

urn: lsid:zoobank.org:pub:9377F481-73E6-4496-B14A-9F5DD4CCFC1C

Belgian Journal of Entomology

A preliminary checklist of the minute diving beetles of Belize (Coleoptera: Dytiscidae: Bidessini)

Kevin SCHEERS^{1,2,*} & Arno THOMAES¹

¹ Research Institute for Nature and Forest (INBO), Havenlaan 88 bus 73, 1000 Brussels, Belgium

² Biodiversity Inventory for Conservation NPO (BINCO), Walmersumstraat 44, 3380 Glabbeek, Belgium

* Corresponding author: aquatic.adephaga@gmail.com



Published: Brussels, 26 January 2022

Citation: SCHEERS K. & THOMAES A., 2022. - A preliminary checklist of the minute diving beetles of Belize (Coleoptera: Dytiscidae: Bidessini). *Belgian Journal of Entomology*, 125: 1–15.

ISSN: 1374-5514 (Print Edition)

ISSN: 2295-0214 (Online Edition)



The Belgian Journal of Entomology is published by the Royal Belgian Society of Entomology, a non-profit association established on April 9, 1855.

Head office: Vautier street 29, B-1000 Brussels.



The publications of the Society are partly sponsored by the University Foundation of Belgium.

In compliance with Article 8.6 of the ICZN, printed versions of all papers are deposited in the following libraries:

- Royal Library of Belgium, Boulevard de l'Empereur 4, B-1000 Brussels.
- Library of the Royal Belgian Institute of Natural Sciences, Vautier street 29, B-1000 Brussels.
- American Museum of Natural History Library, Central Park West at 79th street, New York, NY 10024-5192, USA.
- Central library of the Museum national d'Histoire naturelle, rue Geoffroy SaintHilaire 38, F-75005 Paris, France.
- Library of the Muséum d'Histoire naturelle de Genève, route de Malagnou 1, CH-1208 Genève, Suisse.
- Zoological Record, Thomson Reuters, Publication Processing, 1500 Spring Garden Street, Fourth Floor, Philadelphia PA 19130, USA.

Publishing editors: Isabelle Coppée
Jurate De Prins

Front cover: Dorsal habitus of *Anodocheilus francescae* Young, 1974, *Bidessodes elongatus* (Sharp, 1882) and *Bidessonotus mobilis* J. Balfour-Browne, 1947. © Florence Trus.

A preliminary checklist of the minute diving beetles of Belize (Coleoptera: Dytiscidae: Bidessini)

Kevin SCHEERS^{1,2,*} & Arno THOMAES¹

¹ Research Institute for Nature and Forest (INBO), Havenlaan 88 bus 73, 1000 Brussels, Belgium

² Biodiversity Inventory for Conservation NPO (BINCO), Walmersumstraat 44, 3380 Glabbeek, Belgium

* Corresponding author: aquatic.adephaga@gmail.com

Abstract

The taxonomic composition of the Bidessini of Belize is reviewed based on literature and material collected by the authors during a field survey in 2015. During the field survey a total 683 specimens of Bidessini were collected belonging to nine species of which six species are reported for the first time from Belize: *Anodocheilus francescae* Young, 1974, *Anodocheilus guatemalensis* (Zaitzev, 1910), *Bidessodes elongatus* (Sharp, 1882), *Neobidessus obtusoides* Young, 1977, *Neobidessus persimilis* (Régimbart, 1895) and *Uvarus spretus* (Sharp, 1882). A total of 11 species of Bidessini is now known from Belize. The new records are listed and distribution maps and notes on the ecology are provided for all species.

Keywords: British Honduras, Central America, Hydradeephaga, Neotropical region, water beetles

Introduction

Bidessini is a large tribe of small to extremely small diving beetles with few species exceeding 3 mm in length, and include the smallest species of Dytiscidae with *Limbodessus atypicali* Watts & Humphreys, 2006 not exceeding 0.92 mm. The tribe has a world-wide distribution but is most speciose in the tropical lowlands. Species in this tribe can be found in nearly all types of freshwater habitats, both lentic and lotic including habitats such as phytotelmata, subterranean aquifers, hygropetric habitats and even terrestrial leaf-litter habitats (MILLER & BERGSTEN, 2016). Early work on the Neotropical Bidessini was mainly done by SHARP (1882a, 1882b), RÉGIMBART (1895) and BALFOUR-BROWNE (1947).

The revisions and descriptions of YOUNG (1974, 1977, 1981, 1990) and more recently MILLER (1997, 1998, 2001, 2016) have contributed enormously to the knowledge and the accessibility of this tribe, in which the small size contributes to a lower popularity in comparison with other Dytiscidae. Within most genera, species are externally very similar in coloration and body shape, however, most species are easily identified based on the male genitalia which are distinctive and often very complex. YOUNG (1967) published the first key to the New World genera of Bidessini and MILLER & BERGSTEN (2016) provide a well-illustrated key to all genera of the world.

The taxonomic composition and distribution of the Hydradeephaga of Belize is poorly known and only few species are recorded from the country (CARRIE, 2020). In 2015 a field survey was carried out by the authors with the objective of improving the knowledge of the water beetles of Belize. Parts of the results of this survey have already been published (SCHEERS & THOMAES, 2017, 2018, 2020; SCHEERS, 2018) and this fifth publication deals with the Bidessini.

