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A review of the Burrowing Water Beetles of Belize with a key to the species (Coleoptera: Noteridae)

Kevin SCHEERS^{1,2} & Arno THOMAS¹

¹ Research Institute for Nature and Forest (INBO), Kliniekstraat 25, 1070 Brussels, Belgium
² corresponding author: aquatic.adephaga@gmail.com



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Front cover: From left to right: dorsal view of *Hydrocanthus debilis* Sharp, 1882; *Suphisellus lineatus* (Horn, 1871) and *Suphisellus nigrinus* (Aubé, 1838).

A review of the Burrowing Water Beetles of Belize with a key to the species (Coleoptera: Noteridae)

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Abstract

In this article we review the Burrowing Water Beetles (Coleoptera: Noteridae) from Belize based on recently collected material and literature records. In total nine species belonging to four genera are recorded from Belize. Six species, i.e. *Hydrocanthus debilis* Sharp, 1882, *H. marmoratus* Sharp, 1882, *Mesonoterus leavicolis* Sharp, 1882, *Suphisellus insularis* (Sharp, 1882), *S. nigrinus* (Aubé, 1838) and *Notomicrus sharpi* J. Balfour-Browne, 1939 are recorded from Belize for the first time. All species are briefly discussed and illustrated along with their male genitalia. Notes on the ecology are given for all species and their known distribution in Belize is mapped. Furthermore a key for identification of the species is provided.

Keywords: Belize, Central America, Neotropical region, Hydradephaga, Noteridae

Introduction

The family Noteridae Thomson, 1860 has a worldwide distribution with over 260 described species. It is characterized by the following three synapomorphies: (1) the anterior margin of the metacoxal phragma extending anteriorly beyond the origin of the metacoxal furca, (2) the presence of the noterid platform (the characteristic shaped medial portion of the metacoxae), and (3) the pseudosegmented scape (MILLER, 2009). In Central America there are two subfamilies present, i.e. Notomicrinae and Noterinae which together comprise five genera. With exception of *Mesonoterus* Sharp, 1882 all these genera were revised in the last four decades (YOUNG, 1978; 1979; 1985 and GROSSO, 1993) and for the Central American species there have been no changes since then.

The water beetle fauna of Belize is only poorly known, despite being a former British colony. At present only three species of Noteridae are known from Belize (YOUNG, 1979; NILSSON, 2011) while in the neighboring countries Mexico and Guatemala respectively 16 and 11 species have been recorded (NILSSON, 2011). In 2015 a survey was carried out to study the water beetles of Belize. During this survey 63 sites were sampled and Noteridae were found during 21 samplings at 19 sites. In total 280 specimens were collected belonging to 8 species.

Material and methods

During a field survey carried out from April 13 to May 9 2015, 63 sites in the south and central regions of Belize were sampled on the presence of Noteridae. The sampling was done with a hydrobiological handnet with a diameter of 30cm and a mesh of 1mm and a sieve with

a diameter of 20cm and a mesh of 0.8mm. The content of the net and the sieve was put in a white tray and sorted out on site. All beetles were conserved in the field on 90% alcohol. Specimens were relaxed in hot water for about 10 minutes prior to dissection. Male genitalia were dissected and glued on a mounting card together with the specimen after examination. All collected material is deposited in the collection of the first author.

Habitus photographs were made with the semi-automatic camera system described by BRECKO *et al.* (2014). This Canon-Cognisys set-up uses a Canon 700D camera equipped with a Canon macro lens MP-E 65 mm. The image stacking software package Zerene Stacker (Build T201404082055) was used for image stacking. This method was designed and described in detail by BRECKO *et al.* (2014) and has better results than some expensive high-end approaches (BRECKO *et al.*, 2014).

Drawings of the male genitalia were obtained with the aid of a microscope equipped with a camera lucida attachment. We did not have a male specimen of *Suphisellus varians* (Sharp, 1882) at our disposal and the male genitalia of this species were redrawn from YOUNG (1979). Distribution maps were made with ArcGIS 10.4.1.

The following abbreviations were used in the text: NA: Nearctic region, NT: Neotropic region, TL: total length, length measured from the front of the clypeus to the apices of the elytra.

Results

Of the 63 sites sampled during the field survey, Noteridae were found during 21 samplings at 19 sites. A total of 280 specimens were collected which belong to eight species. Furthermore, literature (YOUNG, 1979) revealed three species with three records from one site.

Checklist of the Noteridae of Belize

Noterinae

- **Hydrocanthus debilis* Sharp, 1882
- **Hydrocanthus marmoratus* Sharp, 1882
- **Mesonoterus laevicollis* Sharp, 1882
- **Suphisellus insularis* (Sharp, 1882)
- Suphisellus lineatus* (Horn, 1871)
- Suphisellus neglectus* Young, 1979
- **Suphisellus nigrinus* (Aubé, 1838)
- Suphisellus varians* (Sharp, 1882)

Notomicrinae

- **Notomicrus sharpi* J. Balfour-Browne, 1939

(the arrangement follows NILSSON (2011). Species newly recorded for Belize are indicated by an asterisk)

Systematics

For each species a concise description is given, based on studied specimens and where necessary completed with literature (YOUNG, 1978; 1979; 1985). Furthermore the known distribution of the species is summarized according to NILSSON (2011), updated with new records of Argentina and Costa Rica given by TORRES *et al.* (2012) and BLANCO (2015), and notes on the habitat are given.

