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Two new records of aquatic Hemiptera (Belostomatidae, Mesoveliidae) from southern Florida, with keys to the genera *Belostoma* Latreille, 1807 and *Mesovelia* Mulsant and Rey, 1852 in Florida and the northern Caribbean

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Two new records of aquatic Hemiptera (Belostomatidae, Mesoveliidae) from southern Florida, with keys to the genera *Belostoma* Latreille, 1807 and *Mesovelia* Mulsant and Rey, 1852 in Florida and the northern Caribbean

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ABSTRACT

Belostoma minor (Palisot de Beauvois, 1805) and *Mesovelia polhemusi* Spangler, 1990 are reported for the first time from the continental United States, in southern Florida. Ten species of Belostomatidae (water bugs) belonging to the genus *Belostoma* Latreille, 1807 are now reported from the United States, with three species documented in Florida; the record of a fourth species, *B. flumineum* Say, 1832, in Florida is doubtful. Four species of Mesoveliidae (water treaders) belonging to the genus *Mesovelia* Mulsant and Rey, 1852 are now documented from Florida and the United States. I provide keys to species of the genera *Belostoma* and *Mesovelia* in the northern Caribbean Bioregion, representing southern Florida, the Greater Antilles, and the Lucayan Archipelago.

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KEYWORDS
Belostomatidae; Florida; Hemiptera; macroinvertebrates; Mesoveliidae; water bugs

Introduction

The aquatic and semiaquatic Heteroptera (Hemiptera) in the infraorders Gerromorpha, Leptopodomorpha and Nepomorpha are currently represented globally by around 5000 species in 25 families (Polhemus and Polhemus 2007); in Florida, there are around 140 species in 15 families (Epler 2006; Epler and Denson 2017). Throughout the Americas, the family Belostomatidae (water bugs) consists of six genera, four of which are known from Florida and the United States, whereas the family Mesoveliidae (water treaders) consists of four genera, only one of which is reported from Florida and the United States (Menke 1979; Smith 1988; Epler 2006; Heckman 2011; Damgaard, Moreira, Hayashi, Weir, and Zettel 2012). The Belostomatidae are among the most prominent aquatic insects in the Americas, particularly due the large size (up to 7 cm) of the Lethocerinae (*Benacus griseus* (Say, 1832) and *Lethocerus* spp. Mayr, 1853) and their propensity to prey on vertebrates such as fish and frog larvae, while the tiny Mesoveliidae (<0.5 cm) are small, cryptic, and often overlooked; all of these taxa occur in southern Florida.

Located at the southeastern end of the North American continent, Florida is uniquely positioned at the intersection of the Nearctic and Neotropical realms.

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Although the entirety of the state is often considered to be in the Nearctic Realm for simplicity, particularly in checklists, southern Florida is ecologically more Neotropical, sharing many characteristics with the Caribbean Bioregion (Omernik 1987; Olson et al. 2001; Spalding et al. 2007; Dinerstein et al. 2017). Even though during the last glacial maximum Florida, the Bahamas, Cuba and other landmasses in the region were not connected by land (Peltier 1994), they share many aquatic insect species, while many other species are found in Florida but not the Bahamas or Cuba, and vice versa (Epler 2006, 2010; Turnbow and Thomas 2008; Naranjo, Riviaux, Moreira, and Correa Court 2010). Many Nearctic aquatic insects have distributions that reach their southern limit in northern or central Florida (Epler 2006), although some species are found to the southernmost end of the peninsula (Pintar, Kline, and Trexler 2021; Pintar and Trexler 2022). At the same time, species that are well-documented in Cuba or the Bahamas are occasionally found in southern Florida; these occurrences are sometimes attributed to weather, particularly tropical storms and hurricanes (Epler 2006, 2010; Pintar and Keller 2020), and sometimes these occurrences lack evidence of established, breeding populations (but see Young 1963; Polhemus and Spangler 1989).

Few researchers studying the aquatic and semiaquatic Heteroptera have examined the fauna of southern Florida, particularly in recent decades (Epler 2006; Sites 2015). This is in spite of the fact that the greater Everglades ecosystem, which occupies a large portion of the state south of Lake Okeechobee, is a unique ecosystem from the heteropteran perspective in that *Pelocoris* spp. Stål, 1876 are among the most common aquatic animals in the system (Pintar et al. 2021). The taxa found in Everglades marshes are predominantly Nearctic, but those found in other habitats, such as coastal areas, mangroves, solution holes in pine rocklands, and urbanised areas, are often a mix of Neotropical and Nearctic species. Better study of all of these habitats is important for understanding the current distribution of species, detecting new arrivals to Florida, and assessing changes to the distribution and abundances of species as climate and land use change.

