

The genus *Limnogonus* Stål (Hemiptera: Gerridae) in North America, with the description of a new species

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Abstract

Water striders of the genus *Limnogonus* Stål, 1868 (Insecta: Hemiptera: Gerridae) occur in lentic and calmer lotic habitats across much of the tropics and into the subtropics. In the Americas, there is a long history of confusion over the identity and ranges of the species. Here, I present a review of the genus in North America including the Caribbean based on collection of new specimens from the United States and review of museum specimens. *Limnogonus macroconfusus* **sp. nov.** is distinguished based on external and internal morphological characteristics from *L. franciscanus* (Stål, 1859), which is redescribed, and the distribution of *L. recens* Drake and Harris, 1934 is updated. This paper includes images of adults and nymphs, measurements, a key to the species occurring in the region, and a discussion on the similarity among species and history of records of the genus in the northern Neotropics.

Key words: Gerrinae, Gerrini, Gerromorpha, Heteroptera, Neotropical Region, taxonomy, water strider

Introduction

The water strider (pond skater) genus *Limnogonus* Stål, 1868 (Hemiptera: Heteroptera: Gerridae: Gerrinae: Gerrini) currently consists of 28 described species globally, distributed primarily in the tropics but also extending into the subtropics (Andersen 1995). *Limnogonus* (s. str.) is a nearly pantropical subgenus, whereas subgenus *Limnogonoides* Poisson, 1965 occurs primarily in Africa with one species in southern Asia (Damgaard *et al.* 2014). The genus is strongly supported as being monophyletic; however, the two subgenera are not as currently recognized (Damgaard *et al.* 2010; Damgaard 2012; Ye *et al.* 2017). *Limnogonus* spp. primarily occur in freshwater lentic habitats, although some species occur in brackish or occasionally hypersaline lentic habitats, or in calmer lotic habitats.

Until now, eight species of *Limnogonus* in the Neotropics have been recognized (Heckman 2011; Damgaard *et al.* 2014; Moreira 2015; Molano Rendón *et al.* 2018). *Limnogonus hyalinus* (Fabricius, 1803) was the first species described from the region, followed by *L. franciscanus* (Stål, 1859). Morphological similarity among species, inadequate species descriptions, and unknown sources of type specimens have led to considerable confusion of species throughout the Neotropics. The only (limited) review of the genus in the Americas was by Drake & Harris (1934). Molecular assessments have indicated deep genetic divergence among populations of some described species in both the Neotropical and Australasian regions, although they lacked some described species (Damgaard *et al.* 2010; Ye *et al.* 2017). Here, I review the genus *Limnogonus* in North America, including the Caribbean north of Trinidad and Panama, and provide the description of a new species, redescription of *L. franciscanus* (due to a limited description by Stål (1859) and historical confusion with other species), a key, distribution maps, and photographs of all three species. South American species and their relationships with those in North America will be examined in a future review.

Materials and methods

The species of *Limnogonus* present in North America including the Caribbean were assessed using museum specimens and personal collecting. For this study, I have examined more than 3000 specimens of *Limnogonus*, including specimens from South America and type specimens of all American species. A relatively small portion of the specimens I examined (typically one per series) were dissected to compare the structure of the genital capsule and vesical plates. This was done by extracting the vesica from the terminal abdominal segments using a pin from alcohol-preserved specimens or from dry pinned specimens that were relaxed with water or 10% potassium hydroxide solution. After examination, dissected genital capsules were preserved in genitalia vials with glycerin.

New specimens were collected in Florida, Texas, and Puerto Rico. Collecting was performed with small handheld fine mesh nets, D-frame nets, or larger kick nets, and specimens were preserved in alcohol (various grades of ethanol or isopropanol) immediately upon collection. In Florida, records are based primarily on my collections and observations during 2020–2021, along with iNaturalist observations and existing collections from the Everglades and southwest Florida. From 2022–2025, I searched for *Limnogonus* across Texas and neighboring US states. I reviewed all Gerromorpha observations reported on iNaturalist and BugGuide from North America to find *Limnogonus* records to further illustrate the distribution and habitat associations of the genus. Although many observations on iNaturalist were insufficient to definitively identify to species with photos alone, they helped to provide data on the range of the genus in areas where museum specimens were lacking. I have conservatively identified online observations to species and sex, maintaining most at genus. When species-level characteristics were not clear, individuals were identified only to species when no other species are known in the region and the records were valuable for illustrating distributions. No taxonomic decisions were made based on online observations, and all distributional data are based on specimens/observations examined and not existing literature records unless otherwise cited. Newly collected specimens for this study have been deposited at CAS, CEIOC, FSAC, SEMC, TAMU, USNM, and UTIC (listed below). In the list of material examined, localities, dates, and collectors are quoted as written on labels with lines and labels separated by \.

Abbreviations of repositories

BYUC: Monte L. Bean Life Science Museum, Brigham Young University (Provo, Utah, United States)

CAS: California Academy of Sciences (San Francisco, California, United States)

CEIOC: Coleção Entomológica do Instituto Oswaldo Cruz, Fundação Oswaldo Cruz (Rio de Janeiro, Brazil)

CSUC: C.P. Gillette Museum of Arthropod Diversity, Colorado State University (Fort Collins, Colorado, United States)

CSWF: Conservancy of Southwest Florida (Naples, Florida, United States)

FIU: Florida International University, Biscayne Bay Campus (North Miami, Florida, United States)

FMNH: Field Museum of Natural History (Chicago, Illinois, United States)

FSAC: Florida State Collection of Arthropods (Gainesville, Florida, United States)

INAT: iNaturalist.org

MEL: Museo Entomológico de León (León, Nicaragua)

MRPC: Matthew R. Pintar collection (San Marcos, Texas, United States)

NHRS: Naturhistoriska riksmuseet (Stockholm, Sweden)

SEMC: Snow Entomological Museum Collection, University of Kansas (Lawrence, Kansas, United States)

TAMU: Texas A&M University Insect Collection (College Station, Texas, United States)

UAIC: University of Arizona Insect Collection (Tucson, Arizona, United States)

USNM: United States National Museum of Natural History, Smithsonian Institution (Washington, District of Columbia, United States)

UTIC: University of Texas Insect Collection (Austin, Texas, United States)

Symbols used to describe specimens

A: apterous (wingless adult)
M: macropterous (winged adult)
N: nymph (immature)
?: unknown sex of adult

Photographs were captured with a Canon R8 camera with a Canon MP-E 65 mm lens with photos stacked in Zerene Stacker and edited by cropping and removing backgrounds. All photos are by the author unless otherwise noted. To obtain most body measurements, apterous and macropterous males and females were photographed using an Olympus DP22 camera on an Olympus SZ61 microscope with segments measured using scaled photographs in ImageJ (Schneider *et al.* 2012). The number of individuals measured (n) is the maximum number of individuals; the number measured for some body parts may be lower if those parts were damaged or missing. Mean measurements are provided in Table 1 with full specimen data archived in Figshare (Pintar 2026), and are abbreviated as follows:

BL: body length
HL: head length
HW: transocular head width through eyes
IOW: interocular width at narrowest point
ANT: length of antennomeres I–IV (ANT I, ANT II, ANT III, ANT IV)
EYE: maximum eye width parallel to IOW (perpendicular to body length)
PL: pronotum length along midline
APW: anterior pronotum width
PPW: posterior pronotum width
FEM: femoral length
TIB: tibial length
TAR: lengths of tarsomeres (TAR I, TAR II)
TERL: length of abdominal mediotergites I–VII of apterous individuals
TERW: width of abdominal mediotergites I–VII of apterous individuals

TABLE 1. Mean body measurements of *Limnogonus franciscanus*, *L. macroconfusus* **sp. nov.**, and *L. recens* by sex and wing morph (A = apterous; M = macropterous). n = number of body length measurements with maximum number of other measurements in parentheses. Abbreviations for body segments are listed in the methods. All measurements are in millimeters.

	<i>L. franciscanus</i>				<i>L. macroconfusus</i>				<i>L. recens</i>			
	Male		Female		Male		Female		Male		Female	
Wing morph	A	M	A	M	A	M	A	M	A	M	A	M
n	32 (15)	32 (9)	19 (5)	21 (7)	26 (13)	36 (17)	19 (14)	20 (10)	13 (13)	2 (2)	8 (8)	1 (1)
BL	5.91	6.62	7.30	7.92	7.41	7.76	8.90	9.13	7.98	9.24	8.14	9.30
HL	0.83	0.84	0.96	0.93	0.99	1.06	1.06	1.08	1.04	1.11	1.04	1.20
HW	1.25	1.25	1.38	1.39	1.57	1.51	1.65	1.55	1.68	1.83	1.66	1.80
IOW	0.55	0.53	0.62	0.61	0.69	0.66	0.77	0.69	0.80	0.85	0.81	0.75
ANT I	1.35	1.38	1.56	1.68	1.65	1.64	1.82	1.78	1.85	2.10	1.80	1.80
ANT II	0.92	0.93	1.10	1.17	1.11	1.11	1.21	1.20	1.57	1.60	1.43	1.45
ANT III	0.90	0.87	1.09	1.07	1.00	0.99	1.08	1.07	1.16	1.15	1.15	1.05
ANT IV	1.24	1.24	1.43	1.33	1.44	1.46	1.51	1.61	1.66	1.70	1.61	1.75
EYE	0.35	0.34	0.37	0.38	0.40	0.42	0.43	0.43	0.41	0.47	0.41	0.50
PL	2.24	2.44	2.65	2.79	2.92	3.00	3.29	3.17	3.01	3.62	2.97	3.70

.....continued on the next page

TABLE 1. (Continued)

Sex	<i>L. franciscanus</i>				<i>L. macroconfusus</i>				<i>L. recens</i>			
	Male		Female		Male		Female		Male		Female	
Wing morph	A	M	A	M	A	M	A	M	A	M	A	M
APW	0.88	0.91	0.99	1.00	1.10	1.03	1.16	1.06	1.20	1.48	1.06	1.40
PPW	0.92	1.31	1.13	1.54	1.24	1.51	1.47	1.64	1.32	1.93	1.35	1.90
L1 FEM	1.79	1.79	2.11	2.17	2.47	2.38	2.67	2.53	2.48	3.03	2.40	2.90
L1 TIB	1.63	1.60	1.88	1.90	2.09	2.07	2.24	2.23	2.21	2.63	2.15	2.45
L1 TAR I	0.23	0.24	0.19	0.19	0.25	0.24	0.31	0.28	0.26	0.27	0.27	0.25
L1 TAR II	0.32	0.32	0.35	0.38	0.43	0.42	0.49	0.46	0.46	0.54	0.46	0.50
L2 FEM	4.43	4.50	5.28	5.47	6.12	5.99	6.87	6.57	6.46	7.10	6.39	6.60
L2 TIB	4.04	4.18	4.73	5.05	5.33	5.06	6.23	5.84	5.78	6.10	5.80	6.10
L2 TAR I	1.81	1.71	2.07	2.25	2.44	2.24	2.57	2.66	2.53	2.20	2.57	2.20
L2 TAR II	0.42	0.43	0.44	0.48	0.54	0.51	0.60	0.59	0.55	0.75	0.58	0.55
L3 FEM	4.74	5.05	5.42	5.94	6.46	6.25	7.03	6.81	6.81	7.50	6.24	6.90
L3 TIB	2.56	2.60	3.20	3.39	3.99	3.89	4.76	4.40	3.99	4.50	4.14	4.25
L3 TAR I	0.59	0.60	0.74	0.72	0.90	0.86	0.99	0.94	0.80	0.85	0.82	0.75
L3 TAR II	0.32	0.31	0.37	0.37	0.43	0.39	0.44	0.41	0.43	0.45	0.43	0.40
TERL I	0.34		0.45		0.39		0.54		0.42		0.48	
TERL II	0.29		0.42		0.39		0.52		0.35		0.44	
TERL III	0.24		0.43		0.30		0.48		0.27		0.38	
TERL IV	0.22		0.41		0.28		0.46		0.25		0.39	
TERL V	0.23		0.44		0.28		0.48		0.26		0.42	
TERL VI	0.27		0.47		0.31		0.52		0.31		0.45	
TERL VII	0.41		0.57		0.51		0.63		0.56		0.62	
TERW I	0.79		1.01		0.88		1.16		1.05		1.27	
TERW II	0.70		0.86		0.81		1.07		0.88		1.04	
TERW III	0.63		0.75		0.72		0.92		0.76		0.86	
TERW IV	0.60		0.69		0.69		0.88		0.75		0.78	
TERW V	0.57		0.67		0.65		0.83		0.76		0.73	
TERW VI	0.53		0.59		0.60		0.73		0.74		0.68	
TERW VII	0.49		0.52		0.55		0.62		0.60		0.72	

Statistical analyses were performed on morphological measurements of *L. franciscanus* and *L. macroconfusus* **sp. nov.** to validate differences between species. Body length and the pronotal spot ratio (anterior gap between anterior pronotal spots / posterior gap between anterior pronotal spots) were analyzed with linear mixed effects models with the lme4 v. 1.1-37 (Bates *et al.* 2015) and lmerTest v. 3.1-3 (Kuznetsova *et al.* 2017) packages in R v. 4.5.1 (R Core Team 2025). These models included species, wing morph, the interaction between species and wing morph, and sex as fixed effects along with population (country) as a random effect to account for measurements of multiple individuals from the same locality. Most morphological measurements were analyzed together using permanova in Primer v. 7.0.24 with the PERMANOVA+ add-on (Anderson *et al.* 2015; Clarke & Gorley 2015). Each sex was analyzed separately in permanova and all variables were scaled for equal weighting; the species:wing morph interaction was not significant ($P > 0.33$) in permanova and dropped from analyses. Because gerrids are very fragile and have a tendency to lose appendages, these multivariate analyses were performed on a reduced dataset excluding segments that were often missing (e.g., hind tibia and tarsi) and individuals with many missing measurements (only specimens with “complete” data were analyzed). Aggregate morphology was visualized using non-metric multi-dimensional scaling (NMDS) including *L. recens* Drake & Harris, 1934 for comparison. *Limnogonus recens*

was excluded from statistical analyses due to limited availability of macropterous specimens and the focus on distinguishing the two other species. Maps were produced in QGIS v. 3.40.2.

Results

Limnogonus franciscanus (Stål, 1859)

(Figs. 1–5, 12A, 18A, 21A,C)

Gerris marginatus Guérin-Ménéville, 1844: 351 [preoccupied]

Gerris franciscana Stål, 1859: 265

Gerris Guerini [sic] Lethierry & Séverin, 1896: 61

Limnogonus guerini: Drake & Harris 1934: 206–207

Limnogonus incasi Poisson, 1955: 67–68; syn. by Andersen 1975: 63

Redescription. Apterous male (Figs. 2A, 3A, 4A). Body length: 4.99–6.56 mm, mean = 5.91 mm.

Dorsally body dark-brown to black with yellow stripes (Fig. 2A). Head dark with two yellow longitudinal stripes more or less connected posteriorly. Antennae dark-yellow to light-brown with apices usually darkest; antennomeres III and IV more densely covered in hairs (sensilla), often producing a whitish appearance (most noticeable in photographs of live specimens; Fig. 22A,C). Pronotum dorsally dark; anteriorly with two medial yellow stripes often (Fig. 1A, 2C, 13A), but not always (Fig. 2B), appearing divergent anteriorly; if these stripes are apparently not divergent (when comparing width of intervening black space), width of stripes often greater anteriorly than posteriorly (Fig. 2B); posterior pronotum with a single yellow medial stripe that often fades posteriorly; pronotum margined with bright-yellow stripe. Dorsally abdomen dark with medial yellow stripe distinct on tergum VII but fading anteriorly and often indistinct or absent on terga I–IV; connexiva sometimes appearing somewhat lighter but coloration not distinct. Lateral coloration on pronotum and thorax alternating dark/light stripes with silvery pubescence (Fig. 3A). Width and shape of lower black stripe variable, ranging from a narrow, sometimes broken stripe (Fig. 3A) to a black area of greatly expanded width on anterior half (more often wider in macropterous specimens; Fig. 3B). Ventrally color generally whitish to yellow medially and gradually darkening towards margins, but margins themselves with light coloration. Legs yellow to brown, often with apices and tarsi darker (Fig. 4A).

Syntipsis $0.77\times$ width of interocular space at posterior margin of eyes. Pronotum anterior width $0.93\times$ maximum posterior width. Antennomere III subequal to antennomere II (average 0.94). Fore tibia constricted $3/5$ th distance to apex, typically producing a bent appearance with average angle 167° (Fig. 2A,B); in a few specimens, tibia appears approximately straight but is vertically constricted and not necessarily apparent at some angles (Fig. 3B). Posterior shape of pronotum gradually rounded appearing more like bottom of U at apex. Ventrally, length of abdominal segment VI approximately $0.8\times$ length of VII. First genital segment with posteroventral margin evenly rounded (Fig. 4C); when viewed laterally, bottom of segment is most anterior portion of its posterior margin (Fig. 4D). Lateral sclerite much wider at middle of vesica than closer to dorsal sclerite (Fig. 4E); lateral sclerite with small process extending from bottom distally; viewed ventrally, bottom of vesical plate slightly expanded distally and broadly rounded at apex (Fig. 4F).

Macropterous male (Figs. 1, 2B, 3B). Body length: 5.64–7.23 mm, mean = 6.62 mm.

Coloration as in apterous male except divergent yellow lines on pronotum anteriorly less frequent but still present in many specimens examined. Dorsal coloration of abdomen not considered (hidden below hemelytra). Hemelytra variably black to dark-brown to gray.

Structure as in apterous male except pronotum wider posteriorly, with anterior:posterior width = 0.68. Abdominal sternum VI slightly longer, $0.84\times$ length of segment VII. Pronotum posterior shape slightly more angulate (Fig. 2B).

Apterous female (Figs. 2C, 3C, 4B). Body length: 6.33–8.26 mm, mean = 7.30 mm.

Coloration and structure as in apterous male except connexiva with distinct yellow stripes connected across all segments. Fore tibia not distinctly constricted or bent, appearing approximately straight (Fig. 2C), angle of curve approximately 176° . Length of abdominal sternum VI approximately $0.75\times$ length of VII (Fig. 4B). Abdominal segment VII posteroventral margin approximately straight or evenly curved with no medial projections.

Macropterous female (Figs. 2D, 3D). Body length: 7.10–8.75 mm, mean = 7.92 mm.

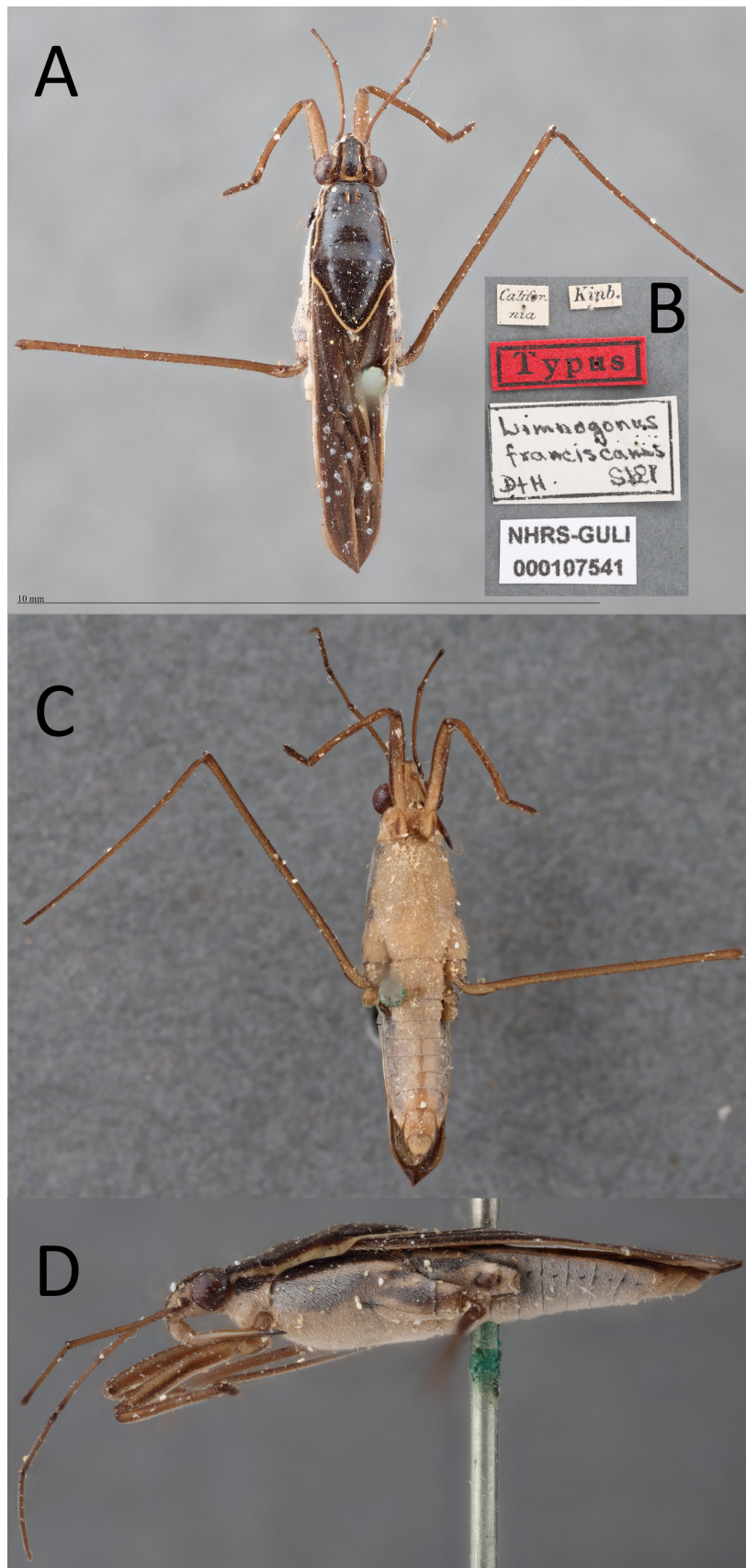


FIGURE 1. *Limnogonus franciscanus* syntype (specimen designated “TYPUS”) at NHRS: A) dorsal habitus; B) specimen labels; C) ventral habitus; D) lateral habitus. Scale is approximate. Photographed by Gunvi Lindberg (© 2023 Naturhistoriska riksmuseet). Made available by the Swedish Museum of Natural History under Creative Commons Attribution 4.0 International Public License, CC BY 4.0.

