely black with cupreous reflections on the pronotum and greenish on the elytra, with ventral side and legs cupreous-bronzy to purplish with metallic reflections, head emerald green, clypeus always dark-brown to reddish. Antennal club tan to light yellow, antennal segments brownish. **Length.** 18–11 mm. **Head.** Both clypeal and genal margins continuous, slightly notched in proximity of the clypeo-genal suture, margins slightly reflexed in female, completely flat to weakly reflexed in male, clypeus sinuated at middle, with two teeth obtuse and forward developed, clypeus of the male wider, that of the female more elongated. Genal suture very shallow, both sexes with two small pointed tubercles and a central conical horn on the fronto-clypeal suture, horn either with rounded or acuminate tip. Clypeus with transverse and shallow wrinkles, surface in front of the horn with shallow wrinkles and scattered punctures, lateral parts of the frons with coarse punctures, smooth at middle, genae with similar punctuation, horn and tubercles completely smooth. **Pronotum.** Simply convex and lacking anterior protuberances, posterior margin without bead. Lateral margins of pronotum evenly curved to obtusely angulated at middle, margins often denticulate, much more in proximity of the anterior angles, inferior side of the lateral margins with short and yellowish-orange setae, female with median angles obtusely angulated. Anterior angles acute with inner margin straight and sinuate behind the eyes, anterior margin of pronotum with a thin and smooth bead slightly elevated over the pronotal surface and sometimes pointed backward at middle. Pronotum with round punctures, distinctly impressed and evenly distributed, punctuation deeper on the anterior angles where they can occasionally form wrinkles. **Elytrae.** Elytral striae black-greyish, clearly marked with rounded and shallow punctures separated by three to four diameters, striae and punctures much more impressed at the base of the elytra. Male with seventh stria much wider, female with seventh stria either wider or normal. Interstriae distinctly convex, with very fine and scattered punctures, both sexes with the eighth interstria clearly swollen. **Legs.** Foretibiae with four external teeth, anterior margin obliquely truncated and apically curved, internal-apical angle with a tuft of short, erected and yellowish-orange setae, tibial spur distinctly curved at middle and sharp at the apex. Dorsal side of the foretibiae longitudinally crossed by a series of deep and coarse punctures that bear semi-erected setae light-yellow, external teeth bordered by fine and slightly granulose punctures bearing setae light-yellow. Apical part of mesotibiae with two spines of different length, apically sinuated and ventrally feebly depressed. Hind tibiae with a spine either truncated or pointed at the




**FIGURES 1–3.** Genus *Chalcocopris*. **1**. Dorsal habitus of *C. hesperus* (male). **2**. Dorsal habitus of *C. inexpectatus* **sp. n.** (male) **3**. Left elytron of *C. inexpectatus*, arrow points to interstrial carina.

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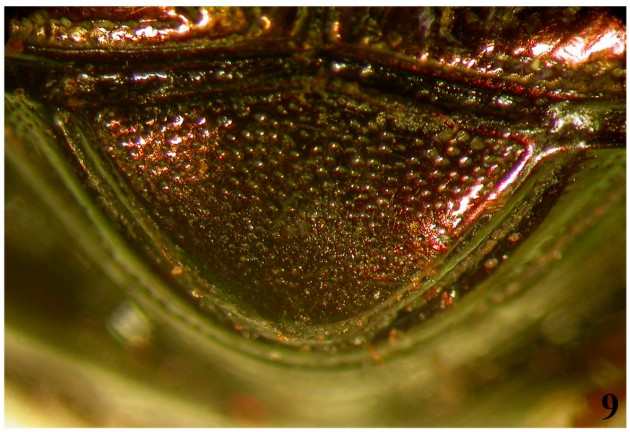

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**FIGURES 4–9. 4–5**. Aedeagus of *C. hesperus*. **6–7**. Aedeagus of *C. inexpectatus* **sp. n. 8–9.** Antenna and pygidium of *C. hesperus*.

