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Review of the whirligig beetle genus *Gyrinus* of Venezuela (Coleoptera: Gyrinidae)

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Abstract. The Venezuelan species of the genus *Gyrinus* Geoffroy, 1762 are reviewed (Gyrinidae: Gyrininae: Gyrinini). The Venezuelan *Gyrinus* fauna is found to be comprised of nine species distributed among the subgenera *Neogyrinus* Hatch, 1926 and *Oreogyrinus* Ochs, 1935, although *Gyrinus* (*Oreogyrinus*) *colombicus* Régimbart, 1883 is known from imprecisely localized and potentially mislabeled specimens and the species presumably does not occur in Venezuela. Three new species are described: *G.* (*Oreogyrinus*) *vinolentus* sp. nov. from the Andes, and *G.* (*Oreogyrinus*) *iridinus* sp. nov. and *G.* (*Neogyrinus*) *sabanensis* sp. nov., from the Guiana Shield region. Two new synonymies are established: *G. amazonicus* Ochs, 1958 syn. nov. is synonymized with *G. guianus* Ochs, 1935, and *G. racenisi* Ochs, 1953 syn. nov. is synonymized with *G. ovatus* Aubé, 1838. *Gyrinus* (*Oreogyrinus*) *feminalis* Mouchamps, 1957, described from Venezuela from two female syntypes only, is considered as species inquirendum, as the types were not found. For each species a dorsal habitus, illustration of male and female genitalia, and distribution map are provided. A key and checklist for the Venezuelan *Gyrinus* species is included.

Resumen. Las especies del Venezuela de género *Gyrinus* Geoffroy, 1762 son revisadas. En Venezuela *Gyrinus* se compone de ocho especies en dos subgéneros *Neogyrinus* Hatch, 1926 y *Oreogyrinus* Ochs, 1935. Tres especies nuevas son escriban: *G.* (*Neogyrinus*) *sabanensis* sp. nov. del Gran Sabana, *G.* (*Oreogyrinus*) *vinolentus* sp. nov. del norte Andes venezolanos, y *G.* (*Oreogyrinus*) *iridinus* sp. nov. del Unturán montañas de Venezuela Amazonas. Dos nuevas sinonimias son establecidos: *G. amazonicus* Ochs, 1958 syn. nov. con *G. guianus* Ochs, 1935 y *G. racenisi* Ochs, 1953 syn. nov. con *G. ovatus* Aubé, 1838. Cada especie es acompañada de imágenes del habitus dorsal, ilustrado del edeago y gonocoxae, y mapa de distribución. Se presentan una clave para las especies del Venezuela de género *Gyrinus* y una lista de la especies venezolanos de género *Gyrinus*.

Key words. Coleoptera, Gyrinidae, aquatic beetles, taxonomy, new species, new synonyms, distribution, Venezuela, Neotropical Region

Introduction

The gyrinid fauna of Venezuela was first treated by Régimbart (1889, 1904), in two small works that did not result in the description of new taxa from the country. The current knowledge on the Venezuelan Gyrinidae primarily comes from the work of Ochs (1953, 1955, 1963b, 1980). Four genera of whirligig beetles are known from Venezuela: *Gyrinus* Geoffroy, 1762, *Gyretes* Brullé, 1835, *Enhydrus* Laporte, 1835, and *Andogyrus* Ochs, 1924. Though, the latter of which was recently relegated to a subgenus of *Macrogyrus* Régimbart, 1882 (Gustafson & Miller 2017). Within Venezuela, the two most speciose genera are *Gyretes* and *Gyrinus*, with the others represented by single species: *Enhydrus mirandus* Ochs, 1955 and *Macrogyrus* (*Andogyrus*) *colombicus* Régimbart, 1892 (Ochs 1955, Brinck 1977). As a result of a long-term project to survey the aquatic insects of Venezuela lead by the second author, a considerable amount of new gyrinid material has been accumulated. Among the *Gyrinus* material collected are two distinctly new species and a third from the Smithsonian National Museum of Natural History (Washington D.C., USA). Thus, the present review was undertaken to update our knowledge on the Venezuelan species of the genus *Gyrinus*.

Material and methods

A total of 701 specimens was examined in this study, housed in the following institutions:

BMNH	Natural History Museum, London, England, United Kingdom;
FMNH	Field Museum of Natural History, Chicago, Illinois, USA;
FSCA	Florida State Collection of Arthropods, Division of Plant Industry, Gainesville, Florida, USA;
KBMC	Kelly B. Miller Collection at the Museum of Southwestern Biology, University of New Mexico, Albuquerque, New Mexico, USA;
MIZA	Museo del Instituto de Zoología Agrícola Francisco Fernándo Yépez, Universidad Central de Venezuela, Maracay, Venezuela;
MNHN	Muséum National d'Histoire Naturelle, Paris, France;
SEMC	Snow Entomological Collection, University of Kansas, Lawrence, Kansas, USA;
SMF	Forschunginstitut und Naturmuseum Senckenberg, Frankfurt-am-Main, Germany;
USNM	National Museum of Natural History, Washington D.C., USA.

Specimens were examined using an Olympus SZ61 microscope. Measurements were taken using a millimeter ruler and follow Gustafson & Miller (2015). For each taxon an attempt was made to measure the largest and smallest individual available and for strongly sexually dimorphic species the same was done for each sex.

Specimens for dissections and imaging were relaxed by placing them in lightly boiling water. The genitalia were then dissected and placed in warm 10% KOH for about five minutes. Following removal from KOH, the genitalia were placed in glacial acetic acid to neutralize the base, then washed in water. Genitalia were drawn while in water or imaged in glycerin, then stored in glycerin. After dissection and /or illustration, genitalia and abdomens were placed in microvials attached to the pin with the original specimens.

Images of the genitalia were first taken on an Olympus SZX16 microscope with attached Olympus DP72 camera, then traced in Adobe Illustrator. Dorsal habitus was taken using a Visionary Digital BK+ light imaging system (www.visionarydigital.com, R. Larimer). Scanning electron microscope images were taken at the KU Microscopy and Analytical Imaging Laboratory at the University of Kansas. Images were edited using Adobe Photoshop to add scale bars, gray backgrounds, drop-shadows, and improve clarity and color.

Terminology of gross anatomical features largely follows Gustafson & Miller (2015); for elytral disc features, critical in the taxonomy and identification of members of the Gyrinini, the system developed by Brinck (1955a,b) is followed.

Subgenera of *Gyrinus* Geoffroy, 1762

The genus *Gyrinus* was first divided into formal subgenera by Zaitzev (1907), who separated *Gyrinus minutus* Fabricius, 1775 into the subgenus *Gyrinulus,* based on the presence of a small carina at the base of the scutellar shield and a mesoventrite with a strong medial groove. Hatch (1926) was next to divide *Gyrinus*, erecting the subgenus *Neogyrinus* for five Neotropical species having the medial elytral striae effaced (e.g. Figs 1–6) and lacking a basal carina on the scutellar shield, with *G. chalybaeus* Perty, 1830 selected as the type. The final division of the genus was originally proposed by Ochs (1935a) to separate species having the pronotum strongly sculptured (Figs 38–39) and the lateral elytral striae sulcate with more strongly impressed punctures (Figs 43, 45) to the subgenus *Oreogyrinus* Ochs, 1935. Ochs (1949) later provided more diagnostic features of members of *Oreogyrinus*: pronotal transverse medial depression or crease always present (Figs 38–39); elytral stria XI strictly marginal (Figs 40–41); elytral lateral margin strongly riffled and terminated in an apical plica (Figs 40–41); venter darkly colored, with only the mesoventrite, epipleura, and anal segment reddish in color. Ochs (1935a) selected *G. parcus* Say, 1830 as the type for the subgenus, which is one of the most widely distributed *Gyrinus* species in the New World (Oygur & Wolfe 1991), being found from southern South America to North Dakota. Despite the species selected for the type, Ochs (1935a) emphasized that members were primarily found along the Andes and mountain chains of Central America (Ochs 1949).

In particular, the distinction between *Oreogyrinus* and the nominotypical subgenus has become more difficult with the discovery of a lowland Amazonian species, *G. fittkaui* Ochs, 1963, resembling *G. marinus* Gyllenhal, 1808 and lacking many diagnostic features of an *Oreogyrinus*. We here report on the discovery of a new Amazonian species lacking nearly all diagnostic features of an *Oreogyrinus*, further weakening its distinction from the nominotypical subgenus (see discussion under *Gyrinus iridinus* sp. nov.). The characters separating *Neogyrinus* from *Gyrinulus* have also been called into question (Ochs 1967b). However, *Neogyrinus* is quite distinct from both *Oreogyrinus* and nominotypical *Gyrinus* members. The features of *Neogyrinus* are distinct enough that full generic rank has been proposed (Crespo 1986). However, Crespo's (1986) decision was based primarily on the form of the anal hooks of the third instar larva of *G. ovatus*. As this is a very minor feature, and one not examined in any other *Neogyrinus* species, we do not follow Crespo's (1986) proposed change in rank.

Oygur & Wolfe (1991) introduced a novel character for *Gyrinus* taxonomy, the metanepisternal ostiole, which in combination with the classical characters, appears to distinctly separate *Neogyrinus* from *Oreogyrinus*, *Gyrinulus* and *Gyrinus* s. str. Members of *Neogyrinus* always lack a metanepisternal ostiole, while the vast majority of species in the other subgenera possess a metanepisternal ostiole, even if it is small (as in the *Oreogyrinus* species treated here). The additional subgeneric characters will make readily apparent species of the nominotypical subgenus that have lost the metanipsternal ostiole (e.g. *Gyrinus rugosus* Oygur & Wolfe, 1991 and *G. gibber* LeConte, 1868).

As the monophyly of the subgenera has yet to be tested phylogenetically, given the considerable differences between *Neogyrinus* species when compared to members of *Oreogyrinus* and the nominotypical subgenus, and the utility of subgenera to quickly convey this information, we here continue to use the classical subgenera when treating Neotropical species.

Structures of taxonomic importance

Elytral serial striae appearance. The number of serial elytral striae (here after simply elytral striae) evident and their appearance are of critical importance for identification of species. Members of the subgenus *Neogyrinus* have at least one or more medial elytral striae (i.e. I–VI) effaced (Figs 1–6, 7, 10, 22, 24). Many of these species have reticulate stripes evident in their place, but the punctures have been lost (see *G. gibbus* for an example, Fig. 2). Species of the subgenus *Oreogyrinus* on the other hand have all 11 elytral striae evident and easily traceable (Figs 33–38, 41–42). The lateral elytral striae of both subgenera (i.e. VII–XI) are often strongly impressed giving them a sulcate appearance (Figs 7, 22, 24, 41, 42, 44, 46). While just how sulcate the lateral striae appear is variable, which striae appear sulcate was consistent and diagnostic of species.

The appearance of the punctures composing the striae is also important for separating similar species. Most of the *Gyrinus* species of both subgenera have round punctures that, at least laterally, are well impressed (Figs 19, 21, 28, 44, 46). A few species however have the punctures within strongly sulcate striae that have become compressed and lineate in appearance (Fig. 26). These lineate punctures are encountered in the sulcate lateral striae of a variety of gyrinine species (Brinck 1955b). In the Venezuelan *Gyrinus*, only two *Neogyrinus* species have lineate punctures, *G. guianus* Ochs, 1935 (Fig. 4) and *G. sabanensis* sp. nov. (Fig. 1), and are useful for distinguishing these species from others similar in general appearance.

Elytral interval reticulation. Most species of *Oreogyrinus* have sexually dimorphic elytral interval reticulation. The females (Figs 33 and 35) have at least the lateral elytral intervals strongly reticulated with well-impressed meshes of round or scale-like sculpticells (Figs 44 and 46). This reticulation is absent in the males of these *Oreogyrinus* species (Figs 34 and 36). The presence or absence of this sexually dimorphic reticulation is important to identify species, and how far this reticulation extends medially on the elytra is critical. For example, *G. venezolensis* and *G. vinolentus* sp. nov. females can be distinguished by the extent of the elytral reticulation, extending normally only to elytral interval V in the former and interval IV in the latter. The female of *Gyrinus iridinus* sp. nov., however, completely lacks reticulation (Fig. 37).

Elytral lateral margins. How broad the elytral lateral margins appear is a useful character separating *Gyrinus* species in both subgenera. For example, some species have a broad lateral margin (Figs 1, 3, 33, 35), while others have a relatively narrow lateral margin (Figs 4 and 37).

In the past the color of the elytral and pronotal lateral margins was considered to be diagnostic of species (Ochs 1953). In general, the lateral margins of many *Neogyrinus* species are lightly colored (Figs 1–4, 78, 79). However, the actual hue varies considerably among specimens within and between populations. Some appear more red in color (Figs 1, 78, 79), while others are more orange or yellow (Fig. 3), and others have the lateral margins similarly colored as the elytral disc (Fig. 5). Because the elytral margins are so variable in color, this character is not considered fully diagnostic of species. As there is considerable regularity to elytral margin coloration, this character is noted in species descriptions and diagnoses. As an example, *G. ovatus* (Figs 3 and 78) frequently has lightly colored pronotal and elytral margins, while *G. gibbus* rarely has the elytral margins lightly colored (Figs 2 and 5), this is noted as a way to help distinguish the two species. But it is not diagnostic between the two species, as some specimens of *G. ovatus* did not have elytral lateral margins lightly colored, and a few specimens of *G. gibbus* did.

Elytral medial pre-apical plica. *Gyrinus guianus* has a distinct plica to the elytral disc, situated medially towards the elytral sutural border, just before the elytral apex (Figs 22–23). This plica is unique to *G. guianus* and is a usefully way to quickly distinguish this species from the other species, especially the other narrowly oval species, *G. rozei* Ochs, 1953 (Fig. 6).

Elytral apices. The elytral apices hold several diagnostic characters important for species identification. The shape of the elytral apex, upon close examination, varies amongst species from being rounded to more truncate in appearance. Within species of *Neogyrinus* there are additional diagnostic modifications to the elytral apex. The elytral apex has a complete border in certain species (Fig. 11); exhibited primarily by *G. gibbus*, it is also present in *G. rozei* (Fig. 24) but much less evident. *Gyrinus ovatus* is unique in having a denticle (Fig. 9) present on the epipleural angle of the elytral apex, although this denticle is sometimes effaced in certain specimens.

Metanepisternal ostiole. The metanepisternal ostiole was first introduced as a diagnostic character for identification of *Gyrinus* species by Oygur & Wolfe (1991). A small to very small metanepisternal ostiole is present only in members of *Oreogyrinus* among the Venezuelan *Gyrinus* species (i.e. *G. venezolensis*, *G. vinolentus* sp. nov. and *G. iridinus* sp. nov.). It is absent in all members of *Neogyrinus*. See Oygur & Wolfe (1991) for further information on this character.

Aedeagus. The aedeagus differs considerably among the different species (Figs 29–32 and 47–50). Even those externally morphologically similar had very different male genitalia (c.f. 4 to 6 and 31 to 32; 34 to 36 and 48 to 49).

Gonocoxae. The shape of the female gonocoxae has been an important feature for identification of different female gyrinine species (Brinck 1955a,b, Franciscolo 1979, Holmen 1987, Hilsenhoff 1990). Similar to the aedeagus, the gonocoxae can be used to distinguish females

of species similar in external morphology (e.g. *G. guianus* Fig. 54 and *G. rozei* Fig. 55 and *G. venezolensis* Fig. 58, and *G. vinolentus* sp. nov. Fig. 59). The gonocoxae of all species studied appear weakly asymmetrical, thus keys and diagnoses make use of the most distinct aspect of the gonocoxae, while descriptions note the asymmetry.

Taxonomy

Gyrinus (*Neogyrinus*) *gibbus* Aubé, 1838

(Figs 2, 5, 10–19, 51–52, 70–71, 75)

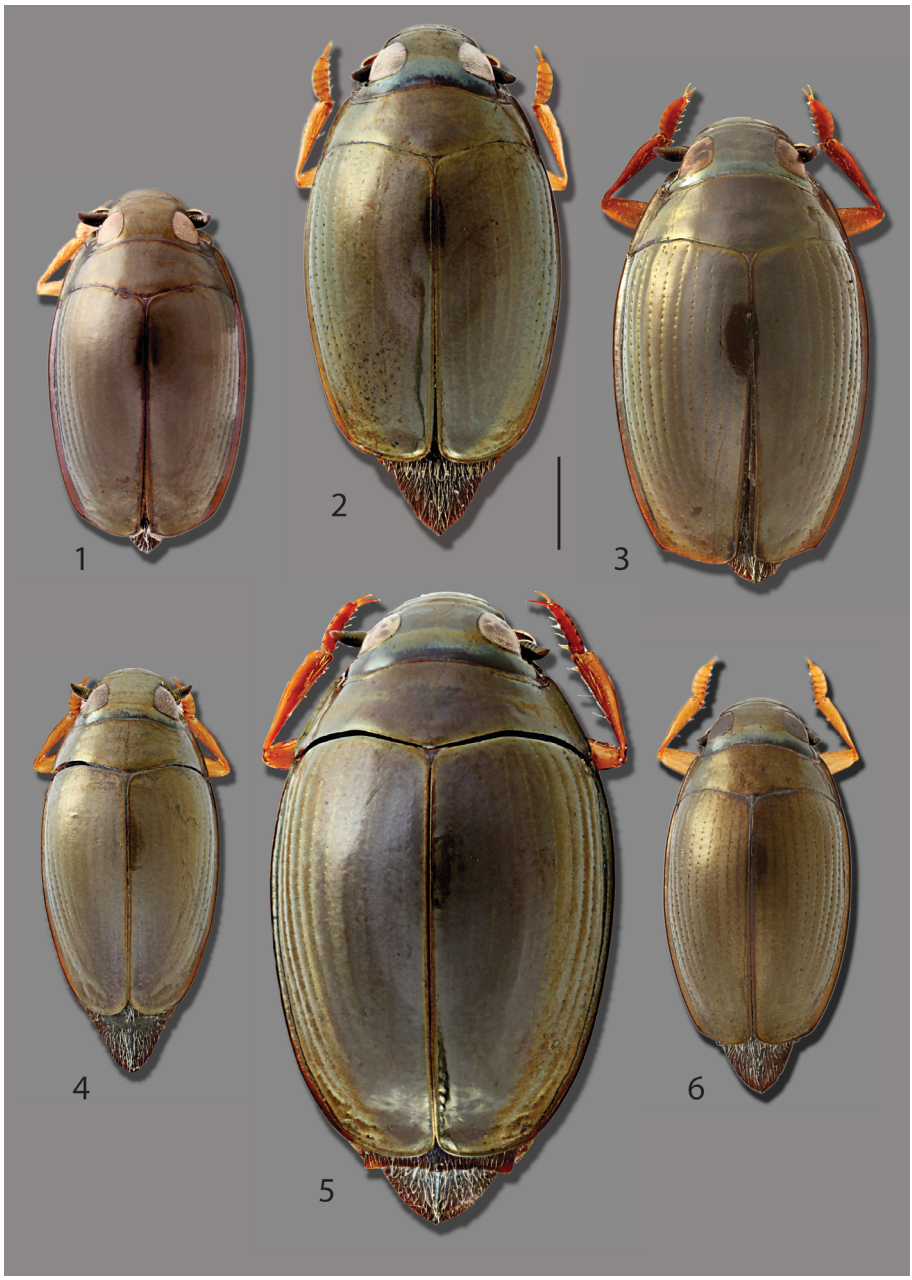
Gyrinus gibbus Aubé, 1838: 709 (original description).
Gyrinus apicalis Sharp, 1877: 117 (original description); synonymy by Régimbart (1883): 186.
Gyrinus (*Neogyrinus*) *gibbus*: Ochs (1935a): 126 (new status).