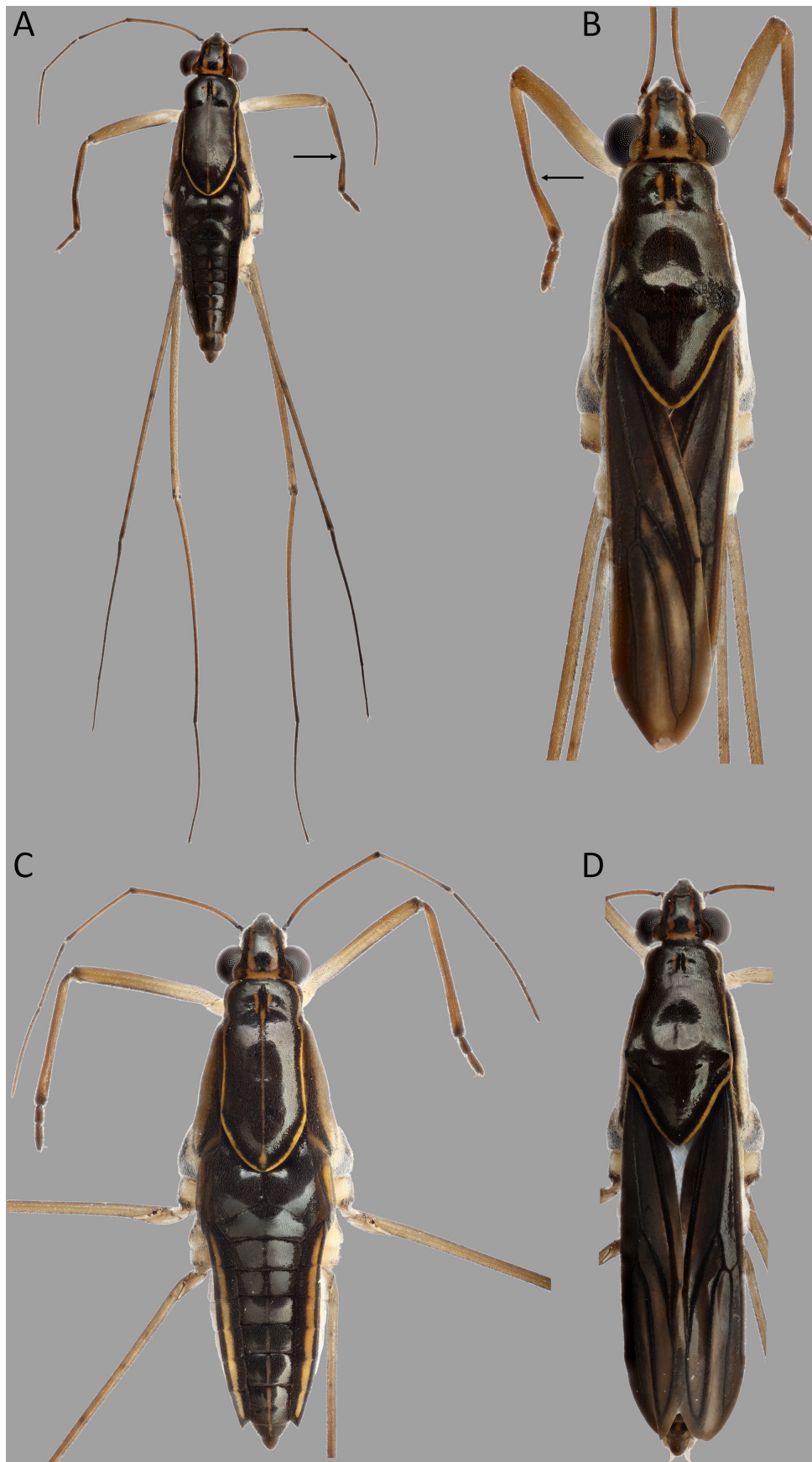


FIGURE 2. *Limnogonus franciscanus* dorsal images (all specimens from Puerto Rico): A) apterous male; B) macropterous male; C) apterous female; D) macropterous female. Arrows in A and B indicate constriction on male fore tibia.

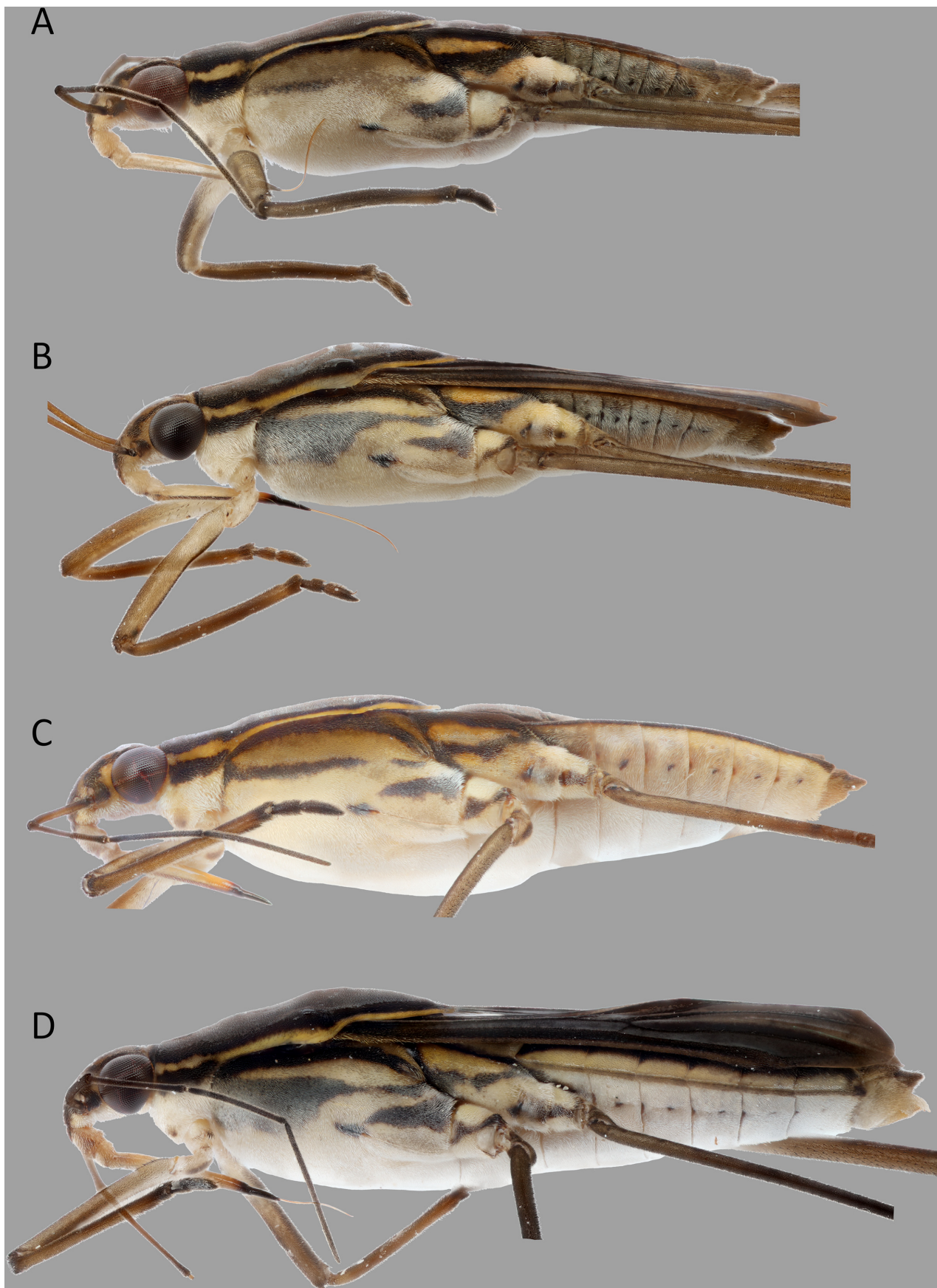


FIGURE 3. *Limnogonus franciscanus* lateral body images (all specimens from Puerto Rico): A) apterous male; B) macropterous male; C) apterous female; D) macropterous female.

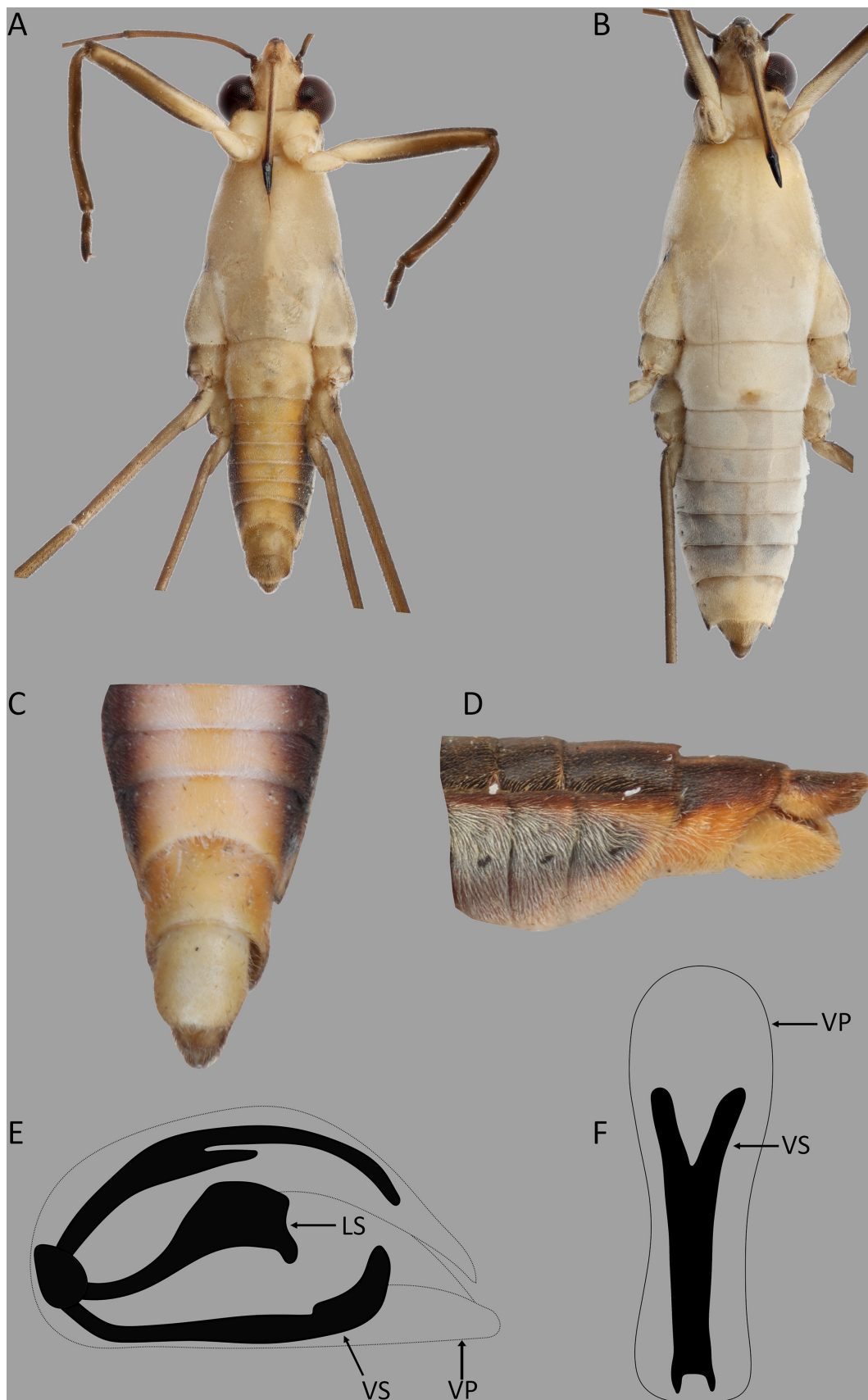


FIGURE 4. *Limnogonus franciscanus* images: A) apterous male ventral; B) apterous female ventral; C) apterous male terminal abdominal/genital segments ventral; D) apterous male terminal abdominal/genital segments lateral. Illustrations of male vesica: E) lateral; F) ventral; LS = lateral sclerite, VP = vesical plate (outline), VS = ventral sclerite; arrows for VP and VS indicate same location in both figures.

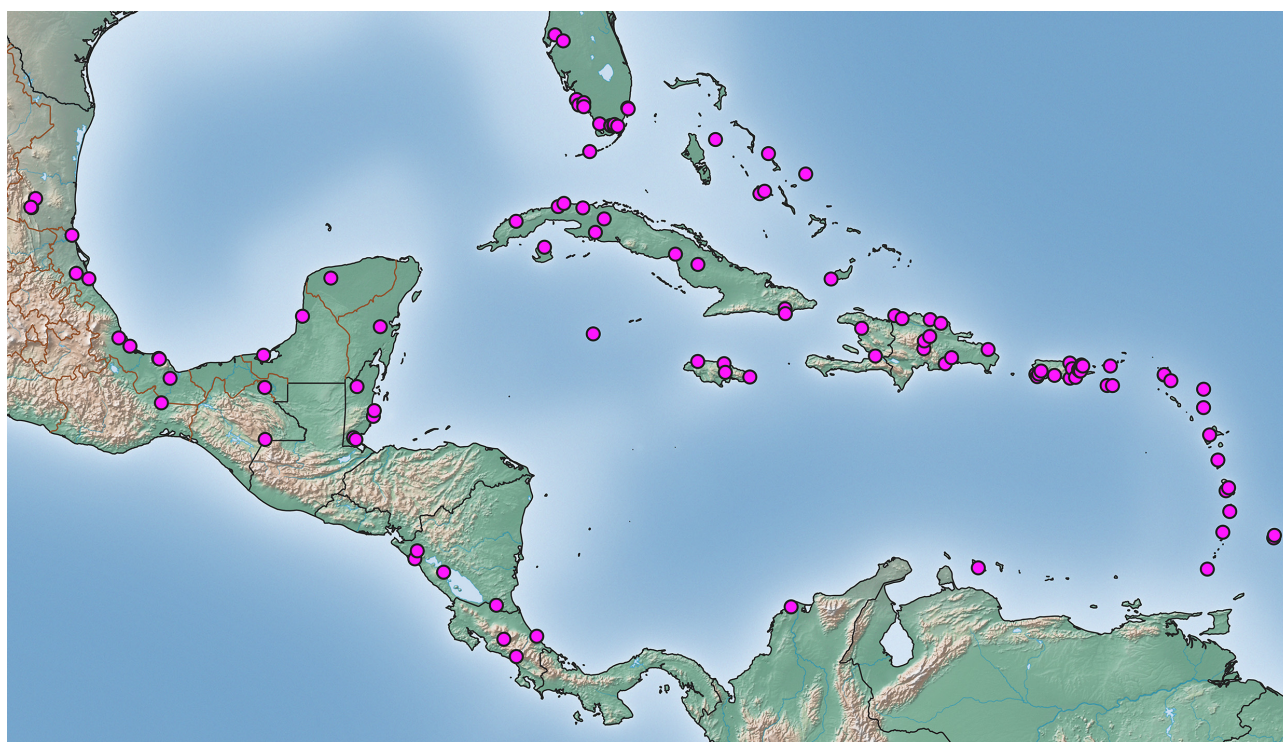


FIGURE 5. Distribution of *Limnogonus franciscanus* in Mesoamerica and the Caribbean based on specimens examined.

Coloration and structure as in apterous female with similar hemelytral coloration and pronotal widths as in macropterous male; dorsal abdominal coloration not considered (hidden below hemelytra).

Etymology. Not stated. Likely named for the erroneous locality of San Francisco (see below).

Distribution. Southern Florida through Central America and the Caribbean, likely including every island with lentic habitats and coastline in the Caribbean, and the northern and western coasts of South America to southern Peru. Males verified from: Antigua and Barbuda, the Bahamas, Barbados, Belize, Cayman Islands, Colombia, Costa Rica, Cuba, Curaçao, Dominica, Dominican Republic, Ecuador, Grenada, Guadeloupe, Guatemala, Haiti, Jamaica, Martinique, Mexico (Campeche, Chiapas, Oaxaca, Quintana Roo, Tamaulipas, Veracruz, Yucatán), Nicaragua, Peru, Puerto Rico, St. Lucia, St. Martin, St. Vincent and the Grenadines, Trinidad and Tobago, continental United States (Florida), and U.S. Virgin Islands (Fig. 5). I consider records from the Galápagos Islands (Peck 2001) to be valid but did not examine specimens or find any in the collection at the Charles Darwin Research Station (Puerto Ayora, Ecuador).

Discussion. The only type material of the species are three syntypes in NHRS bearing the label ‘California’ for which Stål (1859) listed the locality as ‘S:t Francisco’ (assumed to be San Francisco). This locality has long been considered erroneous since San Francisco is far outside the range of the genus. Polhemus & Chapman (1979) surmised that the type specimen could have originated in South America, as the specimen was supposedly collected as part of the Eugenies expedition since Stål (1859) wrote his description in a publication devoted to the expedition’s discoveries. The Eugenies expedition made stops in Peru, Ecuador, and Panama (Persson 1971) in addition to a stop in San Francisco, California; coastal localities in all three countries are possible sources of the types. This likely included a stop in Panama City, where one of the main neighborhoods is named San Francisco; thus, Stål may have erroneously attributed it to the wrong country.

Guérin-Méneville (1844) described “*Gerris marginatus*” based on specimens from Cuba, but during their cataloging work, Lethierry & Séverin (1896) likely provided the name *L. guerini* without examination of any specimens to account for the preoccupied name *G. marginatus*. Most of Guérin-Méneville’s collection and Poisson’s collection from Peru were destroyed during World War II, and no potential types or other specimens bearing labels from either individual could be located. Similarly, Poisson’s (1955) type specimen of *L. incasi* from Peru has been lost, but the description and illustrations, particularly the strongly anteriorly divergent pronotal spots, along with this

being the only species known to occur west of the Andes in Peru, support maintaining it as a junior synonym of *L. franciscanus* as originally proposed by Andersen (1975).