apex, ventrally depressed. **Pygidium.** Nearly flat or weakly convex and not completely bordered, basal and lateral margins with a distinct border, evanescent at the apex, pygidial surface with deep punctures, apex either completely smooth or with scattered and fine punctures. **Abdomen.** Propleuron with both smooth and punctate areas, punctures annulate with short to long and semi-erect setae. Prosternum completely smooth and shining, margins not bordered. Lateral sides of mesosternum with annular and coarse punctures, smooth and slightly swollen at middle, basal margin of mesosternum with a smooth bead slightly elevated. Mesepimeron with a coarse punctuation and granules. Metasternum lacking setae, with shallow and evanescent punctures near the superior side. Sternites shining, superior margin of sternites with a series of coarse punctures which become finer at middle. **Aedeagus.** Stout, phallobase with a thick border, parameres with apex obtusely angulated and downward bent, apically much narrower, lateral sides distinctly concave, dorsal-inner margin of each paramere widely depressed (Fig. 6, 7).

**Material examined.** 317 specimens in CEMT, MNRJ, MNHN, ZFMK, IRSN and NHML, as follows:

**Neotype.** male, **here designated**. labels: (1). Rio. C. Darwin. 87–42; (2). 568; (3. red). NEOTYPE ♂. Scarabaeus hesperus Oliv. F.Z. Vaz-de-Mello 2014 (NHML).

The neotype is here designated in order to maintain nomenclature stability by choosing a single extant name-bearing type-specimen that is available for consulting in a public institution. The original description refers to Banks collection, now in NHML, where specimens of the type series could not be located, nor where in Olivier's collection in MNHN. However, no doubt exists on species identification (thanks to illustration presented in the plates of the original work - Olivier, 1808), even if the originally given type locality (Madras) is erroneous. A specimen already pertaining to NHML was chosen as the neotype. This specimen was chosen because it is a very well conserved male (just one antennal club lacking), collected by a very good observer and field naturalist, and has an exact known locality of collecting. Although original labels have quite few information, it is known that Darwin collected only around the city of Rio de Janeiro, with one trip to Cabo Frio (Darwin, 1845). However, its notebook number (568) refers only to Rio de Janeiro (Smith, 1987: 57; Keynes, 2000: 376), and several other specimens in the same notebook have other more specific indications such as "Corcovado". This implies the probable locality of capture would be Rio de Janeiro itself, probably around Botafogo Bay where Darwin resided during part of the Brazilian trip (April 23rd–June, 1832) (Darwin, 1845). It is interesting to note that one of the sources (Smith, 1987) lists date as May 1832, while the other (Keynes, 2000) lists June of the same year. This specimen, along with many other collected in various localities by C. Darwin in his Voyage of the Beagle, was presented and sold by G. R. Waterhouse in a lot of 2000 insects (1887–42) to the British Museum (Smith, 1987). *Chalcocopris hesperus* is (or was until 20 years ago) a very common species in the higher forests of the Tijuca complex in Rio de Janeiro city (e.g. around the Corcovado), being however rare in the lower altitude parts, which include Botafogo (FZVM, pers. obs.).