Material and methods

During a field survey carried out from April 13 to May 9 2015, Hydradephaga were collected at 63 sites in the south and central regions of Belize. The sampling was done with a hydrobiological handnet with a diameter of 30 cm and a mesh of 1 mm and a sieve with a diameter of 20 cm and a mesh of 0.8 mm. 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 in 90% alcohol. Dry mounted specimens were relaxed in hot water for about 10 minutes prior to dissection. Male genitalia were dissected and glued on the mounting card together with the specimen after examination. The collected material is deposited in the private collection of the first author unless mentioned otherwise. Additionally, collection material of RBINS (Royal Belgian Institute of Natural Sciences) was studied and records included. The nomenclature follows NILSSON & HÁJEK (2021).

Habitus photographs (Fig. 1 A–C) 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. Distribution maps (Fig. 2 A–K) indicating the known distribution of the Bidessini in Belize were made with ArcGIS 10.4.1 and are based on specimens examined as well as the following literature: SHARP (1882b) and YOUNG (1990).

Results

Records of five species of Bidessini from Belize are given by YOUNG (1990), and subsequently repeated by PECK (2005) and MILLER (2016). During the field survey in 2015 a total 683 specimens of Bidessini was collected belonging to nine species. Two female specimens of the genus *Bidessonotus* Régimbart, 1895 could not be identified to species level. In total eleven species are recorded from Belize of which six species are newly recorded from the country. For each species the new records are listed below and notes on the distribution and habitat are provided.

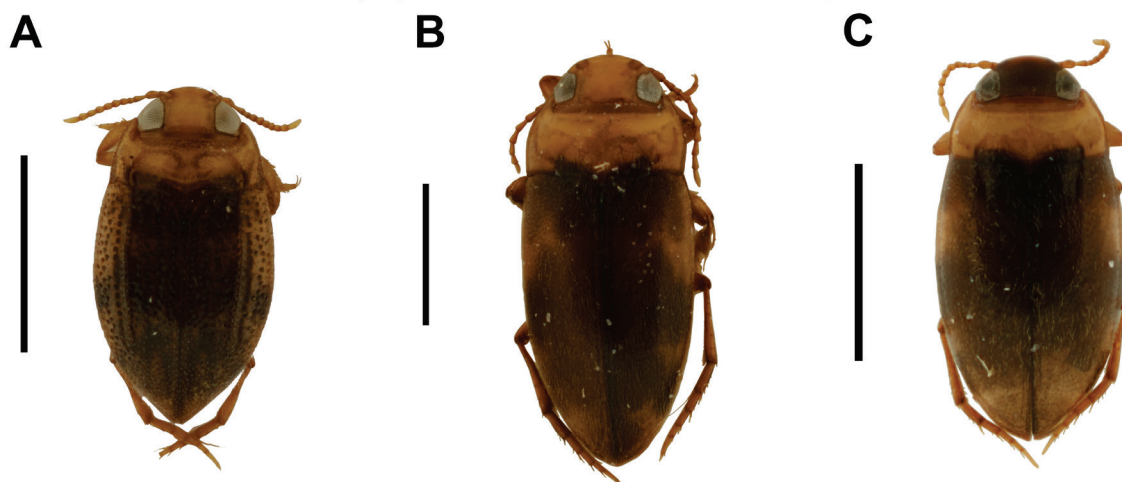


Fig. 1. Dorsal habitus of A, *Anodocheilus francescae* Young, 1974; B, *Bidessodes elongatus* (Sharp, 1882) and C, *Bidessonotus mobilis* J. Balfour-Browne, 1947; scale bars = 1 mm. © Florence Trus.

Anodocheilus francescae Young, 1974

(Fig. 1 A)

STUDIED MATERIAL. CAYO DISTRICT: Nohoch Che'en, small pool on parking lot, 17°12'28,2"N, 88°39'1"W, 09.V.2015, Leg. K. Scheers & A. Thomaes (1 ex.); TOLEDO: Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); BFREE, Agami lagoon, 16°33'27,7"N, 88°42'14,8"W, 17.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Deep River Forest Reserve, pond savannah, 16°31'11,7"N, 88°42'3,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (34 ex.); Deep River Forest Reserve, pond savannah, 16°31'14,2"N, 88°42'5,6"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (47 ex.); Deep River Forest Reserve, pond savannah, 16°31'35,5"N, 88°42'23,6"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (41 ex.); Deep River Forest Reserve, pond savannah, 16°31'41,5"N, 88°42'30"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (21 ex.); Deep River Forest Reserve, pond savannah, 16°31'42,7"N, 88°42'31,6"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (28 ex.); Bladen Nature Reserve, pond transition savannah-forest, 16°32'25,1"N, 88°42'56,1"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Bladen Nature Reserve, pond transition savannah-forest, 16°32'26,3"N, 88°42'57,1"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (22 ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (4 ex.); Punta Gorda, temp. stream in forest, 16°06'37,6"N, 88°49'18,8"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Punta Gorda, cattle pond, 16°05'12,8"N, 88°51'1,5"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (10 ex.); Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Punta Gorda, lights basketball field, 16°06'15,1"N, 88°48'14"W, 03.V.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (4 ex.).