Limnogonus franciscanus was considered to be ‘the commonest and most widely distributed species of *Limnogonus* in the western hemisphere’ with great variation in ‘size, color and markings’ (Drake & Harris 1935). This previously observed large variation in size is likely the result of reliance on external characteristics of the abdominal segments and genital capsule that are nearly identical in *L. franciscanus*, *L. macroconfusus* **sp. nov.**, *L. ignotus* Drake & Harris 1934, and to a lesser degree, *L. profugus* Drake & Harris, 1930. Here, *L. franciscanus* is less variable in size and the smallest species of *Limnogonus* in the Neotropics, on average being slightly smaller than *L. ignotus* (body lengths: apterous male 6.03–6.40 mm; macropterous male 6.50–7.66 mm; apterous female 6.80–7.79 mm; macropterous female 7.40–8.50 mm). The distributions of *L. franciscanus* and *L. ignotus* appear to be allopatric, being separated by the Andes and coastal mountains in northern Venezuela. *Limnogonus ignotus* is easily distinguished from all other Neotropical congeners by the two small, narrowly separated pronotal spots (Fig. 13C). Additionally, the length of antennomere I in *L. ignotus* is usually slightly shorter than the transocular width of the head, whereas in other species it is typically longer. However, this ratio (ANT I:TOW) can be close to 1 in both species and difficult to separate. *Limnogonus franciscanus* differs from *L. profugus* similarly to how *L. macroconfusus* **sp. nov.** differs from *L. profugus*; see discussion under *L. macroconfusus* **sp. nov.**

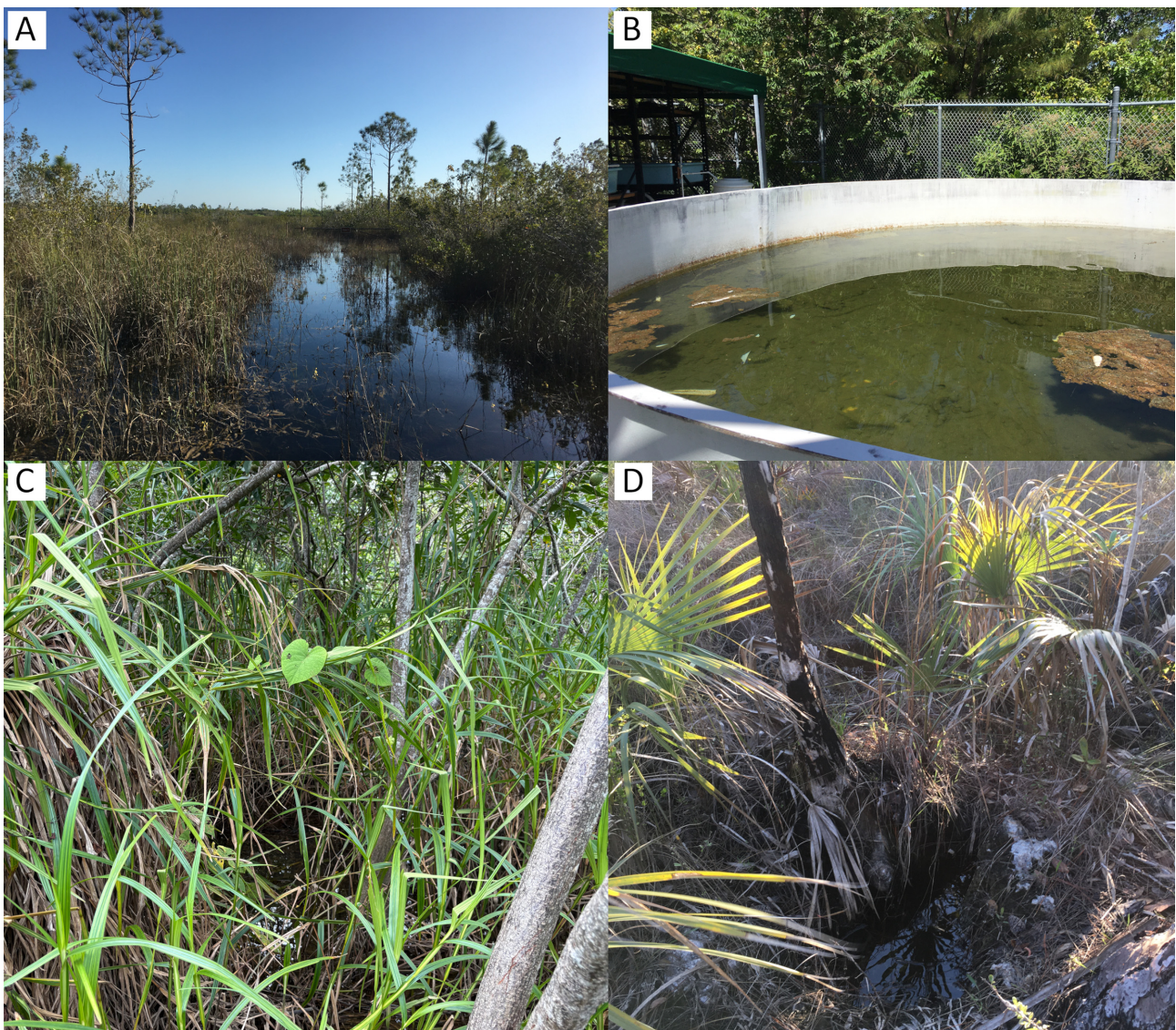


FIGURE 6. Habitat photographs of collection/observation locations of *Limnogonus franciscanus*: A) marsh at Gate 9, Everglades National Park, Florida; B) mesocosm at Biscayne Bay Campus, Florida; C) pools in coastal marsh in eastern Puerto Rico; D) solution holes at Gate 10, Everglades National Park, Florida.

Limnogonus franciscanus is also similar to *L. macroconfusus* **sp. nov.**, with which it sometimes co-occurs in the northern Neotropics. Because Guérin-Ménéville's (1844) description was based on specimens from Cuba, the loss of types and examination of specimens suggesting *L. franciscanus* was the most common species historically collected from Cuba and the Caribbean, I maintain *L. guerini* as a junior synonym of *L. franciscanus* and establish *L. macroconfusus* as a new species. The smaller size, modified shape of the male fore tibia (Fig 2A,B), which is an adaptation for grasping females during mating (Fig. 21A,C), and divergent medial pronotal spots are the easiest ways to distinguish *L. franciscanus* and *L. macroconfusus* **sp. nov.**, while the shape of the lateral sclerite (Fig. 4E) is consistent with variation among the other characteristics. See discussion under *L. macroconfusus* **sp. nov.**

The distribution of *L. franciscanus* covers a large portion of the northern Neotropics (Fig. 5) but is less expansive than previously described. The vast majority of specimens examined were in coastal or near-coastal localities, with few records from the interior of Cuba, Hispaniola, and Mexico. This pattern continues in Florida, where no specific records of the genus have been published (see discussion below). Few records of *L. franciscanus* were found in Central America, where most material was *L. macroconfusus* **sp. nov.** However, *L. franciscanus* should be expected throughout Central America and could eventually be found north to southern Texas or along the western coast of Mexico. It is the only species known to occur in the Lesser Antilles, and it also occurs along the northern coast of South America (Colombia; expected in Venezuela, where one macropterous female specimen posted to iNaturalist from Cumana may be this species). Interestingly, it occurs along the Pacific Coast of South America to southern Peru and perhaps could be found in northernmost Chile. Specimens previously identified as *L. profugus* from Lima were *L. franciscanus*; *L. profugus* should not be expected west of the Andes, which seemingly forms a barrier to species on both sides of the range in South America. Any previously published records of *L. franciscanus* that I did not reexamine here (e.g., relatively recent work by Riviaux *et al.* 2012; Pacheco-Chaves *et al.* 2018; Conjard *et al.* 2021; among others, along with extensive older publications) should be reexamined.

Type material examined. SYNTYPE 1♂[M] (Fig. 1) (NHRS; designated 'TYPUS' for curatorial purposes): 'California \ (Kimb)' [erroneous locality].

Additional material examined. ANTIGUA AND BARBUDA: 1♂[A] (USNM): 'Antigua \ July 28, '18 \ L. Stoner'. 1♀[M] (USNM): 'Antigua \ Horse pond \ 1 V 1958 \ JFG Clarke'. 1♂[M] (USNM): 'Barbuda \ Low Pond \ 25 IV 1958 \ JFG Clarke'. 1♂[A], 1♀[A] (USNM): 'Barbuda \ rainwater cistern' \ 30 June 1988 \ M. Nathan. **BAHAMAS:** 1♀[A] (USNM): 'Arthur's Town, Cat I. \ VII-VIII 1935 \ W.J. Clench'. 14♂/♀ (SEMC): 'Great Exuma-Simons Pt \ 23.31.50 75.47.30 \ 14 January 1980 \ Stephen A. Teale'. 1♂[A], 2♀[A] (USNM): 'Nassau'. **BARBADOS:** 1♂[M], 1♀[A] (USNM): 'Maxwell Coast, pond near beach \ June 17, 1988 \ M. Nathan'. 1♂[A] (SEMC); 2♀[A] (USNM): 'May 21 \ D. Stoner'. 1♂[A], 4♀[A] (CAS): '1979 \ From Indiana Univ.'. **BELIZE:** 1♀[M] (USNM): 'Cayo Dist, Augustine \ blacklight' \ 28 May 1986 \ 'PJ Spangler & RA Faitoute'. 1♂[M], 1♀[M] (USNM): 'Cayo Dist, Augustine (12km SW)' \ 27 May 1986 \ 'PJ Spangler & RA Faitoute'. 1♂[M] (USNM): 'Cayo Dist, Augustine (5km N)' \ 26 May 1986 \ 'PJ Spangler & RA Faitoute'. 1♂[M] (USNM): 'Cayo Dist, San Ignacio (14 mi S)' \ 23 May 1986 \ 'PJ Spangler & RA Faitoute'. 2♂[M] (TAMU): 'Orange Walk Rio Bravo Conservation Area' \ 4 September 1995 \ P.W. Kovarik. 1♂[M], 7♀[A], 1♀[M] (USNM): 'Punta Gorda Br. Honduras'. 1♀[A] (SEMC): 'Punta Gorda British Honduras \ 7-34'. 12♂[A], 3♀[A], 1♀[M] (SEMC): 'Punta Gorda \ Purchsd. Of Parish'. 1♂[M] (SEMC): 'Rio Grande Br. Honduras CA \ January 1932 \ JJ White'. 3♂[M] (USNM): 'Sittee River, R. P. Biol. Sta.' \ 25 April 1987 \ 'Spangler & Faitoute'. 3♂[A], 4♂[M], 2♀[M] (USNM): 'Stann Creek, Dangriga \ pond by airstrip' \ 30 March 1988 \ 'R. A. Faitoute'. 1♀[M] (USNM): 'Stann Creek \ Placencia (2.5 mi N) at Rum Point' \ 5 November 1987 \ PJ Spangler. 2♂[A], 3♂[M], 1♀[M] (USNM): 'Stann Creek, Sittee Point \ collected on riverbank at Possum Point Biological Station' \ 29 April 1987 \ 'Spangler & Faitoute'. 1♂[M], 1♂[M] (TAMU): 'Toledo, 7 mi NW Punta Gorda, Tranquility Lodge' \ 23–29 December 2012 \ E.G. Riley. **CAYMAN ISLANDS:** 1♂[M] (USNM): 'Grand Cayman \ 6-ii-88 \ P. Fitzgerald'. 1♂[M] (USNM): 'Grand Cayman \ 5-II-89 \ P. Fitzgerald \ BL trap'. 1♂[M] (SEMC): 'Grand Cayman Isl. \ 7-11-1938 \ Lewis & Thomps'. **COLOMBIA:** 1♂[M] (USNM): 'Atlantico Cuatro Bocas \ 20.I.1959 \ J.F.G. Clarke'. **COSTA RICA:** 1♂[A], 3♀[A] (SEMC): 'Limon \ 7 Aug. 1959 \ R. Matsuda'. 3♂[M], 2♂[A] (SEMC): 'San Isidro del Gen. \ 2000 ft \ Feb. 1939 \ Dean L. Rounds'. 1♀[M] (SEMC): 'San Jose, Rio Tiribi \ 29 June 59 \ Matsuda'. **CUBA:** **Ciego de Ávila:** 1♀[M] (USNM): 'Baragu \ XI-15-21 \ L.C. Scarsmuzzza'. 2♀[M] (USNM): 'Camaguey, Baragua \ VI-5'32 \ Christenson'. **Guantanamo:** 1♂[M] (USNM): 'Guantanamo \ H. Rolle'. **Habana:** 8♂[M] (SEMC): 'Havana Cuba Pd Bot. Garden \ 2.25 32 \ P.J. Bermudez'. 1♂[A] (USNM): 'La Havane'. 1♂[M], 1♀[M] (USNM): 'Santa Maria del Mar \ mangrove estuary, 23°10'N, 82°11'W \ 23 January 2000 \ M.E. Epstein'. 1♀[M] (USNM): '1, 25 32 \ P.J. Bermudez'. **Matanzas:**

1♂[M] (SEMC): ‘Colon, Cuba \ Dec 15, 1922 \ Dr. A. Comas’. 1♂[M] (USNM): ‘Playa Larga, 1km E \ Wayne N Mathis’. 1♂[M], 1♀[M] (SEMC): ‘Rio San Juan Pueblo Nuevo Matanzas \ 6.18.1932 \ P.J. Bermudez’. **Pinar del Río:** 1♂[A] (USNM): ‘Aguas Claras \ S Vinales \ pond with lily pads \ 22°26'59"N, 83°42'28"W \ 30 January 2000 \ M.E. Epstein’. 1♂[M], 1♀[M] (USNM): ‘Rio San Vicente \ 8 km N Vinales \ 22°26'59"N, 83°42'28"W \ 30 January 2000 \ M.E. Epstein’. 1♂[A], 2♂[M], 4♀[A] (USNM): ‘Vinales \ San Vicente \ water holes for livestock; 22°36'59"N, 83°42'28"W \ 1 February 2000 \ M.E. Epstein’. 1♂[A], 3♂[M], 2♀[M] (USNM): ‘Vinales, San Vicente \ watering holes for livestock \ 22°36'59"N, 83°42'28"W \ 31 January 2000 \ M.E. Epstein’. 4♂[A], 10♂[M], 10♀[A], 6♀[M] (USNM): ‘Vinales \ small stream in grazed area \ 22°26'59"N, 83°42'28"W \ 30 January 2000 \ M.E. Epstein’. **Santiago de Cuba:** 3♂[A], 3♀[A] (SEMC): ‘Palpite Cienaga de Zapute S.C. Prov \ 12. 6. 33 \ P.J. Bermudez’. **Unknown or no province:** 8♂[A], 9♂[M], 4♀[A], 8♀[M] (SEMC): ‘Catalina Cuba \ 11.27.33 \ P.J. Bermudez’. 1♂[M] (USNM): ‘Cuba mer., Daiguiri env. \ 27.5.1985 \ J. Vilimova lgt.’. 1♂[M] (SEMC): ‘Nra Gerona Isla de Pinos \ Feb 20 1923 \ S.C. Bruner’. 1♂[A] (SEMC): ‘Paragua Cuba \ Prov Camagua \ 5.2.27 \ C.O. Bare’. 1♀[M] (USNM): ‘Rio Barpamo’. **CURAÇAO:** 1♂[A], 1♀[A] (INAT): Sint Michiel; 12.1291°N, 68.9821°W; 29 December 2023; Cole Gaerber. **DOMINICA:** 1♂[A] (USNM): ‘Bataka \ 31 January 1968 \ Borys Malkin’. 4♂[A], 4♂[M], 9♀[A], 5♀[M] (USNM): ‘Cabrit Swamp \ 23 Feb. 1965 \ W.W. Wirth’. **DOMINICAN REPUBLIC:** 1♀[M] (USNM): ‘3 miles south Constanza \ La Vega Prov. \ 4 August 1967 \ J.C. Schaffner’. 2♂[A], 3♂[M], 1♀[A] (USNM): ‘Bajos de Haina \ Prov Trujillo \ Dec. 29, 1955 \ J. Maldonado Capriles’. 1♂[M] (TAMU): ‘Districto Nacional, La Victoria’ \ 7 August 1967 \ J.C. Schaffner. 3♂[M], 7♀[M] (USNM): ‘Jarabacoa \ 3-4 June 1969 \ Flint & Gomez’. 5♂[M], 1♀[A], 1♀[M] (USNM): ‘L.V. Piedra Blanca \ VII-19&20-1969 \ P. & P. Spangler’. 1♂[A], 21♂[M], 17♀[M] (USNM): ‘M.C., Copey \ VII-21-1969 \ P. & P. Spangler’. 1♀[M] (USNM): ‘Monte Cristi Prov \ road to Buen Hombre Finca Orilla \ 96 m, MV light \ 19°45'40.3"N 71°24'34.7"W \ 2010-06-25 \ S. Lingafeller’. 5♂[M], 1♀[M] (USNM): ‘Playa de Magante \ 17-IV-1985 \ F. Farci’. 1♂[M] (USNM): ‘Prov Altagracia \ Nisibon \ 9-VI-76 \ R.E. Woodruff’. 1♀[M] (TAMU): ‘Puerto Plata, Sosua’ \ 22 August 1967 \ J.C. Schaffner. **ECUADOR:** 1♀[M] (INAT): Guayaquil, Guayas [2.1354°S, 79.9092°W], 19 August 2024, Julio Narváez. **GRENADA:** 1♂[M], 2♀[M] (USNM): ‘H.H. Smith’. 2♂[M], 1♀[M] (USNM): ‘Telescope Est. (Windward side) \ H.H. Smith’. **GUADELOUPE:** 1♂[M], 1♀[M] (USNM): ‘Nov. 1945 \ Adrien Questel’. 1♂[M] (USNM): ‘Guadeloupe’. **HAITI:** 1♂[M], 1♀[M] (SEMC); 1♀[M] (USNM): ‘Gonaïeves \ Oct 1927 \ G.N. Wolcott’. 1♂[A], 1♀[M] (USNM): ‘Hatte Lathan \ 1943-04-28 \ A. Curtus’. 1♂[M] (USNM): ‘Port au Prince \ February 1925’. 1♀[M] (USNM): ‘Port au Prince \ March 1927 \ G.N. Wolcott’. 1♀[M] (USNM): ‘Port au Prince, Thor \ 10-12-X-1970 \ J.E. Porter’. **JAMAICA:** 2♀[A] (USNM): ‘Jamaica’. 1♂[A], 1♀[A] (USNM): ‘Antonio \ 1 January 1906 \ A.E. Wright’. 2♂[M], 2♀[M] (USNM): [Hector’s River P.O. \ Clifford Meredith’. 1♀[A] (USNM): ‘Ocho Rios \ Aug 20-24 '34 \ Darlington’. 1♂[M], 1♀[M] (USNM): ‘Palm Beach \ Montego Bay \ Mar 11 1911 \ HG Barber Collection’. 1♂[M], 2♀[A], 1♀[M] (USNM): ‘St. Catherine \ Linstead \ 6-iv-1971 \ R.M. Baranowski \ blacklight trap’. 1♂[M], 2♀[M] (USNM): ‘Trelawny \ 1.9 mi n Burnt Hill \ 9-XII-69 \ E.G. Farnworth \ blacklight trap’. **MARTINIQUE:** 1♂[M], 3♀[M] (USNM): ‘Lamantin \ June 1962 \ J. Maldonado Capriles’. **MEXICO: Campeche:** 1♂[A], 2♀[M] (USNM): ‘Camp. 2 mi. E. Campeche \ VII-27-1964 \ Paul J. Spangler’. 27♂[M], 1♀[M] (SEMC): ‘Ciudad del Carmen, Campeche \ 9 – 14 to 16 – 33 \ H.D. Thomas’. **Chiapas:** 2♂[M] (USNM): ‘2 mi. W. Montebello Lakes \ 2 May 1964 \ J.T. & M.S. Polhemus’. 2♀[A], 1♀[M] (USNM): ‘3 mi. W. Montebello Lakes \ 3 May 1964 \ J.T. & M.S. Polhemus’. 1♂[M], 1♀[M] (SEMC): ‘La Libertad Chiapas \ 1-1-38 \ Octavio Utrilla Louis’. 1♂[M], 9♂[M], 15♀[M] (SEMC): ‘Had. La Libertad \ Chiapas Mexico \ Sept 1 1937 \ H.D. Thomas’. **Oaxaca:** 1♂[M] (TAMU): ‘50 mi N La Ventosa’ \ 14 December 1955 \ J.C. Schaffner. **Quintana Roo:** 1♂[M] (TAMU): ‘32.2 km W Felipe Carillo Puerto’ \ 13 August 1971 \ C.A. Newton. **Tabasco:** 1♀(BYUC): ‘Teapa Tabasco \ 1 Feb. '61 \ Delwin Barrett’. **Tamaulipas:** 1♂[M] (TAMU): ‘El Cielo, Canindo \ 23.05710°N, 94.22894°W \ July 28, 1993 \ el. 4350 \ J.C. Schaffner’. 1♂[M] (TAMU): ‘Estancia Biologica Los Cedros, Gomez Farias’ \ 26 July 1993 \ E.G. Riley, M.A. Quinn. 1♂[A] (SEMC): ‘Llera Tamps’ \ VI-15-53 \ Univ. of Kansas Expedition. 1♂[M] (USNM): ‘Tampico \ 16 July 1950 \ Drake & Hottes’. 1♂[A] (SEMC): ‘Llera Tamps \ VI-15-53 \ Univ. of Kansas Expedition’. **Veracruz:** 1♀[M] (USNM): ‘La Piedra 20 mi. S. Veracruz \ XII-11-63 \ J.T. Polhemus’. 2♂[M], 2♀[M] (USNM): ‘Veracruz \ 7 VIII 57 \ D.R. Lauch’. 1♀[M] (USNM): ‘Córdoba \ 6-9-XI-1966 \ A.B. Lau’. 9♂[M], 2♀[A], 3♀[M] (SEMC): ‘15 mi. West Vera Cruz \ V.C. Mexico \ VI.3.53’. 1♀[M] (TAMU): ‘4 mi NW Sontecomapan’ \ 9 June 1965 \ H.R. Burke, J.R. Meyer, J.C. Schaffner. 1♀[M] (TAMU): ‘6 mi NW Sontecomapan’ \ 21 August 1967 \ H.R. Burke, J.E. Hafernik. 1♀[A] (TAMU): ‘2 km NW Alazan’ \ 22-23 January 1970 \ R.K. LaVal. **Yucatán:** 64♂/♀ (SEMC): ‘Merida Yucatan \ 8-30-36 \ H.D. Thomas’. **NICARAGUA:** 1♂[M] (TAMU): ‘Bartola Field Station, Rio San Juan, ca 2mi SE El Castillo’