Material and methods

Study area

From May 2020 through September 2021, I occasionally sampled aquatic (freshwater to marine) habitats at Florida International University's Biscayne Bay Campus (25.9°N, 80.1°W) in North Miami, Miami-Dade County, Florida, United States. The campus is situated at the northern end of Biscayne Bay and surrounded by a small pocket of mostly undeveloped land, which largely consists of Oleta River State Park, along with some land owned by the City of North Miami. The campus contains a few highly manicured freshwater ponds surrounded by lawns that are irrigated with reclaimed wastewater; these ponds are far from the most pristine habitats and contain small fish. The east and south sides of the campus are bordered by Biscayne Bay with a narrow strip of mangroves and other trees separating the campus from the bay. The north side of the campus is bordered by a mangrove-enclosed drainage channel and a section of restored mangroves (circa 2010), with larger areas of mangroves

further to the north. The southwest side of the campus is bordered by the Oleta River State Park Annex, which is a tidal mature mangrove forest dominated by red mangroves (*Rhizophora mangle* L.). To the northwest is a tract of City of North Miami land consisting of red mangroves and Australian pine (*Casuarina* spp. L.) that typically contains numerous small, shallow fresh to brackish pools with few small fish; I have only observed this area directly connected via surface water to the Oleta River State Park Annex during king tides. I sampled the ponds on campus on multiple occasions, along with the drainage channels and mangroves on the campus boundary and the shallow ponds on the City of North Miami tract.

Sampling and identification

Sampling was conducted with a D-frame aquatic net and 25.4-cm handheld fine mesh nets. I collected aquatic and semiaquatic Heteroptera and Coleoptera, although other insect taxa, particularly Odonata, were often present in ponds. Specimens were preserved in 70% or 95% ethanol after collection. Although Epler (2006) provided a key to the known aquatic and semiaquatic Heteroptera of Florida, that key does not include many taxa present in the northern Neotropics that could occur in southern Florida. Furthermore, the aquatic Heteroptera in this region have been poorly studied relative to other parts of North America, and there are few to no region-specific species keys for many taxa in the northern Neotropics.

The genus *Mesovelia* Mulsant and Rey, 1852 was distinguished from other Neotropical mesoveliid genera using the works of Heckman (2011) and Moreira (2015); Spangler (1990) was the primary reference for identifying *Mesovelia* to species, which was supported by Heckman (2011) and Floriano, Moreira, Bispo, Morales, and Molano-Rendón (2016). *Belostoma* Latreille, 1807 were keyed to species groups using Lauck (1962) and Estévez and Polhemus (2001). Species in the *B. flumineum* Say, 1832 and *B. minor* (Palisot de Beauvois, 1805) species groups were identified primarily using Lauck (1964).

Abbreviations for repositories and sources of material studied are:

CSWF: Conservancy of Southwest Florida, Naples, FL
FSCA: Florida State Collection of Arthropods, Gainesville, FL
MRP: Matthew R. Pintar's personal collection
NCSU: North Carolina State University Insect Museum, Raleigh, NC
SEMC: Snow Entomological Museum, University of Kansas, Lawrence, KS
USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC

Newly collected specimens in this study have been deposited in FSCA, SEMC and USNM.

Results

Belostoma minor (Palisot de Beauvois, 1805)