DISTRIBUTION. Belize (**first record**), Mexico, USA (Texas) (YOUNG, 1974). In Belize this species was found in the Cayo and Toledo districts (Fig. 2 A). In the Toledo district it was present at numerous surveyed sites.

HABITAT. Although this species was found in various types of permanent and semi-permanent, sun exposed lentic water bodies in Belize, it was most abundant in exposed shallow ponds with bare substratum in the savanna and other open terrain (Figs 3, 4). One specimen was also collected on light.

Anodocheilus guatemalensis (Zaitzev, 1910)

STUDIED MATERIAL. STANN CREEK: Cockscomb Basin Wildlife Sanctuary, pool with leaf litter next to stream, 16°46'49,3"N, 88°28'7,1"W, 06.V.2015, Leg. K. Scheers & A. Thomaes (7 ex.); Cockscomb Basin Wildlife Sanctuary, Wari Lagoon, 16°46'46,1"N, 88°28'2,4"W, 07.V.2015, Leg. K. Scheers & A. Thomaes (25 ex.); TOLEDO: Bladen Nature Reserve, pond transition savannah-forest, 16°32'26,3"N, 88°42'57,1"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.).

DISTRIBUTION. Belize (**first record**), Costa Rica, Guatemala, Panama (YOUNG, 1974). In Belize this species seems uncommon and was encountered at two sites in the Stann Creek district and one site in the Toledo district (Fig. 2 B).

HABITAT. We found this species at only three sites, but all sites had at least locally a layer of leaf litter on the bottom and were partly shaded. It seems that, in contrast to *A. francescae*, this species does not favor warm, sun exposed silt ponds but is more typically found in less exposed ponds, oxbows etc. (Fig. 4).