\ 19–24 June 2004 \ D.E. Baumgardner. 1♀[M] (INAT/MEL): ‘Chinandega: Las Marias, alt. 90 m, 12.667804, -86.860928, 5-II-1995, col. J.M. Maes & F. Collantes’. 1? [M] (INAT/MEL): ‘Masaya: Las Flores, Finca Tellez, alt. 100 m, 12.003716, -86.020843, 8-VII-1994, trampa UV, col. J.M. Maes & J. Hernandez’. 1♂[M] (INAT/MEL): ‘Leon: Carretera Leon a Poneloya: Rio detrás de la chanchera, alt. 46 m, 12.420101, -86.937010, 29-I-1995, col. J.M. Maes & F. Collantes’. **PERU:** 46 ex. (SEMC): ‘Dept. Cajamarca \ Andes 190 m. a.s.l. \ Laguna de los Blancos \ Loc. Celendin \ June 17, 1936 \ F. Woytkowski’. 1♂[A], 1♀[M] (USNM): ‘Hbg. – Sud – Peru \ Sammelrese 1936 \ Eing. Nr. 1, 1937 \ Sud – Peru \ Hac. Huayuri \ 27.8.1936’. 57 ex. (SEMC): ‘Lagunas Villa \ Dept Lima \ June 34 \ F. Woytkowski’. 1♂[A] (USNM): ‘Lagunas Villa \ Dept Lima \ Je. 8 to Ju. 1 - 34 \ F. Woytkowski’. 1♂[A] (USNM): ‘Lima’. 1♀[A] (SEMC): ‘Lima (Peru) \ 27 V 1939 \ Weyrauch’. 1♂[M] (USNM): ‘Rio Limac, Lima’. 173 ex. (SEMC): ‘Mouth of Rio Rimac Dept Lima \ June 34 \ F. Woytkowski’. 40 ex. (SEMC); 1♂[M], 1♀[M] (USNM): ‘Vic. Pacasmayo Marshy bogs Near Pacific O. \ May 19-20, '36 \ F. Woytkowski’. 3♂[A], 5♀[A] (SEMC): ‘Churin Peru 2300 m \ 17-VIII-52 \ Weyrauch’. 3♂[A], 1♂[M], 1♀[A] (SEMC): ‘Peru S.A. Lurin \ Dept. of Lima \ 45 kms south of Lima pools near sea \ Nov. 3 t 5-1934 \ F. Woytkowski’. 9 ex. (SEMC): ‘Santa Clara River Rimac \ Sept. 22-25 34 \ F. Woytkowski’. 1♂[M] (SEMC): ‘Nazca Peru \ IV. 51 \ W. Weyrauch’. 2♀[A], 3♀[M] (FMNH): ‘Tumbes, rice’s \ field, (lemina of Water), \ 15.xi.1992 \ Codex 038.11.92’. **PUERTO RICO:** 1♂[A], 12♂[M], 2♀[A], 9♀[M] (USNM): ‘Arroyo \ Feb 1899 \ Aug. Busck’. 21♂[A], 5♂[M], 1♀[A] (SEMC): ‘Cabo Rojo P.R. \ 4.4-37 \ J.A. Ramos’. 1♂[A], 1♀[A] (USNM): ‘Calzado \ 2-II-68 \ C.V. Reichart’. 1♂[M] (USNM): ‘Cartagena Lagoon \ 20 January 1954 \ J. Maldonado Capriles’. 1♂[M], 1♀[M] (USNM): ‘Coamo \ 25-III-68 \ C.V. Reichart’. 1♂[M], 1♀[M] (SEMC): ‘Coamo Springs \ Feb 11 1825 \ H.L. Dozier’. 1♂[M] (USNM): ‘Cuatro Calles \ 25-III-68 \ C.V. Reichart’. 1♀[M] (USNM): ‘Culebral \ Feb 1899 \ Aug. Busck’. 1♀[A] (USNM): ‘El Rio \ XII-28-1929 \ S.T. Danforth’. 17♂/♀ (SEMC): ‘Exp Sta Rio Pedras \ May 23, 1935 \ Julio Garcia Diaz’. 2♂[A] (USNM): ‘Guayanilla \ 5-III-68 \ C.V. Reichart’. 1♂[A], 1♂[M], 1♀[A] (USNM): ‘Gurabe \ XI-4-1944’. 2♂[A], 4♀[A] (USNM): ‘Hwy. 31 km 15.4 nr. Paso Seco Jct \ 1963-01-08 \ P.J. Spangler’. 3♂ [A], 1♂ [M], 1N (MRPC): Luquillo [Fig. 6C; wetland, Corredor Ecológico del Este; 18.3655°N, 65.6951°W, 3 m], 24 May 2025, M.R. Pintar. 1♂[A], 5♂[M], 4♀[A], 1N (MRPC): Luquillo [pool in road, Corredor Ecológico del Este; 18.3665°N, 65.6967°W, 3m], 24 May 2025, M.R. Pintar. 1♂[A], 2♂[M], 1♀[A], 2♀[M] (MRPC): Maunabo [canal, Humedal Punta Tuna; 17.9932°N, 65.8823°W, 1m], 25 May 2025, M.R. Pintar. 17♂/♀ (SEMC): ‘Maricao \ XII-1934 \ C. Falarido’. 1♂[M] (MRPC): Naguabo [puddle, Reserva Natural Bosque Pterocarpus; 18.1827°N, 65.7377°W, 3m], 23 May 2025, M.R. Pintar. 1♂[A] (MRPC): Naguabo [Río Blanco along road 191, 18.2447°N, 65.7847°W, 16m], 23 May 2025, M.R. Pintar. 1♂[A], 2♀[A] (USNM): ‘nr Fajardo \ VIII-20-61 \ Flint & Spangler’. 1♂[A], 2♀[A] (USNM): ‘Rio Inabon \ 26-I-68 \ C.V. Reichart’. 1♂[A], 1♀[A] (USNM): ‘Rio Santiago \ beach pool \ VII-30-1962 \ P.J. Spangler’. 1♂[M], 1♀[M] (USNM): ‘San German \ 5-III-68 \ C.V. Reichart’. 5♂[A], 1♂[M], 4♀[A] (USNM): ‘San Juan \ 31-Mar-38 \ H.D. Tate’. 1♀[M] (USNM): ‘San Juan Airport \ I-2-1963 \ Paul J. Spangler’. **SAINT LUCIA:** 2♀[A] (USNM): ‘Fish ponds Union Agr. Sta. \ 28-Jul-63’. 1♂[A], 1♀[A] (USNM): ‘Pond 1mi S. of Micoud \ 1 Aug. 1963 \ Flint & Cadet’. 6♂[A], 1♂[M], 1♀[A] (USNM): ‘Soufriere \ July-63 \ J. Maldonado Capriles’. **SAINT MARTIN:** 1♂[M], 3♀[M] (USNM): ‘St Martin \ January 1957 \ R. H. Cobben’. **SAINT VINCENT AND THE GRENADINES:** 1♂[A] (USNM): ‘St. Vincent \ H.H. Smith’. **TRINIDAD AND TOBAGO:** 1♂[M], 2♀[A], 1♀[M] (USNM): ‘Trinidad \ Oct 27-29, 1938 \ C.J. Drake’. **UNITED STATES: Florida:** 1♀[M] (CSWF): Collier Co. [Naples; golf course pond on headwaters to Gordon River; 26.1881°N, 81.7835°W], 31 March 2016, L. Johnson. 1♂[A] (FSCA); 1♂[A], 1♀[M] (MRPC); 1♂[A] (USNM): Collier Co., [Naples; pond in Christopher B. Smith Preserve; 26.1659°N, 81.7892°W, 3 m], 27 August 2021, M.R. Pintar. 1♂[A], 1♀[A] (CEIOC); 1♀[A] (MRPC): Collier Co., [Naples; pond in Christopher B. Smith Preserve; 26.1659°N, 81.7892°W, 3 m], 23 September 2021, M.R. Pintar. 1♂[A] (MRPC): Collier Co., [Naples; stormwater pond in parking lot of Conservancy of Southwest Florida; 26.1660°N, 81.7888°W, 3 m], 27 August 2021, M.R. Pintar. 2♂[A], 2♀[A], 1[N] (MRPC); 1♂[A], 1♀[A] (USNM): Collier Co., [Naples; filtration pond at Conservancy of Southwest Florida; 26.1667°N, 81.7879°W, 3 m], 27 August 2021, M.R. Pintar. 1♀[A] (CSWF): Collier Co., [Picayune Strand State Forest; Miller Canal at 80th Ave. west from Everglades Blvd.; site CA1; 26.0908°N, 81.5546°W], 19 November 2002, I. Bartoszek. 1♀[A] (INAT): Collier Co., [Rookery Bay; Briggs Boardwalk; 26.024°N, 81.712°W], 29 November 2021, R. Webster. 2♂[A], 1♀[A] (INAT): Collier Co., [Fig. 21C; Ten Thousand Island National Wildlife Refuge; Marsh Trail near parking lot; 25.9741°N, 81.5542°W], 30 November 2021, R. Webster. 1♀[A] (INAT): Hillsborough Co., [Lithia, pond; 27.8440°N, 82.2086°W], 21 July 2024. 1♂[M], 1♀[A] (INAT): Hillsborough Co., [Tampa Zoo; 28.0138°N, 82.4706°W], 9 August 2024, squidpastry. 2♂[M], 2♀[M]: Miami-Dade Co., [Fig. 6A; Everglades National Park; marsh at Gate 9; 25.4351°N, 80.6956°W],

20 February 2021, M.R. Pintar (observed not collected). 1♂[M], 1♀[M]: Miami-Dade Co., [Everglades National Park; Pine Glades Lake; 25.4279°N, 80.7209°W], 16 April 2021, M.R. Pintar (observed not collected). 1♂[M], 1♀[M]: Miami-Dade Co., [Fig. 6D; Everglades National Park; solution holes along Gate 10 Trail; 25.426°N, 80.685°W], 20 February 2021, M.R. Pintar (observed not collected). 1♀[M] (FIU): Miami-Dade Co., [Everglades National Park; Upper Taylor Slough site 1, throw 7; 25.464°N, 80.577°W], 20 November 2017, FIU Aquatic Ecology Lab. 1♂[M] (FIU): Miami-Dade Co., [Everglades National Park; Upper Taylor Slough site 5, throw 1; 25.437°N, 80.599°W], 26 September 2019, FIU Aquatic Ecology Lab. 1♀[A] (FIU): Miami-Dade Co., [Everglades National Park; Upper Taylor Slough site 9, throw 1; 25.417°N, 80.593°W], 28 November 2018, FIU Aquatic Ecology Lab. 1♀[A] (FSCA); 1♂[A], 1♀[A] (SEMC); 3♂[A] (MRPC): Miami-Dade Co., [Greynolds Park; mangrove pond; 25.9395°N, 80.1537°W], 10 August 2021, M.R. Pintar. 1♂[A] (MRPC): Miami-Dade Co., [L-31W Canal; 25.4174°N, 80.4737°W], 11 September 2021, M.R. Pintar. 1♂[A] (MRPC); 1♂[M] (USNM): Miami-Dade Co., [Fig. 6B; North Miami; mesocosm at Florida International University, Biscayne Bay Campus; 25.9130°N, 80.1386°W], 15 March 2021, M.R. Pintar. 1♂[A], 1♀[A] (INAT): Miami-Dade Co., [Fig. 21A; mangroves in Oleta River State Park, North Miami; 25.920°N, 80.134°W], 25 January 2020, Joe MDO. 1♀[M] (UTIC): Miami-Dade Co., [North Miami; small pond in mangroves; 25.9086°N, 80.1452°W], 19 September 2021, M.R. Pintar. 2♂[M], 2♀[M] (USNM), 1♂[M], 1♀[M] (FSCA): ‘Monroe Co. \ Big Pine Key \ (on fresh water) \ Nov. 27 1947 \ J.L. Herring’. 1♀[M] (FIU): Monroe Co., [Everglades National Park; CERP primary sampling unit 254, throw 2; 25.484°N, 81.050°W], 18 October 2016, FIU Aquatic Ecology Lab. **U.S. VIRGIN ISLANDS:** 1♂[M], 3♀[A], 1♀[M] (USNM): ‘St. Croix \ Beaton \ 12-Feb66 \ Paul J. Spangler’. 4♂[A], 5♀[A] (USNM): ‘St. Croix \ 10.VI.1955’. 10♂[A], 8♂[M], 8♀[A], 13♀[M], 3N (USNM): ‘St. Croix \ Beaton \ 14-Feb-66 \ Paul J. Spangler’. 1♂[A], 2♂[M], 1♀[M] (USNM): ‘St. Croix Bethlehem \ 11-15 Feb. 1966 \ Paul J. Spangler’. 14♂/♀(SEMC): ‘St. Croix V.I. \ Christiansted \ 3 1941 \ H.A. Beatty’. 1♂[A], 2♂[M], 1♀[M] (USNM): ‘St. Croix \ Jealousy \ 11–15 Feb. 1966 \ Paul J. Spangler’. 1♂[M], 1♀[A], 1♀[M] (USNM): ‘St. Croix \ 1941 \ H.A. Beatty’. 2♂[M] (USNM): ‘St. Croix \ 14 Feb. 1966 \ Paul J. Spangler’. 2♂[M], 2♀[A] (USNM): ‘St. John \ 01-Apr-61 \ J. Maldonado Capriles’. 7♂[A], 4♂[M], 10♀[A], 2♀[M] (SEMC): ‘St. Thomas \ May 15 1937 \ Chester Roys’. 2♂[M], 2♀[M] (USNM): ‘St. Thomas \ March 27–30, 1961 \ J. Maldonado Capriles’. 12♂[A], 2♂[M], 9♀[A], 4N (USNM): ‘St. Thomas \ Jan. 20, 1963 \ Paul J. Spangler’. 4♂[A], 3♂[M], 4♀[A], 1♀[M], 1N (USNM): ‘St. Thomas \ Jan 21 1963 \ Paul J. Spangler’. 2♂[M], 2♀[M] (USNM): ‘Charlotte Amalie \ St Thomas \ 02-Jun-17 \ Harold Morrison’.

Limnogonus macroconfusus, sp. nov.

(Figs. 7–10, 12B, 18B)

Description. **Apterous male** (Figs. 7A, 8A, 9A). Body length: 6.57–8.25 mm, mean = 7.41 mm.

Dorsally body dark-brown to black with yellow stripes. Head dark with two yellow longitudinal stripes typically connected posteriorly. Antennae dark-yellow to brown, with apices typically darkest; antennomeres III and IV more densely covered in hairs (sensilla), often producing a whitish appearance (most noticeable in photographs of live specimens; Fig. 21D). Pronotum dorsally dark; anteriorly with two medial subparallel yellow stripes (Figs. 7A, 12B); posterior pronotum with a single yellow medial stripe that is usually distinct for its entire length; pronotum margined with bright-yellow stripe. Dorsally abdomen dark with medial yellow to light-brown stripe that is usually distinct for its entire length (Fig. 7A), but may be reduced on anterior segments, especially tergum I; abdominal connexiva sometimes appearing slightly lighter but coloration not distinct. Lateral coloration on pronotum and thorax alternating dark/light stripes with silvery pubescence. Width and shape of lower black stripe variable, ranging from a nearly even-width stripe for its length (Fig. 8A) to greatly expanded width on the anterior half (typically wider in macropterous specimens; Fig. 8B). Ventrally color generally whitish to yellow medially (Fig. 9A); on abdominal segments, lighter medial coloration gradually darkening towards margins, but margins themselves with light coloration. Legs yellow to light-brown with apices and tarsi usually darker.

Syntipsis 0.71× width of the interocular space at posterior margin of eyes. Pronotum anterior width 0.89× maximum posterior width. Fore tibia lacking constriction 3/5th distance to apex, appearing approximately straight or evenly, gradually curved, with average angle 172°. Posterior shape of pronotum gradually appearing like a slightly rounded V. Ventrally, length of abdominal segment VI approximately 0.93× length VII. First genital segment with posteroventral margin of evenly rounded (Fig. 9C); when viewed laterally, bottom of this segment is most anterior portion of its margin (Fig. 9D). Lateral sclerite wider near middle of vesica, but not grossly widened, relatively

even width and without ventral distal extension (Fig. 9E); viewed ventrally, bottom of vesical plate widest distally, widely rounded apically, and slightly laterally constricted nearer base; ventral sclerite usually appearing deeply incised (Fig. 9F).

Macropterous male (Figs. 7C, 8B). Body length: 7.01–8.75 mm, mean = 7.76 mm.

Coloration as in apterous male. Hemelytra variably black to dark-brown to gray. Structure as in apterous male except posterior width of pronotum wider, anterior:posterior width = 0.68. Abdominal sternum VI slightly longer, $0.91\times$ length of segment VII. Dorsal abdominal coloration not considered (hidden beneath hemelytra).

Apterous female (Figs. 7B, 8C, 9B). Body length: 7.77–9.78 mm, mean = 8.90 mm.

Coloration and structure as in apterous male except abdomen dorsally usually with medial yellow stripe distinct; connexiva with distinct yellow stripes connected across segments II–VII (Fig. 7B); medial and lateral stripes on segment I may be distinct to apparently absent. Fore tibia not distinctly constricted or bent, appearing approximately straight (Fig. 7B); angle of curve 172° . Length of abdominal sternum VI approximately $0.75\times$ length of segment VII (Fig. 9B). Abdominal segment VII posteroventral margin approximately straight with no medial projections.

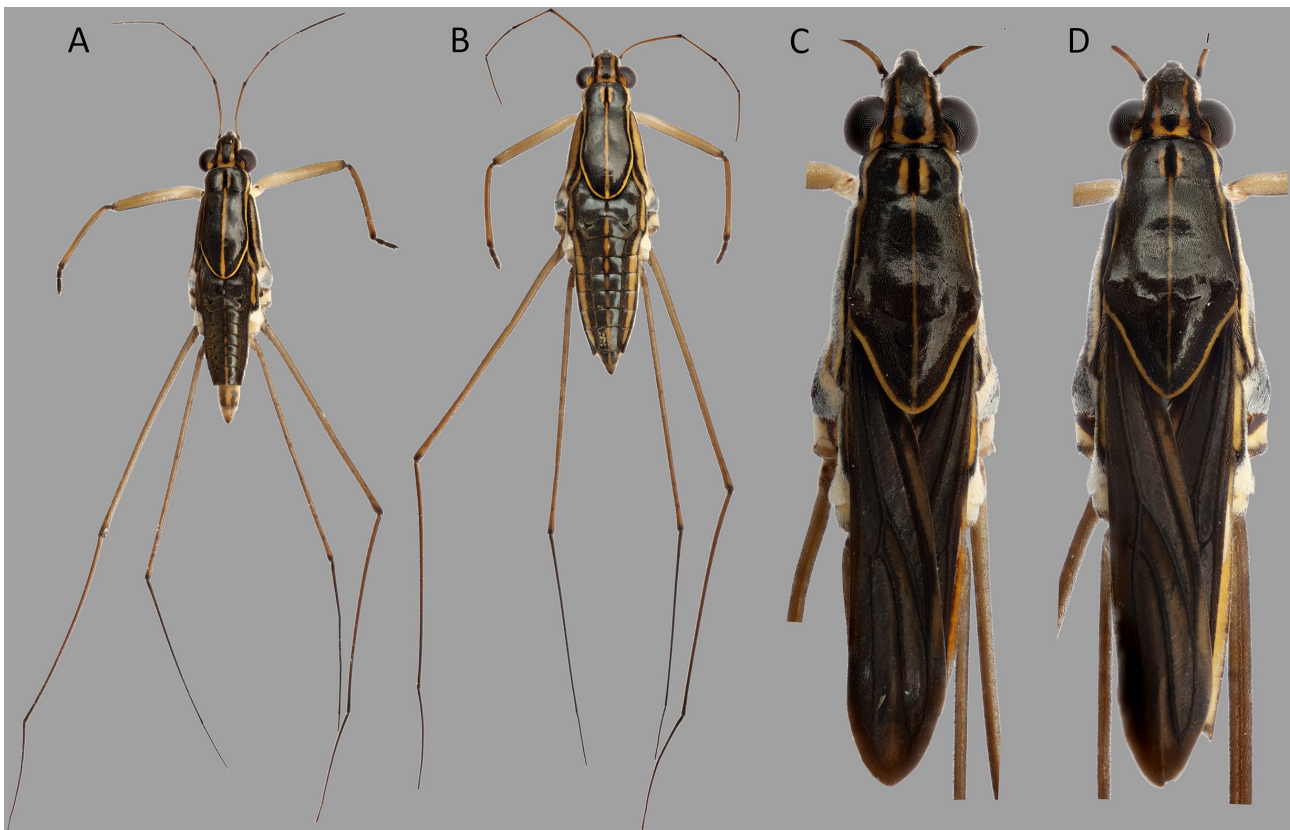


FIGURE 7. *Limnogonus macroconfusus* sp. nov. dorsal habitus images: A) apterous male holotype; B) apterous female paratype, Puerto Rico; C) macropterous male, Texas; D) macropterous female, Texas.