Figure 1

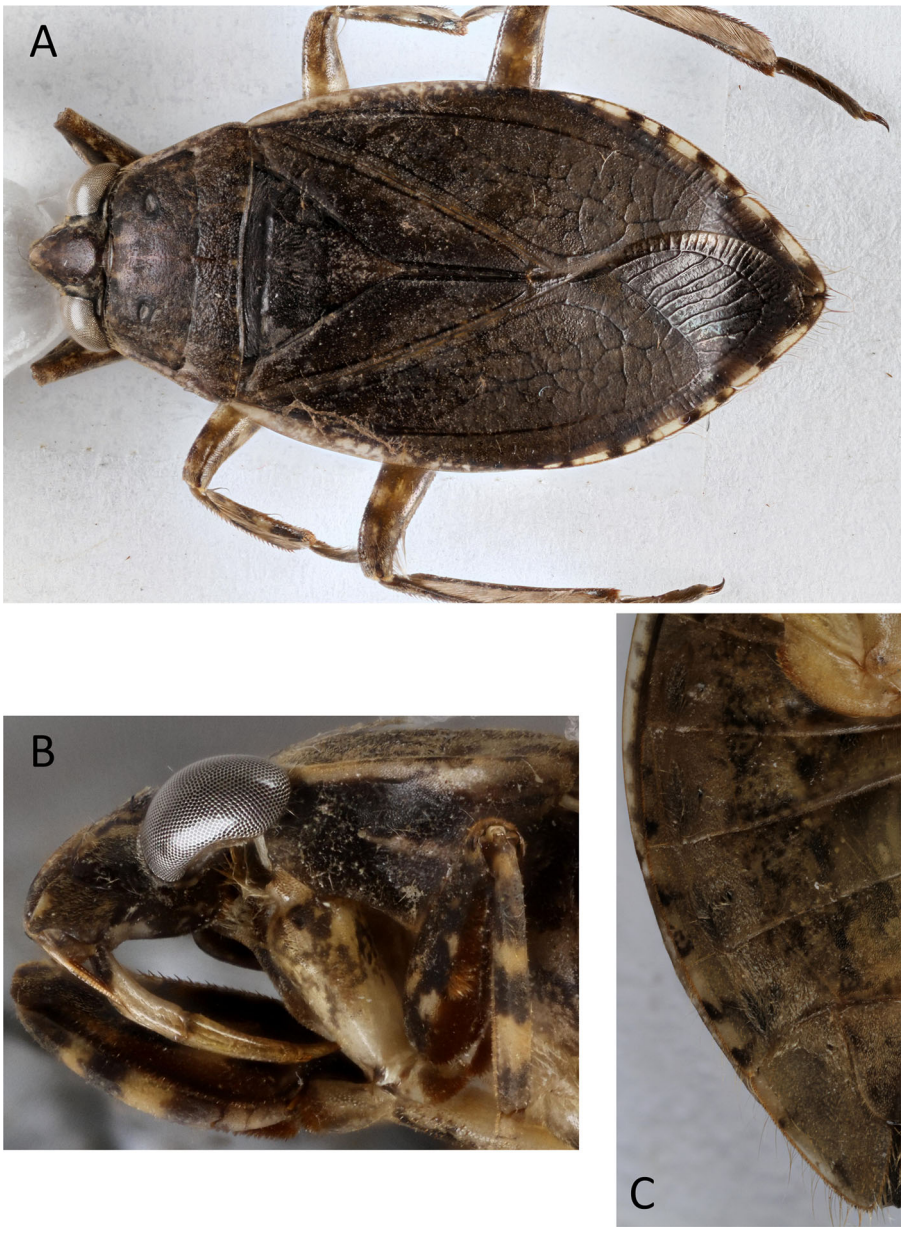

Figure 1. Photographs of *Belostoma minor* (Palisot de Beauvois, 1805) from Florida: (a) dorsal habitus, (b) lateral perspective of head showing beak and eyes, and (c) pilosity on ventral paratergites.

Material examined

1 ♂, 1 ♀, Cuba, Habana, Santiago de las Vegas, 06.XI.1922, leg. S.C. Bruner (SEMC). 1 ♂, 1 ♀, United States, Florida, Collier County, Fakahatchee Strand Preserve State Park, brackish marsh south of U.S. 41, site FS9-BM, 25°56′19.6″N, 81°29′12.1″S, 05.VIII.2009, leg. I. Bartoszek (CSWF). 1 ♂, United States, Florida, Collier County, Fakahatchee Strand Preserve State Park, brackish marsh south of U.S. 41, site FS9-BM, 25°56′19.6″N, 81°29′12.1″S, 01.IX.2010, leg. I. Bartoszek (CSWF). 1 ♂, United

States, Florida, Collier County, Naples, pond in Conservancy of Southwest Florida gopher tortoise preserve, 26°09′57.2″N, 81°47′21.1″W, 27.VIII.2021, leg. M.R. Pintar (MRP). 1 ♂, United States, Florida, Collier County, Picayune Strand State Forest, cypress strand southwestern region, site SG26-C, 26°00′15.1″N, 81°32′53.1″W, 25.VIII.2009, leg. I. Bartoszek (CSWF). 1 ♂, United States, Florida, Miami-Dade County, North Miami, pond 2 at Florida International University Biscayne Bay Campus, 25°54′23.4″N, 80°08′28.7″W, 12.VI.2021, leg. M.R. Pintar (MRP). 1 ♀, United States, Florida, Miami-Dade County, North Miami, pond 2 at Florida International University Biscayne Bay Campus, 25°54′23.4″N, 80°08′28.7″W, 13.VI.2021, leg. M.R. Pintar (SEMC). 2 ♂, United States, Florida, Miami-Dade County, North Miami, pond 2 at Florida International University Biscayne Bay Campus, 25°54′23.4″N, 80°08′28.7″W, 13.VI.2021, leg. M.R. Pintar (MRP). 2 ♂, United States, Florida, Miami-Dade County, North Miami, pond 2 at Florida International University Biscayne Bay Campus, 25°54′23.4″N, 80°08′28.7″W, 01.VIII.2021, leg. M.R. Pintar (FSCA). 4 nymphs, United States, Florida, Miami-Dade County, North Miami, pond 2 at Florida International University Biscayne Bay Campus, 25°54′23.4″N, 80°08′28.7″W, 01.VIII.2021, leg. M.R. Pintar (MRP). 1 ♂, United States, Florida, Miami-Dade County, North Miami, pond 2 at Florida International University Biscayne Bay Campus, 25°54′23.4″N, 80°08′28.7″W, 01.VIII.2021, leg. M.R. Pintar (USNM). 1 ♂, 1 ♀, United States, Florida, Miami-Dade County, North Miami, pond 1 at Florida International University Biscayne Bay Campus; 25°54′22.4″N, 80°08′28.5″W, 01.VIII.2021, leg. M.R. Pintar (MRP). 1 ♂, United States, Florida, Miami-Dade County, North Miami, small pond in mangroves, 25°54′31.9″N, 80°08′48.7″W, 01.VIII.2021, leg. M.R. Pintar (USNM).