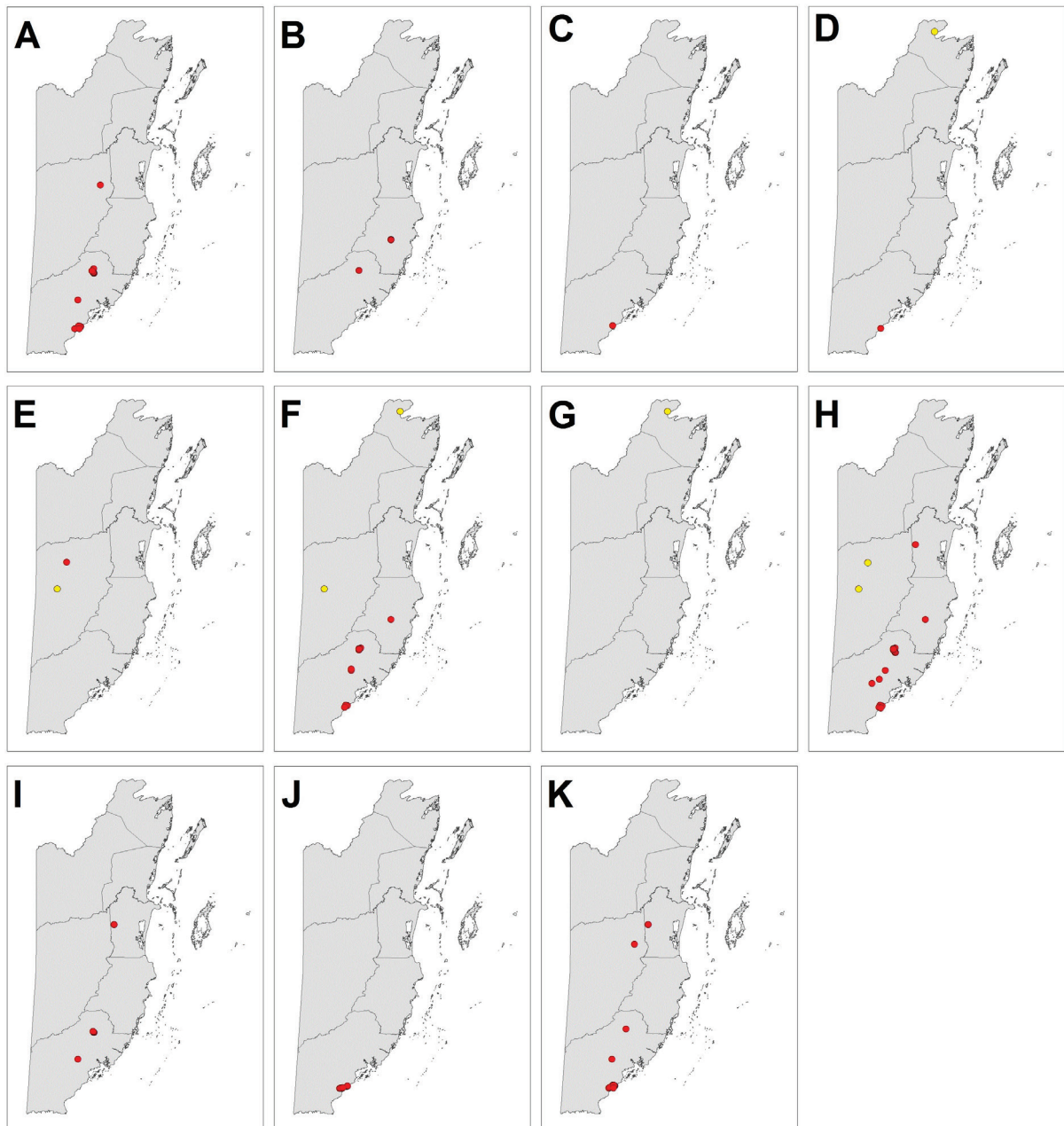


Fig. 2. Distribution of Bidessini in Belize: A, *Anodocheilus francescae* Young, 1974; B, *Anodocheilus guatemalensis* (Zaitzev, 1910); C, *Bidessodes elongatus* (Sharp, 1882); D, *Bidessonotus caraibus* (Chevrolat, 1863); E, *Bidessonotus mexicanus* Régimbart, 1895; F, *Bidessonotus mobilis* J. Balfour-Browne, 1947; G, *Bidessonotus pollostus* Young, 1990; H, *Bidessonotus vicinus* Young, 1990; I, *Neobidessus obtusoides* Young, 1977; J, *Neobidessus persimilis* (Régimbart, 1895); K, *Uvarus spretus* (Sharp, 1882). Yellow dots indicate literature records and red dots studied material.

***Bidessonotus caraibus* (Chevrolat, 1863)**

PUBLISHED RECORDS. YOUNG (1990)

STUDIED MATERIAL. TOLEDO: Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (1 ex.).

DISTRIBUTION. Belize, Cuba (Young, 1990; Miller, 2016). *B. caraibus* is known only from one record in the extreme north and another in the south of Belize (Fig. 2 D).

HABITAT. Nothing is known on the habitat preference of this species. The single specimen found during this survey was collected at coastal level in a shallow pool on exposed substratum in open vegetation (Fig. 5).

NOTE. The disjunct distribution of this species is notable and could reflect a lack of sampling effort in the intermediate areas, but could also be an indication that the Belizean and Cuban populations may not be conspecific.

***Bidessodes elongatus* (Sharp, 1882)**
(Fig. 1 B)

STUDIED MATERIAL. TOLEDO: Punta Gorda, temp. stream in forest, 16°06'37,6"N, 88°49'18,8"W, 25.IV.2015, Leg. K. Scheers & A. Thomas (1 ex.).

DISTRIBUTION. Belize (**first record**), Costa Rica, Guatemala (MILLER, 2017). In Belize this species was only recorded from a single site in the Toledo district (Fig. 2 C).

HABITAT. Habitat preference of this species is yet unknown. We found only one single specimen among leaf litter in a shaded, slow flowing stream in the forest.

NOTE. We have only one female specimen and thus identification is based on external features only. *B. elongatus* is the only species of the genus present in Central America.



Fig. 3. Pond in the savannah of the Deep River Forest Reserve (Toledo), the typical habitat of *Anodocheilus francescae* and *Neobidessus obtusoides*. At this site both species co-occurred with *Bidessonotus vicinus*. © Kevin Scheers.



Fig. 4. Pond in the transition zone between savannah and tropical wet forest in the Bladen Nature Reserve (Toledo) with layer of leaf litter and a vegetation of water lilies. At this site *Anodocheilus francescae*, *A. guatemalensis*, *Bidessonotus mobilis* and *B. vicinus* were collected. © Kevin Scheers.

***Bidessonotus mexicanus* Régimbart, 1895**

PUBLISHED RECORDS. YOUNG (1990).

STUDIED MATERIAL. CAYO DISTRICT: 14 km S. San Ignacio, 23.V.1986, Leg. P.J. Spangler & R.A. Faitoute (2 ex.) (Coll. RBINS, Royal Belgian Institute of Natural Sciences, Brussels, Belgium).

DISTRIBUTION. Belize, Mexico, USA (Texas) (YOUNG, 1990; MILLER, 2016). This species is known from two records in the Cayo district (Fig. 2 E).

HABITAT. Nothing is known on the habitat preference of this species.

***Bidessonotus mobilis* J. Balfour-Browne, 1947**

PUBLISHED RECORDS. YOUNG (1990).

STUDIED MATERIAL. 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 (5 ex.); TOLEDO: BFREE, Agami lagoon, 16°33'27,7"N, 88°42'14,8"W, 17.IV.2015, Leg. K. Scheers & A. Thomaes (5 ex.); Bladen Nature Reserve, Tyre track pools, 16°33'4,82"N, 88°42'58,08"W, 17.IV.2015, Leg. K. Scheers & A. Thomaes (5 ex.); Bladen Nature Reserve, pond in forest, 16°32'55,3"N, 88°43'1,7"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (9 ex.); Bladen Nature Reserve, pond in forest, 16°32'59,4"N, 88°43'0,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (12 ex.); Bladen Nature Reserve, pond transition savannah-forest, 16°32'26,3"N,

88°42'57,1"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (4 ex.); Punta Gorda, temp. stream in forest, 16°06'37,6"N, 88°49'18,8"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (9 ex.); Punta Gorda, pool temp. stream in forest, 16°05'42,2"N, 88°49'38,9"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Golden Stream Corridor Preserve, temp. stream in forest, 16°23'33"N, 88°46'33,8"W, 26.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Golden Stream Corridor Preserve, temp. stream next to road, 16°22'58,4"N, 88°46'40"W, 27.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.).