Macropterous female (Figs. 7D, 8D). Body length: 8.32–9.87 mm, mean = 9.13 mm.

Coloration and structure as in apterous female with similar hemelytral coloration and pronotal width as in macropterous male; dorsal abdominal coloration not considered (hidden below hemelytra).

Type locality. Río Blanco along road 191, Naguabo, Puerto Rico (18.2247°N , 65.7847°W ; Fig. 11A).

Etymology. Larger (*macro-*) than the similar *L. franciscanus*, with which it has long been confused (*-confusus*).

Distribution. Southern Texas through Mexico, Central America, and the Greater Antilles. Males verified from: Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico (Campeche, Chiapas, Guerrero, Jalisco, Michoacán, Morelos, Nayarit, Oaxaca, Puebla, San Luis Potosí, Sinaloa, Tabasco, Tamaulipas, Veracruz, Yucatán), Nicaragua, Puerto Rico (including Vieques Island), and the continental United States (Texas) (Fig. 10).

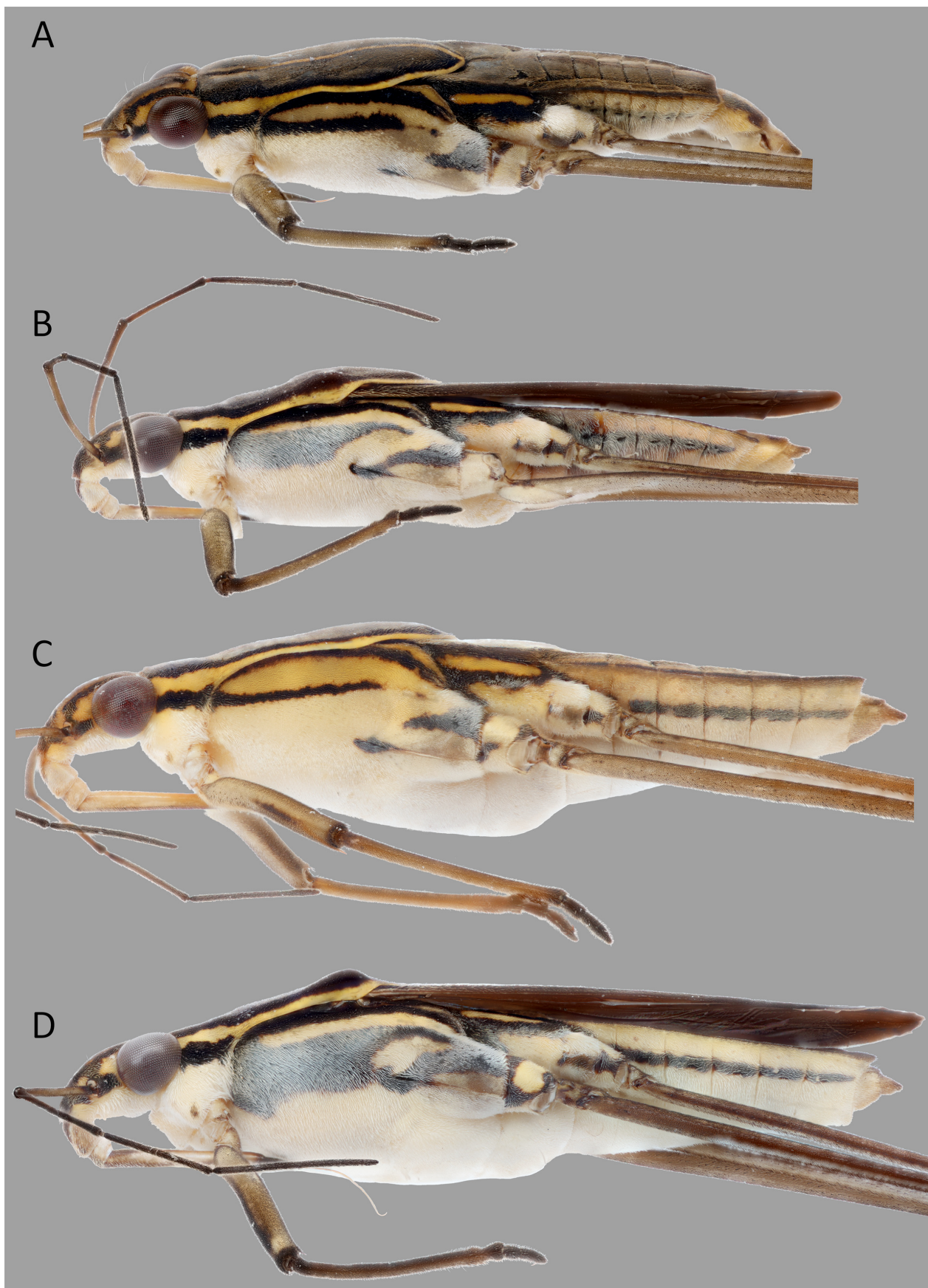


FIGURE 8. *Limnogonus macroconfusus* **sp. nov.** lateral body images: A) apterous male holotype, Puerto Rico; B) macropterous male, Texas; C) apterous female paratype, Puerto Rico; D) macropterous female, Texas.

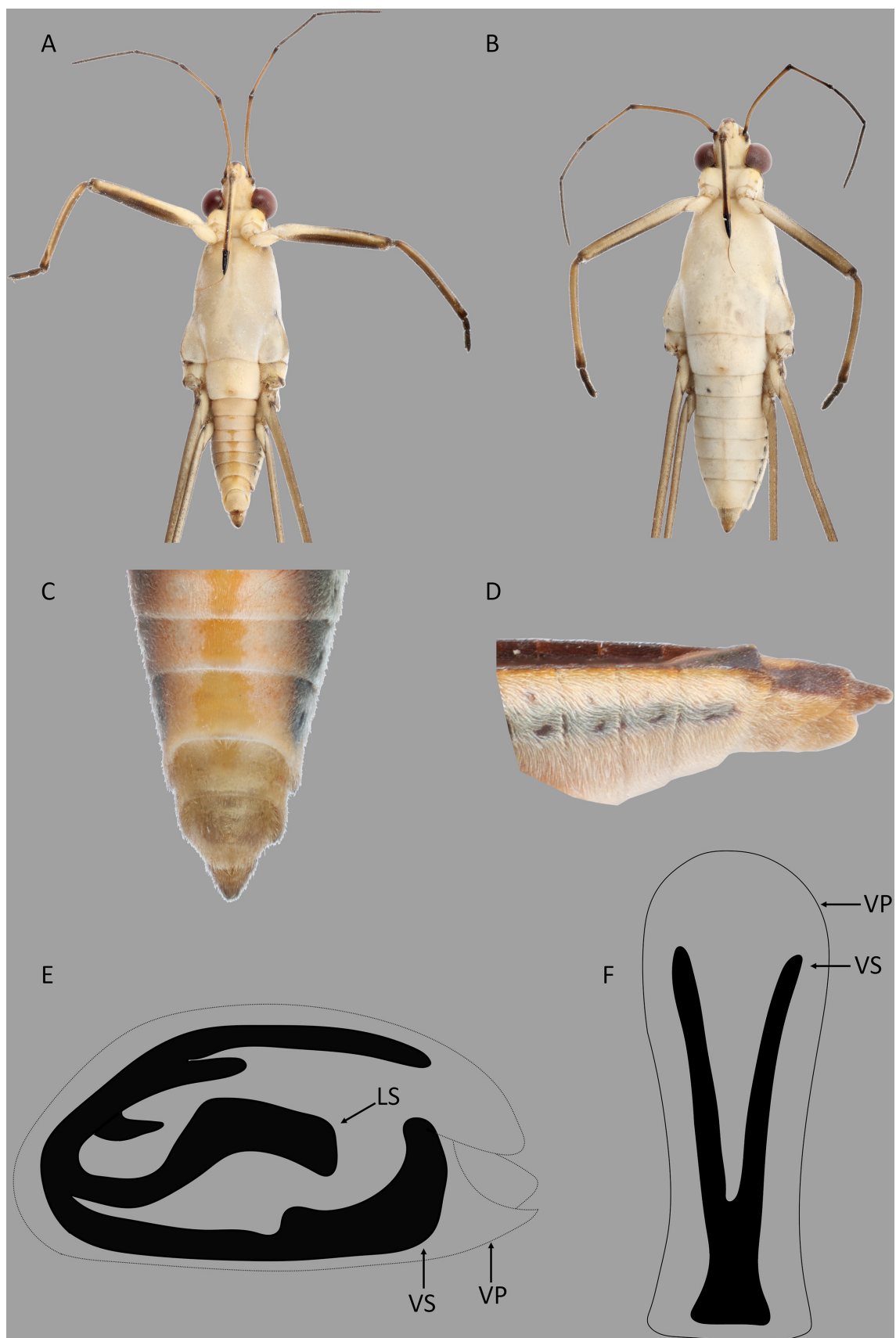


FIGURE 9. *Limnogonus macroconfusus* **sp. nov.** images from type locality in Puerto Rico: A) apterous male holotype ventral; B) apterous female paratype ventral; closeups of apterous male holotype terminal abdominal/genital segments: C) ventral and D) lateral. Illustrations of male vesica: E) lateral; F) ventral; LS = lateral sclerite, VP = vesical plate (outline), VS = ventral sclerite; arrows for VP and VS point indicate same location in both figures.

Discussion. *Limnogonus macroconfusus* **sp. nov.** is very similar to *L. franciscanus*, and the two have long been confused, leading to the prior assumption that *L. franciscanus* is highly variable in size. *Limnogonus macroconfusus* males are distinctly larger than *L. franciscanus*; although females are also larger, some overlap exists in apterous females in the 7.8–8.3 mm range and in macropterous females in the 8.0–8.6 mm range (Fig. 19). Males can be reliably distinguished based on the shape of vesica sclerites, differences in size, the constricted and often bent appearance of the fore tibia in *L. franciscanus* (approximately straight in *L. macroconfusus*), and the typically divergent appearance of the two yellow lines on the anterior of the pronotum in *L. franciscanus*, but always subparallel appearance of the pronotal spots in *L. macroconfusus*. Females cannot always be definitively identified; smaller individuals (<7.5 mm) and those with strongly divergent spots on the pronotum are certainly *L. franciscanus*, whereas larger individuals (>8.5 mm) without diverging pronotal spots are certainly *L. macroconfusus*. Size comparison of females in Fig. 19 was based primarily on individuals from series with males and no congeners nearby.

Morphological analyses further confirmed differences between *L. franciscanus* and *L. macroconfusus* (Table 1). Both body length (Fig. 19) and the pronotal spot ratio were significantly different between species with a significant or marginal interaction between species and wing morph (Table 2). Body size differed by sex as expected, but the pronotal spot ratio did not differ. Permanova indicated significant differences between species and wing morph for both sexes (Table 2). Spatial separation in the male NMDS plot (Fig. 20) indicates all three species are clearly distinct, but closer spatial arrangement of points in the female figure indicates similarity among the species when relying on general size measurements.

TABLE 2. Results of statistical analyses between *L. franciscanus* and *L. macroconfusus* **sp. nov.** Univariate analyses on body length and pronotal spot ratio, and multivariate (permanova) analyses on combined traits for males and females. Country (population) was included as a random effect (RE) in all analyses, but permanova treats this differently than lme4.

	DF	F	P
Body length			
Species	1, 149	357.2	<0.0001
Wing Morph	1, 201	62.4	<0.0001
Sex	1, 187	626.1	<0.0001
Species:Wing	1, 205	8.7	0.0036
Pronotal spot			
Species	1, 78	117.7	<0.0001
Wing Morph	1, 78	5.1	0.0273
Sex	1, 78	0.3	0.5701
Species:Wing	1, 78	3.7	0.0703
Permanova – Males			
Species	1, 36	125.6	0.0001
Wing Morph	1, 36	9.3	0.0001
Country (RE)	4, 36	1.9	0.0260
Permanova – Females			
Species	1, 27	24.4	0.0001
Wing Morph	1, 27	3.1	0.0210
Country (RE)	3, 27	2.8	0.0035

The only species occurring south and east of the Andes in South America that are somewhat similar to *L. macroconfusus* and *L. franciscanus* are *L. ignotus* and *L. profugus* based on the structure of the male genital segments (all lack a point on the posteroventral margin of abdominal sternum VII). In *L. profugus*, the first genital segment is very large and constricted medially, but this segment is not very large or distinctly constricted medially in the other three species. The ventral sclerite of *L. profugus* is laterally sinuate and unique among Neotropical species in that it curves downward at the apex when viewed laterally. The ventral vesical plates of *L. macroconfusus*, *L. franciscanus*,

and *L. ignotus* are relatively similar when compared to all other Neotropical congeners (e.g., *L. recens*; Figs. 15E,F). However, *L. ignotus* is easily distinguished from all other species based on the two small narrowly separated pronotal spots that are parallel or appear convergent anteriorly (Fig. 12C). Additionally, *L. macroconfusus* is larger than *L. ignotus* (see sizes and comparison in discussion under *L. franciscanus*).



FIGURE 10. Distribution of *Limnogonus macroconfusus* sp. nov. based on specimens examined (red circles) and iNaturalist observations and a museum record of a female (Hermosillo, northwesternmost point) likely representing this species (orange circles).

Most records of *L. macroconfusus* are from southern Texas to Costa Rica, with records from the four largest islands in the Greater Antilles (Cuba, Hispaniola, Jamaica, Puerto Rico; all islands with rivers), as well as one specimen from Vieques Island near Puerto Rico (Fig. 10). In contrast, nearly all records of *L. franciscanus* were from coastal areas of the continents and large islands, along with many of the small islands throughout the Caribbean. In Mexico, *L. macroconfusus* is apparently much more widespread than is *L. franciscanus*, occurring throughout nearly all humid, tropical, and lower-elevation areas, potentially as far north as Hermosillo, Sonora. One specimen at CAS (female, Hermosillo) and iNaturalist records of the genus indicate the distribution of the genus much farther north along the Gulf of California (Sea of Cortez) than previously known, including in Baja California Sur. Although these specimens and records could not be definitively identified to species (Fig. 21D), I suspect them to be *L. macroconfusus* given the lack of records of *L. franciscanus* in western Mexico and none possessing divergent pronotal spots.

Limnogonus franciscanus is generally found only in lentic habitats (Fig. 6), although *L. macroconfusus* was collected from similar lentic habitats in Texas, where *L. franciscanus* was absent. General habitat differentiation exists between these species. In Puerto Rico, Jamaica, and Texas, *L. macroconfusus* has been collected from low-gradient streams (Fig. 11) where it has been observed striding on open flowing water similar to *Aquarius* spp. in North America. A few series of the genus apparently contained both *L. macroconfusus* and *L. franciscanus* from the same localities, but most records of each species were in isolation of each other. At the type locality of *L. macroconfusus* (Río Blanco, Puerto Rico; Fig. 11A), I found a single *L. franciscanus* male in a calm, sheltered area along the edge of the river, while *L. macroconfusus* was common nearby, often in open water.

Type material examined. HOLOTYPE: 1♂[A] (USNM): **PUERTO RICO:** Naguabo [Fig. 11A; Río Blanco along road 191, 18.2247°N, 65.7847°W, 16m], 23 May 2025, M.R. Pintar. PARATYPES: 2♂[A], 2♀[A] (SEMC); 1♂[A], 1♀[A] (TAMU); 1♂[A], 2♀[A] (USNM); 1♂[A], 1♀[A] (UTIC); 3♂[A], 2♀[A] (MRPC): same data as holotype.

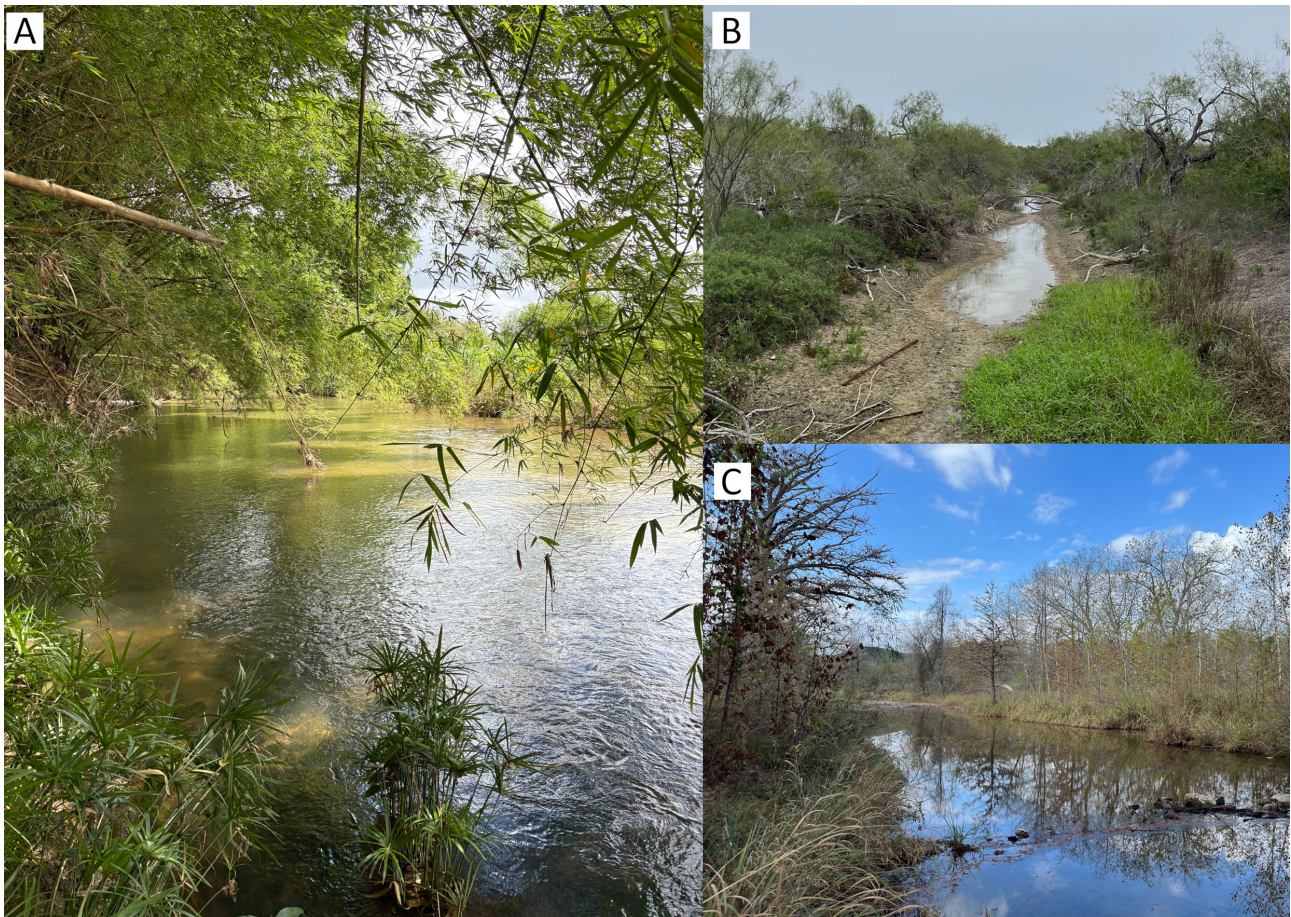


FIGURE 11. Habitats of collection locations of *Limnogonus macroconfusus* **sp. nov.**: A) Río Blanco, Naguabo, Puerto Rico (type locality); B) drainage ditch in Estero Llano Grande State Park, Hidalgo County, Texas; C) Sabinal River, Uvalde County, Texas.



FIGURE 12. Dorsal images showing the anterior pronotal spots on *Limnogonus* specimens: A) *L. franciscanus* from Miami-Dade County Florida; B) *L. macroconfusus* **sp. nov.** holotype from Río Blanco, Puerto Rico; C) *L. ignotus* from Satipo, Peru.