Type localities. *Gyrinus gibbus*: 'Brazil'. *Gyrinus apicalis*: 'Santa Cruz', Brazil' [likely Santa Cruz do Sol, Brazil]. **Material examined. VENEZUELA: Amazonas:** Stream along Rio Sipapo, 4°55.849'N, 67°44.645'W, 16.i.2009, leg. Short /Miller, VZ09011602 (1 spec. KBMC); swift trib. to Rio Siapa, 5.ii.1989, leg. D.A.Polhemus, CL8007 (5 spec. USNM); 40 km S Puerto Ayacucho, at Tobogan, 19.ii.1986, leg. P.J.Spangler, colln#1, USNM ENT 00717233–USNM ENT 00717236 (4 spec. USNM); nr Iboruwa, "Tobogancito", 5°48.414'N, 67°26.313'W, 13.i.2009, leg. Short /Miller, VZ09011302 (2 spec. KBMC); riv nr Orinoco /Sipapo confl., 5°03.707›N, 67°46.768›W, 15.i.2009, leg. Short /Miller, VZ09011501 (4 spec. KBMC). **Bolívar:** ca. 25 km E. El Burro, 6°13'4.6"N, 67°14'26.4"W, 60 m, 7.viii.2008, leg. A.Short, M.García, L.Joly, rocky morichal, AS-08-077, SM0827797 (1 spec. SEMC); Los Pijiguaos, 6°35.617'N, 66°49.238'W, 12.i.2009, leg. Short /Miller, morichal, VZ09011201 (4 spec. KBMC). **Capital District:** Libertador, El Valle, 22.vi.–22, leg. L.R.Reynolds, F. Psota Col. (40 spec. FMNH); Caracas Valley, 6.v.–22, leg. L.R.Reynolds, F. Psota Col. (1 spec. FMNH); Las Trincheras, 9.vi.–22, leg. L.R.Reynolds, F.Psota Col. (1 spec. FMNH). **Non-Venezuelan material examined. BOLIVIA: Beni:** Chacobo Indigenous Village, Río Benicito, '60W-12:20S', 26.vii–4.viii.1960, leg. B.Malkin (6 spec. FSCA). **BRAZIL: Rio de Janeiro:** Itatiaia, 17.iv.1960, leg. Borvs Malkin, temporary "muddy" puddle (46 spec. FSCA); São Paulo: São Paulo leg. J. Metz, Karl Brancsik Coll. (1 spec. FMNH). **MEXICO:** (2 spec. FMNH). **PERU: Mariscal Ramón Castilla:** Estiron, Rio Ampiácu, Loreto, 15–25.xi.1961, leg. B.Malkin, forest stream (66 spec. FSCA).

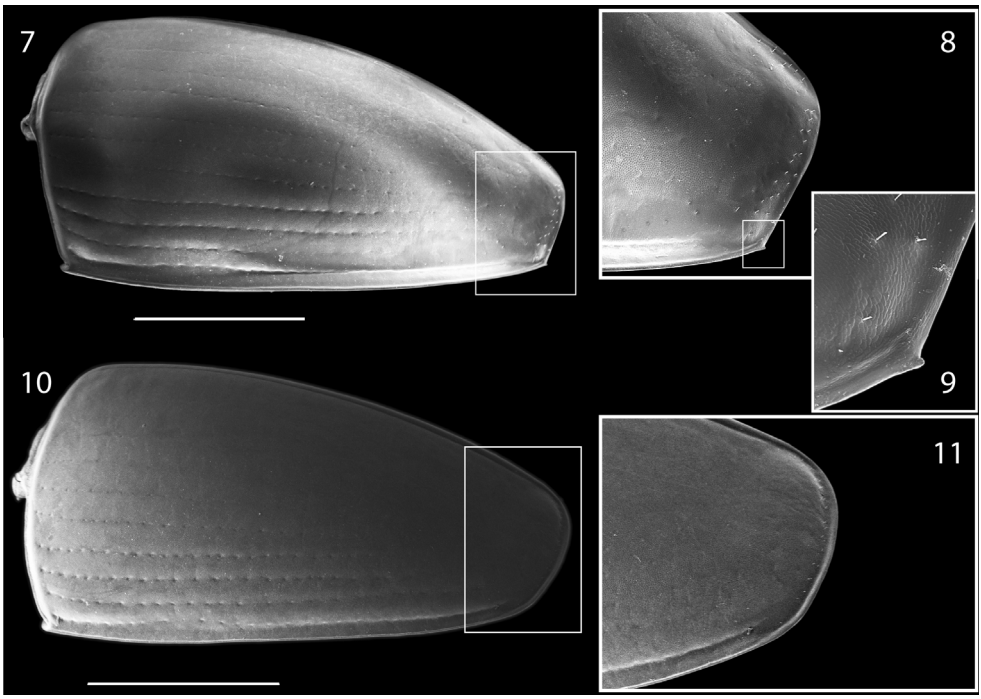
Diagnosis. Body form (Figs 2 and 5) broadly oval, strongly convex in lateral view; pronotal and elytral margins broad, darkly colored except elytral margin apically, often red or lightly colored; elytral disc with non-uniform reticulation, medially appearing polished, laterally bronzy-metallic in appearance; striae VI–XI evident (Fig. 10) with distinct, widely spaced punctures (Fig. 19), striae VIII–IX at most weakly sulcate (Fig. 10); elytral intervals all similarly convex; elytral apex rounded (Fig. 11), border complete (Fig. 11), epipleural angle indistinct; metanepisternal ostiole absent; aedeagus (Fig. 13) with median lobe just shorter than parameres, narrow, evenly attenuated, weakly laterally expanded in apical 1/5 at swollen apex; gonocoxae (Fig. 51) elongate with obliquely truncate apices.

Gyrinus gibbus is most similar to *G. ovatus* and in addition to the difference discussed under the diagnosis of *G. ovatus*, can be distinguished by the much starker difference between the polished appearance of the reticulation of the medial elytral disc, and the bronzy metallic reticulation of the lateral regions (Figs 2 and 5). The elytral apex of *G. gibbus* is also distinct among the Venezuelan *Neogyrinus* species in that it has a complete border to the rounded elytral apex (Fig. 11).

Redescription. Size. Length = 4.5–6.0 mm, width = 2.0–3.5 mm. Habitus. Body form broadly oval, weakly attenuated anteriorly and posteriorly, widest point just anterior to elytral



Figs 1–6. Dorsal habitus of *Neogyrinus* species, scale bar = 1 mm. 1 – *Gyrinus sabanensis* sp. nov. 2 – *G. gibbus* Aubé, 1838 from Amazonian Venezuela. 3 – *G. ovatus* Aubé, 1838. 4 – *G. guianus* Ochs, 1935. 5 – *G. gibbus* 'var. *apicalis*' Sharp, 1877 from Caracas valley, Venezuela. 6 – *G. rozei* Ochs, 1953.

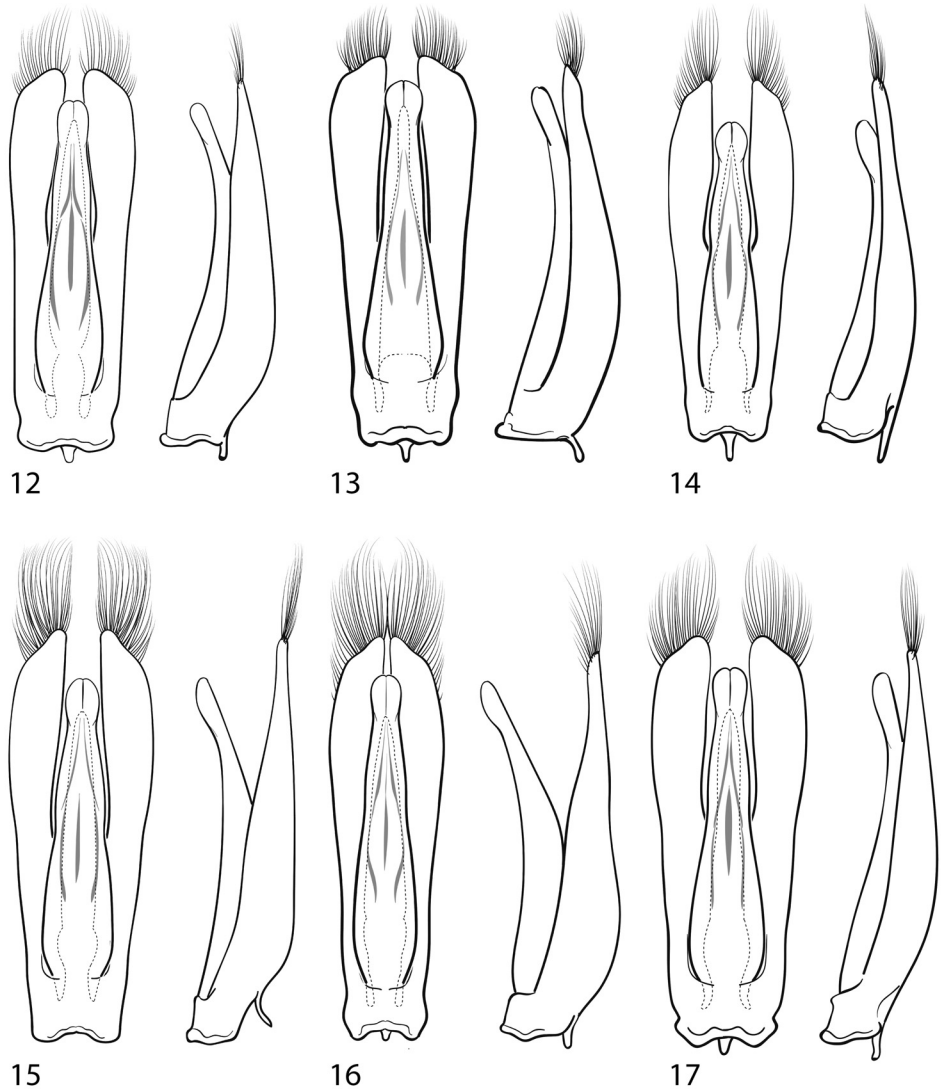


Figs 7–11. 7–9 – SEM images of *Gyrinus ovatus* Aubé, 1838 elytral morphology. 7 – elytron, box indicates region shown in Fig. 8, scale bar = 1 mm. 8 – elytral apex, box indicates region shown in Fig. 9. 9 – denticle of epipleural angle of elytral apex. 10–11 – SEM images of *G. gibbus* Aubé, 1838 elytral morphology. 10 – elytron, box indicates region shown in Fig. 11. 11 – elytral apex of *G. gibbus*, showing complete border.

midlength; in lateral view strongly dorsoventrally convex, greatest convexity posterior to scutellar region, weakly depressed anteriorly and posteriorly.

Coloration (Figs 2 and 5). Dorsally, head, pronotum, elytra bronzy-green, lateral margins of pronotum and elytral similarly colored as remainder of pronotum and elytra, elytral lateral margin lightly colored apically, often red or yellow; ventrally lightly colored, ventral surface of pedicel, hypomeron, and elytral epipleuron light yellow, abdomen slightly darker yellow to orangish-yellow in color, remainder of venter especially meso- and metaventrites, often more darkly colored orange.

Sculpture and structure. Pronotum with broad lateral margins. Elytra (Fig. 10) with striae I–V present as reticulate stripes (Fig. 18), V with very sparse weakly impressed punctures; VI–XI evident (Fig. 10), composed of widely spaced distinct punctures; striae VIII–IX at most weakly sulcate, with largest and most well-impressed punctures (Fig. 19); stria X with smaller, widely separate punctures; stria XI mostly marginal, weakly elevated in basal 1/3. Elytral intervals I–VI (Fig. 18) with weakly impressed reticulation composed of meshes with small sculpticells, producing a polished appearance; intervals VII with more strongly impressed reticulation basally, meshes composed of larger sculpticells producing a metallic appearance;



Figs 12–17. Dorsal and lateral view of the aedeagus of *G. gibbus* Aubé, 1838 specimens from throughout its range, not to scale. 12 – historical specimen from Mexico (FMNH). 13 – Caracas valley, Venezuela 'var. *apicalis*' Sharp, 1877 (FMNH). 14 – Amazonian Venezuela: Amazonas, river near Orinoco /Sipapo confluence (KBMC). 15 – Amazonian Peru: Mariscal Ramón Castilla, Estiron, Rio Ampiácu (FSCA). 16 – Amazonian Bolivia: Beni, Chacobo indigenous village, Río Benicito (FSCA). 17 – São Paulo (FMNH).

intervals VIII–IX entirely with more strongly impressed metallic reticulation (Fig. 19); all intervals evenly convex. Elytra without medial pre-apical plica (Fig. 10); apices round to subtruncate; border complete (Fig. 11); epipleural angle indistinct, never with denticle. Metanepisternal ostiole absent. Ultimate abdominal tergite often with strong medial acumination.

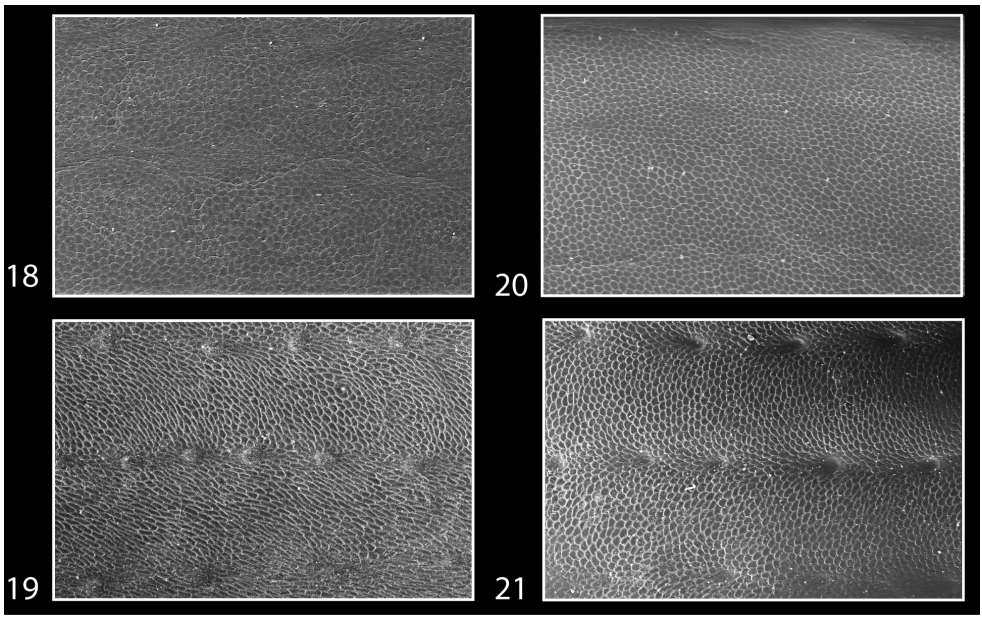
Male genitalia (Figs 13 and 14). Aedeagus with median lobe shorter than parameres, gradually narrowing apically, weakly constricted after basal 2/3 becoming more weakly attenuated, laterally expanded in apical 1/5 forming small round process, apex swollen, rounded, weakly bifid medially; parameres with apex obliquely truncate, often weakly emarginate. Female genitalia (Figs 51 and 52). Gonocoxae elongate, apices obliquely truncate, left gonocoxa more-so than right.

Variability. This species is most variable in the development of the elytral reticulation, dorsoventral convexity, and body size. The material examined included a very unique population of *G. gibbus* from the Caracas Valley in northern Venezuela (Fig. 75). These specimens are much larger in size and more robust in general appearance than others examined (Fig. 5). These specimens also have a coarser metallic reticulation of the elytra, occupying a larger area than exhibited in other specimens, being present on most of elytral interval V and the entirety of VI–IX. Together this gives these specimens a much more bronzy appearance and creates a starker contrast between the lateral and medial region of the elytra disc where the weakly impressed reticulation composed of smaller sculpticells gives a stronger polished appearance (Fig. 5). The elytral apices are more evenly rounded (Fig. 5) and the Caracas specimens have the ultimate abdominal tergite without a strong medial acumination.

Specimens from Amazonian Venezuela differed strongly in appearance to those from the Caracas Valley, being much less convex, and less rounded in appearance (Fig. 2). They also differed considerably in the appearance of the medial elytral reticulation (Fig. 2). In the Amazonian Venezuelan populations, the reticulation of the medial elytra discs was more strongly impressed, with slightly larger sculpticells, resulting in less contrast in comparison to that of the metallic reticulation found laterally. However, the distinctly more polished appearance of the medial reticulation is still evident. The elytral apices of the Amazonian specimens are less strongly rounded, and the ultimate abdominal tergite has a strong medial acumination (Fig. 2). However, the aedeagus between the Caracas Valley specimens (Fig. 13) and the more southern Venezuelan populations does not differ considerably (Fig. 14) compared to the aedeagi of other species (cf. Figs 29–32) and both shared all the diagnostic features of the aedeagus.