DISTRIBUTION. Belize, Guatemala, Mexico (YOUNG, 1990; MILLER, 2016). A common species in Belize, known from the Cayo, Corozal, Stann Creek and Toledo districts (Fig. 2 F).

HABITAT. *Bidessonotus mobilis* was collected in various types of lentic habitats as well as in small, slow flowing and intermittent streams. This species seems to be rare in sun exposed habitats with exposed substratum in the savannah. In the Bladen Nature Reserve and Deep River Forest Reserve this species was found abundant in shaded ponds with a thick layer of leaf litter and other organic debris in the forest (Fig. 6) whereas it was absent in the exposed ponds in the adjacent savannah (SCHEERS, unpublished data).

***Bidessonotus pollostus* Young, 1990**

PUBLISHED RECORDS. YOUNG (1990).

STUDIED MATERIAL. This species is to date only known from the holotype and allotype which were not studied during this project.



Fig. 5. Shallow pool in partly mowed, small marsh near Punta Gorda (Toledo) with *Anodocheilus francescae*, *Bidessonotus caraiibus*, *Bidessonotus vicinus* and *Uvarus spretus*. © Kevin Scheers.

DISTRIBUTION. Belize (YOUNG, 1990; MILLER, 2016). To date only known from the type locality, Corozal Town, in north Belize (Fig. 2 G).

HABITAT. Nothing is known on the habitat preference of this species.

NOTE. This species was described by YOUNG (1990) from Coraxol Town [= Corozal Town], Belize and to date only known from its type locality (YOUNG, 1990; MILLER, 2016). Most probably this species is also present in Mexico, taking into account that *Bidessonotus* are good fliers and that the type locality in Belize is only 10 km from the border with Mexico and there are no major natural features that are likely to restrict this species to this single locality.

***Bidessonotus vicinus* Young, 1990**

PUBLISHED RECORDS. YOUNG (1990).

STUDIED MATERIAL. BELIZE DISTRICT: La Democracia, ditch next to road, 17°21'38,7"N, 88°32'42,1"W, 10.V.2015, Leg. K. Scheers & A. Thomaes (1 ex.); 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 (2ex.); TOLEDO: BFREE, Agami lagoon, 16°33'27,7"N, 88°42'14,8"W, 17.IV.2015, Leg. K. Scheers & A. Thomaes (76 ex.); Bladen Nature Reserve, Tyre track pools, 16°33'4,82"N, 88°42'58,08"W, 17.IV.2015, Leg. K. Scheers & A. Thomaes (12ex.); Deep River Forest Reserve, pond savannah, 16°31'11,7"N, 88°42'3,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Deep River Forest Reserve, pond savannah, 16°31'14,2"N, 88°42'5,6"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Bladen Nature Reserve, pond in forest, 16°32'55,3"N, 88°43'1,7"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (5 ex.); Bladen Nature Reserve, pond in forest, 16°32'59,4"N, 88°43'0,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Deep River Forest Reserve, pond savannah, 16°31'42,7"N, 88°42'31,6"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Bladen Nature Reserve, pond transition savannah-forest, 16°32'26,3"N, 88°42'57,1"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (28 ex.); Punta Gorda, temp. stream in forest, 16°06'37,6"N, 88°49'18,8"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (6 ex.); Punta Gorda, pool temp. stream in forest, 16°05'42,2"N, 88°49'38,9"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (5 ex.); Golden Stream Corridor Preserve, puddle temp. stream, 16°22'50,7"N, 88°46'45,3"W, 27.IV.2015, Leg. K. Scheers & A. Thomaes (5 ex.); Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (9 ex.); San Miguel, puddle in intermittent stream, 16°16'52,5"N, 88°53'3,1"W, 02.V.2015, Leg. K. Scheers & A. Thomaes (3 ex.); Punta Gorda, lights basketball field, 16°06'15,1"N, 88°48'14"W, 03.V.2015, Leg. K. Scheers & A. Thomaes (12 ex.); Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (9 ex.).

DISTRIBUTION. Belize, Panama, Venezuela (YOUNG, 1990; MILLER, 2016). A common species in Belize, known from the Belize, Cayo, Stann Creek and Toledo districts (Fig. 2 H).

HABITAT. This is the most common species of Bidessini in Belize and is found in various types of lentic water (Figs 3–6) and in pools in intermittent and temporary streams. It is often found together with *B. mobilis*.

NOTE. MILLER (2016) incorrectly includes Honduras in the distribution of this species instead of Belize (formerly known as British Honduras), which is however the type locality of this species.



Fig. 6. Pond in the forest of the Bladen Nature Reserve (Toledo) with a thick layer of decaying leaves, the typical habitat of *Bidessonotus mobilis*. At this site the species co-occurred with the more eurytopic *B. vicinus* and a single specimen of *Uvarus spretus*. © Kevin Scheers.

***Bidessonotus* - unidentified specimens**

STUDIED MATERIAL. 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 (1 ex.); TOLEDO: Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (1ex.)*.

