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A REVIEW OF THE NEOTROPICAL GENUS *NEOCORVICOANA* RATCLIFFE AND MICÓ, NEW GENUS (COLEOPTERA: SCARABAEIDAE: CETONIINAE: GYMNETINI)

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A Review of the Neotropical Genus *Neocorvicoana* Ratcliffe and Micó, New Genus (Coleoptera: Scarabaeidae: Cetoniinae: Gymnetini)

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Abstract

The southern Neotropical cetoniine genus *Neocorvicoana* Ratcliffe and Micó **new genus** (Coleoptera: Scarabaeidae: Cetoniinae: Gymnetini) is established for three species previously placed in *Corvicoana* Strand, 1934 (*nomen nudum*) and *Gymnetis* MacLeay, 1819: *N. chalybea* (Kirby), *N. reticulata* (Schürhoff), and *N. tricolor* (Schürhoff), **new combinations.** The type species of the new genus is *N. reticulata* (Kirby). *Corvicoana rudolfi* (Frölich) is transferred to the genus *Gymnetis. Corvicoana suavis* (Schürhoff) and *C. castanea* (Schürhoff) are junior synonyms of *N. chalybea.* We include a taxonomic key to the species, nomenclatural history, descriptions, illustrations, and commentary.

Resúmen

Se establece el género *Neocorvicoana* Ratcliffe y Micó **genero nuevo** (Coleoptera: Scarabaeidae: Cetoniinae: Gymnetini) para tres especies de Cetoninos del sur de la región Neotropical, anteriormente incluidos en *Corvicoana* Strand, 1934 (*nomen nudum*) y *Gymnetis* MacLeay, 1819: *N. chalybea* (Kirby), *N. reticulata* (Schürhoff), y *N. tricolor* (Schürhoff), **combinaciones nuevas.** La especie tipo del nuevo género es *N. reticulata* (Kirby). Se transfiere *Corvicoana rudolfi* (Frölich) al género *Gymnetis. Corvicoana suavis* (Schürhoff) y *C. castanea* (Schürhoff) son sinónimos de *N. chalybea.* Se aporta una clave taxonómica de las especies, revisión histórica de la nomenclatura del grupo, ilustraciones y comentarios.

The tribe Gymnetini (Scarabaeidae: Cetoniinae) in the New World currently comprises 25 genera (Krikken 1984; Krajcík 1998) distributed from the southern United States south to Argentina and Chile. The small genus *Neocorvicoana* **new genus** is known from Brazil, Bolivia, Uruguay, Paraguay, and Argentina. In this paper we describe this genus as new, stabilize the nomenclature, provide a key for identification of the species, and give a description and detailed distribution for each species. This paper continues the revisions of the genera of American Gymnetini begun by the first author (Ratcliffe 1978 for *Argyripa*; Morón and Ratcliffe 1984 for *Argyripa* larvae; Deloya and Ratcliffe 1988 for *Cotinis*; Ratcliffe and Deloya 1992 for *Hologymnetis*).

Taxonomic History

Schürhoff (1933) created the genus *Heteropodia* and included in it *H. reticulata* (Kirby) (previously *Cetonia reticulata*) and three new species: *H. castanea, H. suavis,* and *H. tricolor*. Unfortunately, his *Heteropodia* is a junior homonym of the same name created by Loriol in 1887 for an echinoderm. Moreover, Schürhoff did not designate a type species for the genus as required by Article 13b for generic names published after 1930 (International Commission on Zoological Nomenclature 1999). Consequently, his *Heteropodia* is a *nomen nudum* and unavailable.

Strand (1934) recognized the homonymy and provided the replacement name of *Corvicoana.* The new name was based on the locality of ''Corvico [actually Coroico], Bolivia'' listed for *H. suavis* Schürhoff, the first species discussed in Schürhoff's 1933 paper. Unfortunately, Strand did not designate a type species either, thus rendering his replacement name invalid as well.

To further complicate matters, Schürhoff (1937) proposed *another* name, *Heteropodetis,* probably as a replacement name for his *Heteropodia* that he had come to recognize as a junior homonym of Loriol's *Heteropodia.* Unfortunately, he did not designate a type species for this genus nor did he provide the names for any species that were to be included in the genus. The new name simply appears in his key to gymnetine genera without any further explanations. We can easily surmise that he was referring to the same generic concept as his earlier *Heteropodia* because the same species will key out here. The name *Heteropodetis* Schürhoff is also a *nomen nudum.*

What we have, then, are three names that have all been proposed for the same genus, and none of them were validly proposed. All of these names, therefore, are *nomina nuda* and unavailable. This leaves us in a position of having to name the genus again. We are here creating the new genus *Neocorvicoana* Ratcliffe and Micó.

The recent, highly illustrated volume on the cetoniine beetles of the world by Sakai and Nagai (1998) purports to show three species of *Corvicoana* (now *Neocorvicoana*). Their first species, *C. albiventris* (Gory and Percheron), is actually *Hoplopyga multipunctata* (Gory and Percheron) (based on number of foretibial teeth, absence of dorsal setae, and pattern of the dorsum; *albiventris* is also a *Hoplopyga* species name and has never been associated with *Covicoana*) Their third species, *C. anoguttata* (Gory and Percheron), is a synonym of *N. reticulata* (Kirby). Only their second species, *C. reticulata,* is correctly pictured and with the correct specific epithet.

Methods

The results of this study were based on specimens received on loan from institutions and private collections housing species of *Neocorvicoana,* specimens of which appear to be poorly represented in all collections. Two of the three species are apparently rare and represented by only a few specimens. The collections and their acronyms (given in Arnett *et al.* 1993) are as follows. The curators and/or collections managers who provided the material are also indicated.

AMIC: Antonio Martinez Collection, Salta, Argentina (Antonio Martinez).
AMNH: American Museum of Natural History, New York, NY (Lee Herman, Jr.).
BCRC: Brett C. Ratcliffe Collection, Lincoln, NE.

BMNH: The Natural History Museum (formerly British Museum of Natural History), London, England (Michael Bacchus, Malcolm Kerley).
CASC: California Academy of Sciences, San Francisco, CA (Norman Penny, David Kavanaugh).
CNCI: Canadian National Collection of Insects, Ottawa, Canada (Jean McNamara).
CMNC: Canadian Museum of Nature, Ottawa, Canada (Robert Anderson, François Genier).
CMNH: Carnegie Museum of Natural History, Pittsburgh, PA (John Rawlins, Robert Davidson).
DEIC: Deutsches Entomologisches Institut, Eberswalde, Germany (Lothar Zerche).
FMNH: Field Museum of Natural History, Chicago, IL (Al Newton, Hank Dybas).
HAHC: Henry and Anne Howden Collection, Ottawa, Canada (Henry Howden).
MGFT: Georg Frey Collection then at the Zoologische Staatssammlung, Munich, Germany (Gerhard Scherer, Max Kuhbandner), now at Naturhistorisches Museum Basel, Switzerland (Daniel Burkhardt).
MLPA: Museu de la Plata, La Plata, Argentina (Juan Shnack).
MLUH: Martin Luther Univeristät, Halle, Germany (Manfred Dorn).
MNHN: Museum National d'Histoire Naturelle, Paris, France (Jean Menier, Roger-Paul Dechambre).
MZSP: Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (Cleide Costa).
MCZS: Museum of Comparative Zoology, Cambridge, MA (Philip Perkins).
QBUM: Museu Naçional, Rio de Janeiro, Brazil (Miguel Monné).
SEAB: Carlos Seabra Collection, Rio de Janeiro, Brazil (Carlos Seabra).
SEMC: Snow Entomological Museum, Lawrence, KS (Steve Ashe, Rob Brooks).
USNM: United States National Museum, Washington, D.C. (Robert Gordon).
WBWC: William Warner Collection, Phoenix, AZ (William Warner).
ZMHU: Museum für Naturkunde, Berlin, Germany (Manfred Uhlig, Fritz Hieke, Joachim Schulze, Hella Wendt).
ZSMC: Zoologische Staatssammlung, Munich, Germany (Gerhard Scherer, Max Kuhbandner).