Noterinae

Hydrocanthus debilis Sharp, 1882 (Figs 1A, 2A, 3A)

= *Hydrocanthus finitimus* Guignot, 1942

TYPE LOCALITY. Brazil, Amazon's Valley, Bahia.

MATERIAL EXAMINED. STANN CREEK: Cockscomb Basin Wildlife Sanctuary, Wari Lagoon, 16°46'46,1"N, 88°28'2,4"W, 07.V.2015, Leg. K. Scheers & A. Thomaes (42ex.) TOLEDO: Nim Li Punit, small ditch near road, 16°19'3,6"N, 88°49'14,5"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (3ex.); Big Falls, pool between rocks, 16°15'22,2"N, 88°53'14"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (41ex.).

Published records from Belize: This species is newly recorded from Belize.

DIAGNOSIS. TL = 3.0–3.6 mm; dorsal colour yellowish brown to light reddish brown, with head and pronotum slightly but distinctly lighter than elytra; elytra distinctly marmorate (Fig. 1A); ventral parts uniformly light yellowish brown; male genitalia with the apex of the aedeagus distinctly hooked (Fig. 2A). This species is recognized by the combination of its color and size and most importantly by the male genitalia with the distinctively hooked apex of the aedeagus.

DISTRIBUTION. (NA) US (Texas); (NT) Argentina, Belize (**first records**), Bolivia, Brazil, Colombia, Costa Rica, French Guiana, Guatemala, Mexico, Panama, Paraguay, Peru?, Suriname, Venezuela.

HABITAT. *H. debilis* was present at only three sites. Like *H. marmoratus*, *Mesonoterus leavicollis* and *Suphisellus insularis* this species seems to prefer more sun exposed habitats rich in marginal vegetation. It was found in a big pond, an old oxbow pond (Fig. 4) and a small very shallow ditch, in the two former it was abundant.

Hydrocanthus marmoratus Sharp, 1882 (Figs 1B, 2B, 3B)

TYPE LOCALITY. Guatemala, Escuintla district, Paso Antonio.

MATERIAL EXAMINED. TOLEDO: Bladen NR, pond savannah, 16°31'11,7"N, 88°42'3,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (4ex.); Bladen NR, pond transition savannah-forest, 16°32'26,3"N, 88°42'57,1"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (6ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (6ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (16ex.); Punta Gorda, pond edge forest, 16°06'30,6"N, 88°48'24,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (2ex.); Punta Gorda, small stream, 16°05'17,8"N, 88°52'4"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (2ex.); Punta Gorda, puddle in temporary marsh, 16°05'19,3"N, 88°52'3,7"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.); Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (7ex.); Big Falls, pool between rocks, 16°15'22,2"N, 88°53'14"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.); Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (2ex.).

Published records from Belize: This species is newly recorded from Belize.

DIAGNOSIS. TL = 4.1–4.7 mm; dorsal color reddish brown with elytra marmorate but sometimes very indistinct; elytra usually slightly darker than head and pronotum (Fig. 1B); male genitalia with aedeagus somewhat thickened in lateral view and with only a very small indistinct hook (Fig. 2B). This species can only be confused with *Hydrocanthus debilis*, but it is larger and easily recognized by its male genitalia.