NOTE. Two female specimens of *Bidessonotus* could not be identified to species level. One of these specimens (indicated above with an asterisk) is rather large and dark in color and clearly differs from both *B. mobilis* and *B. vicinus* in size, body shape and color, but could belong to *B. caraibus* or another similar species.

***Neobidessus obtusoides* Young, 1977**

STUDIED MATERIAL. 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 (6 ex.); La Democracia, ditch next to road, 17°21'38,7"N, 88°32'42,1"W, 10.V.2015, Leg. K. Scheers & A. Thomaes (2 ex.); TOLEDO: Deep River Forest Reserve, pond savannah, 16°31'11,7"N, 88°42'3,8"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (13 ex.); Deep River Forest Reserve, pond savannah, 16°31'14,2"N, 88°42'5,6"W, 19.IV.2015, Leg. K. Scheers & A. Thomaes (8 ex.); Deep River Forest Reserve, pond savannah, 16°31'35,5"N, 88°42'23,6"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Deep River Forest Reserve, pond savannah, 16°31'42,7"N, 88°42'31,6"W, 20.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Indian Creek, Lake of

former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.).

DISTRIBUTION. Belize (**first record**), Mexico (YOUNG, 1977). In Belize this species was found in Belize district and the northern half of the Toledo district (Fig. 2 I).

HABITAT. *N. obtusoides* seems to be restricted to ponds, ditches etc. in the savannah of central and north Belize. In the Bladen Nature Reserve and the Deep River Forest Reserve the species was present in nearly all sampled ponds in the savannah (Fig. 3) whilst completely absent in the forest and the transition vegetation in between. In all six sites where *N. obtusoides* was present it co-occurred with the common *Bidessonotus vicinus* and in five out of the six also with *Anodocheilus francescae*.

NOTE. YOUNG (1977) mentioned that this species seems to be isolated in the central plateau of Mexico and noted that it may be only a subspecies of *Neobidessus pullus* (LeConte, 1855). The male genitalia are, however, distinct, and in the specimens studied from Belize there does not seem to be any variation regarding the male genitalia. In Belize this species is present in two forms; the typical form in which the elytra are yellow with contrasting black vittae and another form which is uniformly brown. The occurrence of these two forms is also documented for *N. pullus* and discussed in more detail by YOUNG (1977).

Neobidessus persimilis (Régimbart, 1895)

STUDIED MATERIAL. TOLEDO: Punta Gorda, puddle on road, 16°06'20,3"N, 88°48'29,5"W, 13.V.2015, Leg. K. Scheers & A. Thomaes (7 ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Punta Gorda, tyre rut puddle, 16°05'24"N, 88°51'6,5"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (10 ex.); Punta Gorda, small stream, 16°05'17,8"N, 88°52'4"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (10 ex.); Punta Gorda, puddle in temporary marsh, 16°05'19,3"N, 88°52'3,7"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (4 ex.); Punta Gorda, small stream, 16°05'27,3"N, 88°51'32,7"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (4 ex.); Punta Gorda, small stream, 16°05'37,8"W, 88°50'35,6"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.).

DISTRIBUTION. Belize (**first record**), El Salvador, Guatemala, Mexico, Nicaragua (YOUNG, 1977). In Belize only known from the southern part of the Toledo district (Fig. 2 J).

HABITAT. In the south of Belize this species is found in small puddles and tyre ruts and in pools in small, sluggish streams.

NOTE. This species is rather widespread in Central America, occurring from Nicaragua to Mexico, but in Belize it seems to be restricted to the extreme south where it was only found in the vicinity of the city Punta Gorda near coastal level.

Uvarus spretus (Sharp, 1882)

STUDIED MATERIAL. 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 (20 ex.); La Democracia, ditch next to road, 17°21'38,7"N, 88°32'42,1"W, 10.V.2015, Leg. K. Scheers & A. Thomaes (11 ex.); CAYO DISTRICT: Nochuch, small pool on parking lot, 17°12'28,2"N, 88°39'1"W, 09.V.2015, Leg. K. Scheers & A. Thomaes (3 ex.); TOLEDO: Punta Gorda, puddle on road, 16°06'20,3"N, 88°48'29,5"W, 13.V.2015, Leg. K. Scheers & A. Thomaes (6 ex.); Punta Gorda, puddle on road, 16°06'20,3"N, 88°48'29,5"W, 13.V.2015, Leg. K. Scheers & A. Thomaes (3 ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 13.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Bladen Nature Reserve, pond in forest, 16°32'55,3"N, 88°43'1,7"W, 19.IV.2015, Leg.

K. Scheers & A. Thomaes (1 ex.); Punta Gorda, fishpond, 16°06'24,6"N, 88°48'25,5"W, 23.IV.2015, Leg. K. Scheers & A. Thomaes (57 ex.); Punta Gorda, temp. stream in forest, 16°06'37,6"N, 88°49'18,8"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (6 ex.); Punta Gorda, tyre track puddle, 16°05'24"N, 88°51'6,5"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Punta Gorda, small stream, 16°05'37,8"W, 88°50'35,6"W, 25.IV.2015, Leg. K. Scheers & A. Thomaes (3 ex.); Indian Creek, Lake of former Lodge, 16°18'45,1"N, 88°49'31,4"W, 29.IV.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Punta Gorda, tyre track puddle, 16°06'31,3"N, 88°48'41,7"W, 03.V.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Punta Gorda, temp. pool next to road, 16°06'35"N, 88°48'41"W, 03.V.2015, Leg. K. Scheers & A. Thomaes (1 ex.); Punta Gorda, lights basketball field, 16°06'15,1"N, 88°48'14"W, 03.V.2015, Leg. K. Scheers & A. Thomaes (2 ex.); Punta Gorda, shallow pool, 16°05'19,7"N, 88°48'53,4"W, 05.V.2015, Leg. K. Scheers & A. Thomaes (1 ex.).