A conventional dichotomous key is presented. Many morphological characters for species within *Neocorvicoana* vary (surface sculpturing and coloration especially). We used key characters that are consistently expressed, low in variability, and readily observed with a microscope. Descriptions were based on the following characteristics: length (from apex of pronotum to apex of elytra; the head and pygidium are *not* measured because they can be variably deflexed), color and markings of the body, interocular width (number of transverse eye diameters across the frons, form and sculpturing of the frons, clypeus, antennae, pronotum, mesepimeron, elytra, pygidium, legs, venter (mesometasternal process, abdominal sternites), and parameres.

Geographical localities are arranged by country, province or department, and specific locality. We provide temporal data for each species, but these data should be used with some caution because many specimens came from old collections that lacked this information, and thus a thorough knowledge of the phenology of each species is not well known.

Neocorvicoana Ratcliffe and Micó, **new genus**

Type species. *Cetonia reticulata* Kirby 1818:410, here designated.

Heteropodia Schürhoff 1933:94. *Nomen nudum* and primary junior homonym.
Corvicoana Strand 1934:277. Replacement name for *Heteropodia. Nomen nudum.*
Heteropodetis Schürhoff 1937:70. Replacement name for *Heteropodia. Nomen nudum.*

Description. Scarabaeidae, Cetoniinae, Gymnetini. *Form:* Rhomboidal, robust, sides tapering towards apex, dorsum weakly convex. Length from apex of pronotum to apex of elytra 9–15 mm; width across humeri 6–9 mm. *Color:* Ground color shiny black with color varying from velutinous ochre, orange, or cream-white to metallic light green, blue, or orange to enamel-like tan, ochre, orange, or light green; all with black punctures, punctures on base of pronotum and elytra often surrounded by dark reddish brown spots. Setae moderate to long on frons, pronotum, and usually elytra; color tawny, piceous or black. Venter shining black with creamy white, ochre, or metallic green, blue, or orange maculae on sternites and tibiae. *Head:* Shape subrectangular, longer than wide. Frons densely setose. Clypeus weakly depressed either side of slightly convex disc, apex emarginate medially, lobes either side of emargination round. Antenna with 10 segments, club subequal to or slightly longer than segments 2–7. *Pronotum:* Trapezoidal, widest near base, gradually convergent to apical angles, center-base produced into posteriorly projecting lobe, lobe variably covering all but tip of scutellum. *Elytra:* Widest at base, posthumeral emargination distinct, sutural costa elevated in posterior half, apices with or without sutural spines. *Pygidium:* Surface variably punctate and/or with transverse, vermiform strigulae; surface with short setae, flat to weakly convex in lateral view. *Legs*: Foretibia tridentate in both sexes. Females with tarsi, especially posterior tarsi, thickened and greatly shortened. Meso- and metatibia each with strong, median carina on lateral edge ending in tooth-like process. *Venter:* Vertical, prosternal process just before anterior coxae well developed. Mesometasternal process short, flat, apically rounded, in same plane as longitudinal axis of body. *Parameres:* Form symmetrical, diagnostic at the species level.

Etymology. The compound name is formed by combining the Greek root *neos*, meaning new, with the previously used (but invalid) generic name, *Corvicoana*; here referring to the ''new'' *Corvicoana*. The name is considered feminine in gender.

Diagnosis. Species of *Neocorvicoana* are distinctive because of the following combination of characteristics: frons, pronotum, and elytra with setae; apex of clypeus simple, not reflexed or with marginal bead; foretibia with 3 external teeth in both sexes; tarsomeres in females shortened and compact; mesometasternal process in same plane as venter and short, not or only barely extending past mesocoxae; abdominal sternites simple, not sulcate.

Neocorvicoana is similar to *Hoplopygothrix* (Schürhoff) except that it's species have three foretibial teeth in both sexes whereas there are usually only two in species of *Hoplopygothrix* (the middle one is absent or vestigial). In addition, the apex of the clypeus is simple in *Neocorvicoana* (with a distinct bead in *Hoplopygothrix*); the abdominal sternites in *Neocorvicoana* are unmodified in males (deeply sulcate in males of *Hoplopygothrix*); and the tarsomeres are short and compacted in females of *Neocorvicoana* (simple in females of *Hoplopygothrix*).

Hoplopyga species are also similar, but they have a distinct, reflexed apex on the clypeus whereas the apex is simple in *Neocorvicoana* species. In addition, species of *Hoplopyga* do not have the characteristic dorsal setae present in both *Neocorvicoana* and *Hoplopygothrix.*

Macrocranius similis Schürhoff, the only species in its genus, is also similar to species of *Neocorvicoana,* especially in the surface sculpturing of the pronotum and elytra. However, *M. similis* lacks dorsal setae, has no teeth on the foretibia of the males (female with three teeth), possesses a ventrally glabrous mesometasternal process, does not have compacted tarsomeres in the females, and the male parameres are more slender, proportionately longer,and have an apical tooth that is directed laterally.

Gymnetis species are different from those of *Neocorvicoana* because, in *Gymnetis,* there are no dorsal setae, the foretibia are not tridentate in both sexes, the tarsi in females are not short and compact, the mesometasternal process is strongly developed and angularly deflexed downward, and the body form is more elongate and flattened.

Biology. Typically, most adult cetoniines are diurnal and feed on the pollen of flowers, rotting fruits, or on sap. However, nothing is known of the biology of *Neocorvicoana* species. There is nothing on the labels of any of the 355 specimens examined to indicate on what or how they were collected. The extremely foreshortened and compacted tarsi in the females suggest an adaptation to myrmecophily, perhaps allowing for females to lay eggs in the nests of ants. A number of other cetoniines, particularly in the Cremastocheilini (*e.g.*, *Coenochilus* Schaum, *Cyclidius* MacLeay, *Callinomes* Westwood), have thickened or foreshortened tarsomeres as an adaptation for living with ants or termites (Arrow 1925, Ratcliffe pers. obs.). In fact, other scarabaeoids, as well as beetles in many other families that live in the nests of ants and termites, show this adpatation. Unfortunately, we have no observational data to support the idea that *Neocorvicoana* species are associated with ants, but we propose the idea for other researchers to explore. Additional modern collecting, and especially observations of live beetles, are clearly needed.

