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Authors: Pintar, Matthew R., and Keller, Jay L.

Source: The Coleopterists Bulletin, 74(4) : 696-698

Published By: The Coleopterists Society

URL: <https://doi.org/10.1649/0010-065X-74.4.696>

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SCIENTIFIC NOTE

FIRST RECORD OF *HYDROPHILUS ENSIFER* BRULLÉ (COLEOPTERA: HYDROPHILIDAE) IN THE CONTINENTAL UNITED STATES

MATTHEW R. PINTAR
Institute of Environment
Florida International University
Miami, FL 33131, USA
matthew.pintar@gmail.com

AND

JAY L. KELLER
iNaturalist contributor
Palm Beach County, FL, USA
azure.jay2006@gmail.com

DOI.org/10.1649/0010-065X-74.4.696

The giant water scavenger beetle genus *Hydrophilus* Geoffroy, 1762 in the United States and Canada was reviewed by Short and McIntosh (2014). Three species have been recorded from the continental United States, all of which are also known to occur in Florida: *Hydrophilus* (*Hydrophilus*) *triangularis* Say, 1823, *Hydrophilus* (*Hydrophilus*) *insularis* Laporte de Castelnau, 1840, and *Hydrophilus* (*Dibolocelus*) *ovatus* Gemminger and Harold, 1868. A fourth species, *Hydrophilus* (*Hydrophilus*) *ensifer* Brullé, 1837 has not yet been recorded from the continental United States, but it has been speculated that it does occur or will be found there (Epler 2010). There are currently two valid subspecies of *H. ensifer*: *H. ensifer ensifer* Brullé, 1837 and *H. ensifer duvali* Hansen, 1999. *Hydrophilus e. duvali* occurs throughout the Antilles and Central America, including Puerto Rico, Hispaniola, Cuba, and the Bahamas (Arce-Pérez and Morón 2013; Hansen 1999; Peck 2009). In the Bahamas, *H. e. duvali* has been recorded from Andros and San Salvador (Turnbow and Thomas 2008), as well as North Bimini and South Bimini (Young 1953), which are only 83 km east of the Florida coastline. *Hydrophilus e. ensifer* is found throughout much of Central and South America (Gomez Lutz *et al.* 2012; Peck 2009; Short and McIntosh 2014). Because the status and identification of the two subspecies is not well understood, we do not consider them further.

On the evening of 17 May 2020, J. L. Keller set up a blacklight in a residential neighborhood of Palm Beach County, Florida, USA. The collection location (26.345°N, 80.243°W) was adjacent to a

lake characteristic of many South Florida housing developments, 17 km west (inland) of the coast, and 2 km south-southeast of Loxahatchee National Wildlife Refuge and the boundary between the developed urban area of South Florida and the protected areas of the Greater Everglades Ecosystem. The blacklight was set up for 2.5 h (20:45–23:15) during which time it was monitored for insects. A large hydrophilid (Fig. 1) was first observed at the blacklight around 21:33, photographed, and released. The beetle remained near the blacklight until at least 22:30, actively crawling on the sheet and through the grass, until it was no longer observed. The beetle was not retained as a specimen. On 20 May 2020, J. L. Keller submitted photos of the beetle as an observation on iNaturalist (Keller 2020), an online platform and community that enables the anyone to record organisms, obtain identifications, and contribute data that can be used for biodiversity science.

On 21 May 2020, M. R. Pintar identified the iNaturalist observation as *H. ensifer*. The specimen had a medial glabrous region on its abdominal ventrites that is a primary defining characteristic of *H. ensifer* (Fig. 2) (Short and McIntosh 2014), as well as the protarsal characteristics of *H. ensifer* (Arce-Pérez and Morón 2013), although the tarsi are somewhat obscured in the photos. Additional photos of the beetle are available from the iNaturalist observation and have been archived on Figshare (Pintar and Keller 2020).