Additional material examined. COSTA RICA: 2♂[M] (USNM): ‘16 mi S. La Cruz \ VII-13-1965 \ Paul J. Spangler’. 1♀[M] (USNM): ‘Bagaces Guanacaste \ 16 VII 57 \ DR Lauch’. 4♂[M], 1♀[M] (USNM): ‘Guanacaste \ 12 VII 59 \ DR Lauch’. 1♂[M] (USNM): ‘San Antonio \ XIII-25-1969 \ J.T. Polhemus’. 1♂[M] (USNM): ‘Turrialba \ VII-15-19-65 \ Paul J. Spangler’. **CUBA: Cienfuegos:** 1♂[A], 1♀[A] (SEMC): ‘Soledad, Cuba \ 14.II.1925 \ J.G. Myers’. **Habana:** 1♂[M] (SEMC): ‘Casa Blanca Habana Cuba \ 12.20.33 \ P.J. Bermudez’. **Matanzas:** 2♂[A](USNM): ‘Arroyo in Mena west Matanzas \ Yumuri Valley \ 5, 16 1932 \ P.J. Bermudez’. 1♂[M], 1♀[M] (SEMC): ‘Matanzas Cuba Yumuri Valley \ 12.9.33 \ P.J. Bermudez’. **Pinar del Río:** 2♂[M] (USNM): ‘Vinales \ small stream in grazed area \ 22°26'59"N, 83°42'28"W, sta 2 \ 30-Jan-00 \ M.E. Epstein’. **Unknown province:**

1♂[M] (USNM): 'Cuba \ P.R. Uhler Collection'. **DOMINICAN REPUBLIC:** 3♂[A], 1♀[M] (USNM): 'Valle Nuevo, Prov la Vega \ December 28 1955 \ J. Maldonado Capriles'. 1♀[A] (TAMU): 'Distrito Nacional La Victoria' \ 7 August 1967 \ J.C. Schaffner. **EL SALVADOR:** 1♂[M] (USNM): 'Cojutepeque, 10 Mi E. \ VII-9-65 \ Paul J. Spangler'. 1♂[M] (USNM): 'La Libertad \ Quezaltepeque \ 11-Feb-65'. 1♀ (USNM): 'La Union \ 23 VII 57 \ DR Lauch'. 3♂[M], 2♀[M] (USNM): 'Miguel \ 7 VII 57 \ DR Lauch'. 1♂[M] (USNM): 'Santa Ana \ 28 VII 57 \ DR Lauch'. **GUATEMALA:** 1♂[M] (USNM): '15 Mi w. Pijije \ VIII-5-1965 \ Paul J. Spangler'. 2♂[A], 1♂[M], 7♀[A], 4♀[M] (USNM): 'Aldea Jesus Maria \ VII_14-1965 \ Paul J. Spangler'. 1♂[A], 1♀[A], 1♀[M] (USNM): 'East of Agua Blanca \ I-10-1970 \ J.T. Polhemus'. 1♂[M], 1♀[M] (USNM): 'Jutrapa \ 30 VII 59 \ DR Lauch'. 1♂[M], 5♀[M] (USNM): 'Nr. L. Atescatempa \ I-10-1970 \ J.T. Polhemus'. **HAITI:** 1♂[A], 1♀[A] (USNM): 'Ennery \ Sept 6-11 '34 \ Darlington'. **HONDURAS:** 1♂[A], 2♀[M] (USNM): 'Choluteca \ 20 VII 57 \ DR Lauch'. 1♀[M] (USNM): 'San Marcus Colon \ VII-28-1965 \ PJ Spangler'. **JAMAICA:** 1♂[A], 1♀[A] (USNM): 'Christiana \ Jul-61 \ J. Maldonado Capriles'. 2♂[A], 1♂[M], 3♀[A] (SEMC); 1♀[A] (USNM): 'Claremont Baron Hill Trelawny \ 3.4.28 \ G. Perkins'. 1♂[M], 2♀[A] (MRPC); 1♀[A] (CEIOC): St. Mary [White River; 18.3678°N, 77.0518°W; 'river running through active attraction'], 12 February 2022, G. Campbell. **MEXICO: Campeche:** 6♂[M], 8♀[M] (USNM): 'Camp. 2 Mi E. Campeche \ VII-27-1964 \ Paul J. Spangler'. 4♂[M] (SEMC): 'Ciudad del Carmen \ 9-11 to 16-36 \ H.D. Thomas'. **Chiapas:** 1♀[M] (USNM): 'Chiapas \ 5 VIII 57 \ DR Lauch'. 1♂[A], 1♀[M] (SEMC): 'Ocozocoautla Chiapas \ 2.3.1937 \ H.D. Thomas'. 2♂[A], 2♂[M], 1♀[M] (SEMC): 'San Vicente \ Chiapas, Mex. \ 1-4-38 \ Octavio Utrilla Louis'. **Guerrero:** 2♂[M], 1♀[M] (USNM): 'Acapulco \ 23 July 1950 \ Drake & Hottes'. 1♂[M], 1♀[A] (USNM): 'Acapulco \ 3 August 1951 \ Drake & Hottes'. 1♂[A] (UAIC): '20 km E. Tecpan \ 16-XII-82 \ E Larsen'. **Jalisco:** 2♂[M] (USNM): 'Arroyo Madenas \ 21-30 March 1973 \ H. Brailousky'. 4♂[M], 1♀[M] (UAIC): '6 mi N Puerto Vallarta \ 17-I-83 \ E Larsen'. **Michoacán:** 1♂[M] (UAIC): '11 mi SE. Playa Azul \ 16-I-83 \ E Larsen'. **Morelos:** 1♂[M], 1♀[A] (USNM): '20 Mi S of Cuernavaca \ 27 April 1964 \ J.T. & M.S. Polhemus'. 3♂[A], 3♂[M], 2♀[A], 2♀[M] (USNM): '5 mi W of Zacatepec \ 25 April 1964 \ J.T. & M.S. Polhemus'. 1♂[M] (SEMC): 'Acatilpia \ V.5 44 \ J.G. Shaw'. **Nayarit:** 1♂[M] (USNM): '5 de Mayo \ 21 April 1964 \ J.T. & M.S. Polhemus'. 1♀[M]: '5 mi S. of Rio Santiago Ferry' \ XI-27-1948 \ H.B. Leech. 2♂[M], 2♀[M] (USNM): '7 Mi E of San Blas \ 21 April 1964 \ J.T. & M.S. Polhemus'. 1♂[M] (USNM): 'N of Tuxpan \ 21 April 1964 \ J.T. & M.S. Polhemus'. 8♂[M] (USNM); 4♂[M], 3♀[M] (CSUC): 'San Blas (Riv.) \ XI-28-68 \ J.T. Polhemus'. **Oaxaca:** 4♂[M], 4♀[M] (USNM): 'E of Tehuantepec \ 30 April 1964 \ J.T. & M.S. Polhemus'. 2♂ [A], 3♂ [M], 3♀ [A], 1♀[M] (USNM): 'El Carmen \ 30 April 1964 \ J.T. & M.S. Polhemus'. 2♀[M] (USNM): '9 mi SE El Tule \ VIII-24-1965 \ Paul J. Spangler'. 1♂[M], 1♀[M] (USNM): 'Tehuantepec \ 23-Jul-51 \ Drake & Hottes'. 1♀[M] (USNM): 'Tehuantepec \ VII-15-16-1964 \ Paul J. Spangler'. **Puebla:** 1♂[M] (USNM): 'Puebla \ 30-Jul-50 \ Drake & Hottes'. **San Luis Potosí:** 1♀[M] (USNM): 'Valles \ 17- Jul-50 \ Drake & Hottes'. 6♂[M], 2♀[M] (USNM): 'C. Valles \ 8 August 1951 \ C.J. Drake'. 4♂[M] (USNM): 'Tamazunchale \ 22-VI-1953 \ Slesnick'. **Sinaloa:** 1♀[M] (USNM): 'El Quelite \ XI-29-68 \ J.T. Polhemus'. 3♂[A], 1♂[M], 4♀[A], 2♀[M] (USNM); CSUC: 1♀[M] (CSUC): 'Mazatlan \ V-31-66 \ J.T. & M.S. Polhemus'. 1♂[A], 1♂[M], 3♀[A] (USNM): 'S of Mazatlan \ IV-23-81 \ J.T. & D.A. Polhemus'. 1♂[M] (TAMU): '36 miles N Mazatlan' \ 17 January 1956 \ J.C. Schaffner. **Tabasco:** 1♀[M] (TAMU): '20 kilometers W Cardenas, Campo Exp. CSAT' \ 23 July 1980 \ J.C Schaffner, J. Weaver, T.P. Friedlander. **Tamaulipas:** 1♂[A], 4♂[M], 7♀[M] (USNM): '2 mi E Ciudad Mante Tamps \ VIII-13-1959 \ L.A. Stance'. 2♂ [A], 1♀[A], 1♀[M] (USNM): 'Bocatoma \ 7 km. SSE Gomez Farias \ III-25-30, 78 \ E.G. Riley'. 3♂[M], 3♀[M] (USNM): 'Ciudad Victoria \ 14 July 1950 \ Drake & Hottes'. 1♂[M] (SEMC): 'El Limon Tamps \ VI-17-53 \ Slesnick'. 1♂[A], 1♀[A], 2♀[M] (SEMC): 'Llera Tamps \ VI-15-53'. 1♀[M] (USNM): 'Tamps, Nuevo Morelos \ VIII-28-1965 \ Paul J. Spangler'. 2♂[M], 4♀[M] (USNM): 'Tampico \ 16-Jul-50 \ Drake & Hottes'. **Veracruz:** 1♀[M] (USNM): 'Alvarado \ 28 July 1951 \ Drake & Hottes'. 2♂[M] (USNM): 'Veracruz \ 7 VIII 57 \ DR Lauch'. 1♂[M], 1♀[M] (USNM): 'Veracruz \ 15 Mi se Tantoyuca \ VII-28-1965 \ Paul J. Spangler'. **Yucatán:** 1♂[A] (USNM): 'Yuc. Chichen Itza \ VIII-2-1964 \ Paul J. Spangler'. 1♂[A] (SEMC): 'Yucatan, Mexico \ Chichen Itza \ Dzadz Cenote \ vi-29-1932 \ E.P. Creaser'. 2♂[M] (SEMC): 'Merida Yucatan \ 8-30-36 \ H.D. Thomas'. 1♂[M] (USNM): 'Tical Yucatan \ Mar 26 1947'. **Unknown state:** 1♂[M], 1♀[A] (USNM): 'Guanajuato – Quereturo \ 20 VI 57 \ DR Lauch'. **NICARAGUA:** 2♂[M], 3♂[M] (USNM): '13 Mi N. Sn. Benito \ VII-11-1965 \ Paul J. Spangler'. 1♂[M] (USNM): 'Belen Rivas \ 18 VII 57 \ DR Lauch'. 1♂[M] (USNM): 'Chaparron Jutiapa \ 30 VII 57 \ DR Lauch'. 1♂[M] (USNM): 'Chiquilistagua \ Jul-71 \ J. Maldonado Capriles'. 1♀[M] (USNM): 'Dario, Nlataqalpa \ 10 VII 57 \ DR Lauch'. 1♂[A], 4♂[M], 1♀[M] (USNM): 'Esteli \ 9 VII 57 \ DR Lauch'. 1♀[M] (SEMC): 'Granada: Reserva Silva. Priv. Domitila \ 11.70830 -85.95330 \ 13.VI.2011 \ CW Shin'. 1♂[A], 1♂[M], 2♀[M] (USNM):

‘Rivas \ VII-18-1957 \ DR Lauch’. 2♂[A], 40♂[M], 44♀[M] (USNM): ‘Somoto \ VII-28-1965 \ Paul J. Spangler. **PUERTO RICO**: 1♂[A], 1♀[M] (USNM): ‘Coamo Springs \ July 17-19, '14 \ HG Barber Collection’. 2♂[A], 1♀[A], 1♀[M] (USNM): ‘Lago (N.5) \ 26-I-68 \ C.V. Reichart’. 1♀[A] (USNM): ‘Maricao fish hatchery \ VIII-8-11-61 \ Flint & Spangler’. 1♂[M] (USNM): ‘Mayaguez \ 15-V-68 \ C.V. Reichart’. 1♀[M] (USNM): ‘Mayaguez \ 4-4-36 \ H.D. Tate’. 1♂[A] (USNM): ‘nr Fajardo \ VIII-20-61 \ Flint & Spangler’. 1♂[A], 1♂[A] (USNM): ‘Penuelas \ 14-II-68 \ C.V. Reichart’. 1♂[A], 2♀[A] (USNM): ‘Rio Blanco \ 20-III-68 \ C.V. Reichart’. 4♂[A], 1♂[M], 2♀[A] (USNM): ‘Rio Cidra \ 20-III-68 \ C.V. Reichart’. 1♂[A], 1♀[A], 2♀[M] (USNM): ‘Rio Portugues \ 26-I-68 \ C.V. Reichart’. 4♀[A] (USNM): ‘Taliaboa \ 14-II-68 \ C.V. Reichart’. 1♂[A], 1♂[M] (USNM): ‘Toro Negro \ rt 149 km. 41.8 \ VIII-24-61 \ Flint & Spangler’. 1♀[A] (USNM): ‘ViequesI \ 28 Mar '00 \ L. Stejneger’. **UNITED STATES: Texas**: 1♀[M] (SEMC): Bee Co., ‘Beeville, Tx. Blanco Creek \ 11. 8. 32 \ L.D. Tuthill’. 2♂[M] (MRPC): Cameron Co., [Sabal Palm Sanctuary; pond 1; 25.8497°N, 97.4195°W], 24 November 2023, M.R. Pintar. 2♂[M], 2♀[M] (MRPC); 1♂[M], 1♀[M] (CEIOC): Cameron Co., [Sabal Palm Sanctuary; pond 2; 25.8487°N, 97.4194°W], 24 November 2023, M.R. Pintar. 1♀[M] (MRPC): Hidalgo Co., [Edinburg, Hugh Ramsey Nature Park; Lily Pad Pond; 26.1867°N, 97.6635°W], 23 November 2023, M.R. Pintar. 2♀[M], 1[N] (MRPC): Hidalgo Co., [Edinburg, Hugh Ramsey Nature Park; Lily Pad Pond; 26.1867°N, 97.6635°W], 24 November 2023, M.R. Pintar. 2♂[M] (MRPC); 1♂[M], 1♀[M] (TAMU); 1♂[A] (USNM): Hidalgo Co., [Estero Llano Grande State Park; Curlew Pond; 26.1247°N, 97.9537°W, 22 m], 07 October 2022, M.R. Pintar. 2♀[M] (MRPC): Hidalgo Co., [Fig 11B; Estero Llano Grande State Park; Ditch; 26.1272°N, 97.9532°W], 22 November 2023, M.R. Pintar. 1♂[M] (TAMU): Hidalgo Co., [Las Palomas Wildlife Management Area; La Coma revegetated site 1; 26.0530°N, 98.0467°W], 05 September 2009, J.E. King & E.G. Riley at blacklight. 1♀[M] (SEMC): Hidalgo Co., ‘Progreso, Texas \ IV-12-1950 \ L.D. Beamer’. 1♂[M] (TAMU): Hidalgo Co., [Santa Ana National Wildlife Refuge; cemetery (site 2); 26.0646°N, 98.1415°W], 04 September 2008, J.E. King & E.G. Riley at blacklight. 6♂[M], 1♀[M] (MRPC); 1♂[M], 1♀[M], 1N (TAMU); 2♂[M], 1♀[M] (USNM); 1♂[M] (UTIC): Hidalgo Co., [Santa Ana National Wildlife Refuge; Headquarters Pond, east side; 26.0845°N, 98.1350°W, 33 m], 08 October 2022, M.R. Pintar. 3♂[M], 1♀[A], 2♀[M] (MRPC); 1♀[M] (UTIC): Uvalde Co., [Fig. 11C; Sabinal River at N Ranch Road 187; 29.5168°N, 99.5086°W], 09 November 2024, M.R. Pintar.

iNaturalist records of *L. cf. macroconfusus* from Texas and northwestern Mexico:

MEXICO: Baja California Sur: 1♀[M] (INAT): [Estero San José; 23.050°N, 109.689°W], 12 May 2021, Jorge Eduardo Torres Suárez. 1♀[M] (INAT): [Pond in La Paz; 24.1006°N, 110.3042°W], 25 September 2014, Gerardo Marrón. 1♂[A], 1♀[A] (INAT): [San José del Cabo; coordinates obscured], December 2022, Jozef K. Richards. **Sinaloa**: 1♂[A], 1♀[A] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 22 February 2021, Daniel Sosa. 1♂[A], 1♀[A] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 14 April 2021, Daniel Sosa. 1♀[A], 1♀[M], 1♀[M] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 28 July 2021, Daniel Sosa. 1[M] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 2 May 2022, Antonio Gómez. 1♀[A], 2♀[M] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 28 July 2022, Daniel Sosa. 1♀[M] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 31 March 2025, Daniel Sosa. 1♂[A], 1♂[M], 1♀[M] (INAT): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 28 April 2025, Daniel Sosa. 1♀[A] (INAT; Fig 21D): [Jardín Botánico Culiacán; 24.824°N, 107.385°W], 15 September 2025, Daniel Sosa. 1♀[M] (INAT): [Lake west of San Francisquito; 23.2417°N, 106.2673°W], 29 November 2025, Isa Ramirez. 1♀[M] (INAT): [Las Higueras; 25.019°N, 107.539°W], 25 April 2025, Daniel Sosa and Marco Polo Amarillas Vargas. 1♀[M] (INAT): [North of El Limón; 24.925°N, 107.529°W], 12 April 2024, user: marthajudithosunablancas. 1♀[M] (INAT): [north of Las Pilas; 22.622°N, 105.455°W], 2 February 2026, Sinaloa Silvestre. 1♀[M] (INAT): [Paco's Reserva de Flora y Fauna; 23.299°N, 106.441°W], 25 January 2018, Francisco Miguel Farriols Estrada. 1♀[M] (INAT): [Paco's Reserva de Flora y Fauna; 23.299°N, 106.443°W], 9 December 2019, Francisco Farriols Sarabia. 1♀[A] (INAT): [Stream west of Mezquitita; 24.8772°N, 107.2961°W], 8 January 2024, Marco Polo Amarillas Vargas. **Sonora**: 1♂[A], 1♀[A] (INAT): [Alamos; 27.0165°N, 108.9471°W], 10 January 2023, Miguel Gastelum. **UNITED STATES: Texas**: 1♀[M] (INAT): Cameron Co., [at light along Gamble Road; 26.1008°N, 97.6477°W], 12 September 2024, user: vanwest. 1♀[M] (INAT): Hidalgo Co., [garden pond at National Butterfly Center; 26.1800°N, 98.3667°W], 19 November 2025, Jared Gorrell. 1♂[A], 1♀[A] (INAT): Hidalgo Co., [pond at Quintana Mazatlan; 26.1750°N, 98.2302°W], 13 November 2024, John D. Reynolds. 1♂[A] (INAT): Zapata Co., [pond northeast of Zapata; 26.9201°N, 99.2997°W], 8 January 2026, user: marcoaz.

***Limnogonus recens* Drake & Harris, 1934**

(Figs. 13–16; 18C, 21B)

Limnogonus recens Drake & Harris, 1934: 207–208

Apterous male (Figs. 13A,B, 14A, 15A, 21B). Body length: 7.21–8.90 mm, mean = 7.98 mm.

Macropterous male (Figs. 13D, 14C). Body length: 9.05–9.43 mm, mean = 9.24 mm.

Apterous female (Figs. 13C, 14B, 15B). Body length: 7.27–8.99 mm, mean = 8.14 mm.

Macropterous female. Body length: 9.30 mm.

Etymology. Not stated by Drake & Harris (1934). In Latin, *recens* means new or fresh, so their name may have been distinguishing *L. recens* as a new species distinct from *L. hyalinus*.