DISTRIBUTION. Belize (**first record**), Guatemala. A common species in Belize, known from the Belize, Cayo and Toledo districts (Fig. 2 K).

HABITAT. With the exception of the records of two rather small, permanent ponds, all records of this species are from shallow, small to very small, predominantly temporary and ephemeral water bodies like puddles formed after heavy rain, puddles in temporary streams, ditches and marshes etc. (Fig. 5). A few specimens were also collected on light. The presence in ephemeral puddles on roads etc. within two days after their formation and the species found attracted to lights of the basketball field in Punta Gorda shows that this species is a ready flyer.

NOTE. The genus *Uvarus* is in need of revision and most Neotropical species are poorly known. The genus as known to date is probably not monophyletic (MILLER & BERGSTEN, 2017).

Checklist of Bidessini of Belize

- Anodocheilus francescae* Young, 1974 (**first record**)
- Anodocheilus guatemalensis* (Zaitzev, 1910) (**first record**)
- Bidessodes elongatus* (Sharp, 1882) (**first record**)
- Bidessonotus caraibus* (Chevrolat, 1863)
- Bidessonotus mexicanus* Régimbart, 1895
- Bidessonotus mobilis* J. Balfour-Browne, 1947
- Bidessonotus pollostus* Young, 1990
- Bidessonotus vicinus* Young, 1990
- Neobidessus obtusoides* Young, 1977 (**first record**)
- Neobidessus persimilis* (Régimbart, 1895) (**first record**)
- Uvarus spretus* (Sharp, 1882) (**first record**)

Discussion

In total eleven species of Bidessini are known from Belize, six of which are newly recorded from the country. Some of the recorded species are more or less restricted to the region of Belize, Guatemala and southern Mexico, but most seem to be rather widespread in the Neotropical region. One species, *Bidessonotus pollostus* is to date only known from Belize. Based on the type locality, which is very close to the border with Mexico, this species is expected to occur in the Mexican Yucatán Peninsula. Several species are known from Belize from only one or two localities, which indicates that the knowledge of the Bidessini is still very

limited. The northern half of the country, which was not sampled during the field survey in 2015, lacks data on this tribe. Additional collecting, especially in the northern districts Belize, Corozal and Orange Walk, will most probably reveal additional species and result in a better knowledge of the Bidessini of Belize.

All eleven known species were found in lentic habitats, mostly in small puddles and ponds and in shallow water of larger ponds. During the survey there were no species found in strictly lotic situations as rivers, permanent flowing streams or hygropetric habitats. Several species were found in a lotic environment but always in lentic conditions where water flow was non-existent, such as backwaters and rest pools in intermittent streams. *Bidessonotus* species were encountered in a wide range of lentic habitats, in which *B. mobilis* predominates in shaded, leaf chocked sites whilst *B. vicinus* is common in both shaded, leaf chocked habitats and open habitats with exposed mineral substratum. Although *Neobidessus obtusoides* and *N. persimilis* occur in similar habitats, they did not co-occur at any of the surveyed sites. Based on the known records it seems the distribution of both species in Belize does not overlap. *Uvarus spretus* occurred most frequently in small temporal, often highly ephemeral habitats, but was also encountered in permanent, sun-exposed habitats with rich vegetation. The species was however absent in both forested habitats and ponds in the savannah.

Acknowledgements

The authors wish to acknowledge the Ya'axché Conservation Trust, the Cockscomb Basin Wildlife Sanctuary, The Belize Foundation for Research & Environmental Education (BFREE) and the Belize Forest Department for the permission to conduct the study in the Deep River Forest Reserve, the Bladen Nature Reserve, the Cockscomb Basin Wildlife Sanctuary (permit number: CD/60/3/15(27)) and The BFREE Privately Protected Area. The Belize Forest Department is also acknowledged for the permits for the export of the specimens (permit number: CD/60/3/15(28)). Belize Agricultural Health Authority (BAHA) is acknowledged for providing the Phytosanitary certificate. Thanks are also due to Florence Trus (RBINS) who made the habitus photos and Wouter Dekoninck (RBINS) for his assistance with the collections of the Royal Belgian Institute of Natural Sciences. Furthermore, we would like to thank Maarten Hoffmann for his assistance, hospitality and company during our research in Belize. We also would like to thank Merlijn Jocque (BINCO) for proofreading an earlier version of the manuscript and two anonymous reviewers for their valuable comments.