Diagnosis

Keys to *Belostoma* species groups include the extent of the pilosity on the connexivum/ventral laterotergites as the first couplet: Lauck (1964) states the pilosity either covers the entire margin of the connexivum or does not; Estévez and Polhemus (2001) state the pilosity covers the ventral laterotergites entirely or in part (Figures 1c and 2). This is important for separating the small-to-moderate size *Belostoma* in the *B. flumineum* group (*B. bakeri* Montandon, 1913; *B. flumineum B. lutarium* Stål, 1855; *B. saratogae* Menke, 1958) from the *B. minor* group (*B. confusum* Lauck, 1959; *B. fusciventre* (Dufour, 1863); *B. minor*; *B. testaceum* (Leidy, 1847)), among other species groups. Yet, *B. lutarium* (Figure 2b), in contrast to the other species in the *B. flumineum* group (Figure 2a), does not have the pilosity covering the entire connexivum, with a strip along the interior edge lacking pilosity (Lauck 1964); the pilosity on *B. minor* covers around 75% of the connexivum (Figure 2c). Comparatively, the extent of the pilosity on segments II–VI can appear relatively similar in these two species, though somewhat less expansive in *B. minor*; however, on segment VII this pilosity borders the genital operculum in *B. minor* but the pilosity is separated from the genital operculum in *B. lutarium*.

Belostoma lutarium (18.5–27.5 mm) is typically a larger species than *B. minor* (18–21 mm), but some smaller *B. lutarium* may be of similar size to *B. minor*. The first segment of the beak in *B. lutarium* is about 1.25 times the length of the second