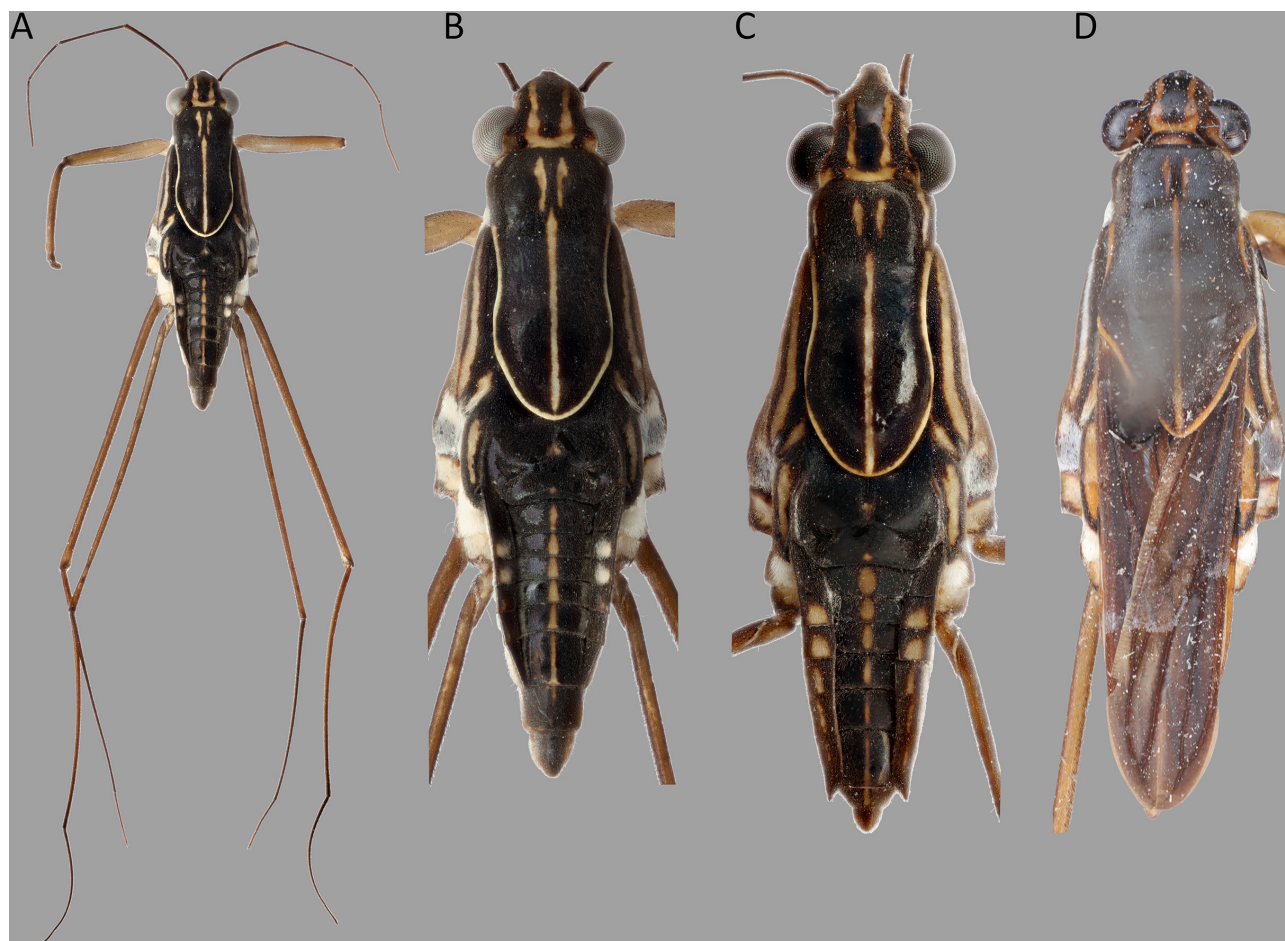


FIGURE 13. Dorsal images of *Limnogonus recens*: A) dorsal habitus of apterous male, Florida (deformed left fore tarsus, missing right fore tibia); B) body closeup of apterous male in (A); C) apterous female, Florida; D) macropterous male, Panama.

Distribution. Southern Florida to Panama. Males verified from Belize, Costa Rica, Cuba, Guatemala, Mexico (Campeche, Chiapas, Yucatán), Panama, and the continental United States (Florida) (Fig. 16).

Discussion. This species is very similar to *L. aduncus* Drake & Harris, 1933 and other related species in South America. A full description and diagnosis of this species will be part of a future revision including similar South American species. It is most similar to *L. carinatus* Molano Rendón, Mondragón-F., & Morales, 2018 in Colombia; their morphological similarity and adjacent ranges question the latter species' validity. In North America, *L. recens* is quite distinct from both *L. franciscanus* and *L. macroconfusus* and can be distinguished based on coloration and structure as described in the key below. Kuitert (1942) provided the first records of *L. recens* in Cuba based on specimens in SEMC, which I examined; more recent work did not provide additional records from the island (Naranjo *et al.* 2010; Riviaux *et al.* 2010, 2012). The SEMC specimens of *L. recens* from Cuba documented by Kuitert (1942) are from what is currently Matanzas Province; SEMC holds one additional unpublished specimen

from Pinar del Río Province. All images I have seen of specimens previously identified as *L. aduncus* or *L. hyalinus* (e.g., Pacheco-Chaves *et al.* 2018; Rodrigues *et al.* 2021) from Central America have been what is currently *L. recens*; these other species do not appear to occur north of the Andes (e.g., Molano Rendón *et al.* 2018). The history of the reported occurrence in Florida and elsewhere of these species is discussed below.

Type material examined.

HOLOTYPE: BELIZE: 1♂[A] (USNM): ‘Punta Gorda Br. Honduras’.

PARATYPES: BELIZE: 141 ex. (USNM); 2♂[M] (SEMC): ‘Punta Gorda Br. Honduras’ \ dates either absent, ‘1932’, or ‘Feb. 1932’.

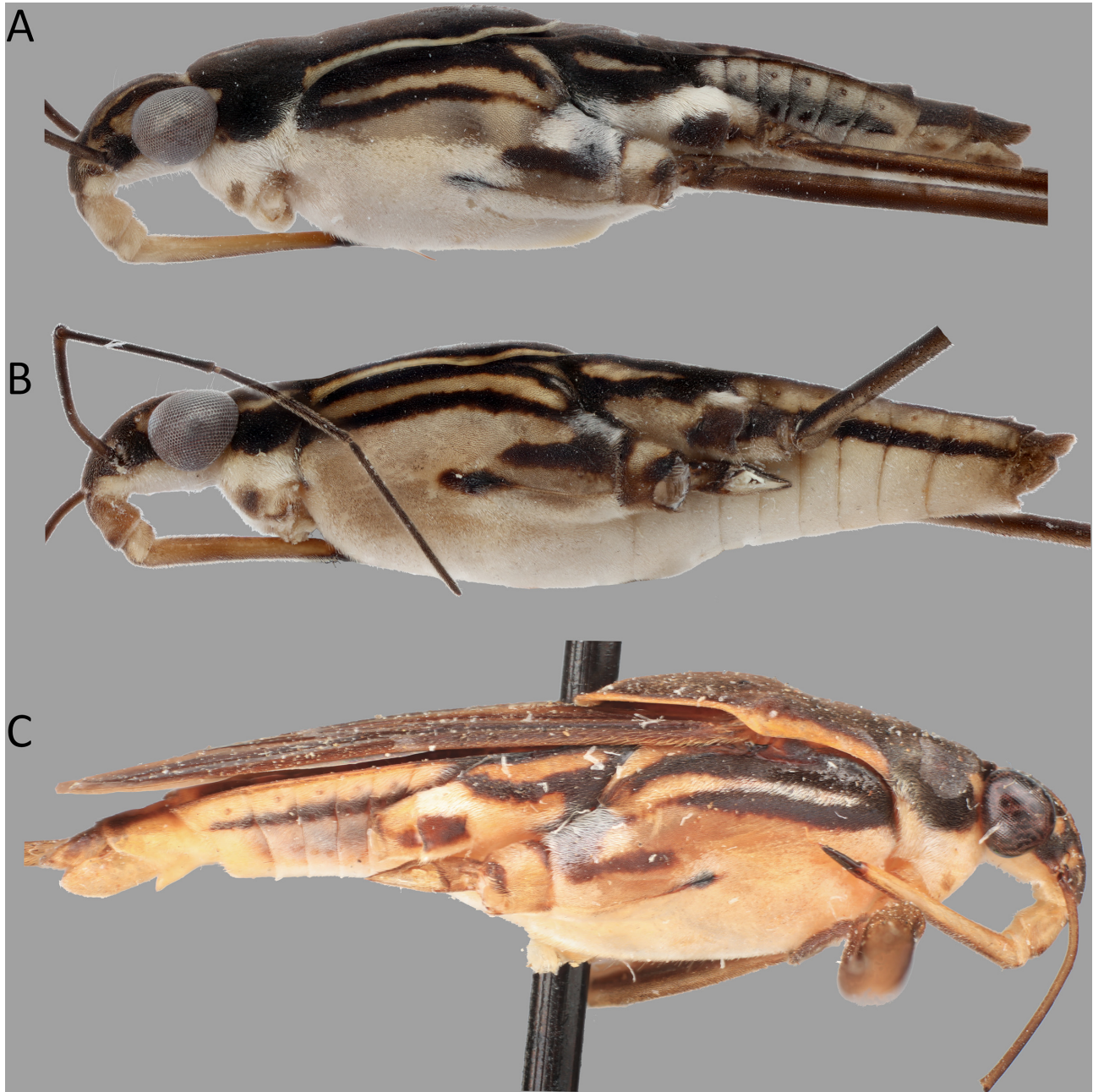


FIGURE 14. Lateral body images of *Limnogonus recens*: A) apterous male, Florida; B) apterous female, Florida; C) macropterous male, Panama.

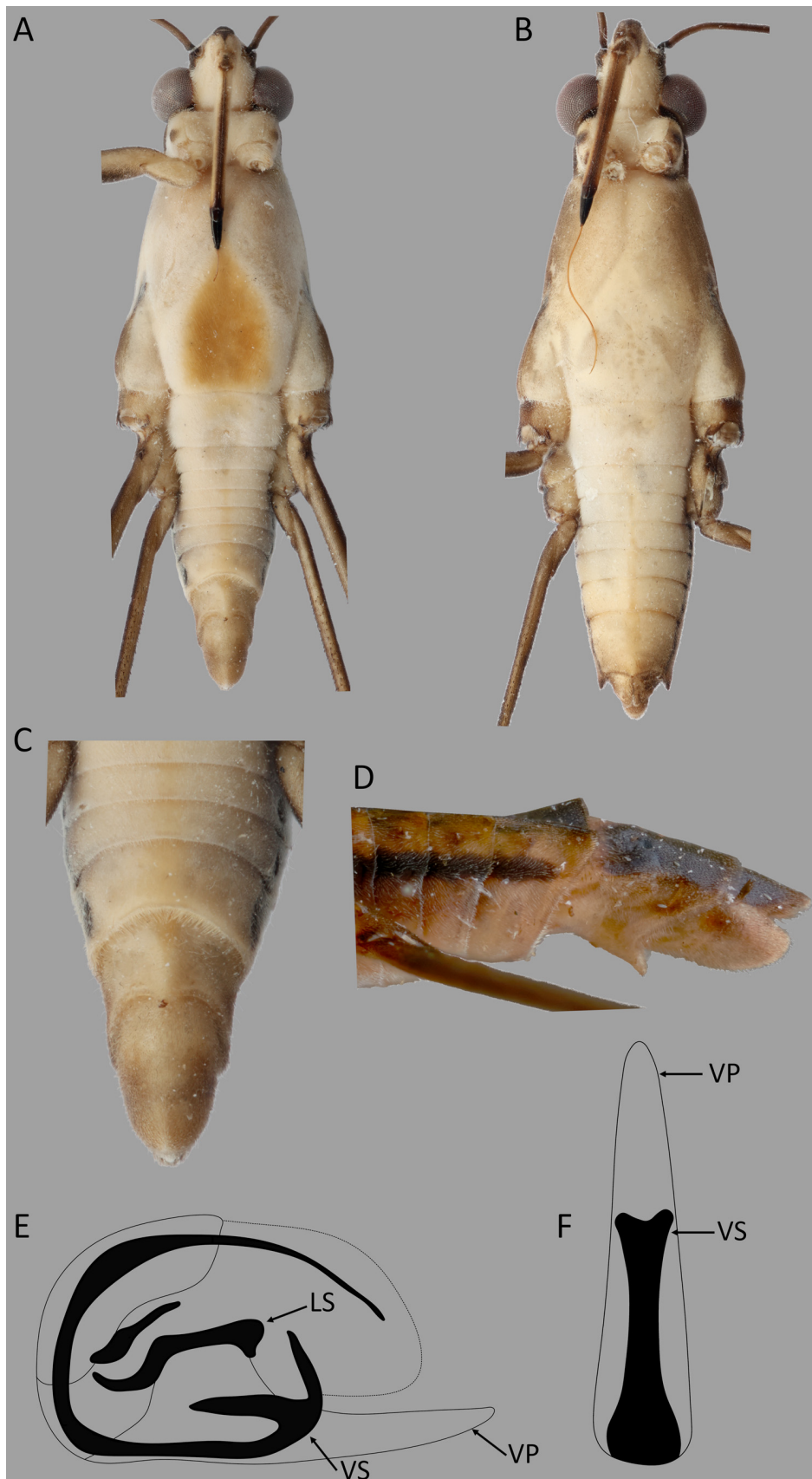


FIGURE 15. *Limnogonus recens* images: A) apterous male body ventral; B) apterous female body ventral; C) apterous male terminal abdominal/genital segments ventral, Florida; D) apterous male terminal abdominal/genital segments lateral, Belize (paratype). Illustrations of male vesica: E) lateral; F) ventral; LS = lateral sclerite, VP = vesical plate (outline), VS = ventral sclerite; arrows for VP and VS point indicate same location in both figures.

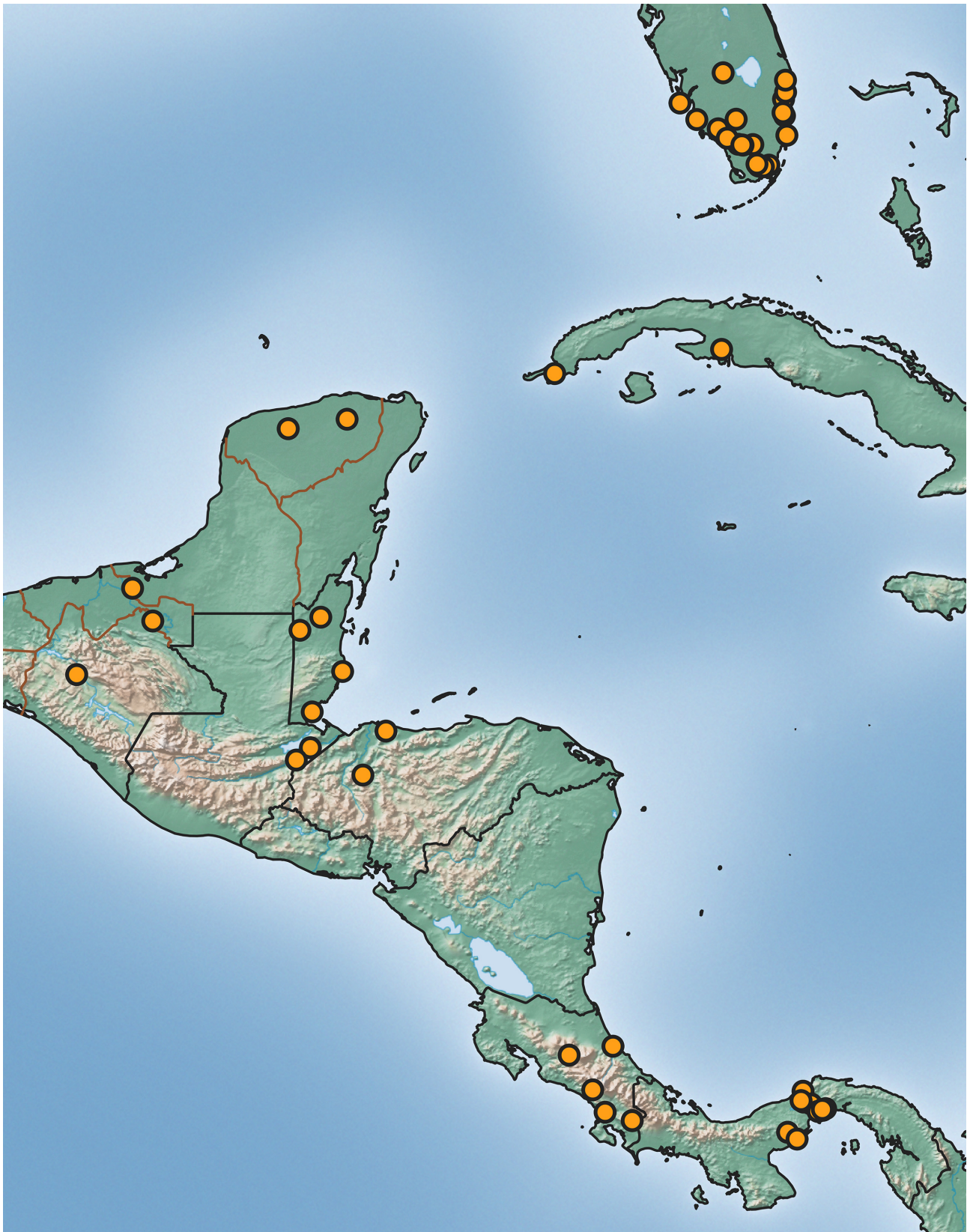


FIGURE 16. Distribution of *Limnogonus recens* based on specimens examined.

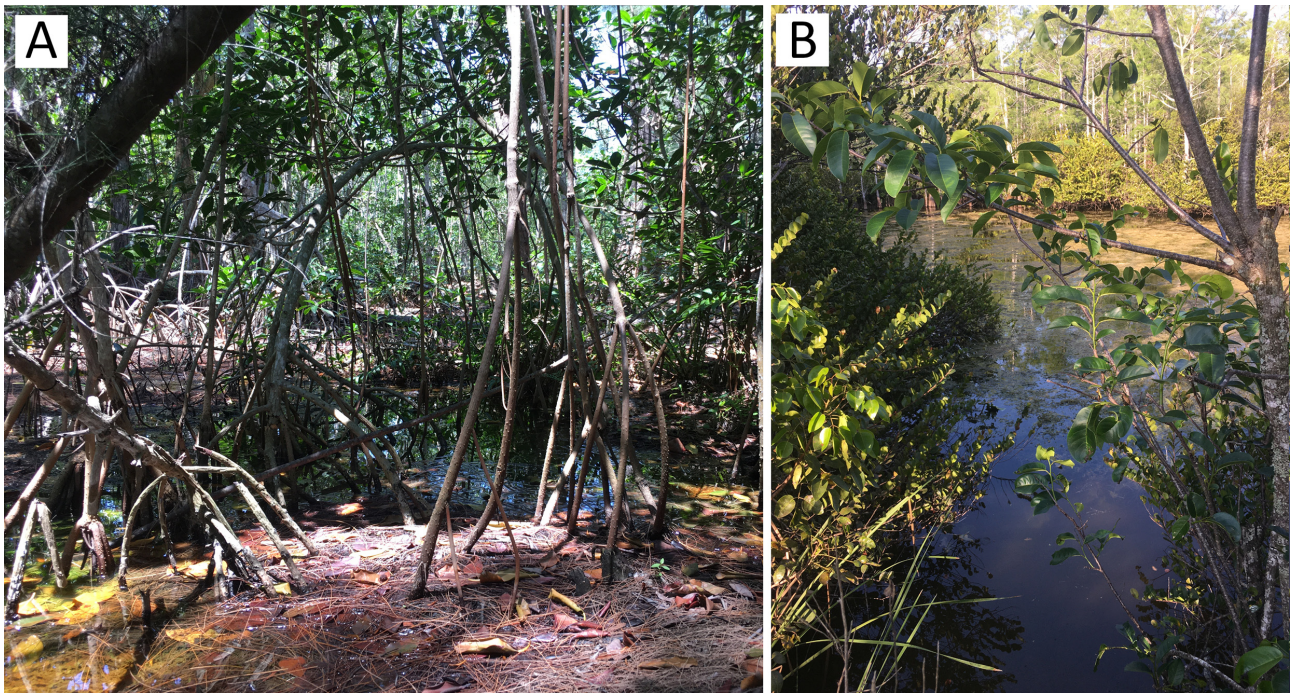


FIGURE 17. Habitats of collection locations of *Limnognathus recens* in Florida: A) pools in mangroves in North Miami; B) pond on the east side of levee along the L-31W Canal.

AUTOTYPES: **BELIZE:** 1♂[A] (USNM): ‘Punta Gorda Br. Honduras \ Feb. 1932’. **GUATEMALA:** 2♂[A], 2♀[A], 3♀[M] (USNM): ‘Guatemala \ Morales \ Dec. 1929 \ J.J. White’.