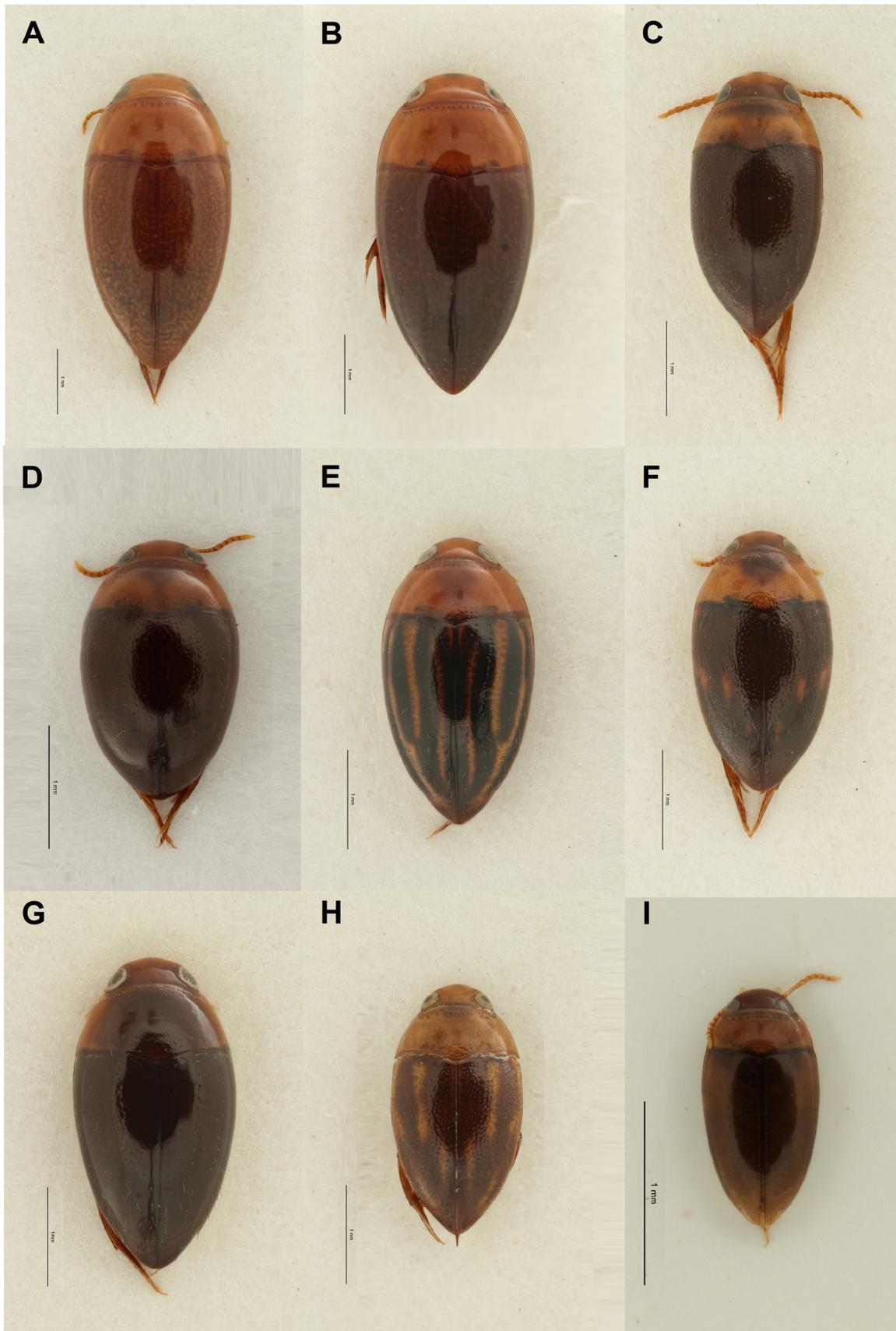


Fig. 1. Dorsal view of the species of Noteridae in Belize. A, *Hydrocanthus debilis* Sharp, 1882; B, *Hydrocanthus marmoratus* Sharp, 1882; C, *Mesonoterus laevicollis* Sharp, 1882; D, *Suphisellus insularis* (Sharp, 1882); E, *Suphisellus lineatus* (Horn, 1871); F, *Suphisellus neglectus* Young, 1979; G, *Suphisellus nigrinus* (Aubé, 1838); H, *Suphisellus varians* (Sharp, 1882); I, *Notomicrus sharpi* J. Balfour-Browne, 1939.

DISTRIBUTION. (NT) Belize (**first records**), Costa Rica, Guatemala, Mexico, Panama.

HABITAT. *H. marmoratus* was most frequently encountered in exposed lentic habitats, both permanent and temporary. It occurs in marshy areas and shallow well vegetated ponds and also occupies the vegetated edges of more open ponds.

Mesonoterus laevicollis Sharp, 1882
(Figs 1C, 3C)

TYPE LOCALITY. Guatemala, Escuintla district, Paso Antonio.

MATERIAL EXAMINED. STANN CREEK: Cockscomb Basin Wildlife Sanctuary, Wari Lagoon, 16°46'46,1"N, 88°28'2,4"W, 07.V.2015, Leg. K. Scheers & A. Thomaes (1ex.) TOLEDO: Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.).

Published records from Belize: This species is newly recorded from Belize.

DIAGNOSIS. TL = 2.5–2.9 mm; venter pale yellowish brown, head and pronotum yellowish brown with disc of pronotum distinctly paler, extending nearly to the lateral margins and forming a pale band across the pronotum; elytra brown, distinctly darker than head and pronotum; punctation on elytra coarse and deep (Fig. 1C); male genitalia with aedeagus small and indistinct and left paramere large with long setae. The only species of its genus in Belize, easily recognizable from the other species of Noteridae by the rounded prosternal process and by the prominent punctation.

DISTRIBUTION. (NT) Argentina, Belize (**first records**), Bolivia, Brazil, Costa Rica, Cuba, Guatemala, Mexico, Paraguay.

HABITAT. This species seems to be rare in Belize and was only encountered at two sites, both with only one specimen. Both sites were sunlit permanent ponds with a rich marginal vegetation. In both cases it co-occurred with *Hydrocanthus debilis*, *Suphisellus insularis* and *S. nigrinus*.

Suphisellus insularis (Sharp, 1882)
(Figs 1D, 2C, 3D)

- = *Canthydrus insularis* Sharp, 1882
- = *Canthydrus floridanus* Blatchley, 1914
- = *Canthydrus similaris* Sharp, 1887
- = *Canthydrus simplex* Sharp, 1882

TYPE LOCALITY. Cuba, Villa Clara province, Santo Domingo.

MATERIAL EXAMINED. STANN CREEK: Cockscomb Basin Wildlife Sanctuary, Wari Lagoon, 16°46'46,1"N, 88°28'2,4"W, 07.V.2015, Leg. K. Scheers & A. Thomaes (25ex.) TOLEDO: Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (2ex.).

Published records from Belize: This species is newly recorded from Belize.