Key to the species of *Neocorvicoana* Ratcliffe and Micó

1. Sternites in central third with transverse field of dense, long setae. Males with dense, long setae on ventral side of tarsomeres. Parameres as in Figure 9. ..... *N. chalybea* (Blanchard)
1′. Sternites in central third glabrous. Males with sparse, short setae on ventral side of tarsomeres 2
2. Mentum, procoxae, and tibiae usually with piceous or black setae. Pygidium and/or sternites usually with ochre or creamy white maculae or flecks (sometimes absent in females); color may be enamel-like but never with lustrous, metallic color. Mesometasternal process weakly produced anteriorly just beyond mesocoxae. Parameres as in Figure 10. ..... *N. reticulata* (Kirby)
2′. Mentum, procoxae, and tibiae usually with tawny setae. Pygidium and/or sternites usually with lustrous, metallic, pale green maculae or flecks. Mesometasternal process not produced anteriorly beyond mesocoxae. Parameres as in Figure 11. ..... *N. tricolor* (Schürhoff)

Clave para las Especies de *Neocorvicoana* Ratcliffe and Micó

1. Área central de los esternitos provistos de pilosidad densa, y larga. Machos con pilosidad densa y larga cubriendo la zona ventral de los tarsómeros. Parámeros como en Figure 9 ..... *N. chalybea* (Blanchard)
1′. Área central de los esternitos glabra. Machos con setas cortas y aisladas en la zona ventral de los tarsómeros 2

2. Pilosidad del mentón, procoxas y tibias normalmente de color marrón oscuro o negra. Pigidio y/o esternitos frecuentemente con manchas de color ocre o beige (a menudo ausentes en las hembras). Colores nunca metálicos, pudiendo mostrar cierta apariencia esmaltada. Apófisis mesometasternal sobrepasando ligeramente las mesocoxas. Parameros como en Figure 10. ..... *N. reticulata* (Kirby)

2′. Pilosidad del mentón, procoxas y tibias normalmente de color anaranjado. Pigidio y/o esternitos frecuentemente con manchas metálicas de color verdoso pálido. Apófisis mesometasternal no sobrepasando las mesocoxas. Parámeros como en.. Figure 11. ..... *N. tricolor* (Schürhoff)

Neocorvicoana chalybea (Blanchard) 1850, new combination
Figs. 1, 5, 6, 9, 12

Gymnetis chalybea Blanchard 1850:37. Holotype male at MNHN (Paris), examined.

Heteropodia suavis Schürhoff 1933:95. Lectotype male and lectoallotype female at ZSMC (Munich), examined and with Ratcliffe's label; two paralectotype males at ZMHU (Berlin), examined and with Ratcliffe's label. **New synonymy.**

Heteropodia castanea Schürhoff 1933:95. Holotype male in the Schürhoff collection which is in the Frey Collection (MGFT) (Munich at the time of examination, now in Basel), examined. **New Synonymy.**

Description. *Male* (Fig. 1). Length 9.9–11.8 mm; width across humeri 6.1–6.6 mm. Color of dorsal surface, legs, thoracic sternites, and maculae on abdominal sternites metallic light green (4 specimens) or blue (1 specimen) with strong reflections of metallic orange (and occasionally with flecks of blue in green specimens) and with black or dark reddish brown punctures; one specimen black with reddish brown pronotum and with blue edges on elytra and pygidium. *Head:* Frons densely punctate to rugopunctate, punctures moderately large, setigerous; setae dense, moderately long, tawny. Clypeus with surface moderately punctate; small punctures scattered over entire surface, large punctures present only either side of middle and setigerous; setae sparse, short to moderate in length, tawny; apex moderately to deeply emarginate at middle, lobes either side of middle rounded or narrowly rounded. Interocular width equals 3.5 transverse eye diameters as viewed from above. Antenna 10-segmented, club distinctly longer than segments 2–7. *Pronotum:* Surface densely punctate to rugopunctate in non-metallic areas (usually disc either side of middle) and sparsely to moderately punctate on metallic areas; punctures in black areas moderately large, round to inversely U-shaped, setigerous; setae dense, moderately long, tawny; punctures on metallic areas both small and moderately large mixed (as on clypeus). Lateral marginal bead entire, extending from posterior angle and wrapping completely around anterior angle. Basomedian lobe not covering all of scutellum (*e.g.,* Fig. 5). Mesepimeron with sparse, moderately large punctures; punctures round to crescent-shaped, coalescing medially, setigerous; setae sparse, short, tawny. *Elytra:* Metallic surface with sparse, small punctures and with large to very large, inversely U-shaped punctures surrounded by large to very large, dark reddish brown spot; punctures sparse to coalesced (especially medially), setigerous; setae sparse, short, tawny. Sutural costa elevated, especially in posterior half. Apices subacutely rounded, not spinose. *Pygidium:* Surface with moderate to large punctures only on metallic surface (similar to those on sides of pronotum); punctures inversely U-shaped, setigerous; setae sparse, minute to short, tawny. In lateral view, surface nearly flat. *Legs:* Foretibia tridentate (Fig. 6), basal tooth widely separated from others. Foretarsus slightly longer than foretibia. Meso- and metatarsi each slightly longer than their respective femora. Tarsomeres ventrally with distinct patches of short, dense, tawny setae. *Venter:* Mentum and procoxae with tawny setae. Mesometasternal process flat (nearly invisible because of

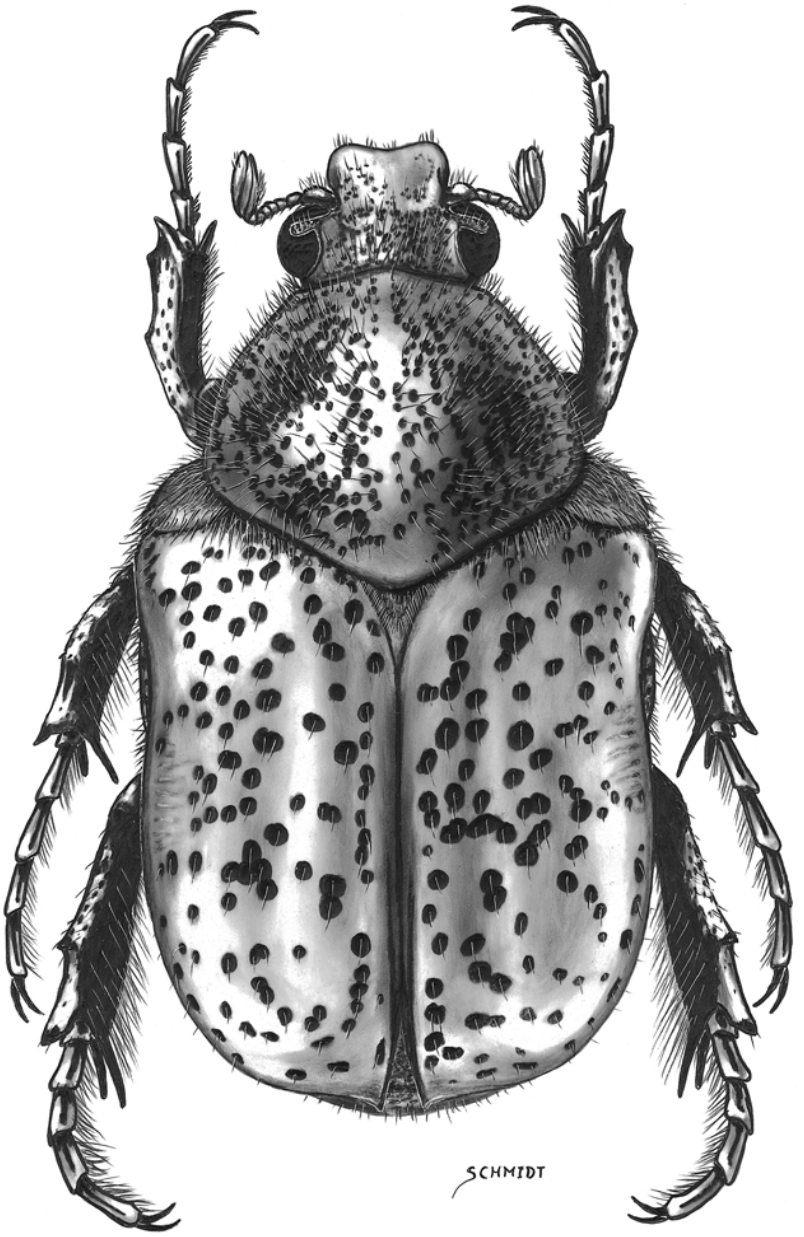


Fig. 1. Habitus of *N. chalybea* (Schürhoff), male.