The variation in the *G. gibbus* population from Caracas Valley is similar to those of specimens examined from outside the Amazon, in Rio de Janeiro and São Paulo, Brazil and Mexico, which also have an evenly rounded appearance, are strongly convex, and have a stark contrast between the lateral and medial elytral disc reticulation. These populations also have the elytral apices more rounded in appearance, but they don't all lack the medial acumination of the ultimate abdominal tergite.

Specimens examined from further south in the Amazon in Peru and Bolivia were similar to those from Amazonian Venezuela in external appearance (Fig. 2). However, all specimens from across the species entire range exhibited the same diagnostic external features provided above, as well as having very similar aedeagi (Figs 12–17). The aedeagi exhibit all the diagnostic features of the median lobe, with variation evident in the apex being similar among adjacent



Figs 18–21. SEM images of elytral interval reticulation and strial punctures. 18–19 – *Gyrinus gibbus* Aubé, 1838. 18 – intervals II and III, striae I–III. 19 – intervals IX and X, striae VIII–X. 20–21 – *G. ovatus* Aubé, 1838. 20 – intervals II and III, striae I–III. 21 – intervals IX and X, striae VIII–X.

populations (i.e. Amazonian Venezuela and Peru: Figs 14 and 15) and consistent differences between Amazonian (Figs 14–16) vs. non-Amazonian (Figs 12, 13, and 17) specimens primarily in the appearance of the parameres. Amazonian specimens have the parameres apically with a greater acute medial angle to the apex, which in combination with the emargination gives them a more obliquely truncate appearance. Specimens from outside the Amazon region have the parameres broader apically with the medial angle of the apex less acute.

Habitat. In Venezuela this species has been primarily found in association with streams and river habitats (Figs 70–71).

Distribution. This is a very widespread Neotropical species found from Argentina through Central America (Ochs 1948), potentially as far as Mexico based on historic specimens examined here from the FMNH. Within Venezuela, this species has a disjunct distribution with most records coming from the Amazonian region and historic specimens from the Caracas Valley in the north (Fig. 75). See discussion below.

Discussion. The considerable amount of variation among populations of *G. gibbus* has long been recognized (Régimbart 1883). There is a general pattern in the variation exhibited based on distribution, whether the specimens come from within or outside of the Amazon (discussed above in the variability section). In Venezuela, this is exemplified by the specimens from the Caracas Valley (Fig. 5), compared to those from Amazonas (Fig. 2). Régimbart (1889) identified the specimens examined by him from Caracas as *G. gibbus* var. *apicalis* Sharp,

1877. *Gyrinus apicalis* was originally described as a distinct species from southern Brazil by Sharp (1877), distinguished from *G. gibbus* by the different elytral reticulation and larger size. However, Régimbart (1883: 186) considered this mere variation and synonymized *G. apicalis* with the typical *G. gibbus* from Brazil (without further locality specification).

The specimens from within the Amazonian region of Venezuela (Fig. 2) also showed consistent external differences with those from other parts of the Amazon (discussed above under the variability section). The male genitalia (Figs 12–17), the indicator of species boundaries in this study, show subtle, yet consistent, differences between the Amazonian populations and non-Amazonian populations (primarily in association with the parameres) across *G. gibbus*' range. The gonocoxae are also very similar between the populations (Figs 51 and 52), especially compared to those of other species. In Venezuela, the disjunct distribution exhibited by *G. gibbus* is quite odd, especially compared to other Venezuelan *Neogyrinus* species (Figs 72–75). The extensive sampling done by the Venezuelan aquatic insect survey precludes the explanation of this being a sampling artifact. Thus, the current definition of *G. gibbus* may include two taxa, one from the Amazon region and the other from outside of it. Based solely on morphology, the variation between these two 'taxa' would at most warrant subspecific status, when compared to the interspecific variation in morphology of the other *Neogyrinus* species (cf. Figs 1–6 and 29–32). Molecular phylogenetic studies of these populations will ultimately be needed to clarify the relationships of these populations and determine their relative taxonomic status. As our focus was a morphological taxonomic study of the Venezuela *Gyrinus* species, we will leave the question of the status of *G. gibbus* and its Amazonian and non-Amazonian populations up to future work.

Gyrinus (*Neogyrinus*) *guianus* Ochs, 1935

(Figs 4, 22–23, 25–26, 31, 54, 70, 72, 76–77)

Gyrinus guianus Ochs, 1935b: 34 (original description).
Gyrinus (*Neogyrinus*) *guianus*: Ochs (1935b): 34 (new status).
Gyrinus (*Neogyrinus*) *amazonicus* Ochs, 1958 (original description), **syn. nov.**

Type localities. *Gyrinus guianus*: 'Britisch-Guiana, N.W. District'. *Gyrinus amazonicus*: 'Lago Irucanga, Igarapé Sahida' [Amazonas, Brazil].

Type material. ***Gyrinus guianus*:** Holotype: ♀, (Fig. 77) 'Type [white disc, red outline, typed black ink]' 'BR. GUIANA / North West District / March 1934 / F. A. Squire [white label, partially typed, partially handwritten, all in black ink]' 'Pres. by / Imp.Inst.Ent. / B.M.1935-40. [white label, typed black ink]' 'Gyrinus / guianus / Ochs / Type ! 1934 [handwritten in black ink, handwriting G. Ochs']'. Paratype ♀ pinned same as holotype except: 'Co-type [white disc, yellow border, typed black ink]' and without Och's handwritten type label (BMNH).

***Gyrinus amazonicus*:** Paratypes (2 spec.): ♂ (Fig. 76), pointed with microvial 'BRAZIL: Amazonas / Igarapé Sahida / Lago Irucanga / 7.xi.1947. R.Braun. [white label, typed blacked ink]' 'Brit. Mus. / 1958-562 [white label, typed black ink, except 562 handwritten in black ink]' '*Gyrinus* / *amazonicus* / Para. Ochs / typen 1958 [white label, handwritten in blue ink, handwriting Ochs']' (BMNH). ♂ pointed, same as previous except 'Igarapé Grande do Jurucui, 27.xi.1947' (BMNH).

Other material examined. VENEZUELA: Amazonas: ca. 7 km S. Samariapo, 5°10.900'N, 67°46.078'W, 95 m, 15.i.2009, leg. Short, Miller, García, Camacho, & Joly, roadside pond, VZ09-0115-02X, SM0846154 (1 spec. SEMC); Puerto Ayacucho (29 km S) Rio Paris Chico, seined, leg. J.T.Polhemus, CL2372 (1 spec. USNM); same as previous except: 66 km N Rio Herera, i.25.1989, CL2385 (1 spec. USNM); nr Iboruwa, 'Tobogancito', 5°48.414'N, 67°26.313'W, 13.i.2009, leg. Short /Miller, VZ09011302 (9 spec. KBMC); Pond 7km S Samariapo, 5°10.900'N,

67°46.078'W, 15.i.2009, leg. Short /Miller, VZ09011502 (14 spec. KBMC); riv. nr Orinoco /Sipapo confl., 5°03.707›N, 67°46.768›W, 15.i.2009, leg. Miller /Short, VZ09011501 (32 spec. KBMC); riv nr Orinoco /Sipapo confl., 5°03.707'N, 67°46.768'W, 15.i.2009, leg. Short /Miller, VZ09011504 (1 spec. KBMC); Stream along Rio Sipapo, 4°55.849'N, 67°44.645'W, 16.i.2009, leg. Short /Miller, VZ09011602 (6 spec. KBMC); same as previous except 87 m, 16.i.2009, leg. Short, García, Camacho, Miller, & Joly, VZ09-0116-02X, SM0845691 (1 spec. SEMC); San Carlos de Rio Negro, 24.i.1985, leg. P. & P. Spangler, R. Faitoute, W. Steiner (1 spec. USNM).

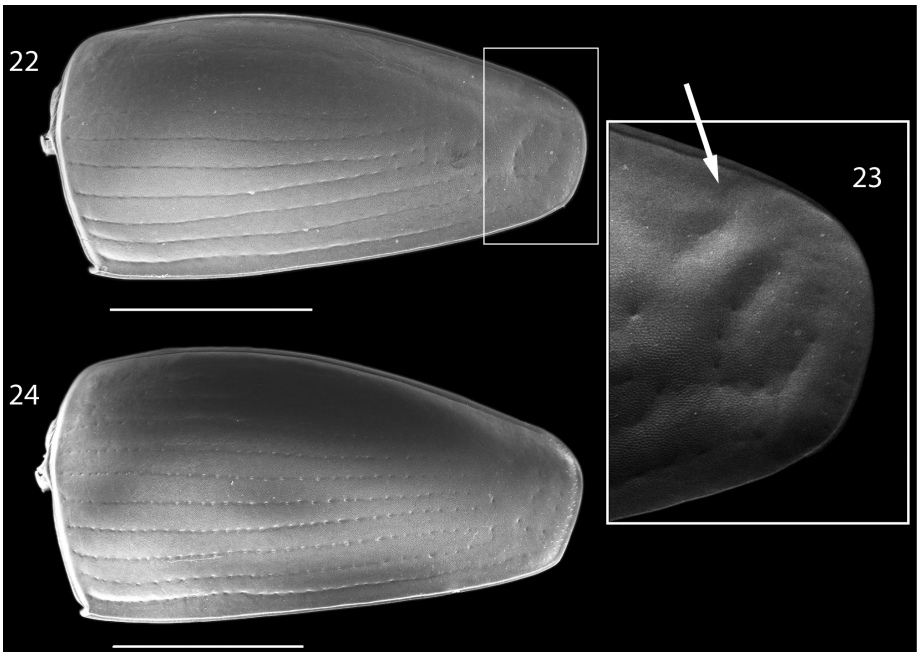
Diagnosis. Body form (Fig. 4) narrowly oval, weakly convex in lateral view; pronotal lateral margins dark in color, elytral lateral margins often dark in color, other times red; elytral disc with mostly uniform reticulation, bronzy-metallic in appearance; striae VI–XI evident (Fig. 22) with distinct linear punctures (Fig. 26), striae VI–X sulcate (Fig. 22); elytral intervals all evenly convex; elytra medially with medial pre-apical plica (Fig. 23); elytral apex rounded (Fig. 23), without border, epipleural indistinct; metanepisternal ostiole absent; aedeagus (Fig. 31) with median lobe shorter than parameres, narrow, apex strongly triangular; gonocoxae (Fig. 54) elongate, with rounded apices.

Gyrinus guianus is most similar to *G. rozei* and can primarily be distinguished by the diagnosis given under *G. rozei*. However, an additional feature unique to *G. guianus* that will aid in identifying this species is the medial pre-apical plica of the elytra (Fig. 23). Among the Venezuela *Neogyrinus* species of Venezuela, only *G. guianus* exhibits this distinguishing elytral feature. The female gonocoxae also easily separate these two species, as *G. guianus* has more elongate gonocoxae with rounded apices (Fig. 54) compared to the shorter strongly emarginate gonocoxae of *G. rozei* (Fig. 55).

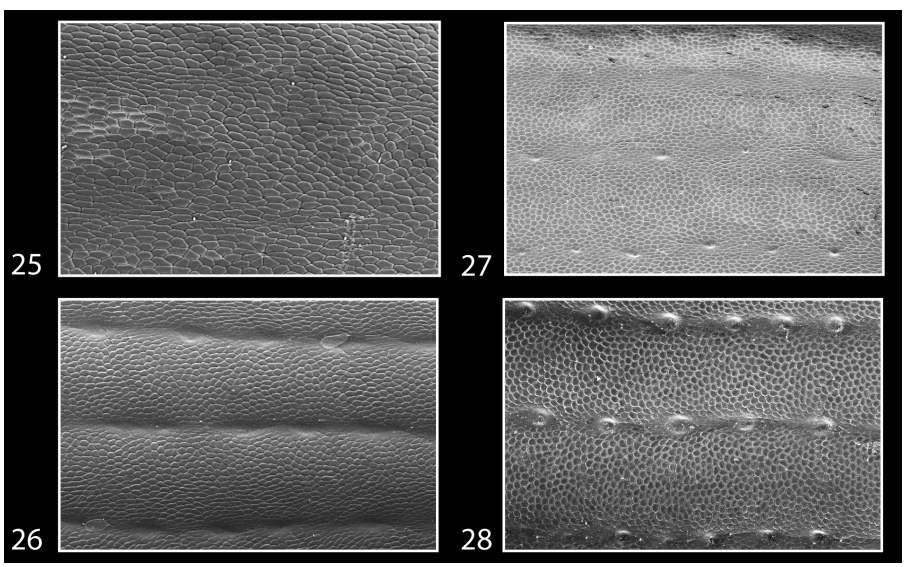
Redescription. Size. Female length = 4.0–4.5 mm, width = 2.0–2.5 mm; male length = 3.5–4.0 mm, width = 2 mm. Habitus. Body form narrowly oval, strongly attenuated anteriorly and posteriorly, widest point at midlength; in lateral view weakly dorsoventrally convex, greatest convexity posterior to scutellar region, evenly depressed anteriorly and posteriorly.

Coloration (Fig. 4). Dorsally, head, pronotum, elytra bronzy-green, lateral margins of pronotum similarly colored as remainder of pronotum, elytral margin often similarly colored as remainder of elytra, other times red; ventrally lightly colored, mouthparts, ventral surface of pedicel, hypomeron, elytral epipleuron, and legs light yellow, remainder of venter slightly darker yellow to orangish-yellow in color.

Sculpture and structure. Pronotum with narrow lateral margins. Elytra (Fig. 22) with stria I–V weakly present, evident only as reticulate stripes (Fig. 25) with irregular, very weakly impressed punctures; striae VI–XI evident, striae VI anteriorly faintly evident anteriorly, posteriorly weakly sulcate with faint linear punctures; stria VII with linear punctures weakly impressed in humeral region, more well impressed and sulcate posteriorly; striae VIII–IX sulcate, linear punctures (Fig. 26) similarly well impressed in humeral region and posteriorly; stria X sulcate only posteriorly; stria XI raised above lateral margin for entirety, lineate in humeral region, punctures distinct in small medial raised region, lineate again posteriorly. Elytral disc with mostly uniform reticulation composed of strongly impressed meshes with round sculpticells (Fig. 26), producing a bronzed appearance; all elytral intervals evenly convex. Elytra with distinct medial pre-apical plica (Fig. 23); apices rounded (Fig. 23); border absent; epipleural angle indistinct, never with denticle. Metanepisternal ostiole absent. Ultimate abdominal tergite without strong acumination.



Figs 22–24. 22–23 – SEM images of *G. guianus* Ochs, 1935 elytral morphology. 22 – elytron, box indicates region shown in Fig. 23, scale bar = 1 mm. 23 – elytral apex, arrow indicates medial pre-apical plica. 24 – elytron of *G. rozei* Ochs, 1953, scale bar = 1 mm.



Figs 25–28. SEM images of elytral interval reticulation and strial punctures. 25–26 – *G. guianus* Ochs, 1935. 25 – intervals II and III, striae I–III. 26 – intervals IX and X, striae VIII–X. 27–28 – *G. rozei* Ochs, 1953. 27 – intervals II and III, striae I–III. 28 – intervals IX and X, striae VIII–X.

Male genitalia (Fig. 32). Aedeagus with median lobe narrow, shorter than parameres, weakly attenuated apically, parallel sided in apical 1 /3, apex strongly triangular, with lateral margins of apical 1/5 straight, bent at ca. 60° angle; parameres with apex narrowly rounded. Female genitalia (Fig. 54). Gonocoxae elongate, apices rounded, left gonocoxa less curved than right.

Variability. This species is variable in the development of the lateral margin of the elytra. Populations from Amazonas, Venezuela had the lateral margin of the elytra considerably narrower than those exhibited by more easterly populations such as the paratype specimens of *G. amazonicus* from Amazonas Brazil, or compared to that of the paratype of *G. guianus*, which have a noticeably broader elytral lateral margin. However, in general, the lateral margin of *G. guianus* is distinctly narrower than that of other species.

The degree of impression of the pre-apical medial plica of the elytra (Fig. 23) was also noted to vary among specimens, even within a population, with it being quite distinct in most specimens, but less so in others. Despite this, the presence of the plica could still be made out even in specimens where the plica was very weakly impressed.

Habitat. In Venezuela, this species has been collected both in ponds and along rivers and streams (Fig. 70).

Distribution. This species was previously known from western Guyana and northwestern Brazil (Ochs 1967a), and is now recorded from Venezuela. Within Venezuela this species is found in the Guiana Shield region (Fig. 72).

Discussion. *Gyrinus guianus* was originally described solely from female specimens from northwestern Guyana (Ochs 1935b). In 1958 Ochs described *G. amazonicus* (Fig. 68) from the Amazonian region of northern Brazil and stated it to be most similar to *G. guianus*. Ochs (1958) suggested his new species could be distinguished from *G. guianus* by having a different habitus, being wider and less parallel-sided in appearance. However, after examining the holotype of *G. guianus* (Fig. 77), and comparing it to paratypes of *G. amazonicus* (Fig. 76), as well as a series of male and female specimens from Venezuela (Fig. 4), the two species are identical. Images of the male holotype in the SMF provided via C. Benetti to confirm this. Most tellingly, *G. amazonicus* (Fig. 76) clearly exhibits the distinct medial pre-apical plica diagnostic of *G. guianus* (Figs 23 and 77). The differences stated by Ochs (1958) to erect the *G. amazonicus*, represent very common variation between populations and even among the sexes as females tend to be more elongate than males.

Gyrinus (*Neogyrinus*) *ovatus* Aubé, 1838

(Figs 3, 7–9, 20–21, 29, 53, 64–67, 74, 78)

Gyrinus ovatus Aubé, 1838: 708 (original description).
Gyrinus (*Neogyrinus*) *ovatus*: Ochs (1935a): 126 (new status).
Gyrinus (*Neogyrinus*) *racenisi* Ochs, 1953: 188 (original description), **syn. nov.**
Neogyrinus ovatus: Crespo (1989): 239 (new combination).