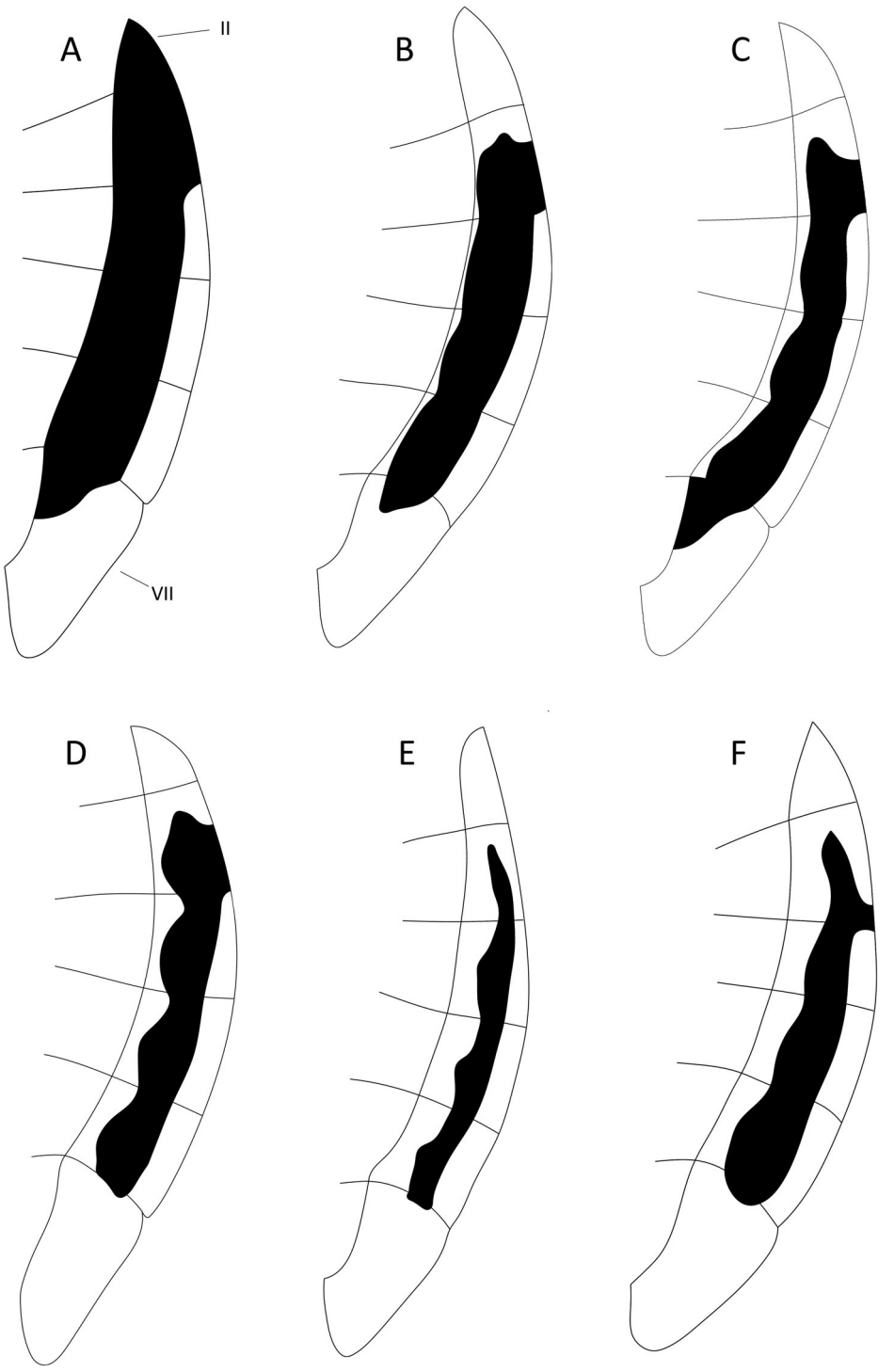

Figure 2. Illustrations of the pilosity on the ventral paratergites in six species of *Belostoma* Latreille, 1807: (a) *B. flumineum* Say, 1832, (b) *B. lutarium* Stål, 1855, (c) *B. minor* (Palisot de Beauvois, 1805), (d) *B. testaceum* (Leidy, 1847), (e) *B. ellipticum* Latreille, 1833, and (f) *B. subspinosum* (Palisot de Beauvois, 1820). Ventral paratergite segments II and VII are labelled in (a).

segment, whereas in *B. minor* the first segment is typically slightly shorter than the second segment (Figure 1b; see key below). In southern Florida, *B. minor* is most morphologically similar to *B. testaceum*, but the two species can easily be separated by the extent of the pilosity on segment VII (Figure 2c, d).

Distribution

Cuba, Dominican Republic, Jamaica, Puerto Rico, and U.S. Virgin Islands (Lauck 1964; Riviaux, Moreira, and López 2010; Lanigan and Hyslop 2011; Rogers and Cruz-Rivera 2021), continental United States (Florida: Collier and Miami-Dade counties; first record). Riviaux et al. (2010) noted the distribution as extending from the 'southern United States in the Nearctic region' but it is unclear what specimens or sources this statement was based on. It seems likely this statement was in reference to specimens of *B. confusum*, which is found from southern California to Texas in the United States, as well as Mexico, and shares some synonyms with *B. minor* (see Lauck 1964), hence the name *confusum*.

Discussion

Belostoma minor was identified for the first time from Florida and the continental United States from two ponds on Florida International University's Biscayne Bay Campus and nearby shallow freshwater ponds in mangroves. I collected several adults nearly two months apart, while numerous other individuals were observed but not collected. Numerous nymphs that resemble adults were found in at the same sites during the same collection events. During August 2021 I found *B. minor* at another site, in a pond in Collier County on the west coast of Florida. I subsequently examined collections at CSWF from Collier County, and they had three specimens collected from a somewhat brackish marsh in Fakahatchee Strand Preserve State Park during 2009 and 2010, along with one specimen collected from a freshwater site in Picayune Strand State Forest during 2009. Thus, *B. minor* has been present in Florida since at least 2009 and has breeding populations on both coasts.

Belostoma minor is the tenth species of *Belostoma* recorded from the continental United States. In Florida, *B. lutarium* is common and widely distributed (Epler 2006), especially in the Everglades ecosystem of southern Florida where *Abedus immaculatus* (Say, 1832) also often occurs (Pintar et al. 2021). Previously, the southernmost records of *B. testaceum* were from Palm Beach County (Epler 2006), while I found a single individual at the same pond in mangroves that I found *B. minor* in, albeit over a year prior on 08 May 2020; this specimen from Miami-Dade County represents the southernmost record of *B. testaceum*. I also examined several specimens of *B. testaceum* at CSWF collected from Collier County. Lauck (1964) provided the only record of *B. flumineum* from Florida (Pinellas County), along with few records from the coastal plain of other states. I attempted to locate the Pinellas County specimen, which in 1964 was deposited in the Cornell University Insect Collection, but specimens labelled as *B. flumineum* from Florida could not be located. I have not collected *B. flumineum* from the coastal plain of any southeastern states, including anywhere in Florida (Pintar and Resetarits 2020; unpublished data). The only specimens of *B. flumineum* I have seen from the coastal plain were deposited at NCSU and collected

from Washington County, North Carolina. Because *B. flumineum* appears to be rare to absent from most of the southeastern coastal plain and Lauck's (1964) record was very far south for the east coast, it is possible his record was an error. Hence, it seems likely that *B. flumineum* does not occur in Florida, though a vagrant occurrence remains a possibility.