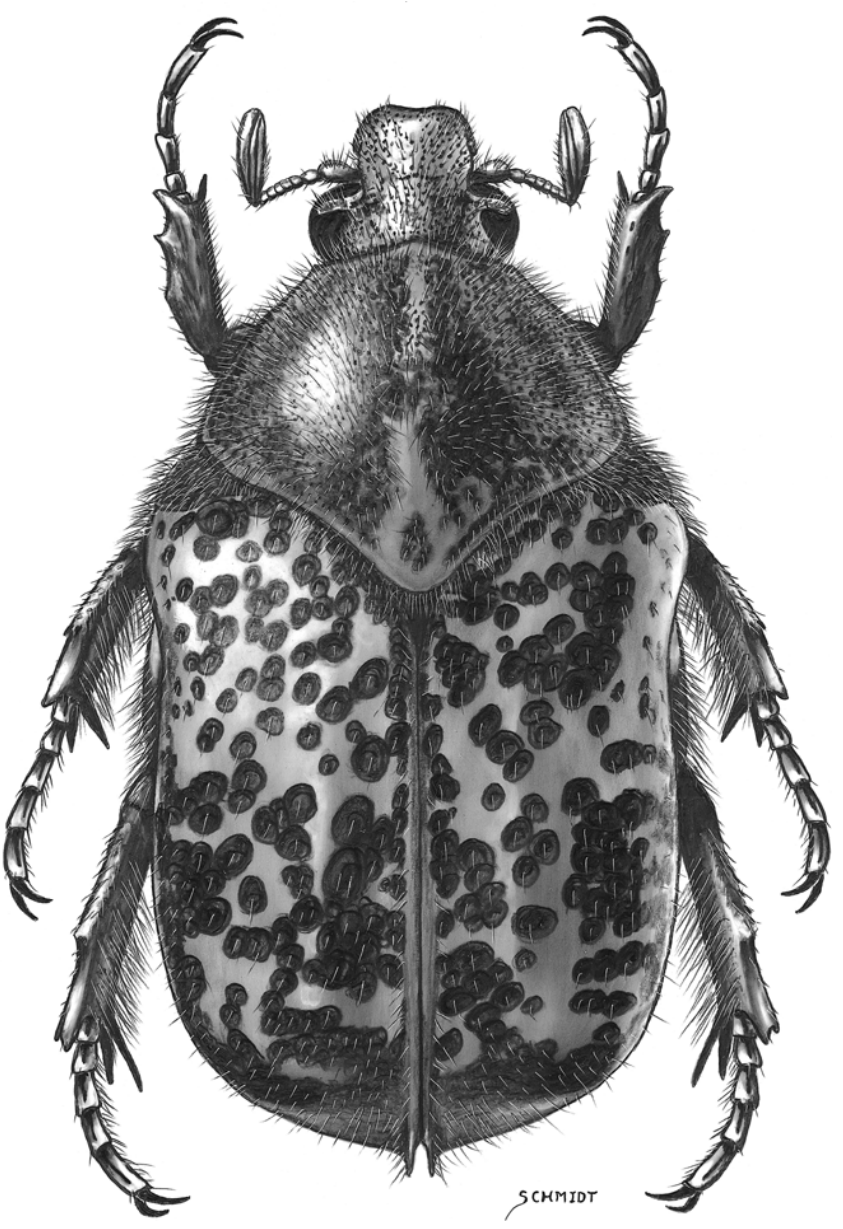


Fig. 2. Habitus of *N. reticulata* (Kirby), male.

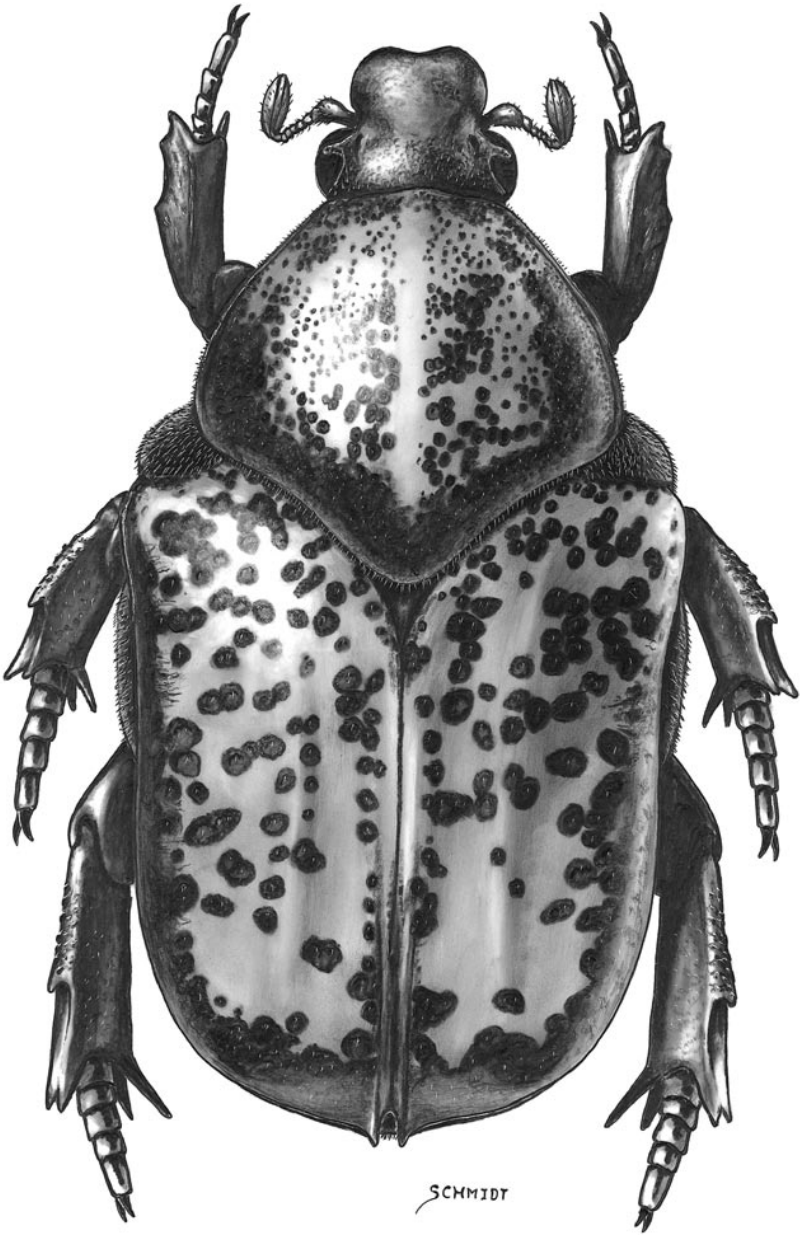
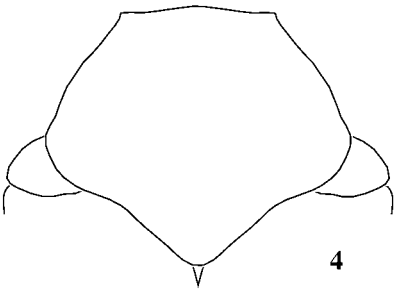
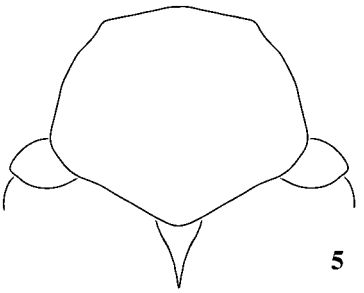


Fig. 3. Habitus of *N. reticulata* (Kirby), female.