Ever since Young's (1953) record in Bimini, the occurrence of *H. ensifer* in South Florida has been noted as a possibility, if not a likely occurrence (Epler 2010; Short and McIntosh 2014). This



Fig. 1. Dorsal habitus of the *Hydrophilus ensifer* observed in Palm Beach County, Florida on 17 May 2020.

observation of *H. ensifer* is a **new state record** in Florida and a **new country record** in the continental United States (previously recorded in Puerto Rico), and it represents the fourth *Hydrophilus* species found in both Florida and the continental United States. The location of this Palm Beach County observation was 116 km northwest of the closest previously known collection location of this species on North Bimini, where it was last recorded in 1951 (Young 1953).



Fig. 2. Abdominal ventrites of the *Hydrophilus ensifer* observed in Palm Beach County, Florida, illustrating the medial glabrous area characteristic of this species.

The occurrence of *H. ensifer* in Palm Beach County coincided with the development of Tropical Storm Arthur. During 13–15 May 2020 a low-pressure system developed north of Cuba over the Straits of Florida, and over the course of 15–17 May the storm system moved past South Florida. With the storm located over the Straits of Florida, the center of the storm passed between Cuba and Florida and then between the Bahamas and Florida. The storm system became Tropical Storm Arthur on 17 May, after the center of the storm was north of the Bahamas. While this was a relatively weak storm system, there were sustained easterly winds in southern Palm Beach County from 12–17 May, increasing the possibility that an individual beetle from the Bahamas could have arrived in South Florida. Indeed, Epler (2010) stated that the occurrence of *H. ensifer* in South Florida could occur “especially after a hurricane.” Although this occurrence may be coincidental, the appearance of this record in conjunction with the storm is still noteworthy.

Following a suggestion by Andrew E. Z. Short, we examined a specimen of *H. ensifer* deposited in the Florida State Collection of Arthropods (FSCA; Gainesville, Florida) (see supporting figures: Pintar and Keller 2020). This specimen was collected in Marathon, Monroe County, Florida on 1 July 1957 by D. R. Paulson. A more precise collection location was not provided, but Marathon is ~170 km north of Cuba and the species’ previously documented range. There were no named tropical storms in this region during 1957, and detailed weather data for this location are limited during this time period. However, during 26 June 1957 through 1 July 1957 at Key West Naval Air Station (~65 km west of Marathon) peak daily wind gusts were from the southeast and averaged 18 km/h (NOAA 2020). Thus, it is also possible weather played role in the occurrence of this specimen in Marathon, but we hesitate to draw conclusions regarding the occurrence of this individual.

The record from Palm Beach County is illustrative of the value that citizen science projects can provide in documenting biodiversity. The platform that iNaturalist provides is user-friendly with tools for documentation and identification of observations. However, there is a need for both experts capable of identifying certain taxonomic groups (particularly arthropods), and for better documentation of specimens by observers. Although obtaining high quality images of small organisms from multiple perspectives can be difficult or even insufficient for identification of many taxa, doing so certainly enhances the chances of proper identification and the value of observations to the scientific community. iNaturalist has proven to be valuable as a tool for outreach and public engagement while

simultaneously documenting range expansions and species diversity (e.g., Jones *et al.* 2019; Unger *et al.* 2020). Collaboration between the public and scientists on iNaturalist and similar platforms will continue to provide opportunities for documenting new discoveries, such as this occurrence of *H. ensifer* in Florida.

Specimens Examined. USA: Florida: Monroe County, [Marathon], 01-vii-1957, D. R. Paulson (FSCA: 1); Palm Beach County, [26.345°N, 80.243°W], 17-v-2020, J. L. Keller at blacklight (1; no voucher collected).

ACKNOWLEDGMENTS

We thank Andrew E. Z. Short for providing guidance on subspecies determinations and suggesting examination of the FSCA specimen. We also thank Paul E. Skelley (FSCA) for providing collection data and photographs of the FSCA specimen.

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(Received 4 June 2020; accepted 25 August 2020. Publication date 22 December 2020.)