DIAGNOSIS. TL = 1.9–2.2 mm; venter pale yellowish brown, dorsal color yellowish brown with elytra distinctly darker and with a more reddish brown tinge; pronotum usually with a darker portion at the posterior margin extending to the disc; body shape short, almost globular (Fig. 1D); male genitalia with aedeagus evenly curved, laterally flattened and slightly but

distinctly curved near apex (Fig. 2C). *Suphisellus insularis* is easily recognized by its body shape and the absence of a darker pattern on the elytra and pronotum. *Suphisellus levis* (Fall, 1909) is closely related but seems to be larger (TL = 2.2–2.4) and has the male genitalia with the apex of the aedeagus not curved laterally. Furthermore this latter species is at present only known from northwestern Mexico (YOUNG, 1979).

DISTRIBUTION. (NA) US (Florida); (NT) Belize (**first records**), Costa Rica, Cuba, Dominican Republic, Guatemala, Haiti, Mexico, Puerto Rico.

HABITAT. this species was only found at two sites. At both sites it was found together with *Mesonoterus leavicolis*. The habitat preference seems to be similar to that of *Hydrocanthus debilis*, *H. marmoratus* and *M. laevicolis*.

Suphisellus lineatus (Horn, 1871)
(Figs 1E, 2D, 3E)

- = *Suphis lineatus* Horn, 1871
- = *Canthydrus centralis* Sharp, 1882
- = *Hydrocanthus lineatus* Wehncke, 1876
- = *Canthydrus mexicanus* Sharp, 1882

TYPE LOCALITY. Mexico, Baja California, Cape San Lucas.

MATERIAL EXAMINED. TOLEDO: Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (11ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 04.V.2015, Leg. K. Scheers & A. Thomaes (3ex.); Big Falls, pool between rocks, 16°15'22,2"N, 88°53'14"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (2ex.); San Miguel, puddle in intermittent stream, 16°16'52,5"N, 88°53'3,1"W, 02.V.2015, Leg. K. Scheers & A. Thomaes (2ex.); Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (7ex.).

Published records from Belize: Cayo District (YOUNG, 1979)

DIAGNOSIS. TL = 2.7–3.1 mm; head and pronotum yellowish brown to light reddish brown; elytra yellowish brown each with four longitudinal black lines, one of which is interrupted somewhat behind the middle; of the other three, two are on the disc and one at the suture; these three black lines in most cases merge near apex (Fig. 1E); male genitalia distinctly bent at about middle (Fig. 2D). This species is extremely similar in color and elytral pattern to *Suphisellus simoni* (Régimbart, 1889) from which it can be distinguished by its smaller size and the different shape of the male genitalia.

DISTRIBUTION. (NA) US (Texas); (NT) Belize, Guatemala, Mexico.

HABITAT. *S. lineatus* prefers shallow areas in exposed permanent lentic habitats with a muddy or organic substrate and rich in marginal vegetation (Fig. 5). YOUNG (1979) states that “the bright stripes of *S. lineatus* (Horn) may be disruptive and concealing in the clear streams and pools in Mexico and Texas”. We did however not find this species in any of the sampled streams and could not find any other reference to confirm that this species also occurs in lotic habitats.

NOTE. The elytral pattern consisting of four longitudinal black lines is somewhat variable and three different species were recognized under *S. lineatus* in the past. YOUNG (1979) states, however, that the characters on which SHARP (1882) distinguished these species are all variable and are mainly based on the extension of the dark pattern on the elytra.