**Non-type specimens. ARGENTINA: Corrientes:** Alto Paraná, Puerto Bemberg, XII–1933 (1 unsexed NHML); **Misiones:** Puerto Iguazú (1 ♂, 1 ♀ CEMT). **BRAZIL**: **no other data** (2 ♂, 1 ♀ ZFMK;, 18 unsexed MNHN;, 12 unsexed NHML). **Bahia:** no more data (2 unsexed NHML); Cachimbo (3 unsexed MNHN); Porto Seguro (5 ♂, 5 ♀ CEMT); Eunápolis (10 ♂, 10 ♀ CEMT). **Espírito Santo:** no more data (2 unsexed NHML); Barra de São Francisco, Corrégo do Itá (1 ♀ MNRJ); Linhares, Reserva Biológica de Sooretama ("Parque Sooretama") (5 ♀, 5♂ MNRJ); Linhares (2 unsexed MNHN); Santa Teresa, Parque Municipal São Lourenço (1 ♂ MNRJ); Rio Guandu (2 ♂ MNRJ); no exact locality (1 ♀ ZFMK); no locality (2 unsexed MNHN); **Minas Gerais**: Caraça (6 unsexed MNHN); Manhuaçu (1 ♂ MNRJ); Mar de Espanha (1 ♀ MNRJ); Mar de Espanha (3 ♀ ZFMK); Rio Novo? (1 ♂ MNRJ); Santana do Riacho, Serra do Cipó (1 ♀ MNRJ); Viçosa (2 ♀, 1 ♂ MNRJ); Rio José Pedro (1 ♂ MNRJ); Diamantina, Parque do Rio Preto (2 ♂, CEMT); Viçosa (3 ♀, 1♂ CEMT); Paraguaçu (1 ♀ CEMT); Araponga, Pico do Boné (1 ♀ CEMT); Conceição Dos Ouros, Rio Sapucai (1 ♂ CEMT); Parque Nacional de Ibitipoca, Conceição de Ibitipoca (1 ♀ CEMT); Paula Cândido (1 ♂ CEMT); no locality (5 unsexed MNHN). **Paraná:** Foz do Iguazú (1 ♂ CEMT). **Rio de Janeiro:** no more data (3 unsexed NHML); Cantagalo (1 unsexed MNHN); Engenheiro Paulo de Frontin (1 ♀ MNRJ); Itaguaí, Serra da Caveira (1 ♂ MNRJ); Itaguaí, Serra do Marapicu (1 ♀ MNRJ); Itatiaia (2 ♀, 2 ♂ MNRJ); Itatiaia, Estação Biológica (1 ♂ MNRJ); Itatiaia, Parque Nacional do Itatiaia (28 ♀, 23 ♂ MNRJ); Mangaratiba, Reserva Ecológica Rio das Pedras (1 ♂ MNRJ); Mendes, Centro Marista São José das Paineras (4 ♀ MNRJ); Miguel Pereira (1 ♀ MNRJ); Nova Friburgo (1 ♀, 2 ♂ MNRJ); Nova Friburgo (2 unsexed MNHN); Petrópolis (1 unsexed NHML); Petrópolis, Araras (1 ♂ MNRJ); Petrópolis, La Mosela - La Vallon (1 ♀ MNRJ); Petrópolis (1 ♀ MNRJ); Rio de Janeiro, Alto da Boa Vista, Vista Chinesa (1 ♀

MNRJ); Rio de Janeiro, Bom Retiro (1 ♂ MNRJ); Rio de Janeiro, Corcovado (2 ♀ MNRJ); Rio de Janeiro, same data as neotype (1 ♀ NHML); Rio de Janeiro, Floresta da Tijuca (4 ♀, 2 ♂ MNRJ); Rio de Janeiro (4 unsexed MNHN); Santa Maria Madalena, PARES do Desengano, Morumbeca (1 ♀ MNRJ); São Fidélis (6 unsexed MNHN); Serra dos Orgãos (1 unsexed MNHN); Teresópolis (1 unsexed MNHN). **Santa Catarina:** Corupá (1 ♀ MNRJ); Mafra (6 unsexed MNHN); Hansa (2 unsexed MNHN). **São Paulo**: no more data (1 unsexed NHML); São Miguel Arcanjo. PE Carlos Botelho. 24º03'32"S, 47º5842"W. 800 m. 11-IV-2012. *Brachyteles* faec29. Marion Boutefeu (2 ♂, 3 ♀ CEMT); same but 24º03'35"S, 47º58'43"W. 807 m (1 ♂, 1 ♀ CEMT); same but 24º03'34"S, 47º58'42"W. 805 m (1 ♂ CEMT); same but 24º03'35"S, 47º58'43"W. 805 m. 20-XI-2011. *Brachyteles* faec3. E Bovy (1 ♂ CEMT); same but 24º03'50"S, 47º59'31"W. 768 m. 20-XI-2012. Brachyteles faec4. E Bovy (1 ♂ CEMT); same but 24º03'40"S, 47º58'44"W. 806 m. 18-X-2011. *Brachyteles* faec5. E Bovy (1 ♂, 1 ♀ CEMT); same but 24º03'35"S, 47º58'43"W. 795 m. 29–I–2012. Human faec19. E Bovy (3 ♂, 1 ♀ CEMT); same but 24º03'32"S, 47º58'42"W. 786 m. 29-I-2012. Human faec19. E Bovy (1 ♀ CEMT); same but 24º03'57"S, 47º58'49"W. 817m. 29-I-2012. Human faec2. E Bovy (7 ♂, 5 ♀ CEMT); 50Km SE Mogi das Cruzes, Serra do Mar Est, Biol. Boracéia (1 ♀ CEMT); Angatuba (1 ♀ MNRJ); Biritiba Mirim, Estação Biológica de Boracéia (1 ♂ MNRJ); Cananéia ("Cananéa") (1 ♀ MNRJ); Peruíbe (1 ♀ MNRJ); São Paulo (1 ♀ MNRJ). **COLOMBIA:** Bogotá? (1 unsexed NHML) [believed to be erroneous data]. **ECUADOR: no more data** (1 unsexed MNHN) [believed to be erroneous data]. **No locality data:** (3 ♀, 1 ♂ MNRJ; 19 unsexed MNHN; 16 unsexed, 1 ♀ IRSN; 1 unsexed NHML)**.**