Type localities. *Gyrinus ovatus*: 'Brésil et Cayenne' [Brazil and Cayenne region, French Guiana]. *Gyrinus racenisi*: 'Espino, Est. Guárico' [Venezuela].

Type material. *Gyrinus ovatus*: not studied, type depository unknown.

***Gyrinus racenisi*:** Paratype: ♀ (Fig. 78), '♀ [beige label, typed black ink]' 'ESPINO, GUÁR. / 29.2.50 / RACENIS L. [beige label handwritten in pencil]' 'R: 42 [beige label, typed black ink]' 'Coll. / G.Ochs [white label, typed black ink] 'Para- / typoid / SMC C 9258 [red label, black border, typed black ink]' 'Senckenberg- /

Museum / Frankfurt / Main [white label, typed black ink]' 'racenisi Ochs [beige label, handwritten, blue ink, handwriting Ochs']' (SMF).

Other material examined. VENEZUELA: Anzoátegui: 'Transect #1', 9°16'00.1"N, 64°13'42.9"W, 256 m, 15.viii.2009, leg. R.Cordero, temporary pond at a crossroad, VZ09-0815-11A, SEMC0909798–SEMC0909808; SEMC0909811–SEMC0909813; SEMC0909816 (11 spec. SEMC). **Apure:** San Fernando de Apure, 2.viii.1975, leg. J. K. Bouseman & R. B. Selander, USNM ENT 00717231 (1 spec. USNM). **Falcón:** Sierra San Luis, W Curimagua, Blackwater lagoon, 11°10.342'N, 69°42.730'W, 1330 m, 11.vii.2009, leg. Short et al., VZ09-0711-01A, SEMC0862274–SEMC0862284; SEMC0862294–SEMC0862297; SEMC0862299, SEMC0862307–SEMC0862310; SEMC0862312–SEMC0862314; SEMC0862318–SEMC0862319; SEMC0862321, SEMC0862323–SEMC0862324; SEMC0862327–SEMC0862328; SEMC0862330–SEMC0862332; SEMC0862334–SEMC0862342; SEMC0862345–SEMC0862347; SEMC0862351–SEMC0862354; SEMC0862358, SEMC0862360–SEMC0862366; SEMC0862368, SEMC0862370–SEMC0862373; SEMC0862375–SEMC0862376; SEMC0862556–SEMC0862558; SEMC082562; SEMC0862568–SEMC0862574; SEMC0862576–SEMC0862580; SEMC0862582–SEMC0862583; SEMC0862585–SEMC0862591; SEMC0862594–SEMC0862597; SEMC0862599, SEMC0862600, SEMC0862603, SEMC0862606, SEMC0862610 SEMC0862613; SEMC0862616–SEMC0862617; SEMC0862619–SEMC08621; SEMC0862625-SEMC0862627; SEMC0862629–SEMC0862637; SEMC0862639 (120 spec. SEMC); Medanos de Coro, 11°26.215'N, 69°40.112'W, 8 m, 9.vii.2009, leg. Short et al., large pond in dunes, VZ09-0709-03A, SEMC0862641–SEMC0862649; SEMC0862651–SEMC0862652, SEMC0862654–SEMC0862655; SEMC0862657–SEMC0862665; SEMC0862786–SEMC0862788; SEMC0862792; SEMC0862794–SEMC0862799; SEMC0862801; SEMC0862833–SEMC0862838; SEMC0862840–SEMCSEMC0862858; SEMC0862860–SEMC0862871; SEMC0862804, SEMC0862808–SEMC0862816; SEMC0862818–SEMC0862821; SEMC0876793; SEMC0876816; SEMC0876846; SEMC0877874; SEMC0880612–SEMC0880613; SEMC0880653–SEMC0880655; SEMC0880666. (95 spec. SEMC, MIZA, MALUZ); SE Tocopero, 11°26.922'N, 69°13.109'W, 12 m, 10.vii.2009, leg. Short et al., margin of large open pond, VZ09-0710-03A, SEMC0862505–SEMC0862506; SEMC0862508–SEMC0862511; SEMC0862513–SEMC0862514; SEMC0862516; SEMC0862520; SEMC0862522–SEMC0862523; SEMC0862525–SEMC0862526; SEMC0862528–SEMC0862529; SEMC0862532–SEMC0862533; SEMC0862538–SEMC0862539 (20 spec. SEMC). **Guárico:** 20 km S Calabozo, collected in Rio Orituco, 8–13.ii.1969, leg. P. & P. Spangler, USNM ENT 00717229 (1 spec. USNM); 44 km S Calabozo, Hato Masaguaral, 5.iii.1986, leg. P. J. Spangler, colln#25, USNM ENT 00717232 (1 spec. USNM); Camaguan, 12.ii.1969, leg. P. & P. Spangler, USNM ENT 00717230 (1 spec. USNM); pond W Las Mercedes Rivs., 9°5.067'N, 66°28.500'W, 8.i.2009, leg. Short & Miller, VZ09010804 (1 spec. KBMC); nr. Socorro, 8°59'1.9"N, 65°44'18.8"W, 110 m, 29.vii.2008, leg. A. Short & M. García, muddy ditch, AS-08-050, SM0827656 (1 spec. SEMC). **Non-Venezuelan material examined. BRAZIL: Rio de Janerio:** Itatiaia, 17.iv.1960, leg. Borvs Malkin, temporary 'middy' puddle (27 spec. FSCA).

Diagnosis. Body form (Fig. 3) broadly oval, strongly convex in lateral view; pronotal and elytral margins broad, often yellow in color; elytral disc with non-uniform reticulation, medially appearing polished, laterally bronzy-metallic in appearance; striae V–XI (Fig. 7) evident with distinct punctures (Fig. 21), striae VI–IX sulcate (Fig. 7); elytral intervals VII–IX convex; elytral apex obliquely truncate (Fig. 8), border incomplete, epipleural angle distinct, often with denticle (Fig. 9); metanepisternal ostiole absent; aedeagus (Fig. 29) with median lobe shorter than parameres, narrow, with leaf-like apical process; gonocoxae (Fig. 53) short, with strongly truncate apices.

Gyrinus ovatus is most similar to *G. gibbus*, but can be distinguished from *G. gibbus* by having more evident elytral striae (Fig. 7, V–XI strongly evident), with VI–IX sulcate, and elytral intervals VIII–X distinctly convex, while in *G. gibbus* fewer elytral striae are evident (Fig. 10, only VI–XI), and the elytra are evenly convex and normally none-sulcate, with only striae VIII–IX being at times weakly sulcate. The two species can further be distinguished by their elytral apices: in *G. ovatus* the elytral apices are obliquely truncate (Fig. 8) with a distinct epipleural angle often bearing a denticle (Fig. 9), while in *G. gibbus* the elytral apices

are most often rounded (Fig. 11), infrequently subtruncate, and never with a distinct epipleural angle. Although less reliably, *G. ovatus* frequently has yellow lateral margins of the elytra and pronotum, compared to *G. gibbus* which often has these similarly colored as the remainder of the elytra and pronotum, and only infrequently has yellow lateral margins of the elytra only. The aedeagus is quite different between the two species (cf. Figs 12–17 and 29) and is the most reliable way to separate them. The gonocoxae also easily separate the two species, as *G. ovatus* has much shorter and more quadrate gonocoxae (Fig. 53) compared to the more elongate gonocoxae (Figs 51–52) of *G. gibbus*.

Redescription. Size. Length = 3.5–5.5 mm, width = 2.5–3.0 mm. Habitus. Body form broadly oval, attenuated anteriorly and very weakly so posteriorly, widest point at elytral midlength; in lateral view strongly dorsoventrally convex, greatest convexity posterior to scutellar region, weakly depressed anteriorly, strongly depressed posteriorly.

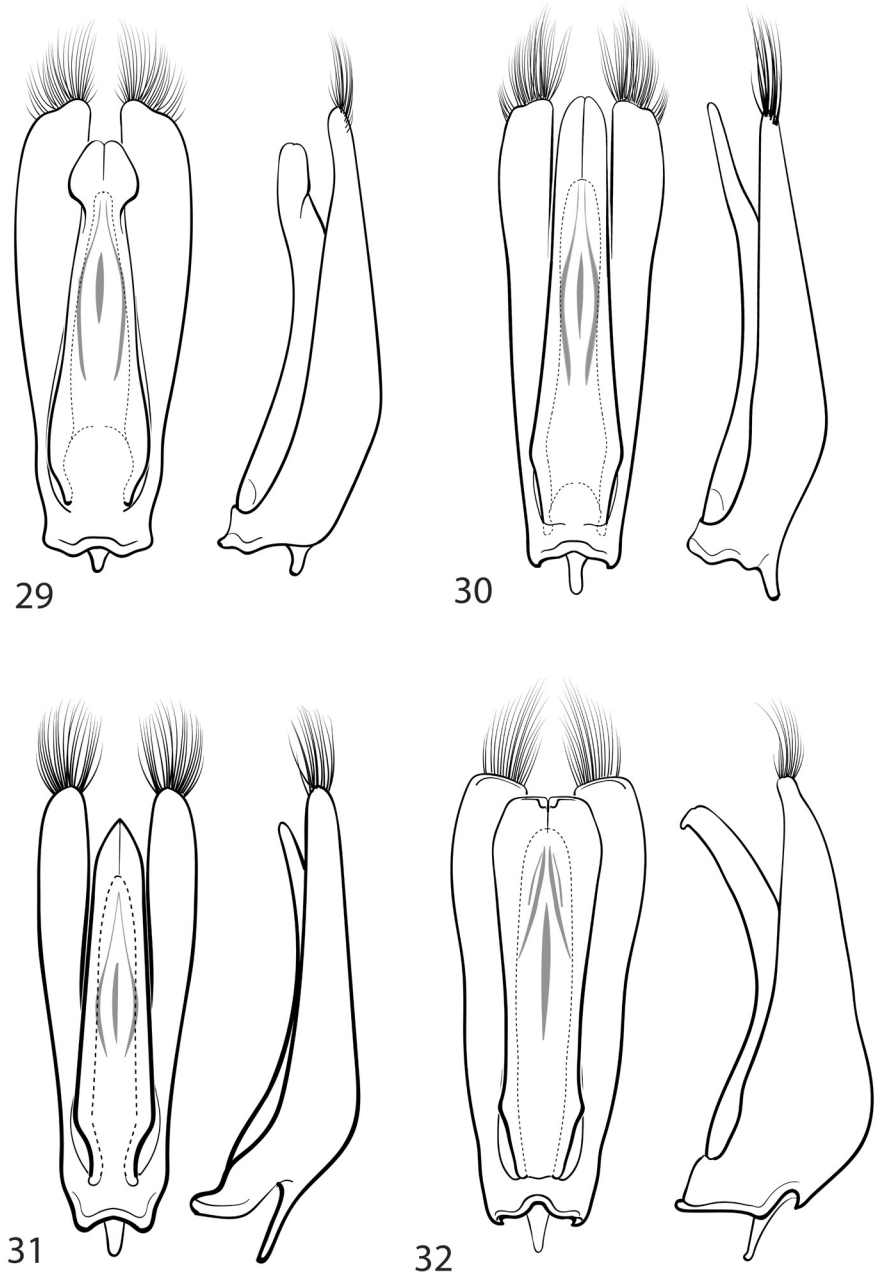
Coloration (Fig. 3). Dorsally, head, pronotum, elytra bronzy-green, lateral margins of pronotum and elytral often yellow, some specimens reddish, others similarly colored as remainder of pronotum and elytra; ventrally lightly colored, mouthparts, ventral surface of pedicel, hypomeron, elytral epipleuron, light yellow, remainder of venter slightly darker yellow to orangish-yellow in color.

Sculpture and structure. Pronotum with broad lateral margins. Elytra (Fig. 7) with striae I–IV weakly present, evident as reticulate stripes with variously developed sparse, weakly impressed punctures; V–XI strongly evident, composed of distinct punctures; VI–IX sulcate with distinct punctures (Fig. 21) evident in shallow depression; stria X non-sulcate, punctures widely separate; stria XI marginal, weakly elevated briefly in basal 1/3. Elytral intervals I–III (Fig. 20) with reticulation composed of meshes with small sculpticells, producing a polished appearance; intervals IV–VI with reticulation more strongly impressed basally, meshes composed of larger sculpticells producing a metallic appearance; intervals VII–XI (Fig. 21) entirely with more strongly impressed metallic reticulation; intervals VIII–X distinctly convex. Elytra without pre-apical medial plica; apices obliquely truncate (Fig. 8); border incomplete, present laterally, effaced medially; epipleural angle prominent, often with small denticle (Fig. 9). Metanepisternal ostiole absent. Ultimate abdominal tergite without strong medial acumination.

Male genitalia (Fig. 29). Aedeagus with median lobe just shorter than parameres, gradually narrowing apically, abruptly laterally expanded in apical 1/4 forming a leaf-like process, apex rounded, weakly bifid medially; parameres with apex obliquely truncate, often weakly marginated. Female genitalia (Fig. 53). Gonocoxae short, quadrate with truncate apices.

Variability. This species is most variable in the development of the punctures of the elytral striae. In some populations examined the punctures of elytral stria IV were regularly evident, and even those of striae II and III apically in some specimens. The size of the punctures of striae VII–IX also varied considerably with many specimens from Venezuela having large coarse punctures, while the additional specimens examined from Brazil had very small and widely spaced punctures.

How strongly sulcate the lateral striae appeared varied among populations, but all specimens had at least striae VII–IX sulcate. Specimens from near Tocopero in Falcón had only elytral striae VII–IX sulcate, and very weakly so. Those from Medanos de Coro in the same state



Figs 29–33. Dorsal and lateral view of the aedeagus of *Neogyrinus* species, not to scale. 29 – *G. ovatus* Aubé, 1838. 30 – *G. sabanensis* sp. nov. 31 – *G. guianus* Ochs, 1935. 32 – *G. rozei* Ochs, 1953.

similarly had only striae VII–IX evidently sulcate, but considerably more strongly sulcate than those from Tocopero. Specimens from Guárico had the most strongly sulcate elytra among the Venezuelan populations studied, with striae VI also appearing weakly sulcate, similar to the additional material examined from Itatiaia, São Paulo, Brazil.

The shape of the elytral apices also varied noticeably. Most populations have the elytral apices obliquely truncate with the epipleural angle possessing a denticle. However, some specimens had somewhat more rounded elytral apices, with the epipleural angle distinct, but without a noticeable denticle. The development of the border of the elytral apex also varied, but was never fully present in a manner truly comparable to *G. gibbus*.

Habitat. In Venezuela, this species has been collected in a variety of lentic habitats, including ponds, ditches, and marshes (Figs 64–67).

Distribution. This is a very widely distributed Neotropical species with a similar distribution to *G. gibbus*, found from Argentina to Mexico (Ochs 1948, 1949). Within Venezuela, this species has been found in the Llanos and along the northwest coast (Fig. 74).

Discussion. Ochs (1953) described *G. racenisi* (Fig. 78) from specimens collected in the central Venezuelan state of Guárico, considering them distinct from *G. ovatus* by having more strongly impressed lateral striae with more convex associated elytral intervals, and a reddish color to the lateral margin of the pronotum and elytra. These differences represent intraspecific variation in elytral features, as how sulcate the lateral striae are (affecting both impression and convexity of nearby intervals) is one of the most common ways this species varies (see above discussion of variability). The lateral margins of the pronotum and elytra of all species of *Neogyrinus* species commonly vary considerably in their color (see structures of taxonomic importance). Furthermore, dissection of male specimens from Guárico with this variation reveals identical genitalia to *G. ovatus*. While the type material of *G. ovatus* appears lost (H. Fery pers. comm.), the identity of *G. ovatus* has remained clear given its unique elytral apices (figured as early as Régimbart 1884: Pl. 6, Fig. 93) and its very distinctive median lobe (first described by Ochs 1935a). Given this, and the few variable, external characters used to erect *G. racenisi* we here synonymize it with *G. ovatus*.

Gyrinus (*Neogyrinus*) *rozei* Ochs, 1953

(Figs 6, 24, 27–28, 32, 55, 68, 73, 79)

Gyrinus (*Neogyrinus*) *rozei* Ochs, 1953: 186 (original description).

Type locality. 'Espino, Est. Guárico' [Venezuela].

Type material examined. Paratype: ♂ (Fig. 79), '♂ [beige label, typed black ink]' 'ESPINO, GUÁR. / 28.3.1950 / RACENIS leg. [beige label handwritten in pencil]' 'R: 43 [beige label, typed black ink]' 'Coll. / G.Ochs [white label, typed black ink] 'Para- / typoid / SMC C 9259 [red label, black border, typed black ink]' 'Senckenberg- / Museum / Frankfurt / Main [white label, typed black ink]' 'rozei Ochs [beige label, handwritten, blue ink, handwriting Ochs']' (SMF).

Other material examined. VENEZUELA: Amazonas: nr Iboruwa, 'Tobogancito', 5°48.414'N, 67°26.313'W, 13.i.2009, leg. Short & Miller, VZ09011302 (1 spec. KBMC). **Bolívar:** E of Kavanaven, 5°44'28.7"N, 61°30'54.3'W, 1290 m, 1.viii.2008, leg. Short & García, large vegetated marsh, AS-08-063, SM0829943, SM0829938 (2 spec. SEMC, MIZA); nr Rio Sakaika, 5°34'29.8"N, 61°18'43.4"W, 1100 m, 2.viii.2008, leg. Short & García, roadside pond, AS-08-067, SM0829320 (1 spec. KSM). **Guárico:** San Nicolasito Field Station, 8°8.296'N, 66°24.459'W, 10.i.2009, leg. Short & Miller, Morichal, VZ09011002 (2 spec. KBMC).

Diagnosis. Body form (Fig. 6) narrowly oval, weakly convex in lateral view; pronotal and elytral margins broad, lighter in color, often yellow; elytral disc with mostly uniform reticulation, bronzy-metallic in appearance; striae II–XI (Fig. 24) evident with distinct punctures, striae VI–IX sulcate; elytral intervals all evenly convex; elytral apex obliquely truncate (Fig. 24), complete border faintly evident, epipleural angle distinct, never with denticle; metanepisternal ostiole absent; aedeagus (Fig. 32) with median lobe nearly as long as parameres, broad, apex truncate; gonocoxae (Fig. 55) short, apices strongly emarginate, medial angle strongly pointed.