Figs. 4–5. Dorsal view of pronotum, mesepimeron, and scutellum. 4) *N. reticulata*; 5) *N. chalybea.*

covering of dense, long, tawny setae), short, not extending anteriorly beyond mesocoxae, apex subacute in lateral view, broadly rounded in ventral view. Center of abdominal sternites each with transverse field of moderately dense, small, setigerous punctures; setae dense, moderately long, tawny. Lateral edges of sternites with sparse, setigerous punctures; setae sparse, short, tawny. *Parameres:* Figure 9.

Female. Length 17.0 mm; width across humeri 7.0 mm. Does not differ appreciably from male except for foreshortened tarsomeres.

Distribution. *Neocorvicoana chalybea* occurs in western Bolivia and southeastern Brazil.

Locality Records (Fig. 12*).* 6 specimens examined from the following collections: BCRC, MGFT, MNHN, ZSMC. **BRAZIL** (1): MINAS GERAIS (1): Jaboticatubas (Serra do Cipó). **BOLIVIA** (3): LA PAZ (4): Coroico, No data. **NO DATA** (1). **ERRONEOUS DATA** (1): Chiriqui [Panama].

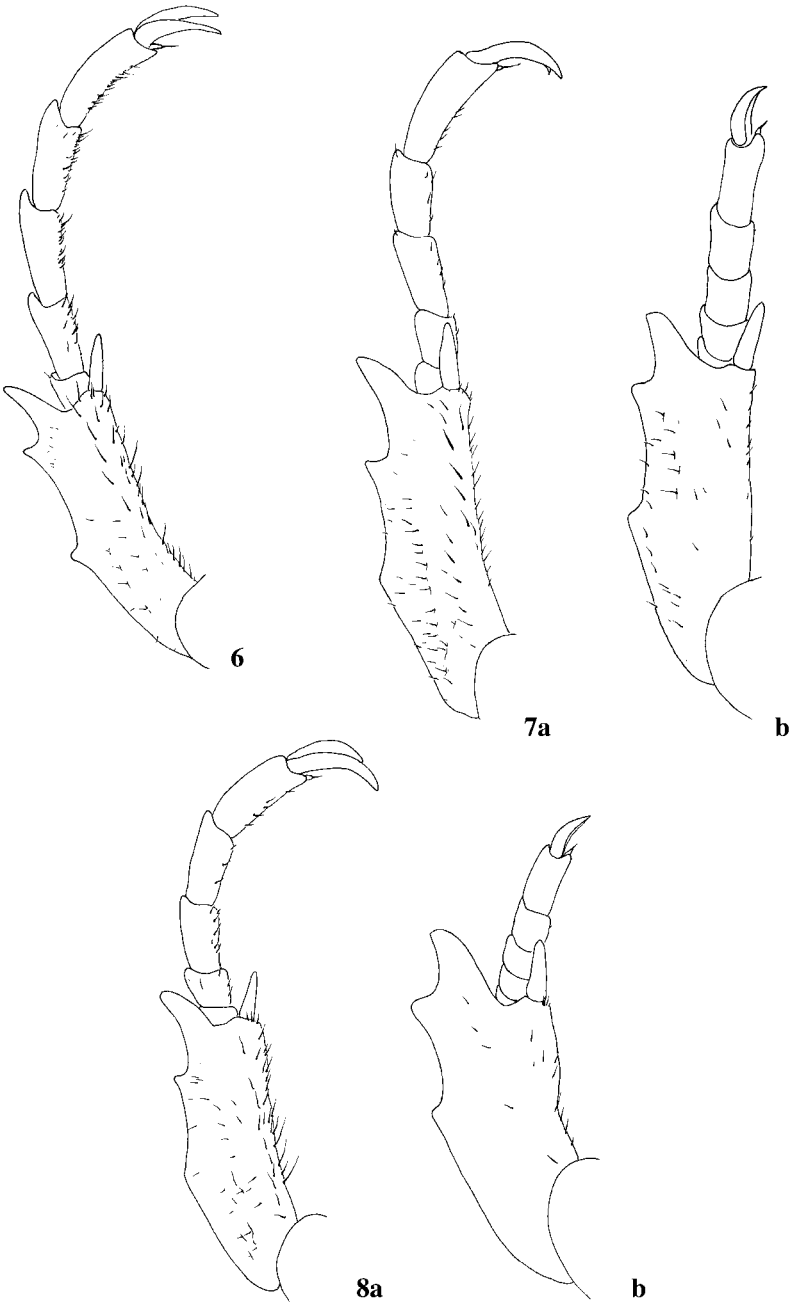
Temporal Distribution. November (1).

Remarks. *Neocorvicoana chalybea* is easily separated from other species of *Neocorvicoana* by the metallic blue or green markings on the dorsal surface in combination with the presence of setae on the central third of the abdominal sternites. The parameres (Fig. 9) are also diagnostic.

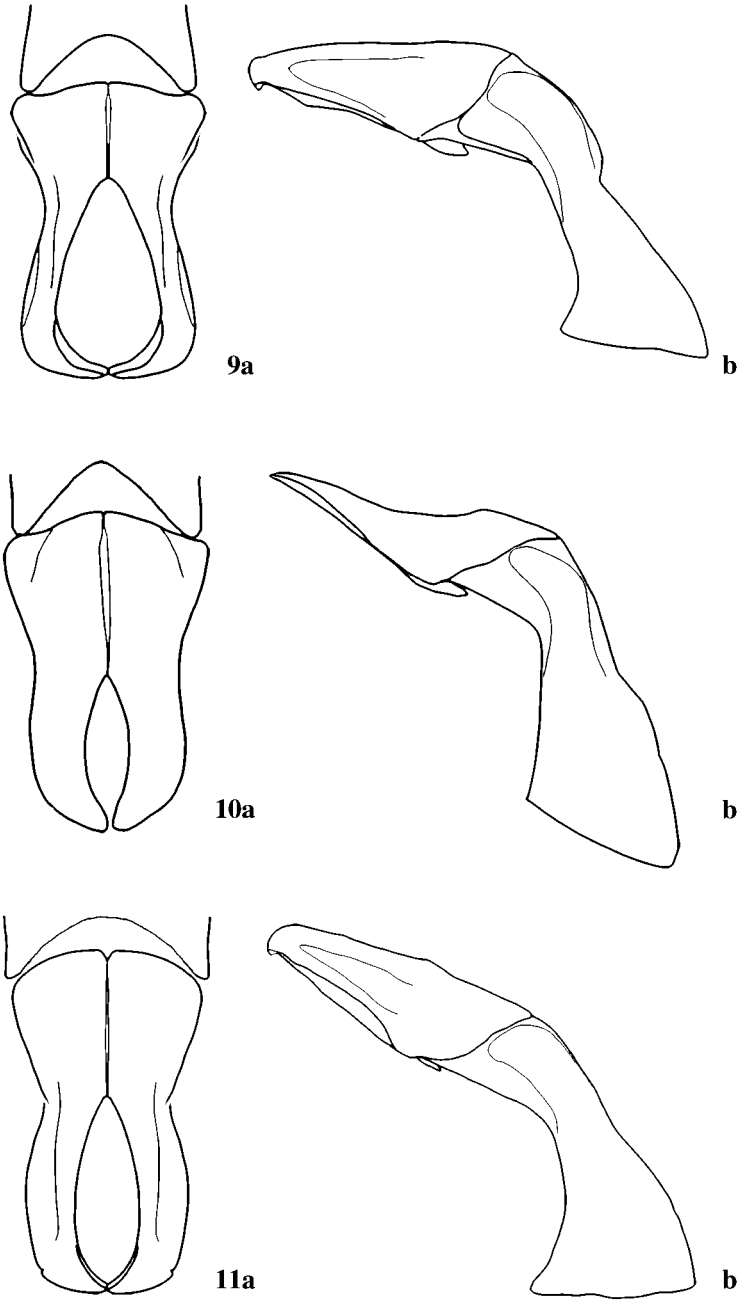
Other than ''Amerique Meridionale, Castelnau 1845,'' the type specimen of *N. chalybea* is without locality data. Castelnau's travels in South America began in Rio de Janeiro, and he journeyed northwest to Goias and then west to Santa Cruz and La Paz in Bolivia during 1844–45 (Papavero 1971). Although Castelnau's expedition later went on to other places in South America, this first part of his route nearly connects the two known localities for this species in Brazil and Bolivia. We believe it is reasonable to assume that the type specimen came from somewhere along this path.