**Distribution.** Southern Bahia, all Rio de Janeiro and Espírito Santo, Southeastern Minas Gerais, Eastern São Paulo, Northwestern Paraná and Eastern Santa Catarina in Brazil, Misiones in Argentina, probably also present in Northeastern Rio Grande do Sul in Brazil and in Southeastern Paraguay (Fig. 9).

**Habitat and natural history.** Species associated to Atlantic forest from sea level to about 1300 m, also present in borders and small open areas surrounded by forest. A primarily coprophagous species, but with records from carcasses and rotten fruits. Diurnal, commonly found perching along forest trails. Very abundant species in all its range even in small forest patches.

***Chalcocopris inexpectatus* sp. nov.**
(Fig. 2, 3, 6)

**Description. Colour.** Body black to reddish-brown, bright and silky, legs black to dark brown, tarsal segments brownish to black. Antennal club bright yellow, antennal segments brownish. **Length.** 12–0.9 mm. **Head.** Clypeus evenly curved and distinctly reflexed, anterior part of the genae forward elongated with a distinct tooth apically blunt, genae clearly notched in proximity of the clypeus, genal suture usually with a small and rounded protuberance at middle, often rather difficult to see. Head without horns or tubercles. Clypeus and genae finely and shallowly wrinkled, genae slightly granulose, frontal surface with punctures very shallow and fine, sometimes frons with a transversal area completely smooth. **Pronotum.** Simply convex, without anterior protuberances or swellings, lateral margins nearly straight and parallel between posterior and medial angles, well curved in proximity of the anterior angles, Posterior margin not bordered, evenly and weakly curved, with a series of short and longitudinal grooves. Anterior margin of pronotum with a smooth and thin bead feebly elevated over the pronotal surface. Anterior angles pointed and forward developed, internal margins either nearly straight or barely sinuated. Pronotal surface with fine and evenly distributed punctures, anterior angles with a shallow and transverse punctuation, coarse punctures along the lateral margins. **Elytrae.** Silky and feebly convex, striae very fine and shallow, with punctures distinctly impressed and separated approximately by three to four diameters. Interstriae nearly flat to slightly convex, with tiny and scattered punctures, eighth interstria distinctly swollen. **Legs.** Foretibiae slender, with four external teeth, apical tooth either almost flat or widely curved at the apex, anterior margin of foretibiae obliquely truncated, apical-internal angles sharply obtuse ($\geq 90°$), apical spur bifid with both extremities sharply pointed. Dorsal-internal surface of the foretibiae largely smooth, with a few coarse and scattered punctures, medial-external surface crossed by a series of coarse and setigerous punctures. Apical margin of meso- and meta-tibiae with spines either truncate or obtusely acute at the apex, tarsal claws elongated and feebly curved. **Pygidium.** Smooth and shiny, completely bordered with a marked groove, strongly convex, surface with fine and scattered punctures. **Abdomen.** Propleuron with a fine microsculpture, lateral margins with punctures and