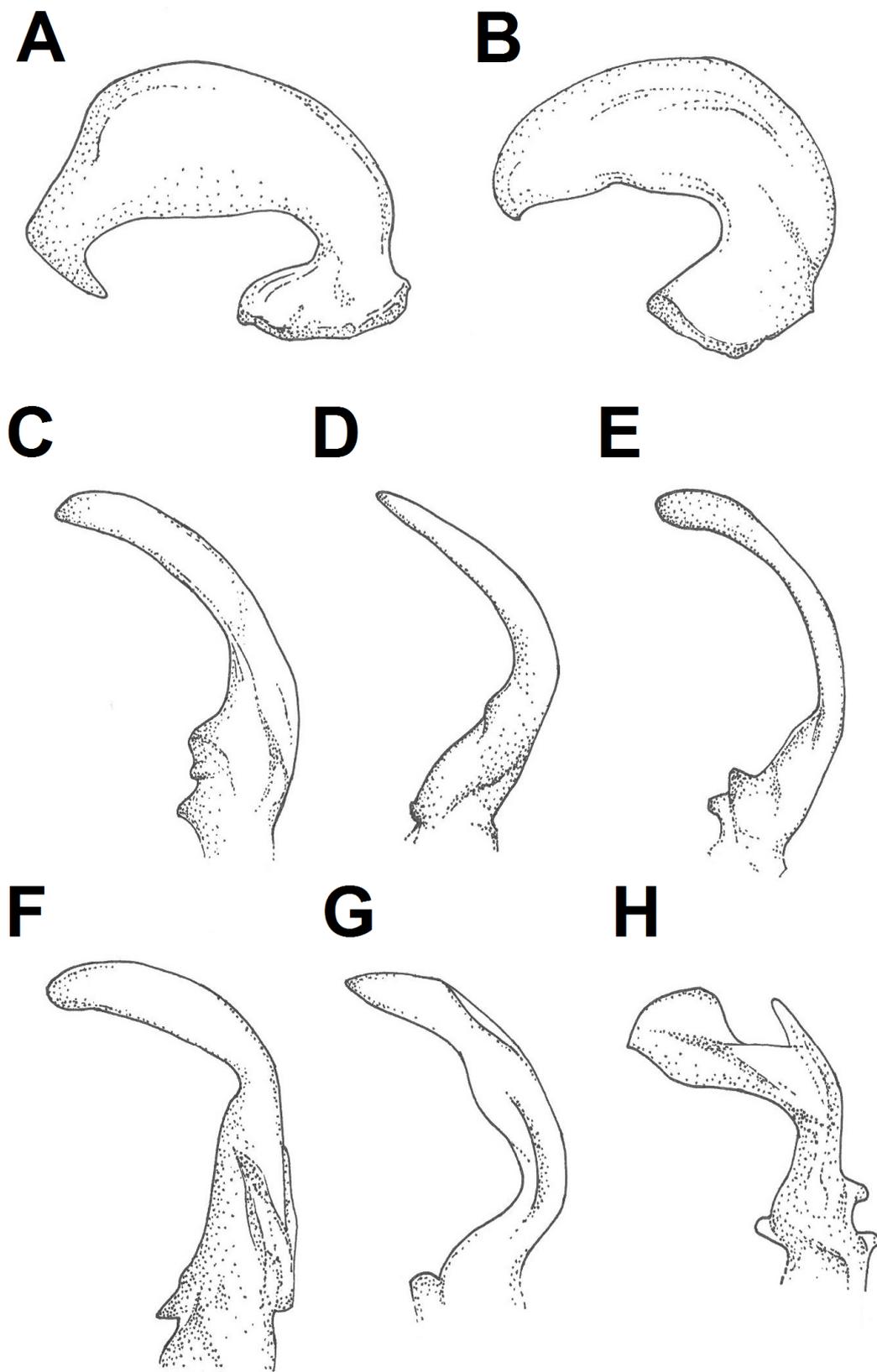


Fig. 2. Left lateral view of the aedeagus. A, *Hydrocanthus debilis* Sharp, 1882; B, *Hydrocanthus marmoratus* Sharp, 1882; C, *Suphisellus insularis* (Sharp, 1882); D, *Suphisellus lineatus* (Horn, 1871); E, *Suphisellus neglectus* Young, 1979; F, *Suphisellus nigrinus* (Aubé, 1838); G, *Suphisellus varians* (Sharp, 1882); H, *Notomicrus sharpi* J. Balfour-Browne, 1939.

***Suphisellus neglectus* Young, 1979**
(Figs 1F, 2E, 3F)

TYPE LOCALITY. Colombia, Magdalena, Isla Salamanca NP.

MATERIAL EXAMINED. STANN CREEK: Cockscomb Basin Wildlife Sanctuary, Wari Lagoon, 16°46'46,1"N, 88°28'2,4"W, 07.V.2015, Leg. K. Scheers & A. Thomaes (3ex.)

Published records from Belize: "Cayo Provide, Mile 66 on western highway, 14 Jul. 1969, BLT, W. and D. Hasse" (6ex.) (YOUNG, 1979).

DIAGNOSIS. TL = 2.7–3.1 mm; head yellowish brown, pronotum yellowish brown with darker area near the anterior margin, elytra dark brown to piceous, each with three elongated pale spots, one lateral and one discal at about middle, and one towards the apex (Fig. 1F); male genitalia with aedeagus very slender at middle portion and with apex broadened and rounded (Fig. 2E). This species is externally similar to *Suphisellus varius* and *S. subsignatus* (Sharp, 1882) but is readily distinguished by the distinctive male genitalia.

TAXONOMICAL NOTE: The male genitalia of the specimens collected in Belize show some distinctions compared with the genitalia of the typical *S. neglectus* as illustrated by YOUNG (1979) and moreover the specimens of Belize lack the pale discal spot near the base of the elytra. Because only three specimens are available and these distinctions are minor, we consider the collected specimens to be conspecific with *S. neglectus* as defined by YOUNG (1979). Additional material should be collected to confirm the taxonomic status of the species in Belize.

DISTRIBUTION. (NT) Belize, Colombia, Guatemala, Mexico?, Panama.

HABITAT. During the field survey this species was encountered only at the Wari lagoon at the Cockscomb Basin Wildlife Sanctuary (Fig. 4). There it was collected in an old oxbow pond with a thick layer of organic debris. The pond was largely unshaded and a rich marginal vegetation was present (Fig. 4).

***Suphisellus nigrinus* (Aubé, 1838)**
(Figs 1G, 2F, 3G)

= *Hydrocanthus nigrinus* Aubé, 1838

= *Canthydrus rufipes* Sharp, 1882

TYPE LOCALITY. Antilles, Brazil.

MATERIAL EXAMINED. BELIZE DISTRICT: La Democracia, shallow exposed pool, 17°21'23,5"N, 88°33'1,8"W, 09.V.2015, Leg. K. Scheers & A. Thomaes (1ex.) STANN CREEK: Cockscomb Basin Wildlife Sanctuary, Wari Lagoon, 16°46'46,1"N, 88°28'2,4"W, 07.V.2015, Leg. K. Scheers & A. Thomaes (3ex.) TOLEDO: Bladen NR, pond savannah, 16°31'11,7"N, 88°42'3,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (5ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (6ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 04.V.2015, Leg. K. Scheers & A. Thomaes (2ex.); Punta Gorda, pond edge forest, 16°06'30,6"N, 88°48'24,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (4ex.); Punta Gorda, tyre track edge forest, 16°05'24"N, 88°51'6,5"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (4ex.); Punta Gorda, cattle pond, 16°05'12,8"N, 88°51'1,5"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (10ex.); Punta Gorda, small stream, 16°05'17,8"N, 88°52'4"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (7ex.); Punta Gorda, puddle in temporary marsh, 16°05'19,3"N, 88°52'3,7"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes

(4ex.); Nim Li Punit, small ditch near road, 16°19'3,6"N, 88°49'14,5"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (13ex.); Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (28ex.); Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (1ex.); Punta Gorda, temporary puddle, 16°05'20,9"N, 88°48'41,9"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (1ex.).