The holotype of *C. castanea* (Schürhoff) was labeled ''Chiriqui'' which is in Panama, an area in which this genus does not occur. Schürhoff (1933) thought the label was in error as do we. This specimen is a melanistic form of *N. chalybea.*

Schürhoff (1933) referred to a specimen of *H. suavis* (now *N. chalybea*) from ''Corvico, Bolivia,'' and the allotype and one of the paratypes bear this hand written label. This is apparently a misspelling of Coroico in the Department of La Paz because there is no location called Corvico in Bolivia. Strand (1934) used this misspelling to rename the genus during some nomenclatural ''house cleaning'' when he discovered that *Heteropodia* Schürhoff was a primary junior homonym of another genus.



Figs. 6–8. Dorsal view of left foretibia and tarsus. 6) *N. chalybea* male; 7) *N. reticulata* (a) male and (b) female; 8) *D. tricolor* (a) male and (b) female.



Figs. 9–11. Parameres [caudal view (a) and lateral view (b)]. 9) *N. chalybea*; 10) *N. reticulata*; 11) *N. tricolor*.

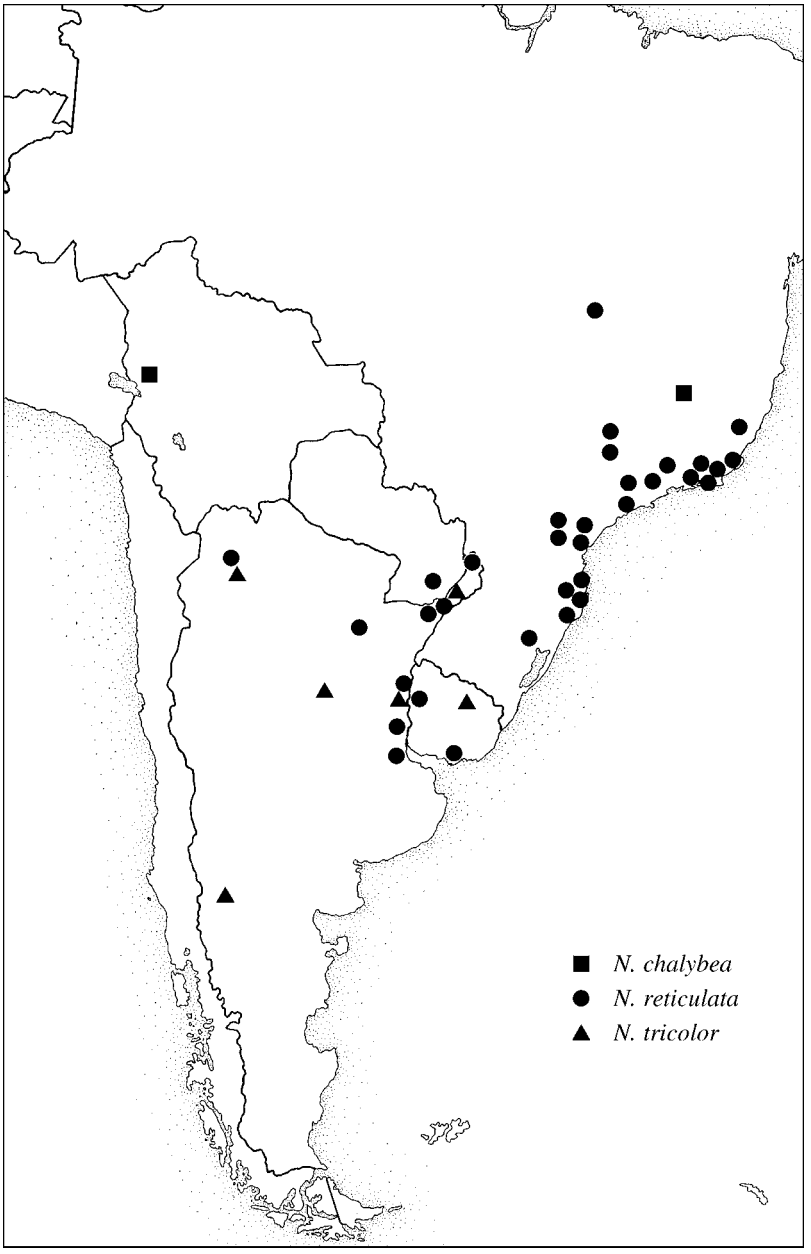


Fig. 12. Distribution map of the species of *Neocorvicoana*.

This species is known from only six specimens, and additional collecting is needed to discover the female as well as more precisely characterize the distribution.

Neocorvicoana reticulata (Kirby) 1818, **new combination**
Figs. 2–4, 7, 10, 12

Cetonia reticulata Kirby 1818:410. Holotype male at BMNH (London), examined.
Gymnetis anoguttata Gory and Percheron 1833:72. Type not found at MNHN (Paris).
Gymnetis carbonaria Gory and Percheron 1833:72. Type not found at MNHN (Paris).
Gymnetis varia Gory and Percheron 1833:72. Holotype female at MNHN (Paris), examined.

Description. *Male* (Fig. 2). Length 11.4–14.3 mm; width across humeri 6.6–8.4 mm. Color dorsally varies from velutinous cream color to ochre with black, piceous, or reddish brown punctures and large, round spots (melanistic form completely black on head, pronotum, and elytra); pygidium with velutinous cream colored or ochre spots on lateral margins either side of middle, sometimes with similar colored flecks on disc. Venter shining black with velutinous ochre marks on lateral margins of sternites, on metafemur, usually on mesofemur, and often as a spot on profemur. *Head:* Frons densely punctate; punctures small, usually round, setigerous; setae dense, moderate in length, tawny and dark brown mixed. Clypeus with surface moderately punctate, punctures becoming sparse at apex; punctures small, usually round, setigerous; setae similar to those of frons, becoming shorter and sparser anteriorly; clypeal apex weakly emarginate medially, broadly rounded either side of emargination. Interocular width equals 4.0 transverse eye diameters as seen from above. Antenna with 10 segments, club slightly longer than segments 2–7. *Pronotum:* Surface moderately to densely punctate; punctures setigerous, mostly small except where confluent and then larger; larger, denser, often confluent punctures in 4 longitudinal bands, bands occasionally partially or totally coalesced; punctures of basomedial lobe small, setigerous, each surrounded by larger reddish brown spot; setae similar to those of frons except some darker. Lateral margin with bead not reaching basal angle and either broken or missing at anterior angle. Basomedian lobe covering nearly all of scutellum (Fig. 4). Mesepimera shiny black with dense, confluent, setigerous punctures. *Elytra:* Surface moderately punctate, punctures becoming dense at apex; punctures vary (from anterior to posterior) from crescent-shaped to inverted U-shaped to a transverse, curved, vermiform line; punctures setigerous, surrounded by dark reddish brown spot, spots very from a few confluent to nearly all confluent; setae moderate in length, dark brown. Sutural costa elevated in posterior half of elytra and with apex spinose. Apical umbone well developed. *Pygidium:* Surface punctate, usually densely so and thus making surface appear rugulose; punctures inversely U-shaped, setigerous; setae moderate in density and length, dark brown. Center of disc usually with feeble, longitudinal ridge. In lateral view, surface weakly convex. *Legs:* Foretibia with 3 teeth (Fig. 7a), basal tooth slightly smaller and removed from other teeth. Foretarsus subequal in length to foretibia. Meso- and metatibia each with strong, tooth-like angle at middle on lateral edge. Meso- and metatarsi subequal in length to their respective tibiae. *Venter:* Setae of mentum and procoxae black. Mesometasternal process short but extending anteriorly to just beyond mesocoxae, apex acute in lateral view, broadly rounded in ventral view; ventral surface flat with small setae except at apex which is glabrous; anterior surface with long, dense setae that curl around apex of process. Lateral edges of abdominal sternites with oval to crescent-shaped punctures; punctures moderately large, moderate to dense to confluent, setigerous; setae moderate in length, dark brown; central third of sternites smooth, glabrous. *Parameres:* Figure 10.