setae, posterior margin of propleuron with short and longitudinal grooves. Prosternum completely smooth and finely microsculptured, mesosternum lacking setae, with shallow and annular points. Superior side of metasternum with evanescent punctures, much finer and scattered at middle, inferior side of metasternum not depressed. Sternites smooth and silky, with fine punctures distributed along the superior margin, completely smooth at middle, lateral portion of the sternites with a small depression. **Aedeagus.** In lateral view, feebly curved and rather thick at the apex, phallobase thin and slender, parameres apically wide, evenly rounded and well separated, with lateral sides concave, dorsal sclerotization of both parameres with a strong depression at middle (Fig. 8).

**Etymology.** Owing to the abundance of specimens of this genus in field and collections, we assigned this name to the new species because of the unexpected nature of its finding, and to its so unpredictable geographical distribution.

**Material examined.** 16 specimens in CEMT and MNHN, as follows:

**Holotype: male. BRAZIL: Mato Grosso:** Chapada dos Guimarães. Cidade de Pedra. 15°18'01"S, 55°50'22"W. III-2011. R.V. Nunes (CEMT). With F. Vaz-de-Mello's red holotype label.

**Paratypes** (all with FZVM yellow paratype labels)**: BRAZIL: Bahia:** Barreiras, XII-1991 (1 ♀ CEMT); **Goiás**: Mineiros, PNEmas, 17°59'48"S, 52°56'54"W, 837 mosl, Light trap, 15-III-2011, M.F. Souza (1 ♂ CEMT); Niquelândia, X-1994 (1 unsexed CEMT); **Mato Grosso:** Chapada dos Guimarães, PNCG Módulo, 15°19'51"S, 55°51'9"W, 14.XII.2012, GM Daniel, pitfall (1 unsexed CEMT); same but 15°19'53"S, 55°51'10"W (1 unsexed CEMT); same but 15°19'31"S, 55°51'30"W (1 unsexed CEMT); Diamantino, Vale da Solidão, 14°22'14"S, 56°07'59"W, 21-X-2000, Luminosa, E. Furtado Casa (1 ♂ CEMT); [Japurah] Faz. São Tiago, 12.35 S, 56.20 W, XI-1982 (1 ♀, CEMT); **Mato Grosso do Sul:** Corumbá, 20-XI-1992, Faz. Nhumirim-Embrapa, Pantanal, 18°59'S, 56°39'W, Ex. Armadilha Luminosa, A.T.M Barros col. (1 ♂ CEMT); Corumbá, Centro de pesquisa EMBRAPA, Pantanal, 26-X-1992, A.T. Barros col. (1 ♀ CEMT); **Minas Gerais:** Três Marias, X-1989, J.C. Zanuncio (1 ♂, 2 ♀ CEMT); same but I-1993 (1 unsexed CEMT); **PARAGUAY: Paraguari**: Jaguarón, Santa Clara (1 ♀ MNHN).


**FIGURE 10.** Known distribution of *C. hesperus* (●) and *C. inexpectatus* (▲) in South America.

**Distribution.** Cerrado and Pantanal of Mato Grosso, Mato Grosso do Sul, Goiás and central Minas Gerais in Central Brazil, one record from Southern Paraguay, so probably present in a wider range, maybe including some parts of Chaco (Fig. 9).

**Habitat and natural history.** The limited number of specimens with data have been collected either at light or with human-dung baited pitfall traps. The habitat appears limited to the cerrado *sensu stricto* vegetation and planted *Eucalyptus* forest. This species appears not to be very abundant or widespread.

The finding of a second species of *Chalcocopris*, in a different Biogeographical province (the Cerrado) is a good example of how understudied are the South American scarabaeine dung beetles.

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