References

- BALFOUR-BROWNE J., 1947. - A revision of the genus *Bidessonotus* Régimbart (Coleoptera: Dytiscidae). *Transactions of the Royal Entomological Society*, 98: 425–448.
- BRECKO J., MATHYS A., DEKONINCK W., LEPONCE M., VANDENSPIEGEL D. & SEMAL P., 2014. - Focus stacking: Comparing commercial top-end set-ups with a semi-automatic low budget approach. A possible solution for mass digitization of type specimens. *ZooKeys*, 464: 1–23.
- CARRIE R., 2020. - A Checklist of the Freshwater Macroinvertebrates of Belize. https://www.researchgate.net/publication/283351464_A_checklist_of_the_freshwater_macroinvertebrates_of_Belize [accessed September 22, 2020].
- MILLER K.B., 1997. - *Bidessonotus canis*, a new species of predaceous diving beetle from Costa Rica (Coleoptera: Dytiscidae: Hydroporinae: Bidessini). *The Coleopterists Bulletin*, 51: 289–291.
- MILLER K.B., 1998 Revision of the Nearctic *Liodessus affinis* (Say 1823) species group (Coleoptera: Dytiscidae, Hydroporinae, Bidessini). *Entomologica Scandinavica*, 29: 281–314.
- MILLER K.B., 2001. - Revision and phylogenetic analysis of the New World genus *Neoclypeodytes* Young (Coleoptera: Dytiscidae: Hydroporinae: Bidessini). *Systematic Entomology*, 26: 87–123.
- MILLER K.B., 2016. - New species of *Bidessonotus* Régimbart, 1895 with a review of the South American species (Coleoptera, Adephaga, Dytiscidae, Hydroporinae, Bidessini). *ZooKeys*, 622: 95–127.
- MILLER K.B., 2017. - A review of the Neotropical genus *Bidessodes* Régimbart, 1895 including description of four new species (Coleoptera, Adephaga, Dytiscidae, Hydroporinae, Bidessini). *ZooKeys*, 658: 9–38.
- MILLER K.B. & BERGSTEN J., 2016. - *Diving beetles of the World. Systematics and biology of the Dytiscidae*. Johns Hopkins University Press, Baltimore, 320 pp.

- NILSSON A.N. & HÁJEK J., 2021. - *A world catalogue of the family Dytiscidae, or the diving beetles (Coleoptera, Adephaga). Version 1.1.2021*. Distributed as a PDF file via Internet. <http://www.waterbeetles.eu> [accessed June 5, 2021].
- PECK S. B., 2005. - A checklist of the beetles of Cuba with data on distribution and bionomics (Insecta: Coleoptera). *Arthropods of Florida and Neighboring Land Areas*, 18: 1–241.
- RÉGIMBART M., 1895. - Dytiscides trouvés dans les tabacs par les soins de M. Antoine Grouvelle. *Annales de la Société Entomologique de France*, 64: 321–348 + pl. 8: figs 3–18.
- SCHEERS K., 2018. - *Copelatus yaguarete* sp. nov. a new species of the *Copelatus erichsoni* group from Central America (Coleoptera: Dytiscidae). *Belgian Journal of Entomology*, 66: 1–11.
- SCHEERS K. & THOMAES A., 2017. - A review of the Burrowing Water Beetles of Belize with a key to the species (Coleoptera: Noteridae). *Belgian Journal of Entomology*, 51: 1–17.
- SCHEERS K. & THOMAES A., 2018. - The Laccophilinae Gistel, 1848 of Belize (Coleoptera: Dytiscidae). *Belgian Journal of Entomology*, 65: 1–18.
- SCHEERS K. & THOMAES A., 2020. - The genus *Thermonectus* Dejean, 1833 in Belize (Coleoptera: Dytiscidae). *Bulletin S.R.B.E./K.B.V.E.*, 156(1): 52–57.
- SHARP D., 1882a. - On aquatic carnivorous Coleoptera or Dytiscidae. *Scientific Transactions of the Royal Dublin Society, Series II* 2: 179–1003 + pls 7–18.
- SHARP D., 1882b. - *Biologia Centrali-Americana. Zoologia. Insecta. Coleoptera. Vol. 1. Part 2*. Published for the editors by R. H. Porter, London, xvi + 144 pp. + 4 pls.
- YOUNG F.N., 1967. - A key to the genera of American bidessine water beetles, with descriptions of three new genera (Coleoptera: Dytiscidae, Hydroporinae). *The Coleopterists Bulletin*, 21: 75–83.
- YOUNG F.N., 1974. - Review of the predaceous water beetles of genus *Anodocheilus* (Coleoptera: Dytiscidae: Hydroporinae). *Occasional Papers of the Museum of Zoology of the University of Michigan*, 670: 1–28.
- YOUNG F.N., 1977. - Predaceous water beetles of the genus *Neobidessus* Young in the Americas north of Colombia (Coleoptera: Dytiscidae, Hydroporinae). *Occasional Papers of the Museum of Zoology of the University of Michigan*, 681: 1–24.
- YOUNG F.N., 1981. - Predaceous water beetles of the genus *Neobidessus* from South America (Coleoptera: Dytiscidae). *The Coleopterists Bulletin*, 35(3): 317–340.
- YOUNG F.N., 1990. - A review of classification of the water beetles of the new world genus *Bidessonotus* Régimbart (Coleoptera: Dytiscidae: Hydroporinae: Bidessini). *Quaestiones Entomologicae*, 26(3): 355–381.
-