Female (Fig. 3). Length 12.3–17.1 mm; width across humeri 7.0–10.6 mm. As male except in the following respects: Velvety ochre maculae on sides of sternites smaller or absent; legs entirely black, lacking ochre marks. *Head:* Interocular width equals 4.4–5.0 transverse eye diameters as seen from above. Setae shorter. *Elytra:* Apical sutural spines a little less developed. *Legs:* Tibiae shorter, broader. Tarsi compact and short: protarsus (Fig. 7b) slightly shorter than protibia, middle tarsus subequal in length to mesotibia, metatarsus about half length of metatibiae; metatarsus with segments 1–4 wider than long.

Distribution. *Neocorvicoana reticulata* occurs in southeastern Brazil, southeastern Paraguay, Uruguay, and northeastern Argentina. There were two highly questionable records from Cayenne in French Guiana and Surinam that we consider to be erroneous.

Locality Records (Fig. 12). 332 specimens examined from the following collections: AMIC, AMNH, BCRC, BMNH, CASC, CNCI, CMNC, CMNH, DEIC, FMNH, MLPA, MLUH, MNHN, MZSP, MCZC, MLPA, SEAB, SEMC, USNM, WBWC, ZMHU, ZSMC. **ARGENTINA** (28): BUENOS AIRES (1): Buenos Aires; CORRIENTES (1): Corrientes; ENTRE RIOS (1): Concordia (Salto Grande); MISIONES (19): Loreto, San Pedro; SALTA (4): R. de Lerma; SANTA FÉ (1): Santa Fé; SANTIAGO DEL ESTERO (1): Chaco de Santiago. **BRAZIL** (295): D. F. (1): Brasilia; GOIAS (7): Ilha de Paneiros, Santos; MINAS GERAIS (10): Passa Quatro; PARANA (14): Araucaria, Curitiba, Florestal Deodoro, Ipiranga, Ponta Grossa; RIO DE JANEIRO (48): Guaipi Magé, Itatiaya, Petropolis, Rio de Janeiro, Serra de Orgãos, Theresopolis, Tijuca Forest, No data; RIO GRANDE DO SUL (6): Cruz Alta, Mundo Novo, São Leopoldo, No data; SANTA CATARINA (54): Corupa, Joinville, Lanca, Nova Tuetonia, Rio Natal, Rio Vermelho, São Bento, São Francisco, No data; SAO PAULO (8): Batataes, Bragança, Campos de Jordão, Cantareira, Umurama, No data; NO DATA (147). **PARAGUAY** (6): ITAPUA (2): No data; NO DATA (4). **URUGUAY** (3): D. F. (1): Montevideo; PAYSANDU (2): Paysandu.

Temporal Distribution. January (12), February (10), March (2), April (1), May (1), June (3), July (1), August (12), September (11), October (15), November (28), December (4).

Remarks. *Neocorvicoana reticulata* differs from other *Neocorvicoana* species by the following combination of characters: sternites with central third glabrous, setae (especially around mentum and procoxae) dark brown to black, and usually with ochre or creamy white maculae or flecks on the pronotum, elytra, pygidium and venter (never with metallic marks). The parameres are also distinctive (Fig. 10). The dorsal coloring and degree of punctation varies considerably between individuals. Some specimens are totally black with no apparent correlation to locality, habitat, or elevation.

Schenkling (1921) and Blackwelder (1944) listed *Cetonia rudolphi* Frölich, 1792 as an aberration of *Corvicoana reticulata* Kirby. These authors were probably following Schaum (1849) who first placed the name as a variety of ''*reticulata.*'' This taxon in not a species of *Neocorvicoana.* Examination of the type specimen at the MNHN (Paris) shows it to belong to the genus *Gymnetis* (*Paragymnetis*) and not *Neocorvicoana.* Interestingly, Blackwelder listed ''*rudolphi*'' Frölich in *Paragymnetis* as well as in *Corvicoana,* suggesting either a slip of the pen or perhaps ambivalence as to correct placement.

Burmeister (1842) first placed into synonymy *N. anoguttata, N. carbonaria,* and *N. varia* with *N. reticulata.*

Neocorvicoana tricolor (Schürhoff) 1933, **new combination**
Figs. 5, 8, 11–12

Heteropodia tricolor Schürhoff 1933:95. Holotype male at ZSMC (Munich), examined.

Description. *Male.* Length 10.3–12.5 mm; width across humeri 6.0–6.8 mm. Ground color shiny black. Head with frons mostly black, occasionally with flecks of ochre, orange, or blue; clypeus rarely black, usually with enamel-like tan, ochre, orange, or pale green interspersed with black punctures. Pronotum varies from mostly black with enamel-like tan, ochre, orange, or pale green along lateral margins to same enamel-like color on disc with dark reddish brown spots surrounding punctures. Mesepimeron shining black anteriorly and with enamel-like tan, ochre, orange, or pale green posteriorly. Elytra ochre with dark reddish brown spots surrounding punctures; ochre color often with enamel-like orange or pale green reflections; reddish brown circles surrounding punctures often confluent, especially around margins and at base, occasionally entire elytron reddish brown. Pygidium with large, irregularly-shaped macula on each lateral margin at about middle; macula with enamel-like ochre, cream-white, or pale green color; macula occasionally broken into pieces, disc occasionally with colored flecks. Legs rarely entirely black, usually protibia (rarely profemur), meso- and metafemora, and tibiae with enamel-like cream, ochre, orange, or pale green color. Sternites on lateral edges usually with similarly colored enamel-like spot. *Head*: Frons densely punctate to rugopunctate; punctures small to moderate in size, setigerous; setae dense, long, tawny. Clypeus with surface densely punctate at base, becoming moderately or sparsely punctate on disc and apex; punctures vary from small (everywhere) to moderately large (especially on sides and/or base where some punctures confluent); punctures at base of clypeus with dense, long, tawny setae; apex moderately emarginate at middle, lobes broadly rounded either side of middle. Interocular width equals 5.0–6.5 transverse eye diameters when viewed from above. Antenna with 10 segments, club broad, almost as long as shaft. *Pronotum:* Surface densely punctate (less so on colored areas); punctures moderate to moderately large, round to crescent-shaped to inversely U-shaped, setigerous; setae dense, long, tawny. Marginal bead along lateral edge varies from complete to broken to absent in anterior half. Basomedian lobe not covering all of scutellum (Fig. 5). Mesepimeron densely punctate in black area, sparsely punctate on colored area; punctures moderate to moderately large, setigerous; setae dense, long, tawny. *Elytra:* Disc with 2 parallel, slightly elevated, rounded carinae that converge at apical umbone (slightly more distinct in green specimens). *Pygidium:* Surface sparsely to densely covered with very shallow, setigerous, inversely U-shaped punctures and transverse, curved, vermiform strigulae (surface appears reticulated); setae sparse, short, tawny. Disc in center with feeble, longitudinal ridge. In lateral view, surface nearly flat to weakly convex. *Legs:* Foretibia (Fig. 8a) tridentate, basal tooth widely separated from others. Meso- and metatibia each with strong, acute tooth at middle on lateral edge. Pro- and mesotarsi slightly longer than respective tibiae; metatarsus slightly shorter than metatibia. All tarsi with only a few short setae beneath. *Venter:* Setae of mentum and procoxae tawny. Mesometasternal process short, not extending anteriorly past mesocoxae, apex acute in lateral view, broadly rounded in ventral view; ventral surface flat, with long setae except at apex which is glabrous; anterior face with long, sparse, setae that curl around apex of process. Lateral edges of sternites with sparse punctures; punctures moderate to large, oval to transverse, setigerous; setae sparse, short, tawny. *Parameres:* Figure 11.