Belostoma ellipticum Latreille, 1833 has been recorded from Texas to Honduras, Cuba, Jamaica, and the Bahamas (Lauck 1962; Ribeiro, Estévez, Moreira, and Guilbert 2017; Reynoso-Velasco and Arce-Pérez 2020); it may eventually be found in southern Florida. *Belostoma subspinosum* (Palisot de Beauvois, 1820) occurs in the Dominican Republic, Hispaniola, Jamaica, Puerto Rico, as well as the southwestern United States (Arizona, California, and Texas) to Panama (Lauck 1962; Lanigan and Hyslop 2011; Ribeiro et al. 2017). Although not recorded in Cuba, *B. subspinosum* may occur there, and it may eventually be found in southern Florida as well. There had been considerable confusion regarding the identification and records of the northern species in the *B. dentatum* (Mayr, 1863) species group (variously identified as *B. anurum* (Herrich-Schaeffer, 1848), *B. ellipticum*, and *B. subspinosum*) (Menke 1979; Ribeiro, Estévez, Guilbert, and París 2014; Ribeiro et al. 2017), and many specimens from this region may need to be reexamined. Several Neotropical aquatic insect species found in the Caribbean region either are native/established in southern Florida or occur in the region as vagrants, possibly brought in by storms (Epler 2006; Pintar and Keller 2020). Other species of aquatic Heteroptera have been introduced from southeast Asia (Polhemus and Rutter 1997; Polhemus and Golia 2006), so it is not surprising to find a species like *B. minor*, and other species of Heteroptera will likely be found in the future.

Insects collected along with *B. minor* in North Miami include many Nearctic species, along with some predominantly Neotropical species. The two similar ponds on the Biscayne Bay Campus also contained *Enochrus ochraceus* (Melsheimer, 1844); *Haliplus punctatus* Aubé, 1838; *Helochares maculicollis* Mulsant, 1844; *Hydrometra australis* Say, 1832; *Hydrovatus pustulatus* (Melsheimer, 1844); *Limnoporus canaliculatus* (Say, 1832); *Mesovelia mulsanti* White, 1879; *Neogerris hesione* (Kirkaldy, 1902); *Pelocoris femoratus* (Palisot de Beauvois, 1820); *Pelonomus obscurus* LeConte, 1852; and *Peltodytes dietrichi* Young, 1961. The southern of the two ponds on the campus that contained *B. minor* also contained two adult *B. lutarium*. During the same collecting event in August 2021, the ponds among the mangroves contained other insects such as *Derallus altus* (LeConte, 1855); *Derovatellus floridanus* Fall, 1932; *E. ochraceus*; *Limnogonus recens* Drake and Harris, 1934; and *Pachydrus princeps* (Blatchley, 1914).

Key to adults of Belostoma *of the northern Caribbean Bioregion, including southern Florida, the Greater Antilles, and the Lucayan Archipelago*

The following key is adapted from Lauck (1962, 1964), Estévez and Polhemus (2001), Epler (2006) and Ribeiro et al. (2017) with reference to the known distribution of species mentioned previously. *Abedus immaculatus*, a unique species that occurs

throughout Florida, is included due its similarity to species of *Belostoma* and potential uncertainty regarding its taxonomic placement.

1 Membraneous area of forewing small; length <14 mm ..... ***Abedus immaculatus***
- Membraneous area of forewing larger; length >14 mm **2**
2 Pilosity on the inner margin of ventral paratergites II–VI reaches inner margin of paratergites (Figure 2a) ..... ***B. flumineum*** (not known from the region)
- Pilosity on the inner margin of ventral paratergites II–VI does not reach the inner margin of the paratergites **3**
3 Pilosity on ventral paratergites II–VI covers 75% or more of the paratergites and is narrowly separated from the inner margin. Pilosity extends well onto segment VII (Figure 2b, c) **4**
- Pilosity on ventral paratergites II–VI covers 75% or less of paratergites and is well separated from the inner margin. Pilosity barely, if at all, extends onto segment VII (Figure 2d–f) **5**
4 Pilosity on paratergite VII does not reach the inner margin (Figure 2b); first segment of the beak is 1.25 times the length of the second segment ..... ***B. lutarium***
- Pilosity on paratergite VII reaches the inner margin (Figure 2c), bordering the first genital segment for about half of its length; first segment of the beak is slightly shorter than the second segment ..... ***B. minor***
5 Length 20 mm or less; pilosity as in Figure 2d ..... ***B. testaceum***
- Length 27 mm or more **6**
6 Anteoculus shorter than interoculus; pilosity covers more than half of ventral paratergites, extending to lateral margin on segments II and III (Figure 2f) ..... ***B. subspinosum***
- Anteoculus as long or longer than interoculus; pilosity covers less than half of ventral paratergites, strongly constricted between spiracles, not extending to lateral margin on segments II and III (Figure 2e) ..... ***B. ellipticum***

Mesovelia polhemusi Spangler, 1990

Figure 3

Material examined

3 ♂, 2 ♀, 8 N, United States, Florida, Collier County, Marco Island, Fruit Farm Creek, mangrove tidal creek culvert, site TC5, 25°55′54.6″N, 81°39′58.7″W, 18.VIII.2020, leg. J. Schmid (CSWF). 12 ♂, 3 ♀, 3 N, United States, Florida, Miami-Dade County, North Miami, mangroves at Florida International University Biscayne Bay Campus, 25°54′27.7″N, 80°′35.2″W, 22.IX.2020, leg. M.R. Pintar (MRP). 3 ♂, 3 ♀, United States, Florida, Miami-Dade County, North Miami, mangroves at Florida International University Biscayne Bay Campus, 25°54′27.7″N, 80°08′35.2″W, 22.IV.2020, leg. M.R. Pintar (SEMC). 1 ♂, 1 ♀, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′10.1″N, 80°08′33.7″W, 01.VI.2021, leg. M.R. Pintar (FSCA).
2 ♂, 3 ♀, 3 N, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′10.1″N,