Gyrinus rozei is most similar to *G. guianus* but can be distinguished from the latter by having the elytral striae much more apparent, with striae II–XI easily evident (Fig. 24), compared to VI–XI in *G. guianus* (Fig. 22). *Gyrinus rozei* can further be distinguished from *G. guianus* in having the striae composed of distinct round punctures (Fig. 28), compared to the lineate punctures of *G. guianus* (Fig. 26). Finally, the aedeagus differs drastically between the two species, in *G. rozei* the median lobe is exceptionally broad (wider than a paramere) and the apex is strongly truncate (Fig. 33), compared to *G. guianus* which possesses a narrow median lobe with a strongly triangular apex (Fig. 32). The gonocoxae of *G. rozei* are very unique among the Venezuelan *Gyrinus* species (Fig. 55) having strongly emarginate apices with a strongly pointed medial angle.

Description. Size. Length = 3.5–4.0 mm, width = 2.0–2.5 mm. Habitus. Body form narrowly oval, strongly attenuated anteriorly and posteriorly, widest point at midlength; in lateral view weakly dorsoventrally convex, greatest convexity posterior to scutellar region, evenly depressed anteriorly and posteriorly.

Coloration (Fig. 6). Dorsally, head, pronotum, elytra bronzy-green, lateral margins of pronotum often yellow, some specimens reddish, others similarly colored as remainder of pronotum, elytral margins normally lighter in color, often yellow; ventrally lightly colored, mouthparts, ventral surface of pedicel, hypomeron, elytral epipleuron, light yellow, remainder of venter slightly darker yellow to orangish-yellow in color.

Sculpture and structure. Pronotum with broad lateral margins. Elytra with stria I weakly present, evident as reticulate stripes with variously developed sparse, weakly impressed punctures; striae II–XI (Figs 24) evident, II–V (Fig. 27) beginning with sparse weakly impressed punctures becoming progressively larger, more well impressed, and evenly distributed as strial number increases; stria VI weakly sulcate; striae VII–IX sulcate, with distinct round punctures (Fig. 28); stria X non-sulcate, with slightly smaller and less impressed punctures basally and apically; stria XI raised above lateral margin for entirety. Elytral disc with mostly uniform reticulation composed of strongly impressed meshes with round sculpticells (Figs 27–28), producing a bronzed appearance; all elytral intervals evenly convex. Elytra without medial pre-apical plica; apices obliquely truncate; border complete, faintly evident normally (Fig. 24); epipleural angle prominent, never with small denticle. Metanepisternal ostiole absent. Ultimate abdominal tergite acute medially, but without strong acumination.

Male genitalia (Fig. 32). Aedeagus with median lobe broad, about as long as parameres, parallel-sided basally, gradually laterally expanded in apical 1/3, apex strongly truncate, bifid, with medial pair of denticles; parameres with apex truncate. Female genitalia (Fig. 55).

Gonocoxae short, apices strongly emarginate, medial angle strongly pointed, left gonocoxa more so than right.

Variability. Specimens from Bolívar, Venezuela had more well impressed elytral reticulation, giving them a much more grainy and metallic appearance. The appearance of the elytral striae also varied considerably. The specimen from Amazonas had the elytral striae more weakly impressed and less sulcate in appearance compared to other specimens. Those from Bolívar had the most strongly impressed and sulcate appearing elytral striae. This resulted in somewhat more convex associated elytral intervals compared to both the Amazonas and Guárico specimens.

Habitat. In Venezuela this species has been largely collected within lentic habitats (Fig. 68).

Distribution. Known from the llanos and Guiana shield regions of Venezuela (Fig. 73).

Discussion. This species is currently only known from Venezuela. Given its distribution spreads across southern Venezuela (Fig. 73) it is likely more widely spread in the Guiana shield, similar to *G. guianus*.

Gyrinus (*Neogyrinus*) *sabanensis* sp. nov.

(Figs 1, 30, 56, 69, 75)

Type material. Holotype: ♂, 'VENEZUELA: Bolivar State / 5°40›24.8»N, 61°24›11.3»W, 1330 m / unnamed river; 2.viii.2008 / leg. A.Short, M.García, L.Joly / AS-08-066; small side stream [white label, typed black ink]', 'SEMC0878700 / KUNHM-ENT [white label, typed black ink with barcode]' (MIZA). Paratypes (3 spec.): same as holotype but, SEMC0878691, SEMC0878696; and 5°44'35.6"N, 61°24'11.2"W, 1305 m, Rio Mareman Paru, 2.viii.2008, AS-08-065; various river habitats, SM0828809 (MIZA, SEMC).

Diagnosis. Body form (Fig. 1) broadly oval, strongly convex in lateral view; pronotal and elytral margins broad, pronotal margins darkly colored, elytral margins lightly colored yellowish-orange to red; elytral disc with non-uniform reticulation, medially appearing polished, laterally bronzy-metallic in appearance; striae VI–XI evident with mostly distinct ovoid punctures, VIII–IX with punctures linear basally becoming distinct apically; striae VIII–X sulcate, elytral stria X weakly impressed basally, sulcate apically; elytral intervals all similarly convex; elytral apex obliquely truncate, border absent, epipleural angle indistinct; metanepisternal ostiole absent; aedeagus (Fig. 31) with median lobe just longer than parameres, narrow, very weakly attenuated towards apex, apex laterally parallel-sided, broadly rounded apically; gonocoxae (Fig. 56) elongate, apices obliquely truncate with lateral angle distinct.

Description. Size. Length = 3.5–4.0 mm, width = 2.0–2.5 mm. Habitus. Body form broadly oval, attenuated anteriorly and very weakly so posteriorly, widest point at elytral humeral angle; in lateral view strongly dorsoventrally convex, greatest convexity posterior to scutellar region, weakly depressed anteriorly, strongly depressed posteriorly.

Coloration (Fig. 1). Dorsally, head, pronotum, elytral disc bronzy-green, lateral margins of pronotum similarly colored as remainder of pronotum, elytral lateral margin lightly colored yellowish-orange to red; ventrally lightly colored, mouthparts, ventral surface of pedicel, hypomeron, elytral epipleuron, light yellow, remainder of venter slightly darker yellow to orangish-yellow in color.

Sculpture and structure. Pronotum with broad lateral margins. Elytra with striae I–V weakly present, evident as reticulate stripes, V with variously developed weakly impressed punctures;

VI–XI evident, mostly composed of distinct ovoid punctures; VI with small faintly impressed ovoid punctures; VII ovoid punctures larger than VI; striae VIII–IX sulcate, basally punctures linear, apically becoming distinct ovoid punctures; stria X weakly impressed basally becoming sulcate apically; stria XI raised above elytral margin in basal half, marginal apically. Elytral interval I entirely and intervals II–VI apically, with reticulation composed of meshes with small sculpticells, producing a polished appearance; intervals II–VI basally with reticulation more strongly impressed, meshes composed of larger sculpticells producing a metallic appearance; intervals VII–XI entirely with more strongly impressed metallic reticulation; all elytral intervals evenly convex. Elytra without medial pre-apical plica; lateral margin of elytra separated from apex by plica; apices obliquely truncate; border absent; epipleural angle indistinct, never with denticle. Metanepisternal ostiole absent. Ultimate abdominal tergite without strong medial acumination.

Male genitalia (Fig. 30). Aedeagus with median lobe just longer than parameres, weakly narrowing apically, parallel-sided in apical 1/4, apex broadly rounded, bifid medially; parameres with apex truncate, weakly emarginate paramedially. Female genitalia (Fig. 56). Gonocoxae elongate, apices obliquely truncate, lateral angle distinct, left gonocoxa somewhat broader than right.

Variability. The few specimens examined differed in how linear the punctures of elytral striae VIII–IX appeared basally, and for how long the lineate region extended along these striae. The two female paratypes are also larger in size than the male holotype.

Differential diagnosis. *Gyrinus sabanensis* sp. nov. is most similar to *G. ovatus*, in terms of general appearance, but can be easily distinguished from *G. ovatus* by having elytral striae VIII–IX sulcate, with linear punctures basally, that become distinct apically but remain ovoid in shape, as opposed to having elytral striae VI–IX sulcate with round punctures that are distinct throughout the entirety of the stria. Furthermore, the elytral apices differ strongly between the two species. In *G. sabanensis* sp. nov. the elytral apex is not bordered, the epipleural angle is indistinct, and the elytral lateral margin is separated completely from the apex by a plica, as opposed to *G. ovatus* in which the elytral apex is incompletely bordered, the epipleural angle is distinct and often possessing a denticle, and the elytral lateral margin is not separated from the apex by a plica. Finally, the aedeagus differs pronouncedly between the two species as *G. sabanensis* sp. nov. has the medial lobe weakly attenuated apically, is just longer than the parameres, and has the apex broadly rounded and nearly parallel-sided (Fig. 30). This is not at all similar to the distinct median lobe of the aedeagus of *G. ovatus* which is shorter than the parameres and has a peculiar leaf-like process at its apex (Fig. 29). The gonocoxae also differ strongly between the two species, as those of *G. sabanensis* sp. nov. (Fig. 56) are much more elongate, compared to the short, truncate gonocoxae of *G. ovatus* (Fig. 53).

Etymology. This species is named for the region in which it was discovered, the Gran Sabana; adjective.

Habitat. This species is known from stream and river margin habitats (Fig. 69).

Distribution. This species is currently only known from the type locality in the Gran Sabana of southeastern Venezuela (Fig. 75).

Discussion. This new species is known from relatively high elevation streams within the

Gran Sabana of southeastern Venezuela. Due to the limited number of specimens available, they were not destructively treated for SEM imaging.

Gyrinus (*Oreogyrinus*) *colombicus* Régimbart, 1883

(Fig. 47)

Gyrinus colombicus Régimbart, 1883: 180 (original description).
Gyrinus (*Oreogyrinus*) *colombicus*: Ochs (1953): 184 (new status).

Type locality. 'Colombia'.
Type material examined. Syntype: ♂, 'Colombie [beige label, handwritten black ink]' 'MUSEUM PARIS / COLL. MAURICE REGIMBART / 1908 [green label, typed black ink]' 'R. Mouchamps vid., 1955 / GYRINUS / colombicus Rég / [white label, R. Mouchamps vid., 19- typed black ink, -55 GYRINUS colombicus Rég. Handwritten black ink]' (MNHN).
Other material examined. VENEZUELA: without additional data (1 spec. BMNH). **Non-Venezuelan material examined. COLOMBIA:** 'Colombie', Sharp Col. 1905-313 (1 spec. BMNH). **Sucre:** Cuenca (1 spec. BMNH). **Without locality:** Sharp Col. 1905-313 (2 spec. BMNH).

Diagnosis. Body form oval, in lateral view strongly convex; pronotal disc with transverse creased strongly impressed, laterally with sparse wrinkles; elytral disc of female with at most intervals I–II non-reticulate, III–X strongly reticulate, XI non-reticulate; female elytral striae VI–IX sulcate, only VII–IX strongly so; elytral lateral margin weakly interrupted before apex; metanepisternal ostiole present; aedeagus (Fig. 47) with median lobe evenly narrowed for 2/3 length, weakly expanded towards apex in apical 1/3, apex broadly rounded; parameres truncate apically.

Gyrinus colombicus is most similar to *G. venezolensis* having a relatively weakly wrinkled pronotum. The strongly reticulate female elytra of *G. colombicus* should easily prevent confusion with females of both *G. venezolensis* and *G. vinolentus* sp. nov. as the reticulation covers nearly the entire elytron (at least to interval II), whereas in *G. venezolensis* and *G. vinolentus* sp. nov. females the reticulation is present up to at most interval IV. The aedeagus (Fig. 47) will easily distinguish males of *G. colombicus* from both *G. venezolensis* and *G. vinolentus* sp. nov.

Redescription. Size. Female length = 5.5– 6.0 mm, width = 3.5 mm; male length = 4.5–5.0 mm, width = 3.0 mm. Habitus. Body form evenly oval, attenuated anteriorly and posteriorly, slightly more so posteriorly, widest point just posteriad of humeral region; in lateral view dorsoventrally strongly convex, greatest convexity posterior to scutellar region, evenly depressed anteriorly and posteriorly.

Coloration. Dorsally, head, pronotum, elytra black, with blue reflections; laterally reflections bronzy yellow and green, especially in females whose elytral lateral reticulation appears strongly bronzy green. Venter overall darkly colored; mouthparts, ventral surface of antennal pedicel, hypomeron, elytral epipleuron, mesoventrite medially, mesocoxae, and ultimate abdominal ventrite lighter in color – reddish brown to darker orange yellow; legs yellow in color; remainder of venter dark brown to black.

Sculpture and structure. Pronotum of both sexes with broad riffled lateral margins; pronotal disc laterally weakly wrinkled, wrinkles present anteriorly and associated with pronotal transverse impressed line, wrinkles also present posteriorly near posterior margin of pronotum.

Female elytra with striae I–IV non-sulcate, elytral striae V weakly sulcate medially, VI slightly more sulcate medially, VI–IV strongly sulcate posteriad of humeral region with linear punctures medially, stria X non-sulcate, stria XI strictly marginal. Female elytral disc nearly entirely reticulate with at most intervals I–II free of reticulation, XI never with reticulation, reticulation composed of scale-like sculpticells. Male elytra with striae I–VII non-sulcate; VIII–IX weakly sulcate just posterior to humeral region, ending before apical 1/3 of elytron; stria X non-sulcate; stria XI strictly marginal. Male elytral disc with intervals I–XI without reticulation. Elytra of both sexes with lateral margins weakly interrupted in apical 1/5 by minor swelling; elytral apex truncate to weakly rounded. Metanepisternal ostiole small.

Male genitalia (Fig. 47). Aedeagus with median lobe narrow, shorter than parameres, attenuated towards apex in basal 2/3, in apical 1/3 weakly laterally expanded towards apex, apex broadly rounded, medially weakly raised; in lateral view median lobe thick, strongly dorsally curved; parameres with apex strongly truncate.

Variability. Of the few female specimens examined, there was variability in the extant of the reticulate region of the elytra. Two of the three specimens examined had the reticulation extending to elytral interval II, while the third had the reticulation extending all the way onto interval I, reaching the elytral sutural border in areas.

Habitat. Unknown

Distribution. Colombia.

Discussion. This species is primarily known from historical specimens from Colombia and 'Venezuela', often with little or no further specific locality information (Régimbart 1907, Ochs 1953). In his first treatment of the Venezuelan Gyrinidae, Ochs (1953) included *G. colombicus* stating the species is likely to be found in western Venezuela. However, he only examined specimens from Colombia, and believed most of the historical Colombian specimens to be from Bogotá (Ochs 1953). In our study, only a single historical specimen was examined with the locality of 'Venezuela' from the BMNH, and the species was not recollected during the Venezuelan aquatic insect survey, despite multiple sampling localities in the western Venezuelan Andes. It seems likely the historical specimens from 'Venezuela' are in error, and that the species does not truly occur in Venezuela. For this reason, we did not extensively treat *G. colombicus*, but to aid in its identification, should it be found in Venezuela in the future, we provide a redescription of the specimens examined and an image of the aedeagus of a syntype in the MNHN.

Gyrinus (*Oreogyrinus*) *iridinus* sp. nov.

(Figs 37–38, 50, 57, 74)

Type material. Holotype: ♂, 'VENEZUELA, Amazonas / stream nr. Summit of / Unturan Range, CL 8012 / II Feb. 1989 D.A. Polhemus' (USNM). Paratypes (20 spec.): same as holotype (USNM, SEMC, MIZA).

Diagnosis. Body form (Fig. 37) oval, in lateral view strongly convex; pronotal disc with transverse crease weakly impressed, without wrinkles laterally; dorsal surface strongly iridescent; elytral disc of female and male similar, all intervals non-reticulate, striae I–IV with small weakly impressed punctures, punctures of V–XI larger and more well impressed, striae VIII–X weakly sulcate; elytral lateral margin narrow, without riffles, not interrupted before

apex; elytra apex truncate; metanepisternal ostiole present; aedeagus (Fig. 50) with median lobe just broader in width than single paramere, weakly constricted in apical 1/3, apex broadly rounded; parameres rounded apically; gonocoxae (Fig. 57) curved, with rounded apices.

Description. Size. Female length = 4.0–4.5 mm, width = 2.5–2.7 mm; male length = 3.5–4.0 mm, width = 2.5 mm. Habitus. Body form evenly oval, attenuated anteriorly and posteriorly, widest point just posteriad of humeral region; in lateral view dorsoventrally strongly convex, greatest convexity posterior to scutellar region, evenly depressed anteriorly and posteriorly.