Female. Length 11.8–14.3 mm; width across humeri 7.1–8.4 mm. As males except in the following respects: Color of frons, pronotum, and elytra mostly enamel-like light to medium green (with or without orange reflections) or orange (occasionally with light green reflections), with black punctures; frons and pronotum and elytra usually with varying amounts of black, especially either side of midline and near base on pronotum and on lateral and apical margins of elytra; pronotum at base (occasionally) and elytra (always) with moderate to large, dark reddish brown or piceous spots surrounding punctures. Clypeus black. Legs black. *Head:* Clypeal apex with lobes either side of middle slightly larger, more rounded. *Pronotum:* Punctation on shiny black areas similar to that

of male. Punctures on enamel-like, colored areas moderate to dense, moderate to large in size, irregular, often confluent in large patches either side of middle and at base, each surrounded by moderate to large, dark reddish brown spot. *Legs:* Tibiae shorter, broader. Tarsi compact and short: foretarsus slightly shorter than foretibia, mesotarsus subequal in length to mesotibia, metatarsus less than half length of metatibia; tarsomeres 1–4 on all legs with width subequal to or greater than length (Fig. 8b).

Distribution. *Neocorvicoana tricolor* is known from southern Brazil, Argentina, and Uruguay.

Locality Records (Fig. 12). A total of 17 specimens were seen from the following collections: AMIC, CMNC, CASC, MLPA, ZMHU, ZSMC. **BRAZIL** (3): SAO PAULO (1): São Paulo; NO DATA (2). **ARGENTINA** (11): CÓDOBA (1): No data; ENTRE RIOS (1): Concordia; LA PAMPA (1): Pico; MISIONES (4): Loreto; NEUQUEN (3): Zapala, Piedra del Aguila; SALTA (1): Lerma. **URUGUAY** (2): CERRO LARGO (2): Cañada de los Burros. **NO DATA** (1).

Temporal Distribution. August (1), September (3), October (3), November (3).

Remarks. *Neocorvicoana tricolor* is highly variable in color and punctation. It is distinguished from other species in the genus by the absence of setae on the center of the abdominal sternites, presence of enamel-like, metallic maculae or flecks, tawny setae on the mentum and procoxae, and shape of the parameres.

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Literature Cited

Arnett, Jr., R. H., G. A. Samuelson, and G. M. Nishida. 1993. The Insect and Spider Collections of the World. Sandhill Crane Press, Gainesville. 310 pp.

Arrow, G. J. 1925. The Fauna of British India, Including Ceylon and Burma. Coleoptera, Lamellicornia (Cetoniinae and Dynastinae). Taylor and Francis, London. 322 pp.

Blackwelder, R. E. 1944. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. Bulletin of the United States National Museum 185:189–341.

Blanchard, E. 1850. Muséum d'Histoire Naturelle de Paris. Catalogue de la Collection

Entomologique. Classe des Insectes. Ordre de Coléoptères. Volume 1, pp. 1–128. Gide and Baudry, Paris.

Burmeister, H. 1842. Handbuch der Entomologie. Volume 3. T. Enslin, Berlin. 827 pp.

Deloya, C., and B. C. Ratcliffe. 1988. Las especies de *Cotinis* en Mexico (Coleoptera: Melolonthidae: Cetoniinae). Acta Zoological Mexicana (new series) No. 28:1–52.

Frölich, J. 1792. Bemerkungen übereinige seltene Käfer aus der Insecten-Sammlung des Hr. Rudolph in Erlangen. Naturforscher, part 26:68–165.

Gory, H. L., and A. R. Percheron. 1833. Monographie des Cétoines et Genres Voisins, Formant, dans les Familles Naturelles de Latreille, la Division des Scarabées. J.-B. Bailliére, Paris. 410 pp., 77 plates.

International Commission on Zoological Nomenclature. 1999. International Code of Zoological Nomenclature, 4th ed. International Trust for Zoological Nomenclature, London. 306 pp.

Kirby, W. 1818. A century of insects, including several new genera described from his cabinet. Transactions of the Linnean Society of London 12:375–453.

Krajcík, M. 1998. Cetoniidae of the World. Catalogue-Part 1. Published by the author, Most, Czech Republic. 96 pp. plus indices.

Krikken, J. 1984. A new key to the suprageneric taxa in the beetle family Cetoniidae, with annotated lists of the known genera. Zoologische Verhandelingen No. 210: 1–75.

Morón, M. A., and B. C. Ratcliffe. 1984. Description of the larva and pupa of *Argyripa lansbergei* (Sallé) with new distributional records for the genus and a key to New World Gymnetini larvae (Coleoptera: Scarabaeidae: Cetoniinae). Proceedings of the Entomological Society of Washington 86:760–768.

Papavero, N. 1971. Essays on the History of Neotropical Dipterology. Volume 1. Museu de Zoologia, Universidade de São Paulo, São Paulo. 216 pp.

Ratcliffe, B. C. 1978. A review of the genus *Argyripa* (Coleoptera: Scarabaeidae). Systematic Entomology 3:371–378.

Ratcliffe, B. C., and A. C. Deloya. 1992. The biogeography and phylogeny of *Hologymnetis* (Coleoptera: Scarabaeidae: Cetoniinae) with a revision of the genus. Coleopterists Bulletin 46:161–202.

Sakai, K., and S. Nagai. 1998. The Cetoniine Beetles of the World. Mushi-Sha, Tokyo. 421 pp.

Schaum, H. 1849. Observations critiques sur la famille des lamellicornes mélitophiles. Annales de la Société Entomologique de France (series 2) 7:241–295.

Schenkling, S. 1921. Coleopterorum Catalogus, pars 72. Scarabaeidae: Cetoniinae. W. Junk, Berlin. 431 pp.

Schürhoff, P. N. 1933. Beiträge zur Kenntnis der Cetoniden III. Entomologisches Nachrichtenblatt 7:89–96.

Schürhoff, P. N. 1937. Beiträge zur Kenntnis der Cetoniden (Col.). VIII. Revision der Gattung *Gymnetis* MacLeay. Deutsche Entomologische Zeitschrift 1937:565–580.

Strand, E. 1934. Miscellanea nomenclatorica zoologica et palaeontologica. Folia Zoologica et Hydrobiologica 6:271–277.

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