80°08′33.7″W, 01.VI.2021, leg. M.R. Pintar (MRP). 4 ♂, 1 ♀, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′10.1″N, 80°08′33.7″W, 01.VI.2021, leg. M.R. Pintar (USNM). 1 ♂, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′27.7″N, 80°08′35.2″W, 01.VIII.2021, leg. M.R. Pintar (FSCA). 1 ♂, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′27.7″N, 80°08′35.2″W, 12.IX.2021, leg. M.R. Pintar (FSCA). 1 ♀, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′27.7″N, 80°08′35.2″W, 12.IX.2021, leg. M.R. Pintar (USNM). 15 ♂, 9 ♀, 14 N, United States, Florida, Miami-Dade County, North Miami, mangroves near Florida International University Biscayne Bay Campus, 25°54′27.7″N, 80°08′35.2″W, 19.IX.2021, leg. M.R. Pintar (MRP).

Diagnosis

Mesovelia polhemusi is distinguished from other species of *Mesovelia* in Florida through the combination of the posterior row of 15 or more dark spines on the mesofemur (Figure 3e), small adult size (<3 mm), and males that lack dense patches of setae on abdominal sternite VII. Males also have unique genitalia as illustrated in Spangler (1990).

Distribution

Belize (Stann Creek District; Spangler 1990), United States (Florida: Collier and Miami-Dade counties; first record).

Discussion

Here, I have recorded *M. polhemusi* for the first time since its original description (Spangler 1990). *Mesovelia polhemusi* is clearly well-established in southern Florida; I easily captured several dozen adults from the mangroves around Florida International University's Biscayne Bay Campus during sampling events over the course of one year. Samples at CSWF collected from a tidal, saline mangrove creek on Marco Island also contained several specimens of *M. polhemusi*. The two known locations of this species, in Belize and southern Florida, United States, are remarkably disjunct. The reason for this disjunct distribution could simply be a lack of data, as not many researchers have studied *Mesovelia* from the region or the aquatic insects of mangroves in recent decades. Indeed, Spangler's (1990) description was the only species of *Mesovelia* described in the Americas from 1976–2015, and there have been no published records of *M. polhemusi* since then (Damgaard et al. 2012). It seems unlikely the species would be restricted to a small country like Belize, especially when similar habitats are found along the coast north around the Yucatan Peninsula of Mexico and south through coastal Central America. If *M. polhemusi* is naturally present in Florida, it may also eventually be found in the Greater Antilles and Lucayan Archipelago (Bahamas, Turks, and Caicos). However, several relatively recent studies in Cuba (Naranjo et al. 2010; Riviaux et al. 2010, Riviaux, López, and Moreira 2012),