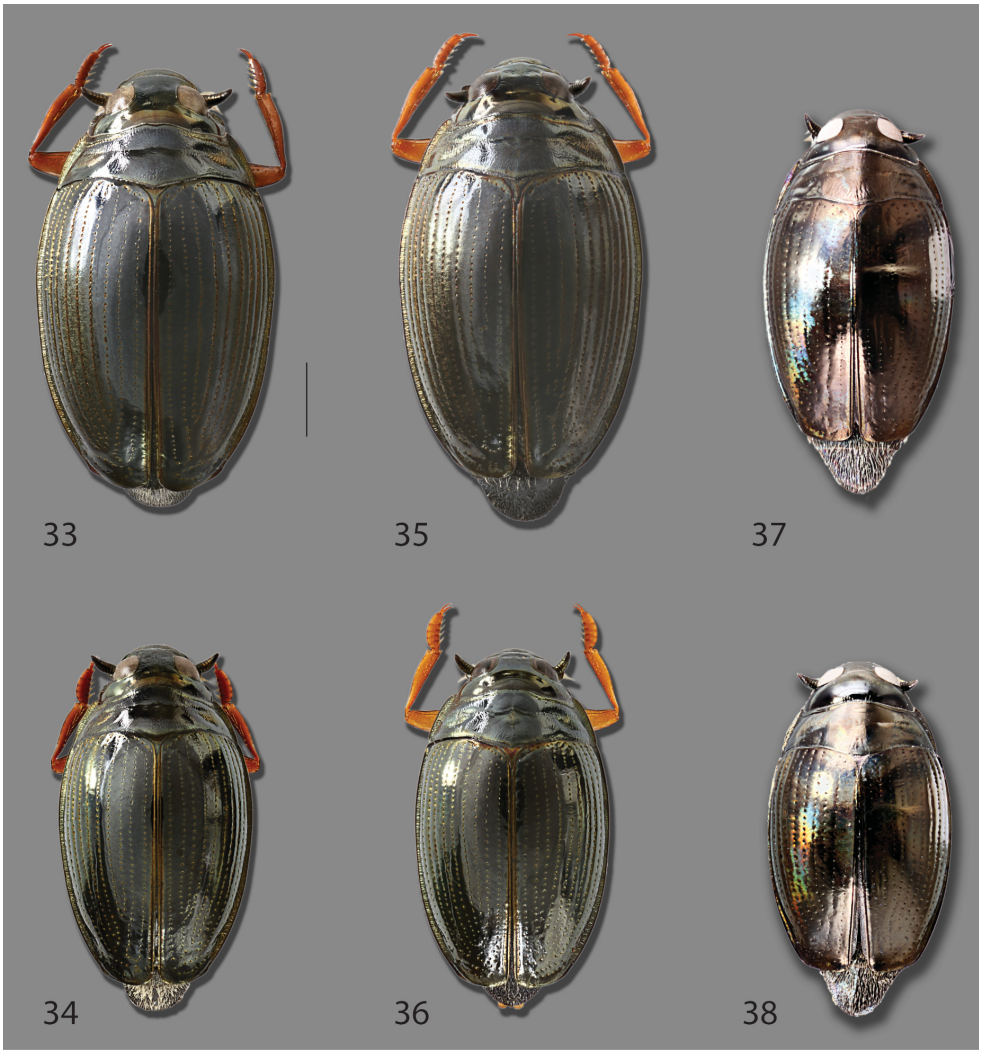
Coloration (Fig. 37). Dorsally, head, pronotum, elytra black, with strongly iridescent reflections. Venter overall darkly colored; mouthparts, ventral surface of antennal pedicel, prosternum laterally, propleuron, hypomeron, elytral epipleuron, mesocoxal apex, metacoxal apex, posterior half of abdominal sternite VII, and ultimate abdominal ventrite lighter in color – reddish brown to darker orange yellow; legs yellow in color; remainder of venter dark brown to black.

Sculpture and structure. Pronotum of both sexes with broad nearly unriffled lateral margins, only very few weak riffles anteriorly; pronotal disc with weakly impressed transverse crease, without considerable wrinkles laterally, only wrinkled medially near posterior margin. Female and male elytra similar (Figs 37–38), striae I–IV with very small, weakly impressed punctures; striae V–XI with larger more well impressed punctures; striae VIII–X weakly sulcate in anterior half; stria XI mostly marginal, briefly raised after basal 1/4 of elytral length. Elytral intervals of both sexes completely without reticulation. Elytra lateral margins narrow, completely unwrinkled, slight sub-apical swelling noticeable, not distinctly interrupting margin; elytral apex truncate. Metanepisternal ostiole small.

Male genitalia (Fig. 50). Aedeagus with median lobe about as long as parameres, width just wider than width of single paramere, attenuated in basal 2/3, weakly constricted before apical 1/3, apical 1/3 with lateral margins rounded, apex broadly rounded; in lateral view dorsally curved; parameres with rounded apex. Female genitalia (Fig. 57). Gonocoxae curved, apices rounded, left gonocoxa somewhat less curved than right.

Variability. There was some minor variation in how sulcate elytral striae VIII and IX appeared, less so in X, as this was the most shallow of the sulcate striae (bearing in mind striae VIII–X of *G. iridinus* sp. nov. are all weakly sulcate when compared to other *Oreogyrinus* species).

Differential diagnosis. *Gyrinus iridinus* sp. nov. is most similar to *G.* (*Oreogyrinus*) *opalinus* Régimbart, 1883 (Fig. 81), being strongly iridescent, small in size (less than 6.0 mm), and having truncate elytral apices, which distinguishes both species from *G.* (*Oreogyrinus*) *fittkaui* Ochs, 1963. *Gyrinus iridinus* sp. nov. differs from *G. opalinus* by having a narrow lateral margin of the elytra, completely lacking any riffles, which is not interrupted by a subapical swelling (Fig. 37); and by having elytral intervals VIII–X weakly sulcate. *Gyrinus opalinus* has a broad elytral lateral margin (Fig. 81), possessing minute riffles (Ochs 1954), that is distinctly interrupted by a subapical swelling (Fig. 81), and more strongly sulcate lateral elytral intervals. *Gyrinus iridinus* sp. nov. also has the pronotal lateral margins nearly unriffled, compared to that of *G. opalinus* which is considerably riffled (Fig. 81). Based on the description provided by Ochs (1954) the aedeagus of *G. opalinus* differs from that of *G. iridinus* sp. nov. by being narrower, ca. the width of a paramere, and having the anterior half subparallel, compared to *G. iridinus* sp. nov. which has a broader median lobe, which is



Figs 33–38. Dorsal habitus of *Oreogyrinus* species, scale bar = 1 mm. 33 – *Gyrinus venezolensis* Ochs, 1953, female. 34 – *G. venezolensis*, male. 35 – *G. vinolentus* sp. nov. female. 36 – *G. vinolentus*, male. 37 – *G. iridinus* sp. nov., female paratype. 38 – *G. iridinus*, male holotype.

just wider than the width of a paramere, constricted before its apical 1/3, with the apical 1/3 possessing rounded lateral margins (Fig. 50).

Etymology. The specific epithet *iridinus* refers to the new species' rainbow iridescence, and is selected for its similarity to the name *G. opalinus*, the species *G. iridinus* appears most similar to. It is treated as a noun in apposition.

Habitat. The label data indicates the specimens came from a stream near the summit of the Unturán mountain range.
Distribution. Known only from the type locality in the Unturán Mountains of far southern Amazonian Venezuela (Fig. 74).
Discussion. This species lacks nearly all the morphological characters of an *Oreogyrinus*. The pronotum is very weakly sculptured (Figs 37–38), with the transverse crease faintly impressed, and lacking the strong wrinkles present in other *Oreogyrinus* species (Figs 39–40). The lateral margins of the elytra are narrow, unriffled (Figs 37–38), and are not terminated in a plica. The pronotal lateral margin, while broad, is also almost completely without riffles, save for a few faintly evident anteriorly. The lateral striae are not well impressed and sulcate in appearance. Elytral stria XI is not strictly marginal, instead it is briefly elevated in the basal half of the elytra, similar to members of the nominotypical subgenus. The male and female are also not strongly sexually dimorphic (Figs 37–38), unlike the majority of other *Oreogyrinus* species (Figs 33–36). The ventral coloration is similar to an *Oreogyrinus*, however, this coloration is not unique to *Oreogyrinus* species, being present in other Nearctic nominotypical species like *G. affinis* Aubé, 1838. The only morphological character to suggest this species is a member of *Oreogyrinus* is the faintly evident riffles in the anterior portion of the pronotal lateral margins. The primary reason this species is being classified here as an *Oreogyrinus*, is because it is a South American species lacking the features uniting members of *Neogyrinus* (see discussion above on the *Gyrinus* subgenera), and as currently defined the nominotypical subgenus is absent from South America (Ochs 1954). Interestingly, the species most similar to *G. iridinus* sp. nov. is *G. opalinus* (Fig. 81), a rarely collected species, known from the Atlantic forest of Brazil, with the only specific localities available being, Nova Friburgo, Rio de Janerio, and Lago de Jequiá, Jequiá da Praia, Alagoas, Brazil (Ochs 1954: 132).

Gyrinus (*Oreogyrinus*) *venezolensis* Ochs, 1953

(Figs 33–34, 39, 41, 43–44, 48, 58, 62–63, 72, 80)

Gyrinus (*Oreogyrinus*) *venezolensis* Ochs, 1953: 185 (original description).

Type locality. 'Venezuela Mérida'.
Type material examined. Paratypes (4 spec. SMF): '♂ [white label, typed black ink]' 'Merida [white label, typed black ink]' 'Venezuela / Briceno [white label, typed black ink]' 'coll. / G. Ochs [white label, typed black ink]' 'Para- / typoid / SMF / C 9065 [red label, black border, typed black ink]' 'Senckenberg- / Museum / Frankfurt / Main [white label, typed black ink]' 'Gyrinus / venezolensis / Paratype Ochs / ♂ 1942 [white label, handwritten black ink, handwriting is Ochs']' 'venezolensis Ochs [white label, black border, handwritten black ink, handwriting is Ochs']'. Card mounted ♀, same locality as previous except 'Mus. Berlin don. 1942 [white label, black border, typed black ink]'; paratype SMF C 9066, and without handwritten Ochs det labels. Card mounted ♂ and ♀ (Fig. 73), 'DR Moritz / 1858 / Venezuela [beige label, typed black ink]', paratypes SMF C 9068, SMF C 9069.
Other material examined. VENEZUELA: Mérida: Rt. 4, 27 km N. of Mérida, 20.ii.1976, leg. CM. & O.S.Flint Jr. (20 spec. USNM); Bailadores, roadside stream, 8°14'27.94"N, 71°48'57.37"W, 15.i.2006, leg. A.E.Z. Short, mud / gravel stream, AS-06-032, SM0828873–SM0828878 (6 spec. SEMC); Cascada de Bailadores, 8°14.393'N, 71°48.672'W, 1862 m, 18.vii.2009, leg. Sites, stream, VZ09-0718-02S / L-1092, SEMC0879873–SEMC0879874 (2 spec. SEMC); ca. 4 km E Jaji, 8°34.574'N, 71°18.806'W, 1830 m, 16.i.2006, leg. A.E.Z. Short, Lagoon in pasture, AS-06-035, SM0827433–SM0827451, SM0827453–SM0827470, SM0827472–SM0827486 (52 spec. SEMC, MIZA, MALUZ).

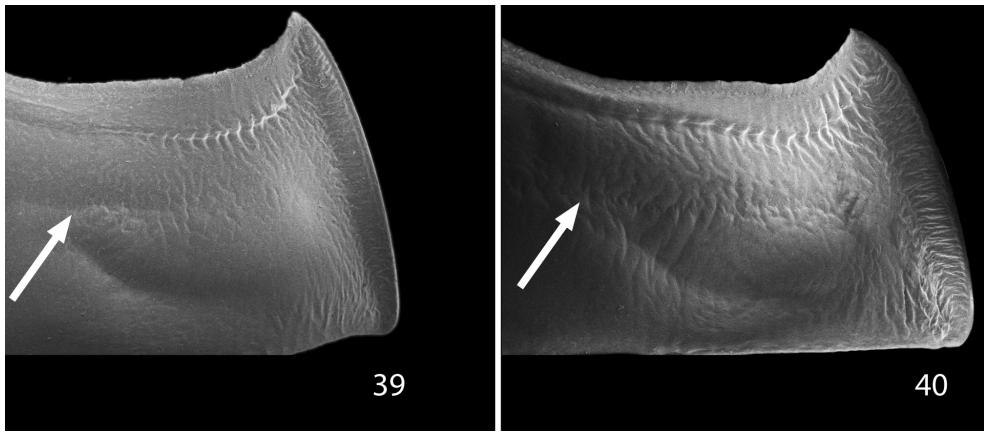
Diagnosis. Body form (Fig. 33) oval, in lateral view strongly convex; pronotal disc with transverse crease strongly impressed, laterally with sparse wrinkles (Fig. 39); elytral disc of female with intervals I–IV non-reticulate in basal half (Fig. 43), V–X strongly reticulate (Fig. 44), XI non-reticulate; female elytral striae VI–IX sulcate (Fig. 41); elytral lateral margin weakly interrupted before apex (Fig. 41); metanepisternal ostiole present; aedeagus (Fig. 48) with median lobe strongly parallel sided for 2/3 length, apex broad, weakly triangular or rounded; parameres truncate apically.

Gyrinus venezolensis is most similar to *G. vinolentus* sp. nov. but can be distinguished from it by being more evenly oval in dorsal habitus, having a less wrinkled pronotum (c.f. Figs 39 and 40), and the elytral lateral margin weakly interrupted in its apical 1/5 by a swelling (Fig. 41), as opposed to being strongly interrupted by a relatively large swelling (Fig. 42). Females of *G. venezolensis* can further be distinguished from *G. vinolentus* sp. nov. by having somewhat less reticulate elytra, with reticulation only being regularly present on intervals V–X, as opposed to *G. vinolentus* sp. nov in which intervals IV–X are normally reticulate (at least in basal half of intervals IV–V). The male aedeagus is the most reliable way to separate the two species, as in *G. venezolensis* the parameres are apically truncate, and the median lobe is strongly parallel sided in its apical 2/3, with a broad apex (Fig. 48), compared to *G. vinolentus* sp. nov. which has rounded apices to the parameres and the median lobe strongly constricted in its apical 1/3, with a rounded apex (Fig. 49). The female gonocoxae also differ strongly between the two species, being more elongate and less curved in *G. venezolensis* (Fig. 58) compared to the relatively shorter and more strongly curved gonocoxae of *G. vinolentus* sp. nov. (Fig. 59).

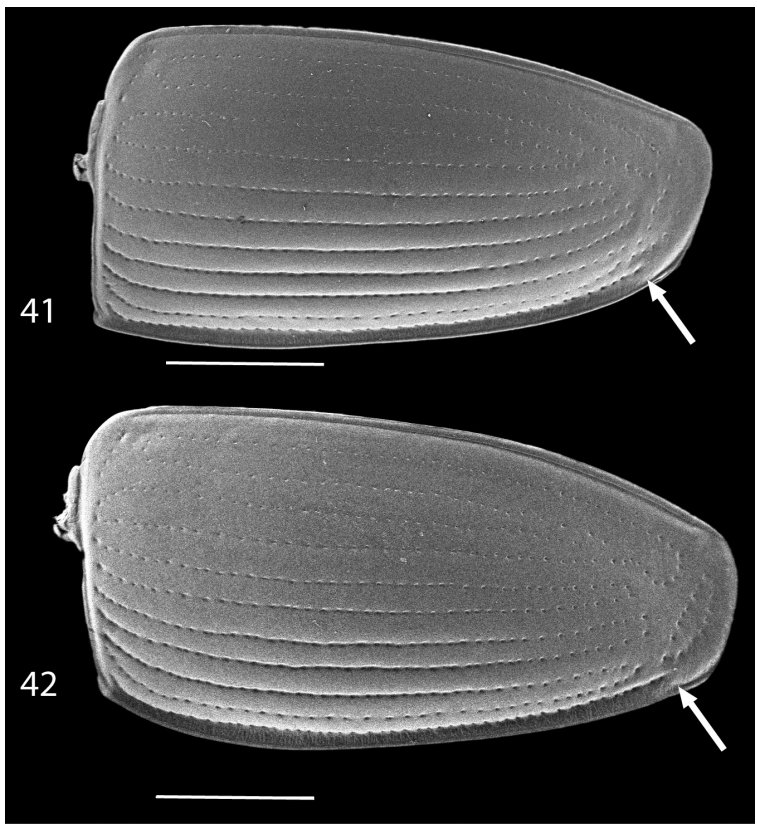
Redescription. Size. Female length = 5.0–5.5 mm, width = 3.0–3.5 mm, male length = 4.5–5.0 mm, width = 2.5–3.0 mm. Habitus. Body form evenly oval, attenuated anteriorly and posteriorly, widest point just posteriad of humeral region; in lateral view dorsoventrally strongly convex, greatest convexity posterior to scutellar region, evenly depressed anteriorly and posteriorly.

Coloration (Figs 33–34). Dorsally, head, pronotum, elytra black, with blue reflections; laterally reflections bronzy yellow and green, especially in females whose elytral lateral reticulation appears strongly bronzy green. Venter overall darkly colored; mouthparts, ventral surface of antennal pedicel, hypomeron, elytral epipleuron, mesoventrite medially, mesocoxae, and ultimate abdominal ventrite lighter in color – reddish brown to darker orange yellow; legs yellow in color; remainder of venter dark brown to black.

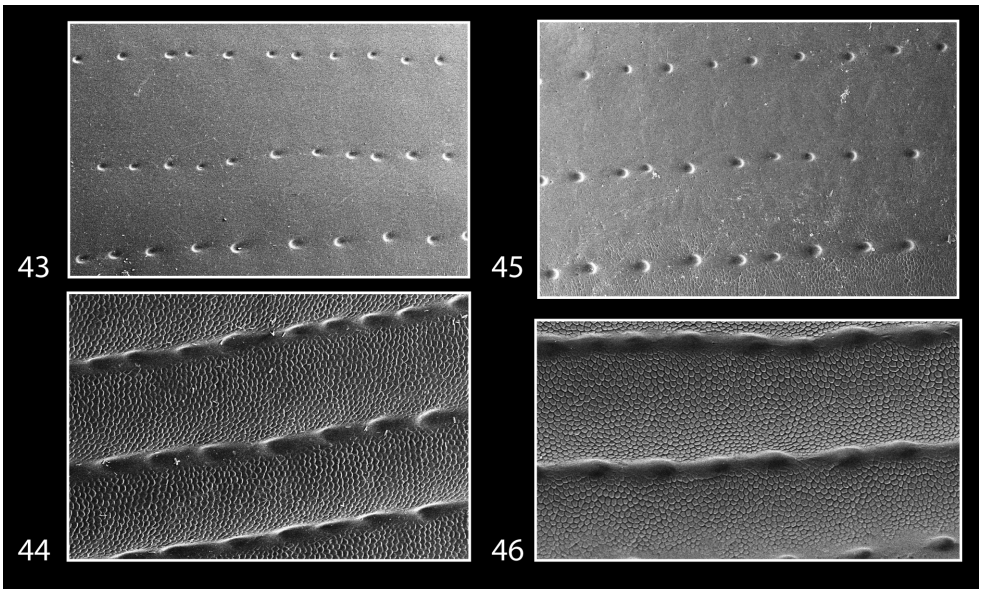
Sculpture and structure. Pronotum of both sexes with broad riffled lateral margins (Fig. 39); pronotal disc laterally weakly wrinkled (Fig. 39), wrinkles present anteriorly and associated with pronotal transverse impressed line, wrinkles also present posteriorly near posterior margin of pronotum. Female elytra (Figs 33 and 41) with striae I–IV non-sulcate, elytral striae V–IX strongly sulcate in basal 2/3 of elytron, stria X non-sulcate, stria XI strictly marginal. Female elytral disc with intervals I–IV normally non-reticulate (Fig. 43), always basally free of reticulation; interval V always with reticulation present at least apically or in lateral half near stria V; intervals VI–X completely reticulate (Fig. 44), reticulation with impressed dense meshes, composed of scale-like sculpticells; interval XI free of reticulation. Male elytra (Fig. 34) with striae I–IV non-sulcate; V–VII weakly sulcate after humeral region for brief extant;



Figs 39–40. SEM images of the pronotum showing sculpturing of wrinkles and riffles of the lateral margins, arrows indicate pronotal transverse crease. 39 – *Gyrinus venezolensis* Ochs, 1953. 40 – *G. vinolentus* sp. nov.