Published records from Belize: This species is newly recorded from Belize.

DIAGNOSIS. TL = 2.8–3.8 mm; color uniformly dark reddish brown to pitchy black, with margins of pronotum and elytra somewhat lighter (Fig. 1G). Male genitalia with aedeagus straight in the first 2/3, then abruptly bent 90° (Fig. 2F). The dark color sets this species apart from all other Noteridae occurring in Belize and neighbouring countries. *Suphisellus curtus* (Sharp, 1882), which is known in Central America only from Panama, is externally similar to *S. nigrinus* but is smaller (TL = 2.6–2.8 mm) and is easily recognized by the different male genitalia (YOUNG, 1979).

DISTRIBUTION. (NT) Antigua, Argentina, Belize (**first records**), Bolivia, Brazil, Colombia, Costa Rica, Cuba, Ecuador, Guadeloupe, Guatemala, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Suriname, Trinidad, Uruguay, Venezuela.

HABITAT. *S. nigrinus* is the most common Noterid in Belize and in Central America as a whole. This species was found to occur in a wide range of lentic habitats, as long as they were permanent or semi-permanent and had at least some vegetation. It was also found in a tyre track pool on a forest road near Punta Gorda and a semi-permanent shallow pool in the savanna on bare sand, which indicates that this species is capable of flight.

Suphisellus varians (Sharp, 1882)
(Figs 1H, 2G, 3H)

= *Canthydrus varians* Sharp, 1882

TYPE LOCALITY. Guatemala, Escuintla district, Paso Antonio.

MATERIAL EXAMINED. no material examined

Published records from Belize: Cayo District (YOUNG, 1979)

DIAGNOSIS. TL = 2.3–2.6 mm; head and pronotum yellowish brown, pronotum with a darker area near anterior margin; elytra dark brown to piceous with a yellowish elongate humeral stripe, a long elongate mark on the disc and another one behind the middle near the suture (Fig. 1H); male genitalia with apex of aedeagus narrowed (Fig. 2G). Externally similar to *S. neglectus* but with the yellow markings forming stripes and being more prominent and the differences in the male genitalia.

DISTRIBUTION. (NT) Belize, Guatemala, Nicaragua.

HABITAT. This species was not encountered during our field survey and its habitat preferences are unknown.

NOTE. Although we did not study the specimen mentioned by YOUNG (1979), we are confident that the identification by F.N. Young is correct.