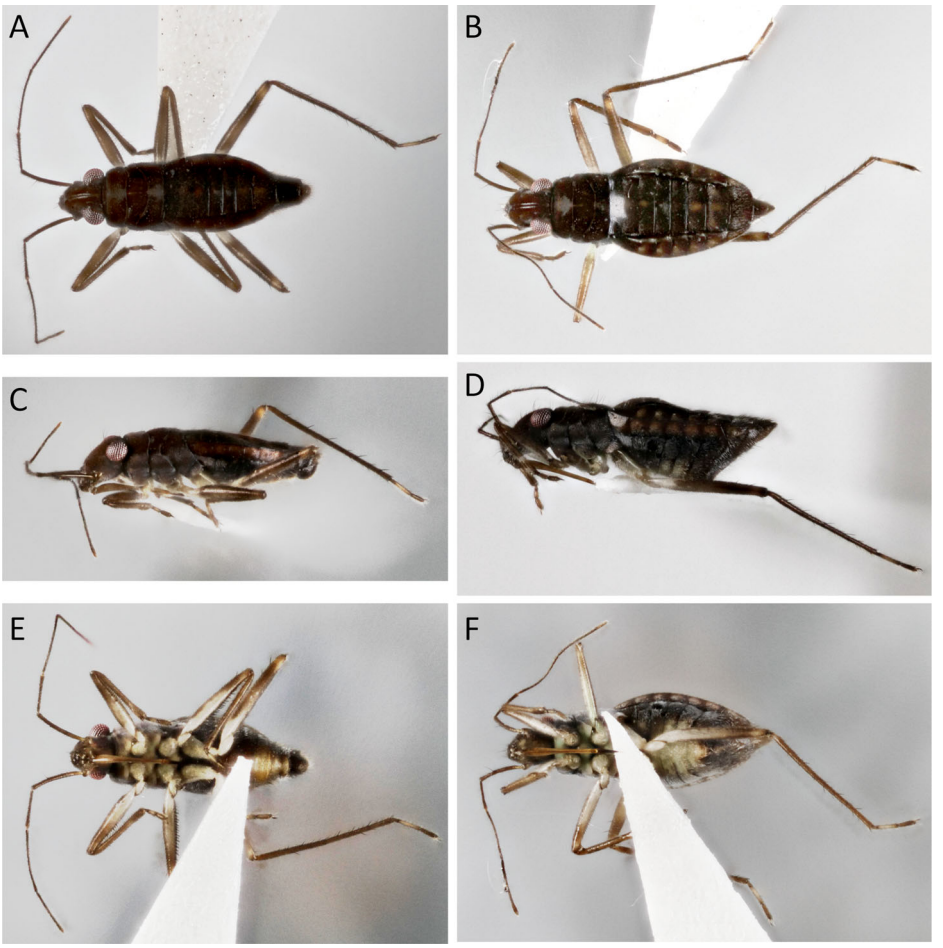

Figure 3. Photographs of *Mesovelia polhemusi* Spangler, 1990 from Florida: (a, b) dorsal habitus, (c, d) lateral habitus, and (e, f) ventral habitus. (a, c, e) are male and (b, d, f) are female.

Guadeloupe (Conjard, Garrouste, Gustave, and Gros 2021), Jamaica (Lanigan and Hyslop 2011), and the U.S. Virgin Islands (Rogers and Cruz-Rivera 2021) did not report the species in those places. Conversely, if *M. polhemusi* has been introduced to Florida, it could have arrived in ballast water (Bailey 2015), and cruise ships are particularly suspect. The Port of Miami, 14 km to the south in Biscayne Bay, was the busiest cruise ship port in the world during 2016/2017, while Port Everglades, 20 km to the north, was the third busiest. Ships from these ports regularly travel throughout the Caribbean and Central America, including places such as Harvest Cay, Belize, which is 50 km to the south of Twin Cays, where Spangler (1990) first observed *M. polhemusi*.

Mesovelia polhemusi was found in similar mangrove habitat types in both Belize and Florida, albeit Spangler (1990) noted he found *M. polhemusi* on black mangroves (*Avicennia germinans* (L.) L.) on cays (small, low elevation islands). I found *M. polhemusi* around red mangroves on the mainland, though some black mangroves are

present in the area too. I collected only a single other insect species in these same habitats, *Rheumatobates vegatus* Drake and Harris, 1942. Few nymphs of *M. polhemusi* were collected, and no adults had wings; macropterus forms of this species remain unknown.

Spangler (1990) noted that *M. polhemusi* and *M. halirrhyta* Polhemus, 1975 are the only strictly halophilus species in the genus. The type locality of *M. tuberculata* Floriano and Moreira in Floriano et al., 2016 is listed as a tidal lagoon, so it may be halophilus as well, but data on its habitats are lacking. *Mesovelia tuberculata* and *M. halirrhyta* are known from only the Pacific Coast (Polhemus 1975; Floriano et al. 2016), and *M. polhemusi* is known from only the Atlantic Coast. *Mesovelia mulsanti* is regularly found in many freshwater habitats, including the ponds where I found *B. minor*, but it can also be found in salt marshes (Kelts 1979) and has been recorded from brackish mangrove ponds in southern Florida (J. Schmid, personal communication, September 28, 2021). In southern Florida, I have found *M. mulsanti* in a range of freshwater habitats across the region, along with occasional cooccurrences with *M. amoena* Uhler, 1894. Both *M. mulsanti* and *M. amoena* are widespread in the Americas, occurring from Canada to Argentina and Brazil, respectively (Damgaard et al. 2012). The only other species of *Mesovelia* known from the United States, *M. cryptophila* Hungerford, 1924, was noted by Spangler (1990) as occurring in Florida (unspecified location), but no other records of this species are known from Florida and most of the southeastern United States (Smith 1988; Epler 2006). No other species of Mesoveliidae are known from the Greater Antilles, but four other Neotropical species are known to occur as far north as Mexico (Damgaard et al. 2012).

Key to adults of Mesovelia *of the northern Caribbean Bioregion, including southern Florida, the Greater Antilles, and the Lucayan Archipelago*

The following key is adapted from Spangler (1990) and Epler (2006), with reference to the known distribution of species and recent species description mentioned previously.

1 Middle femur with posterior row of dark spines (best viewed ventrally) **2**
- Middle femur without posterior row of dark spines **3**
2 Middle femur typically with 15 or fewer posterior spines; male with 2 patches of dense, black setae on abdominal sternite VIII; size >3.0 mm ..... ***M. mulsanti***
- Middle femur typically with 15 or more posterior spines; male with no patches of dense, black setae on abdominal sternites; size <3.0 mm ..... ***M. polhemusi***
3 First antennal segment ≤3/4 width of head through eyes; male with fine posterior fringe of setae on abdominal sternite VI; male paramere long and thin ..... ***M. amoena***
- First antennal segment subequal to width of head through eyes; male without fringe of setae on abdominal sternites; male paramere thicker .... ***M. cryptophila*** (not known from the region)

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