Figs 41–42. SEM images of the elytron of *Oreogyrinus* species, scale bars = 1mm, arrows indicate the pre-apical swelling interrupting the elytral lateral margin. 41 – *Gyrinus venezolensis* Ochs, 1953. 42 – *G. vinolentus* sp. nov.



Figs 43–46. SEM images of elytral interval reticulation and strial punctures. 43–44 – *Gyrinus venezolensis* Ochs, 1953. 43 – intervals II and III, striae I–III. 44 – intervals IX and X, striae VIII–X. 45–46 – *G. vinolentus* sp. nov. 45 – intervals II and III, striae I–III. 46 – intervals IX and X, striae VIII–X.

VIII–IX sulcate in humeral region, ending before apical 1/3 of elytron; stria X non-sulcate; stria XI strictly marginal. Male elytral disc with intervals I–XI without reticulation. Elytra of both sexes with lateral margins weakly interrupted interrupted in apical 1 /5 by minor swelling; elytral apex truncate to weakly rounded. Metanepisternal ostiole very small.

Male genitalia (Fig. 48). Aedeagus with median lobe narrow, shorter than parameres, weakly attenuated after basal 1/3, strongly parallel sided in apical 2/3, apex broad, weakly triangular; in lateral view median lobe thick, strongly dorsally curved; parameres with apex strongly truncate. Female genitalia (Fig. 58). Gonocoxae elongate, mostly straight with curved lateral margins, apices relatively truncate, weakly emarginate laterally, with lateral angle distinct, left gonocoxal apex less emarginate laterally than right.

Variability. There is variability in the extent of the female elytral reticulation. Few specimens examined had the reticulation absent on interval V basally, with the reticulation present only apically and on the lateral half of the interval near stria V. A few other specimens had interval IV with reticulation in its apical half. However, it was most common for the species to have elytral interval IV free of reticulation in its basal half, having reticulation at most apically, and with interval V completely reticulate.

Habitat. This species has been collected from both streams and lagoons (Figs 62–63).

Distribution. Known only from the southern Venezuelan Andes in Mérida (Fig. 72).

Discussion. While currently only known from Venezuela, given its distribution in the far southern Venezuelan Andes (Fig. 72), this species may also be found in the Andes of northern Colombia.

Gyrinus (*Oreogyrinus*) *vinolentus* sp. nov.

(Figs 35–36, 40, 42, 45–46, 49, 59–61, 75)

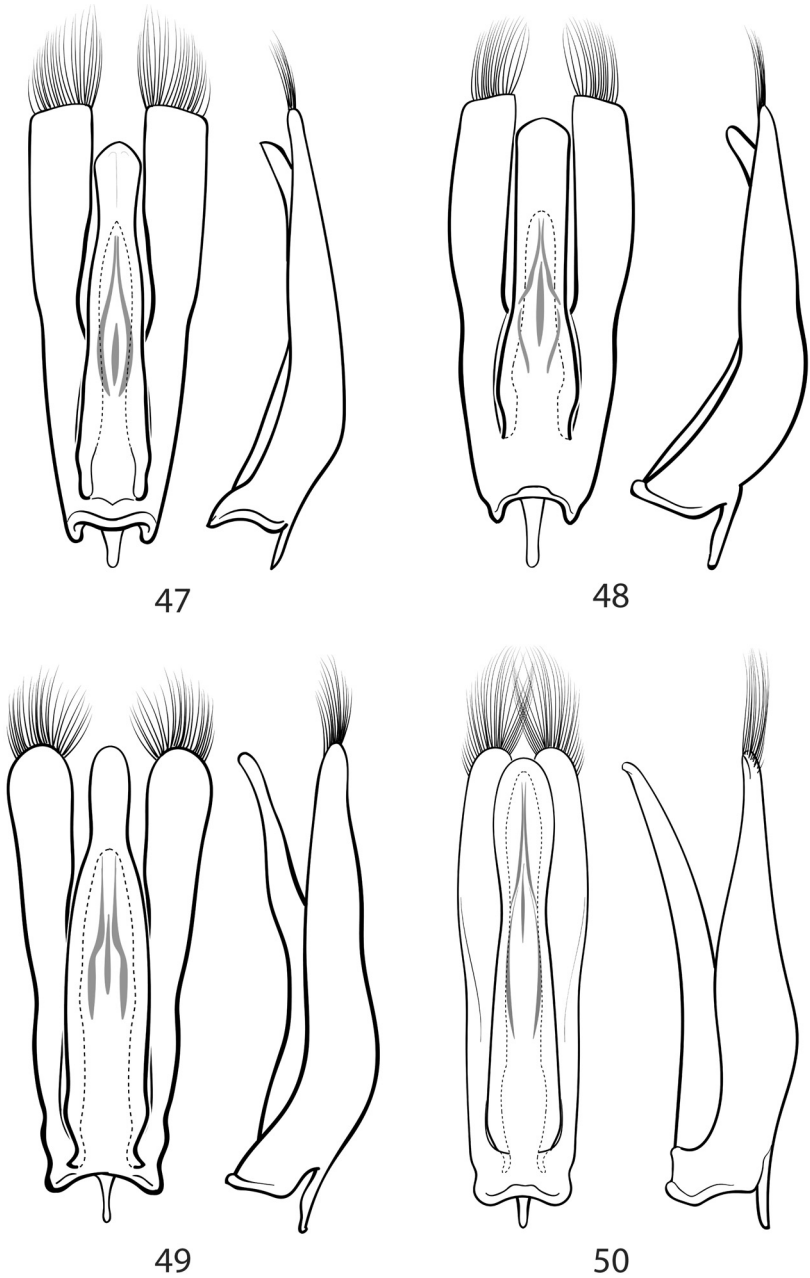
Type material. Holotype: ♂, 'VENEZUELA: Lara State / 9°46.707›N, 70°02.113›W, 1877 m / E Humocaro Bajo; nr. / Cascado del Vino, river margins & / pools, 12.vii.2009; leg. Short, Gustafson, Garcia, Inciarte, Camacho; VZ09-0712-03A [white label, typed black ink]' 'SEMC0879582 / KUNHM-ENT [white label with barcode, typed black ink]' (MIZA). Paratypes (46 spec.): same as holotype except: SEMC0879486–SEMC087488, SEMC0879490–SEMC0879491, SEMC0879498, SEMC0879502–SEMC0879503, SEMC0879505, SEMC0879506, SEMC0879508, SEMC0879510, SEMC0879512, SEMC0879514, SEMC0879523–SEMC0879528, SEMC0879531, SEMC0879536, SEMC0879538, SEMC0879539, SEMC0879540, SEMC0879544, SEMC0879546–SEMC0879548, SEMC0879550, SEMC0879556–SEMC0879559, SEMC0879561–SEMC0879564, SEMC0879569–SEMC0879570, SEMC0879577–SEMC0879581, SEMC0879585 (MALUZ, MIZA, SEMC).

Diagnosis. Body form (Fig. 36) broadly oval, in lateral view convex; pronotal disc with transverse crease strongly impressed, laterally with dense wrinkles (Fig. 40); elytral disc of female with intervals I–III non-reticulate in basal half (Fig. 45), IV–V reticulate at least in basal half, VI–X strongly reticulate (Fig. 46), XI non-reticulate; female elytral striae V–IX sulcate; elytral lateral margin strongly interrupted before apex (Fig. 42); metanepisternal ostiole present; aedeagus (Fig. 49) with median lobe mostly parallel sided in basal 2/3, strongly constricted in apical 1/3, apex narrowly rounded; parameres rounded apically; gonocoxae (Fig. 59) curved, with truncate apices.

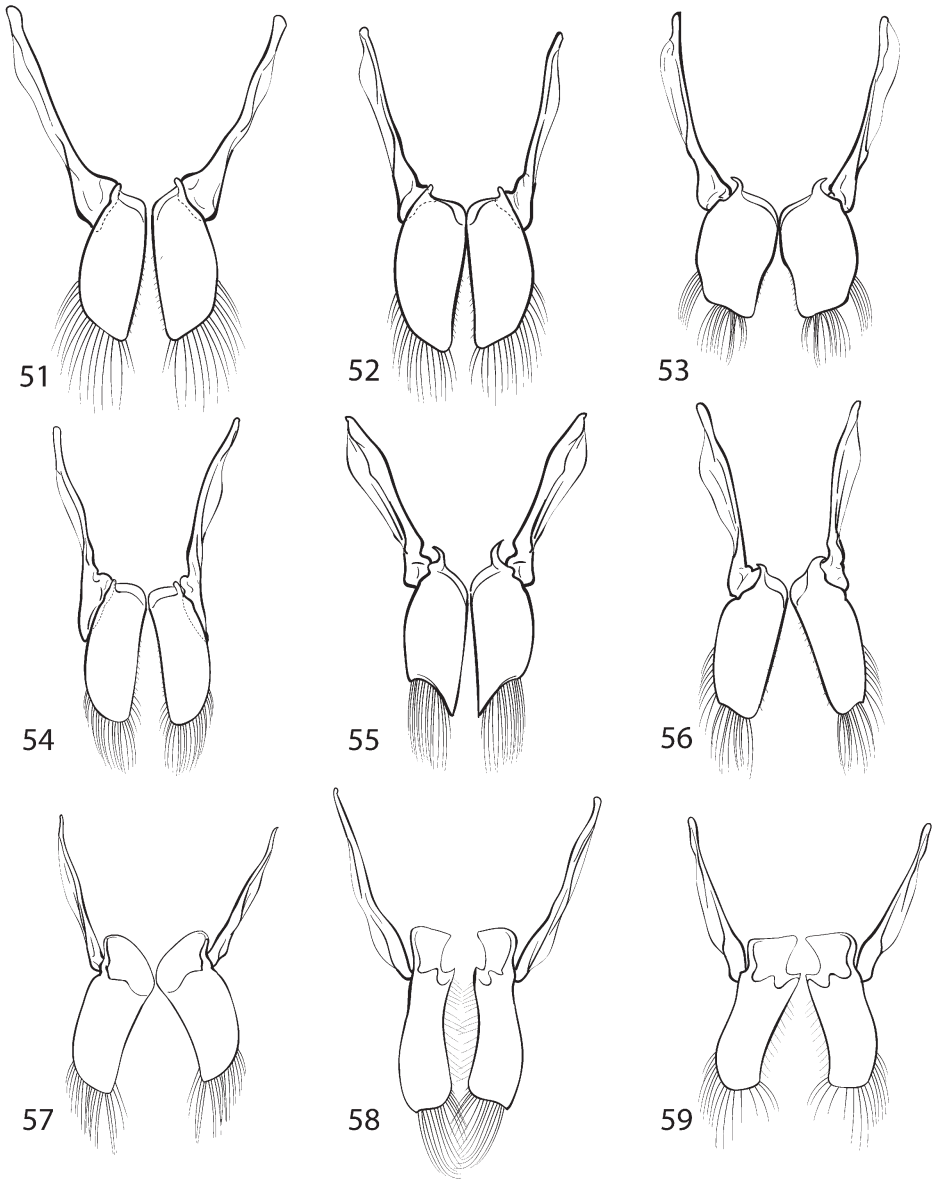
Description. Size. Female length = 5.0–5.5 mm, width = 3.0–3.5 mm, male length = 4.0–5.0 mm, width = 2.5–3.0 mm. Habitus. Body form broadly oval, weakly attenuated anteriorly and posteriorly, widest point near mid-length; in lateral view dorsoventrally convex, greatest convexity near elytral mid-length, evenly depressed anteriorly and posteriorly.

Coloration (Figs 35–37). Dorsally, head, pronotum, elytra black, with blue reflections; laterally reflections bronzy yellow and green, especially in females whose elytral lateral reticulation strongly bronzy green. Venter overall darkly colored; mouthparts, ventral surface of antennal pedicel, hypomeron, elytral epipleuron, mesoventrite medially, mesocoxae, and ultimate abdominal ventrite lighter in color – reddish brown to darker orange yellow; legs yellow in color; remainder of venter dark brown to black.

Sculpture and structure. Pronotum of both sexes with broad riffled lateral margins (Fig. 40); pronotal disc strongly wrinkled laterally (Fig. 40), wrinkles associated with pronotal crease laterally, transversely impressed line anteriorly, and posterior margin of pronotum, wrinkles weakly present medially on posterior 1 /2 of pronotal disc. Female elytra (Figs 35 and 42) with striae I–IV non-sulcate, striae V–VI sulcate only medially; VII–VIII strongly sulcate in basal 2/3 of elytron, stria X mostly non-sulcate, only weakly sulcate in humeral region; stria XI strictly marginal. Female elytral disc with intervals I–III normally non-reticulate (Fig. 45), always basally free of reticulation; interval IV–V always with reticulation present at least basomedially (Fig. 45); intervals VI–X completely reticulate (Fig. 46), reticulation with strongly impressed dense meshes, composed of scale-like sculpticells; interval XI free of reticulation. Male elytra (Fig. 36) with striae I–IV non-sulcate; V–VII weakly sulcate after humeral region for brief extant; VIII–IX sulcate in humeral region, ending before apical 1/3 of elytron; stria X non-sulcate; stria XI strictly marginal. Male elytral disc with intervals I–XI without reticulation. Elytra of both sexes with lateral margins interrupted in apical 1/5 by strong swelling; elytral apex truncate to weakly rounded. Metanepisternal ostiole very small.



Figs 47–50. Dorsal and lateral view of the aedeagus of *Oreogyrinus* species, not to scale. 47 – *Gyrinus colombicus* Régimbart, 1883, syntype (MNHN). 48 – *G. venezolensis* Ochs, 1953. 49 – *G. vinolentus* sp. nov. 50 – *G. iridinus* sp. nov.



Figs 51–59. Ventral view of gonocoxae of Venezuelan *Gyrinus* species, not to scale. 51–56 – *Neogyrinus* species. 51 – *G. gibbus* Aubé, 1838 from Caracas valley, Venezuela (FMNH). 52 – *G. gibbus* from Amazonian Venezuela: Amazonas stream along Rio Sipapo (KBMC). 53 – *G. ovatus* Aubé, 1838 from Venezuela: Falcón: W. Curimagua, Blackwater Lagoon. 54 – *G. guianus* Ochs, 1935 from Amazonian Venezuela: Amazonas: river near Orinoco /Sipapo confluence (KBMC). 55 – *G. rozei* Ochs, 1953. 56 – *G. sabanensis* sp. nov. 57–59 – *Oreogyrinus* species: 57 – *G. iridinus* sp. nov. 58 – *G. venezolensis* Ochs, 1953. 59 – *G. vinolentus* sp. nov.

Male genitalia (Fig. 49). Aedeagus with median lobe narrow, shorter than parameres, basal 2/3 mostly parallel sided, very weakly attenuated, distinctly constricted at apical 1/3, apex narrowly rounded; in lateral view median lobe narrow, sinuate, weakly dorsally curved; parameres with apex weakly rounded, not truncate. Female genitalia (Fig. 59). Gonocoxae curved, apices truncate, left gonocoxa more strongly curved than right.

Variability. There is variability in the extant and appearance of the reticulate region of the female elytral disc. Normally females have reticulation present on interval IV in the basal half of the elytra, however, some specimens had the reticulation relatively weakly impressed. Others had it as strongly impress as the other more lateral elytral intervals. Some specimens had faint reticulation extending as far medially as the basal half of interval III.

Differential diagnosis. *Gyrinus vinolentus* is most similar to *G. venezolensis* but can be distinguished from it by the characters provided in the diagnosis for *G. venezolensis*.

Etymology. The type locality is near Cascada del Vino, an area where the water is tinted dark red, like wine, due to plant tanins. The specific epithet, Latin adjective *vinolentus*, means full of wine, or drunk, in reference to the wine-like waters of the type locality (Fig. 60).

Habitat. The only known collecting event for this species is from the margins of pools in a swift flowing mountain stream (Figs 60–61).

Distribution. Only known from the type locality in the northern Venezuelan Andes (Fig. 75).

Species inquirendum

Gyrinus (*Oreogyrinus*) *feminalis* Mouchamps, 1957

Gyrinus (*Oreogyrinus*) *feminalis* Mouchamps, 1957: 246 (original description).

Gyrinus feminalis is known only from its original description, based on two female specimens, said to be deposited in the MNHN, with no further locality information than 'Venezuela' (Mouchamps 1957). The species was declared so distinct by Mouchamps (1957) that he did not hesitate to describe it without the male. Upon a request to loan the type specimens from the MNHN, we were informed they could not be found. The specimens are also not in the collection of the Institut Royal des Science Naturelles de Belgique, in Brussels. Therefore, they could not be studied. The actual description of *G. feminalis* sounds suspiciously similar to that of *G. venezolensis*, which is mentioned by Mouchamps (1957), but not formally diagnosed. Furthermore, the most critical diagnostic feature provided by Mouchamps (1957) for *G. feminalis*, is the almost totally smooth pronotum, which is also similar to *G. venezolensis* (Fig.