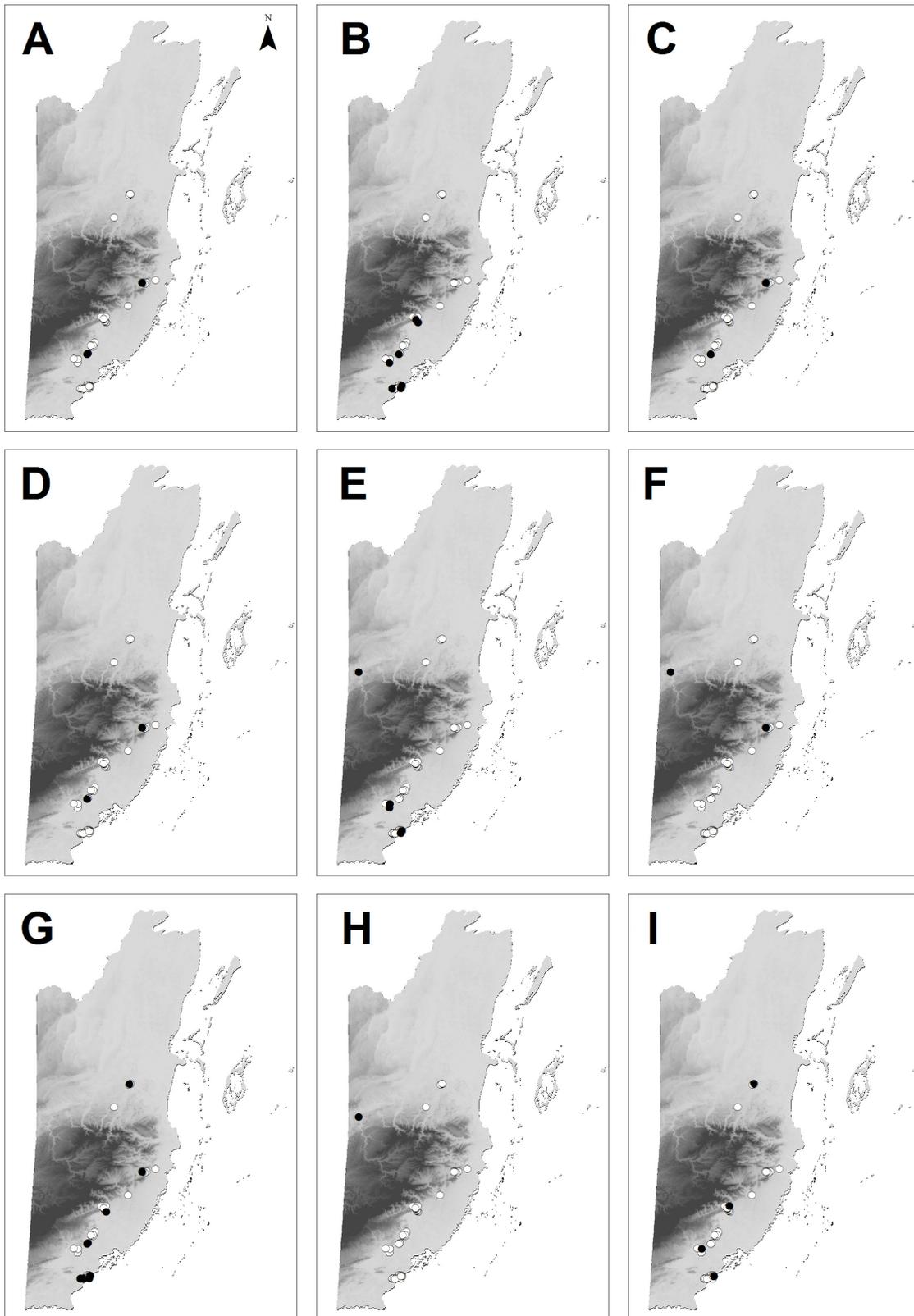


Fig. 3. Distribution maps of the species of Noteridae in Belize. A, *Hydrocanthus debilis* Sharp, 1882; B, *Hydrocanthus marmoratus* Sharp, 1882; C, *Mesonoterus laevicollis* Sharp, 1882; D, *Suphisellus insularis* (Sharp, 1882); E, *Suphisellus lineatus* (Horn, 1871); F, *Suphisellus neglectus* Young, 1979; G, *Suphisellus nigrinus* (Aubé, 1838); H, *Suphisellus varians* (Sharp, 1882); I, *Notomicrus sharpi* J. Balfour-Browne, 1939 (white dots indicate sampled sites and black dots indicate sites where the species is recorded, elevation map as background in which dark shading increases with height).

Notomicrinae

Notomicrus sharpi J. Balfour-Browne, 1939 (Figs 1I, 2H, 3I)

= *Notomicrus politus* Sharp, 1882

TYPE LOCALITY. Guatemala, Retalhuleu district, Paraiso.

MATERIAL EXAMINED. BELIZE DISTRICT: La Democracia, ditch next to road, 17°21'38,7"N, 88°32'42,1"W, 09.V.2015, Leg. K. Scheers & A. Thomaes (10ex.) TOLEDO: BFree, Agami lagoon, 16°33'27,7"N, 88°42'14,8"W, 17.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (1ex.); Punta Gorda, lights basketball field, 16°6'15,1"N, 88°48'14"W, 03.V.2015, Leg. K. Scheers & A. Thomaes (12ex.); San Miguel, puddle in intermittent stream, 16°16'52,5"N, 88°53'3,1"W, 02.V.2015, Leg. K. Scheers & A. Thomaes (1ex.).

Published records from Belize: This species is newly recorded from Belize.

DIAGNOSIS. TL = 1.2–1.4 mm; dorsal color yellowish brown, elytra in some specimens slightly darker than head and pronotum (Fig. 1I); punctation on elytra strongly reduced and, with exception of the discal striae punctures present only behind the middle; male genitalia distinctive (Fig. 2H). This species is externally very similar to *Notomicrus gracilipes* Sharp, 1882 but differs in size and punctation. It is however easily distinguished from it by the different shape of the aedeagus of the male genitalia.

DISTRIBUTION. (NA) US (Florida); (NT) Bahamas, Belize (**first records**), Costa Rica, Cuba, Dominican Republic, Guatemala, Jamaica, Mexico, Panama, Puerto Rico, Virgin Islands.

HABITAT. This species was found with single specimens in different types of habitat. It was however not uncommon in a small exposed ditch free of any vegetation. In Punta Gorda it was found in numbers attracted by lights of a basketball field.

Key to the species of Noteridae of Belize

This key is mainly based on ARCE PÉREZ & ROUGHLEY, 1999; MEGNA & DELER, 2006; MILLER, 2009; YOUNG, 1978; 1979; 1985. Also species that are to be expected in Belize based on their occurrence in Central America in countries both to the north and to the south of Belize were included in the key and are placed in brackets.