Figs 60–67. Habitat of *Gyrinus* species in the Venezuela, boxes indicate micro habitats. 60–63 – Venezuelan Andes. 60–61 – Lara State, Cascada del Vino, collecting event VZ09-0712-03A. 60 – macrohabitat of *G. vinolentus* sp. nov., G. Gustafson collecting. 61 – microhabitat, *G. vinolentus* sp. nov. swimming amongst emergent vegetation. 62–63 – Mérida State, between Jaji and Mérida, collecting event AS-06-035. 62 – macrohabitat of *G. venezolensis* Ochs, 1953, A. E. Z. Short collecting in background. 63 – microhabitat, *G. venezolensis* swimming amongst emergent vegetation. 64–67 – habitat of *Gyrinus ovatus* Aubé, 1838 in Falcón State Venezuela, boxes indicate micro habitats. 64 – Medanos de Coro, collecting event VZ09-0709-03A, macrohabitat. 65 – microhabitat, marginal vegetation, G. Gustafson collecting. 66 – W. of Curimagua, Blackwater Lagoon, collecting event VZ09-0711-01A, macrohabitat. 67 – microhabitat, pond margins.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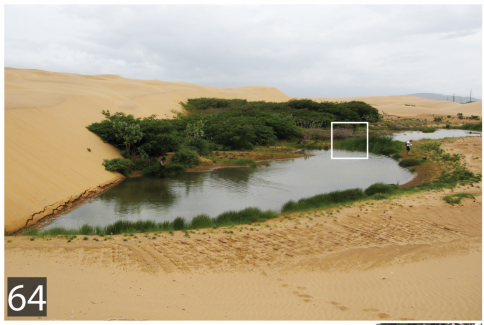
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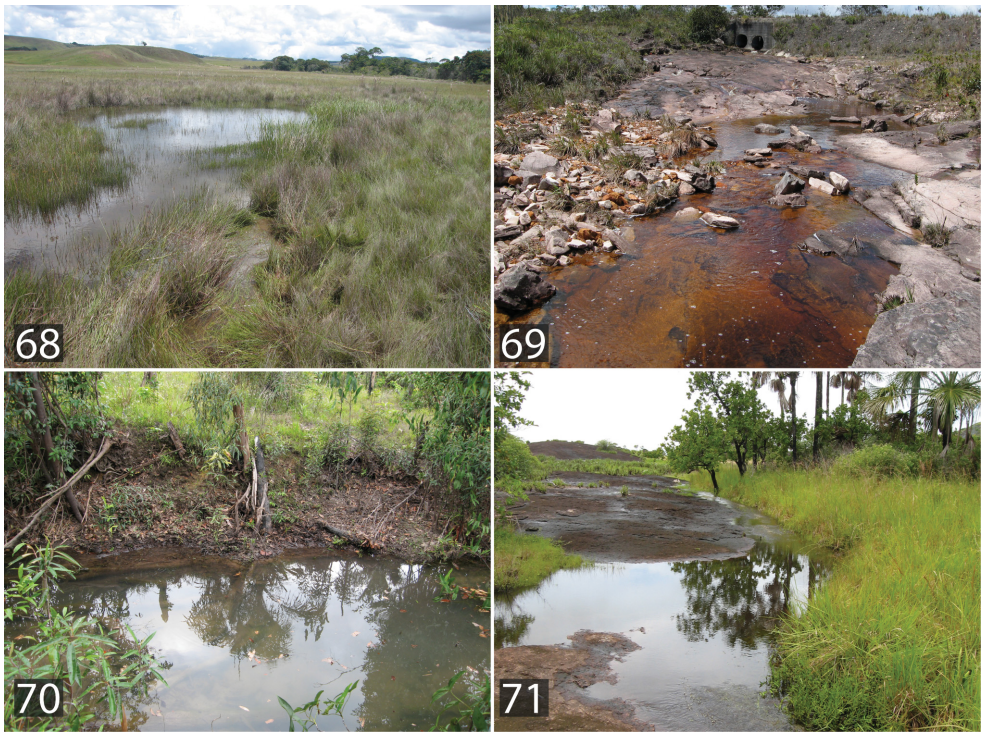


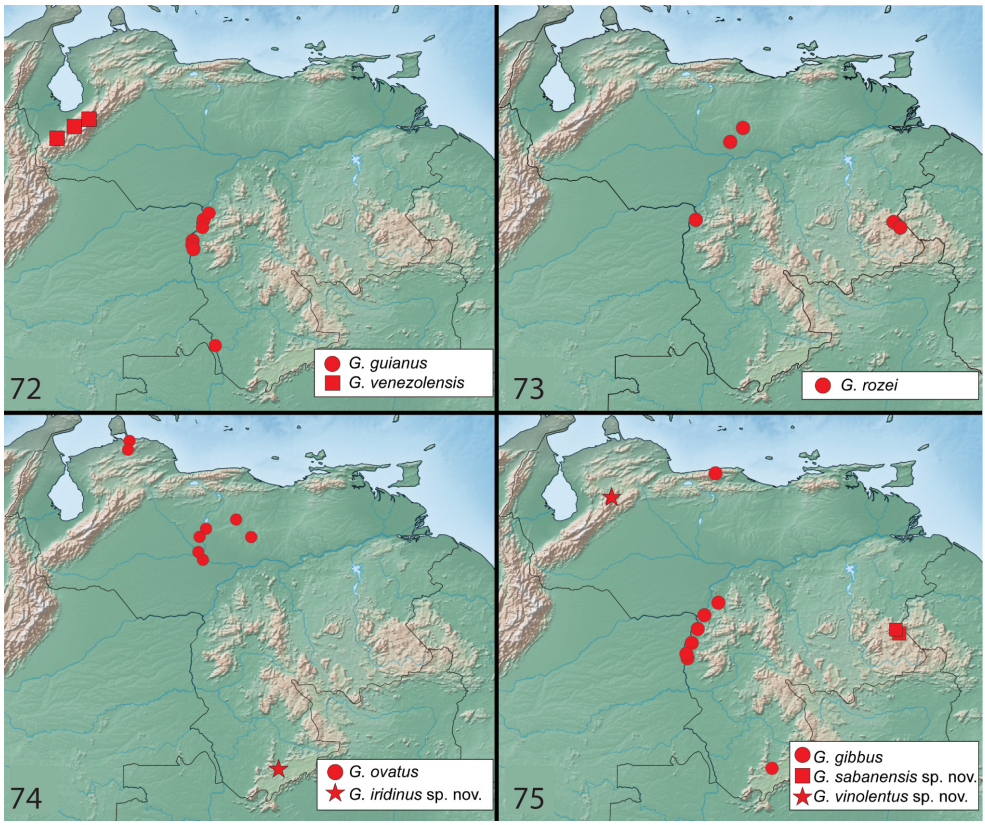
Figs 68–71. Habitat of *Gyrinus* species in the Guiana Shield region of Venezuela. 68 – Bolívar State, Gran Sabana, collecting event AS-08-063, habitat of *G. rozei* Ochs, 1953. 69 – Bolívar State, Gran Sabana, collecting event AS-08-066, habitat of *G. sabanensis* sp. nov. 70 – Amazonas, tributary of the Rio Sipapo, collecting event VZ09-0116-02X, habitat of *G. guianus* Ochs, 1935 and *G. gibbus* Aubé, 1838. 71 – Bolívar State, 25 km E. El Burro, collecting event AS-08-077, habitat of *G. gibbus*.

38). However, *G. feminalis* is stated as being most similar to *G. baeri* Régimbart, 1907, from Peru. As the types appear lost, no other treatment of the species exists, and with no specimens examined from Venezuela clearly matching the description (apart from *G. venezolensis*), we place this species as a *species inquirendum* until the types are discovered.

Key to the adult *Gyrinus* species of Venezuela

1 Dorsally black in color (Figs 33–38), venter mostly dark – medially brown to black in color; elytron with punctures of all 11 serial striae distinguishable (Figs 33–38, 43, 45); metanepisternal ostiole present. Subgenus ***Oreogyrinus***. 2

– Dorsally olive green in color (Figs 1–6), venter lighter – yellow to orange in color; elytron with at least one (stria I) or more medial serial striae totally effaced or with strongly reduced punctures (Figs 1–6, 18, 20, 25, 27); metanepisternal ostiole absent. Subgenus ***Neogyrinus***. 5



Figs 72–75. Distribution maps of *Gyrinus* species within Venezuela.

2 Pronotal transverse crease strongly impressed (Figs 33–36, 39–40); pronotal and elytral lateral margins densely riffled (Figs 39–42); dorsal surface not iridescent (Figs 33–36); strongly sexually dimorphic, female elytra strongly reticulate laterally (Figs 33, 35, 44, 46). 3

– Pronotal transverse crease greatly reduced (Figs 37–38); pronotal and elytral lateral margins without riffles; dorsal surface iridescent (Figs 37–38); not sexually dimorphic in elytral sculpturing. ..... ***Gyrinus* (*Oreogyrinus*) *iridinus* sp. nov.**

3 Pronotum relatively weakly wrinkled, laterally with sparser wrinkles (Fig. 39); elytral lateral margin weakly interrupted in apical 1/5 by swelling (as in Fig. 41); aedeagus not strongly constricted in apical 1/3, more evenly attenuated towards apex, at most weakly constricted in apical 1/3. 4

– Pronotum more strongly wrinkled, laterally often with many wrinkles (Fig. 40); elytral lateral margin strongly interrupted in apical 1/5 by large swelling (Fig. 42); aedeagus strongly constricted in apical 1/3 (Fig. 49); gonocoxae curved with truncate apices (Fig. 59). ..... ***Gyrinus* (*Oreogyrinus*) *vinolentus* sp. nov.**

4 Female elytron more reticulate, nearly entirely covered in reticulation or at least to elytral interval II; male aedeagus attenuated in basal 2/3, weakly expanded laterally in apical 1/3 (Fig. 47); gonocoxae not studied. Not confirmed to be in Venezuela. ..... ***Gyrinus* (*Oreogyrinus*) *colombicus*** Régimbart, 1883

– Female elytron less reticulate, reticulation reaching at most to elytral interval IV; male aedeagus strongly parallel sided, apex broadly rounded (Fig. 48); gonocoxae relatively straight, not strongly curved, apices weakly emarginate with prominent lateral angle (Fig. 58). ..... ***Gyrinus* (*Oreogyrinus*) *venezolensis*** Ochs, 1953

5 Body form broadly oval (Figs 1–3, 5); elytra with non-uniform reticulation, lateral reticulation distinctly more strongly impressed than medially. 6

– Body form narrowly oval (Figs 4, 6); elytra with more uniform reticulation, laterally not distinctly more strongly impressed. 8

6 Elytra with at least serial striae VIII–IX sulcate (as in Fig. 7); elytral apex obliquely truncate (Figs 1, 8), at most with incomplete border present laterally; ultimate abdominal tergite without strong medial acumination. 7

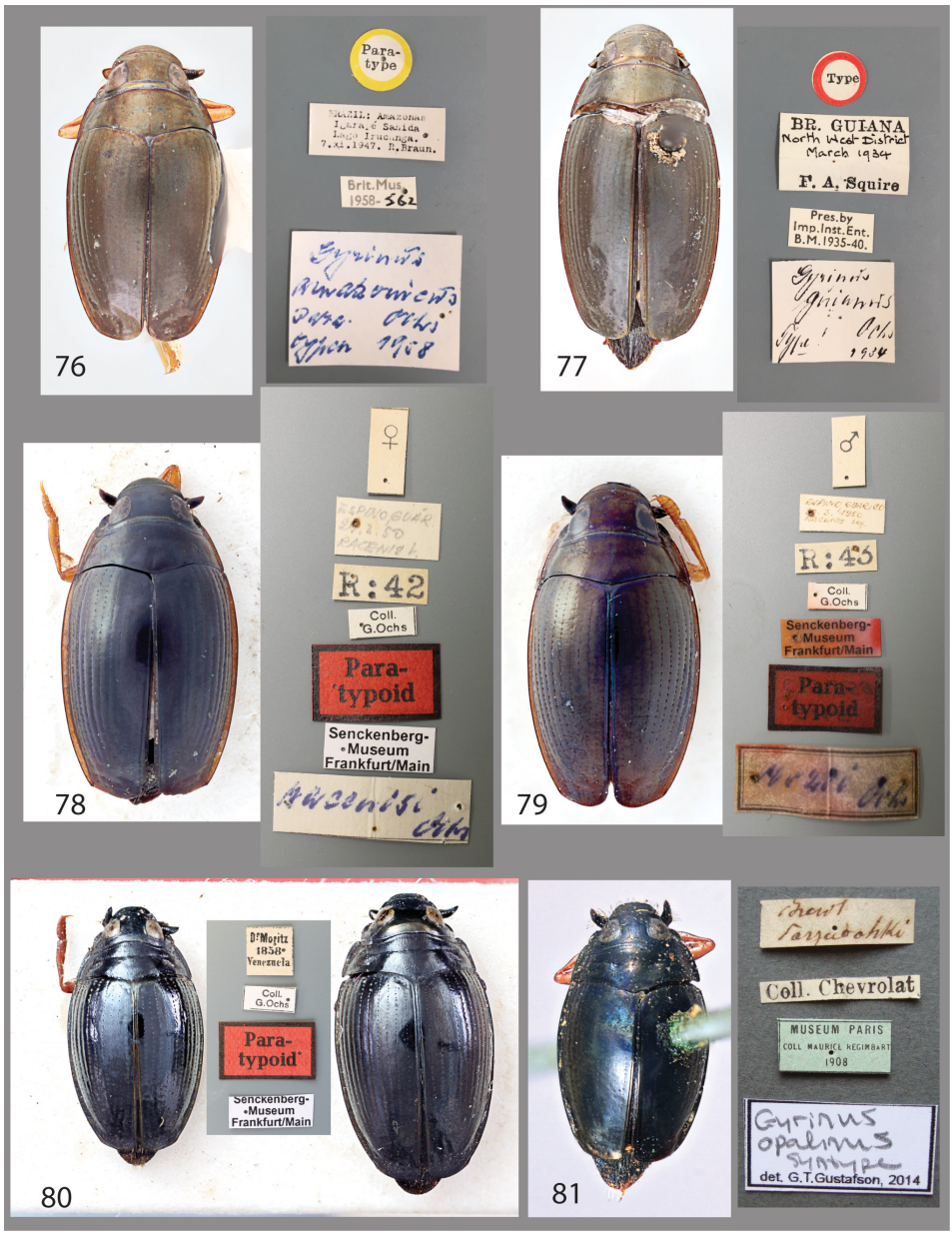
– Elytra with serial striae VIII–IX at most weakly sulcate (Fig. 10); elytral apex rounded, with complete border (Fig. 11); ultimate abdominal tergite often with strong medial acumination. ..... ***Gyrinus* (*Neogyrinus*) *gibbus*** Aubé, 1838

7 Elytral serial striae VIII–X never lineate, with distinctly separated round punctures (Fig. 21); epipleural angle of elytral apex always distinct, normally with denticle (Fig. 9); aedeagus with median lobe shorter than parameres, apex with broad process (Fig. 29); gonocoxae short, with strongly truncate apices (Fig. 53). Very widespread Neotropical species. ..... ***Gyrinus* (*Neogyrinus*) *ovatus*** Aubé, 1838

– Elytral serial striae VIII–X lineate basally with ovoid punctures; epipleural angle of elytral apex always indistinct, never with denticle; aedeagus with median lobe as long as parameres, apex evenly rounded without broad process (Fig. 30); gonocoxae elongate, apices laterally weakly emarginate with prominent lateral angle (Fig. 56). Species known only from the Gran Sabana in southeastern Venezuela. .... ***Gyrinus* (*Neogyrinus*) *sabanensis* sp. nov.**

8 Elytral serial striae II–XI evident (Figs 24, 27), striae VI–IX sulcate with distinct round punctures (Fig. 28); elytra without distinct pre-apical medial plica; elytral apex obliquely truncate, with distinct epipleural angle (Fig. 24); aedeagus with median lobe exceptionally long and broad, apex truncate (Fig. 32); gonocoxae shorter with strongly emarginate apices producing a strongly pointed medial angle (Fig. 55). .... ***Gyrinus* (*Neogyrinus*) *rozei*** Ochs, 1953

– Elytral serial striae VI–XI evident (Fig. 22), striae VI–X sulcate with linear punctures (Fig. 26); elytra with distinct medial pre-apical plica (Fig. 23); elytral apex rounded, without distinct epipleural angle (Fig. 23); aedeagus shorter than parameres, narrow, apex strongly triangular in form (Fig. 31); gonocoxae more elongate with rounded apices (Fig. 54). ..... ***Gyrinus* (*Neogyrinus*) *guianus*** Ochs, 1935



Figs 76–81. Type specimens and associated labels. 76 – *Gyrinus amazonicus* Ochs, 1958, paratype male (BMNH). 77 – *G. guianus* Ochs, 1935, holotype female (BMNH). 78 – *G. racenisi* Ochs, 1953, paratype female (SMF). 79 – *G. rozei* Ochs, 1953, paratype male (SMF). 80 – *G. venezolensis* Ochs, 1953, paratypes, male and female (SMF). 81 – *G. opalinus* Régimbart, 1883, syntype male and labels (MNHN).

Species incorrectly localized in Venezuela

Gyrinus (*Neogyrinus*) *crassus* Aubé, 1838

Some of the historical specimens from the BMNH Venezuelan material included a single female previously determined to be *G. crassus* Aubé, 1838 with the locality of 'Venezuela'. We confirm the identification of the specimen as *G. crassus*. For much of this species' history, it was known from sparse historical material without specific locality information (Ochs 1960). Later, more material with improved locality data revealed it to be a southern Brazilian species, known from the states of Rio de Janerio, São Paulo, and Santa Catarina (Ochs 1960, 1963a). Given the improved knowledge of this species' distribution, and not having recollected it during the survey, we consider this locality information to be in error, and *G. crassus* does not occur in Venezuela or northern South America.

Checklist of the *Gyrinus* species of Venezuela

Subgenus *Neogyrinus* Hatch, 1925

G. gibbus Aubé, 1838	Widespread Neotropical species
G. guianus Ochs, 1935	Brazil, Guiana, Venezuela
= *G. amazonicus* Ochs, 1958, syn. nov.	
G. ovatus Aubé, 1838	Widespread Neotropical species
= *G. racenisi* Ochs, 1953, syn. nov.	
G. rozei Ochs, 1953	Guiana Shield region of Venezuela
G. sabanensis sp. nov.	Gran Sabana of Venezuela

Subgenus *Oreogyrinus* Ochs, 1935

G. iridinus sp. nov.	Unturán Mountains of Venezuela
G. venezolensis Ochs, 1953	Southern Venezuelan Andes
G. vinolentus sp. nov.	Northern Venezuelan Andes

Acknowledgements

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