- 1a Size small to very small, length less than 1.5 mm; metacoxa and metaventrite fused laterally; suture obscured **2** *Notomicrus*
- 1b Size larger, length at least 1.9 mm to over 4.5 mm; metacoxa and metaventrite not fused laterally; suture entire **3**

- 2a Elytra with punctures between discal stria and suture only present in apical half, not extending anteriorly beyond the middle of elytra; male genitalia with aedeagus as in Fig. 2H *Notomicrus sharpi*
- 2b Elytra with scattered coarse punctures between discal stria and suture extending anteriorly beyond the middle of elytra, but not reaching base; male genitalia with aedeagus simple and evenly curved, not as Fig. 2H [*Notomicrus gracilipes*]

- 3a Noterid platform not extending onto metaventricle [*Suphis cimicoides*]
 3b Noterid platform extending onto metaventricle 4
- 4a Prosternal process posteriorly rounded; male genitalia distinct, with aedeagus small and left paramere large and bearing long setae *Mesonoterus laevicollis*
 4b Prosternal process posteriorly distinctly truncated; male genitalia with aedeagus as large or larger than parameres and distinctly curved in lateral view (Fig. 2A-G), left paramere with or without long setae 5
- 5a Pronotum with lateral marginal striae complete from base to anterior margin; prosternum medially without series of stiff setae 6 *Hydrocanthus*
 5b Pronotum with lateral marginal striae originating at base and disappearing at about middle, not reaching anterior margin; prosternum medially with distinct series of stiff setae 7 *Suphisellus*
- 6a Size larger, length 4.1-4.7 mm; male genitalia with tip of aedeagus with a very small, rather indistinct hook (Fig. 2B) *Hydrocanthus marmoratus*
 6b Size smaller, length 3.0-3.6 mm; male genitalia with tip of aedeagus distinctly hooked (Fig. 2A) *Hydrocanthus debilis*
- 7a Size smaller, length 1.9-2.2 mm; body shape short, stout, almost hemispherical.....
 *Suphisellus insularis*
 7b Size larger, length at least 2.3 mm; body shape elongated 8
- 8a Elytra uniformly dark brown to pitchy black without lighter markings; pronotum dark brown, normally not or only slightly lighter than elytra *Suphisellus nigrinus*
 8b Elytra dark brown to black with distinct lighter markings, spots or stripes; pronotum brownish yellow to reddish and contrasting with the darker base color of elytra 9
- 9a Elytra with distinct yellow stripes contrasting with the darker background; size 2.8-3.5 mm 10
 9b Elytra with lighter spots and total length 2.3-3.0 mm or with elongated spots interconnected to form stripes but with total length less than 2.6 mm 11
- 10a Size 2.7-3.1 mm; male genitalia with aedeagus distinctly bent in the middle (Fig. 2D) *Suphisellus lineatus*
 10b Size 3.2-3.5 mm; male genitalia with aedeagus evenly curved [*Suphisellus simoni*]
- 11a Size 2.7-3.0 mm; prosternum distinctly grooved medio-apically and distinctly narrowed between the fore coxae; elytral markings small and isolated; male genitalia with aedeagus in lateral view very slender with a long narrow part in the middle and slightly but distinctly broadened before the apex (Fig. 2E) *Suphisellus neglectus*
 11b Size 2.3-2.6 mm; prosternum not grooved and relatively broad between the fore coxae; elytral markings elongated and interconnected to form stripes; male genitalia with aedeagus in lateral view relatively broad with apex narrowed (Fig. 2G).....
 *Suphisellus varians*



Fig. 4. Wari Lagoon in the Cockscomb Basin Wildlife Sanctuary. In this old oxbow pond five species of Noteridae were present: *Hydrocanthus debilis*, *Mesonotus leavicolis*, *Suphisellus insularis*, *S. neglectus* and *S. nigrinus*. (photograph: Kevin Scheers).



Fig. 5. Fishing pond near Punta Gorda. Collecting site of *Hydrocanthus marmoratus*, *Suphisellus lineatus*, *S. nigrinus* and *Notomicrus sharpi*. (photograph: Kevin Scheers).

Discussion

All species occurring in Belize are restricted to permanent lentic habitats with exception of *Hydrocanthus marmoratus* and *Suphisellus nigrinus* which were also found in a pool of a small intermittent stream near Punta Gorda. However, this site was rich in submerged vegetation and was characterized by a muddy bottom. Therefore it had more in common with a lentic habitat than a lotic one. Furthermore this site was located next to a marsh where both species occurred. During this survey no Noteridae were found in heavily shaded pools in rainforest characterized by a thick layer of organic debris although this type of habitat was well collected during the field survey. According to YOUNG (1979) both the adults and larvae of *Suphisellus* are “scavenger-herbivores” which feed in masses of decaying vegetation. This however does not explain the absence of Noteridae in shaded pools in the Belizean rainforests. The preference of Noterids for sunny, shallow lentic habitats is already stated by various authors (e.g. MILLER, 2009), but the ecology of Noteridae is, with exception of some European species of the genus *Noterus* Clairville, 1806, still largely unknown (YOUNG, 1979; MILLER, 2009). Some other genera from South America that have been recently described or revised appear to occur typically in lotic habitats like *Liocanthydrus* Guignot, 1957 (BACA *et al.*, 2014) or shaded habitats in forested areas (both lentic and lotic) like *Canthysellus* Baca and Toledo, 2015 (BACA & TOLEDO, 2015).

During the field survey only three of the six districts of Belize were sampled and it is needless to say that further collecting would result in a better knowledge about the distribution and ecology of the Noteridae in Belize. Furthermore there are three more species that could occur in Belize based on their presence in neighboring countries: *Notomicrus gracilipes* Sharp, 1882, *Suphisellus simoni* (Régimbart, 1889), *Suphis cimicoides* Aubé, 1837. These three species occur in Central America in countries both to the north and to the south of Belize and are expected to have a continued distribution.

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