Additional material examined. **BELIZE:** 8♂[A], 1♂[M], 1♀[A], 1♀[M] (USNM): ‘Orange Walk District \ Gallon Jug (6 mi S) \ Chan Chich Creek \ 06-May-93 \ B.W. Miller’. 1♂[M], 1♀[M] (USNM): ‘Stann Creek, Sittee Point \ from mats of grass trailing in river at Possum Point Biological Station \ 29-Apr-87 \ Spangler & Fautoute’. 1♂[A], 1♀[A] (CSUC): ‘San Ignacio \ Macal R. area \ Trail behind Midas Resort \ 04 January 2016 \ A.L. Hall & B. Kondratieff’. 5♂[A], 1♂[M], 2♀[A] (SEMC): ‘Punta Gorda \ 7-34’. **COSTA RICA:** 16♂ (SEMC): ‘Limon \ 7 Aug. 1959 \ R. Matsuda’. 1♂[M] (SEMC): ‘San Isidro del Gen. \ Feb. 1939 \ Dean L. Rounds’. 1♂[M] (USNM): ‘N of Palmar Sur \ XII-28 1969 \ J.T. Polhemus’. **CUBA:** **Matanzas:** 5♂[A] (SEMC): ‘Palpito Cienaga de Zapato S \ C. Prov \ 12. 6. 33 \ P. J. Bermudez’. **Pinar del Río:** 1♂[A] (SEMC): ‘C. Grande \ P. de Guana-hacabibes \ Ap.8.'24 \ S.C. Bruner’. **GUATEMALA:** 1♂[M] (SEMC): ‘El Salto Escuintla \ 1934 \ F.X. Williams’. 3♂[A], 2♂[M], 1♀[A], 2♀[M] (SEMC): ‘Los Amates \ 16.I.5’. **HONDURAS:** 2♂[M], 2♀[M] (SEMC): ‘Tela \ March 15 1936 \ John Deal’. **MEXICO:** **Campeche:** 4♂[A], 3♀[A] (SEMC): ‘Palizada \ 9-15-36 \ H. D. Thomas’. **Chiapas:** 2♂ [A], 2♂ [M], 3♀[A], 2♀[M] (SEMC): ‘La Libertad \ 500 M above sea level \ 1-1-38 \ Octavio Utrilla Louis’. 1♂[M] (SEMC): ‘Tuxtla Gutiérrez \ Aug. 27. 1937 \ H.D. Thomas’. **Yucatán:** 1♂[A] (SEMC). “Talcha, Miramar Cenote”, “VII-31-1932”, E.P. Creaser. 1♂[A], 1♀[A] (INAT): Tizimín [21.1582°N, 88.1737°W], 29 April 2024, seydi_itzincab. **PANAMA:** 2♂[A] (SEMC): ‘Canal Zone \ III.24.45 \ G.S. Ryan’. 1♂[A] (SEMC): ‘Panama Canal Zone \ Juan Mina \ 5 Sept 1959 \ R. Matsuda’. 1♂[M] (USNM): ‘Corozal, C.Z. \ XII.w61936 \ R. Bliss’. 1♂[M] (USNM): ‘Old Panama \ I.31.11 \ Aug. Busck’. 1♂[M] (USNM): ‘barro Colorado, C.Z. \ Feb 6-8 1939 \ Carl J. Drake’. 1♂[M] (USNM): ‘Canal Zone \ 2-10-39 \ Carl J. Drake’. 2♂[A] (USNM): ‘Canal Zone \ L.J. Rozeboom’. 1♂[M] (USNM): ‘Coco Solo Hospital Canal Zone’ \ 9°21'N, 79°51'W \ ‘1 Dec 22’ \ Engleman’. 5♂[M] (USNM): ‘Juan Diaz \ 1-23-36’. 2♂[M] (USNM): ‘Juan Dica \ II-2-1935’. 1♂[M] (USNM): ‘Juan Diaz \ 2-17-36’. 1♂[A], 9♂[M] (USNM): ‘Rio Abajo \ Apr 24 1935 \ L.J. Rozeboom’. 2♂[A] (USNM): ‘Rio Gatun \ I-1 1970 \ J.T. Polhemus’. 1♂[A] (USNM): ‘Rio Marte Manade, Panama Road \ Mar.26.12 \ Meek & Hidebrand’. 3♂[M] (USNM): ‘San Carlos \ I-4-1970 \ J.T. Polhemus’. 2♂[M] (USNM): ‘San Juan \ XII-10-1934’. 3♂[M] (USNM): ‘Tuan Dia \ Aug. 1934 \ L.J. Rozeboom’. **UNITED STATES:** **Florida:** 1♂[A], 1♀[A], 1? [M] (INAT): Collier Co., [Alligator Alley; 26.1707°N, 81.0713°W], 16 January 2023, J. Keller. 1♂[A] (MRPC); 1♂[A] (CEIOC): Collier Co., [Naples; pond in Christopher B. Smith Preserve; 26.1659°N, 81.7892°W, 3 m], 27 August 2021, M.R. Pintar. 1♀[A] (MRPC): Collier

Co., [Naples; pond in Christopher B. Smith Preserve; 26.1659°N, 81.7892°W, 3 m], 23 September 2021, M.R. Pintar. 2[N], 1♀[A] (MRPC): Collier Co., [Turner River at U.S. Route 41; 25.8918°N, 81.2706°W], 27 August 2021, M.R. Pintar. 1♀[A] (MRPC): Glades Co., [Swamp near Fisheating Creek; 26.9293°N, 81.3084°W], 04 September 2021, M.R. Pintar. Lee Co., [Sanibel; small ponds along Sanibel River; 26.4365°N, 82.0971°W], 27 August 2021, M.R. Pintar (no specimens collected). 1♂[A] (INAT): Miami-Dade Co., [Everglades National Park; canal along Shark Valley Loop Road; 25.7559°N, 80.7665°W], 30 November 2021, R. Webster. 1♀[A] (INAT): Miami-Dade Co., [Everglades National Park; edge of finger glade at Long Pine Key; 25.4018°N, 80.6612°W], 30 January 2021, Joe MDO. 2♀[A] (INAT): Miami-Dade Co., [Everglades National Park; Gate 9/10 Trail; 25.4350°N, 80.6914°W], 17 February 2024, Joe MDO. 2♀[A] (CAS); 2♂[A], 2♀[A] (SEMC); 3♂[A], 3♀[A], 3[N] (MRPC): Miami-Dade Co., [Both sides of levee along L-31W Canal (in canal to west and marsh to east [Fig. 17B]); 25.389°N, 80.574°W], 22 February 2021, M. R. Pintar. 1♀[A] (MRPC): Miami-Dade Co., [Fig. 17A; North Miami; small pond in mangroves; 25.9086°N, 80.1452°W], 01 May 2021, M.R. Pintar. 1♂[A], 1♀[A] (SEMC); 2♂[A] (MRPC): Miami-Dade Co., [North Miami; small pond in mangroves; 25.9086°N, 80.1452°W], 16 May 2021, M.R. Pintar. 1♂[M], 1♀[A] (USNM): Miami-Dade Co., [North Miami; small pond in mangroves; 25.9086°N, 80.1452°W], 01 August 2021, M.R. Pintar. 1♂[A], 1♀[A] (FSCA); 1♀[A] (MRPC); 1♂[A] (USNM): Miami-Dade Co., [North Miami; small pond in mangroves; 25.9086°N, 80.1452°W], 12 September 2021, M.R. Pintar. 1♂[A], 1♀[A] (MRPC): Miami-Dade Co., [North Miami; small pond in mangroves; 25.9086°N, 80.1452°W], 19 September 2021, M.R. Pintar. 2♂[A] (CAS); 4♂[A], 2♀[A] (MRPC): Miami-Dade Co., [Pond east of L-31W Canal; 25.3835°N, 80.5736°W], 16 April 2021, M.R. Pintar. 1♂[A] (INAT): Monroe Co., [Big Cypress National Preserve; Loop Road; 25.7464°N, 80.9459°W], 27 April 2024, Joe MDO. 3♂[A], 1♀[A] (MRPC); 1♀[A] (CEIOC): Palm Beach Co., [Agricultural ditch at SW corner of US 441 and Lee Rd. (2nd ditch south of Lee Rd., east of Loxahatchee National Wildlife Refuge); 26.4982°N, 80.2059°W], 17 March 2021, M. R. Pintar. 1♀[A] (INAT): Palm Beach Co., [by parking area at north end of Grassy Waters Preserve; 26.809°N, 80.170°W], 25 April 2025, M. Green. 1♀[A] (INAT): Palm Beach Co., [by parking area at north end of Grassy Waters Preserve; 26.8094°N, 80.1695°W], 29 January 2026, M. Green. 1? [M] (INAT): Palm Beach Co., [in neighborhood south of Lake Worth Road; 26.614°N, 80.169°W], 11 December 2025, M. Green.

Key to species of adult *Limnogonus* of North America

- 1 Terminal abdominal segments not divided medially (Fig. 4A) 2 (males)
- Terminal abdominal segments divided medially (Fig. 4B) 4 (females)

- 2 First genital segment with posteroventral margin produced to a point medially (Fig. 15C,D) *L. recens*
- First genital segment with posteroventral margin evenly rounded (Figs. 4C, 9C), not produced to a point. 3

- 3 Fore tibia constricted 3/5 distance to apex, typically producing bent appearance (Fig. 2A,B); lateral vesical sclerite as illustrated in Fig. 4E; anterior pronotal spots often but not always divergent anteriorly (Figs. 1A, 12A); size smaller (4.9–7.2 mm) *L. franciscanus*
- Fore tibia not constricted or appearing bent (Fig. 7A); lateral vesical sclerite as illustrated in Fig. 9E; anterior pronotal spots always subparallel (Figs. 7A,C, 12B); size larger (6.5–8.8 mm). *L. macroconfusus* **sp. nov.**

- 4 Abdominal sternum VII posteroventral margin produced to a small point medially (Fig. 15B). Apterous specimens with connexiva with series of yellow spots (Fig. 13C), more or less connected; connexiva and lateral margins of abdominal terga with some silvery pubescence *L. recens*
- Abdominal sternum VII posteroventral margin not produced to a small point medially, approximately straight (Figs. 4B, 9B). Apterous specimens with connexiva with continuous yellow stripe (Figs. 2C, 7B); abdomen dorsally and laterally lacking silvery pubescence. 5

- 5 Medial pronotal spots often, but not always, divergent anteriorly (Fig. 2C); medial yellow stripes on posterior of pronotum and abdomen (apterous individuals) often faint to apparently absent, especially on abdominal segments (Fig. 2C,D); average size smaller (apterous: 6.3–8.3 mm; macropterous: 7.1–8.8 mm). *L. franciscanus*
- Medial pronotal spots always subparallel (Fig. 7B,D); medial yellow stripes on posterior of pronotum and abdomen usually distinct; average size larger (apterous: 7.7–9.8 mm; macropterous: 8.3–9.9 mm) *L. macroconfusus* **sp. nov.**



FIGURE 18. Dorsal habitus images of *Limnogonus* spp. nymphs. A) *L. franciscanus* fifth instar female nymph from Florida; B) *L. macroconfusus* **sp. nov.** fifth instar male nymph from Texas; C) *L. recens* fourth instar male nymph from Florida.

Discussion

Here, I document three species of *Limnogonus* north of Panama and Trinidad, *L. macroconfusus* **sp. nov.**, *L. franciscanus*, and *L. recens*; no other species are known to occur in the region. Records of *Limnogonus* in the continental United States began with the original description of *L. franciscanus*, which was based on a specimen erroneously attributed to San Francisco, California (Stål 1859). Records of the genus in Texas originated with Drake & Harris (1934), who reported *L. guerini* as “extending into southern parts of Texas and California.” Drake & Harris (1934) provided no further details on their records but later examined the *L. franciscanus* type and synonymized *L. guerini* with *L. franciscanus* (Drake & Harris 1935).

The original account of the genus in Florida was by Torre-Bueno (1911), who reported one species, *L. hyalinus*, from the United States with its distribution extending “south from Florida throughout South America.” However, Torre-Bueno’s (1911) record was viewed as problematic after Drake & Harris (1934) reviewed the genus, described additional species, and documented the range of *L. hyalinus* as predominantly throughout South America to as far north as Trinidad; ongoing review suggests the distribution of *L. hyalinus* is much more restricted in northern South America than other species. Drake & Harris (1934) deemed Torre-Bueno’s (1911) record of *L. hyalinus* in Florida

likely to be an error and provided no other information on the potential occurrence of *Limnognus* in Florida. Subsequent literature noting the occurrence of *Limnognus* in Florida (e.g., Epler 2006; Nummelin 1997) has cited Polhemus & Chapman (1979) or Smith (1988), both of which relied on prior publications. Specific records of *Limnognus* in the continental United States were absent from the literature, and prior to 2021 online databases had no records of specimens.

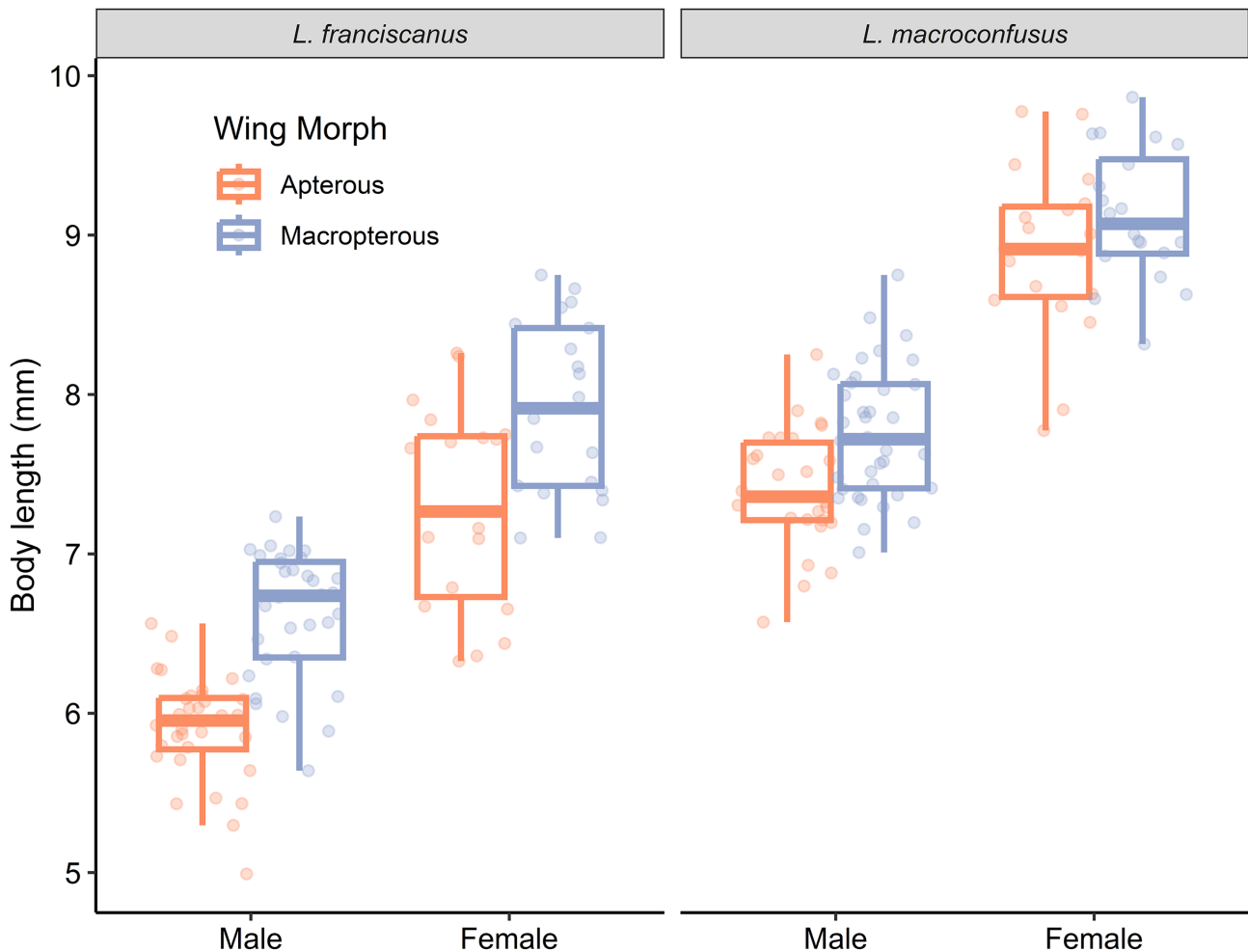


FIGURE 19. Boxplots of *Limnognus franciscanus* and *L. macroconfusus* **sp. nov.** body lengths by sex and wing morph.

Although Drake & Harris (1935) stated *L. franciscanus* occurs in Texas and examined the type specimen (“California”; Fig. 1), it is unknown whether Drake, J.T. Polhemus, Torre-Bueno, or any of their collaborators ever verified records of *Limnognus* in the United States, as none of them published details on their observations or specimens examined in any state. Because *L. franciscanus* historically was the most widely documented species from the Greater Antilles (de Kort-Gommers & Nieser 1969; Nieser 1970; Riviaux *et al.* 2010; Damgaard *et al.* 2014), previous authors may have assumed without verification that Torre-Bueno’s (1911) record and any potential occurrences of the genus in Florida were of *L. franciscanus*. Further complicating matters is that *Neogerris* Matsumura, 1913 was formerly placed in *Limnognus* (initially as the subgenus *Limnognonellus* Hungerford & Matsuda, 1959) (Matsuda 1960; Andersen 1995). *Neogerris hesione* (Kirkaldy, 1902) is found throughout the eastern United States and is common in Florida, including the greater Everglades ecosystem in subtropical southern Florida (Epler 2006; Pintar *et al.* 2021).

Although the characteristics presented herein can be used for identification of adults, nymphs of all three species remain largely undescribed. I obtained very few nymphs in my collections and compared populations in which each species was found in isolation. Comparison of fifth instar *L. franciscanus* and *L. macroconfusus* nymphs shows they are very similar. The pronotal spots in *L. franciscanus* show some trend towards being anteriorly divergent (Fig. 18A), whereas those in *L. macroconfusus* appear parallel (not visible in Fig. 18B), which is consistent with

adult characteristics. Fourth instar *L. recens* nymphs have proportionally larger pronotal spots (Fig. 18C) as is seen in some adults (Fig. 13A). However, full assessment of all instars and examination of more material is needed; a few nymphs of Old World *Limnogonus* have been formally illustrated or described (see Andersen 1975; Kment & Damme 2025).

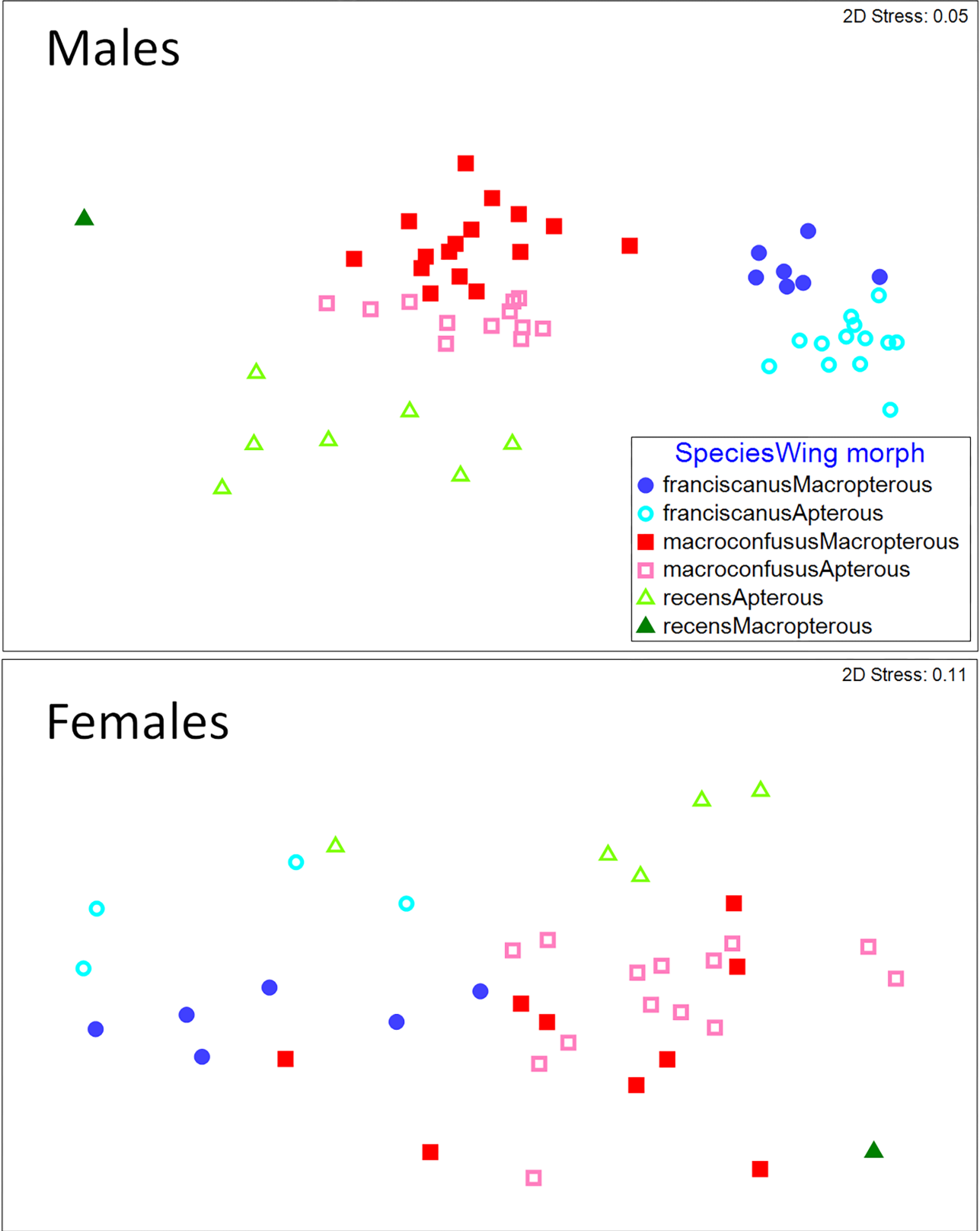


FIGURE 20. Non-metric multi-dimensional scaling (NMDS) plots of *Limnogonus* spp. males and females by sex, species, and wing morph.

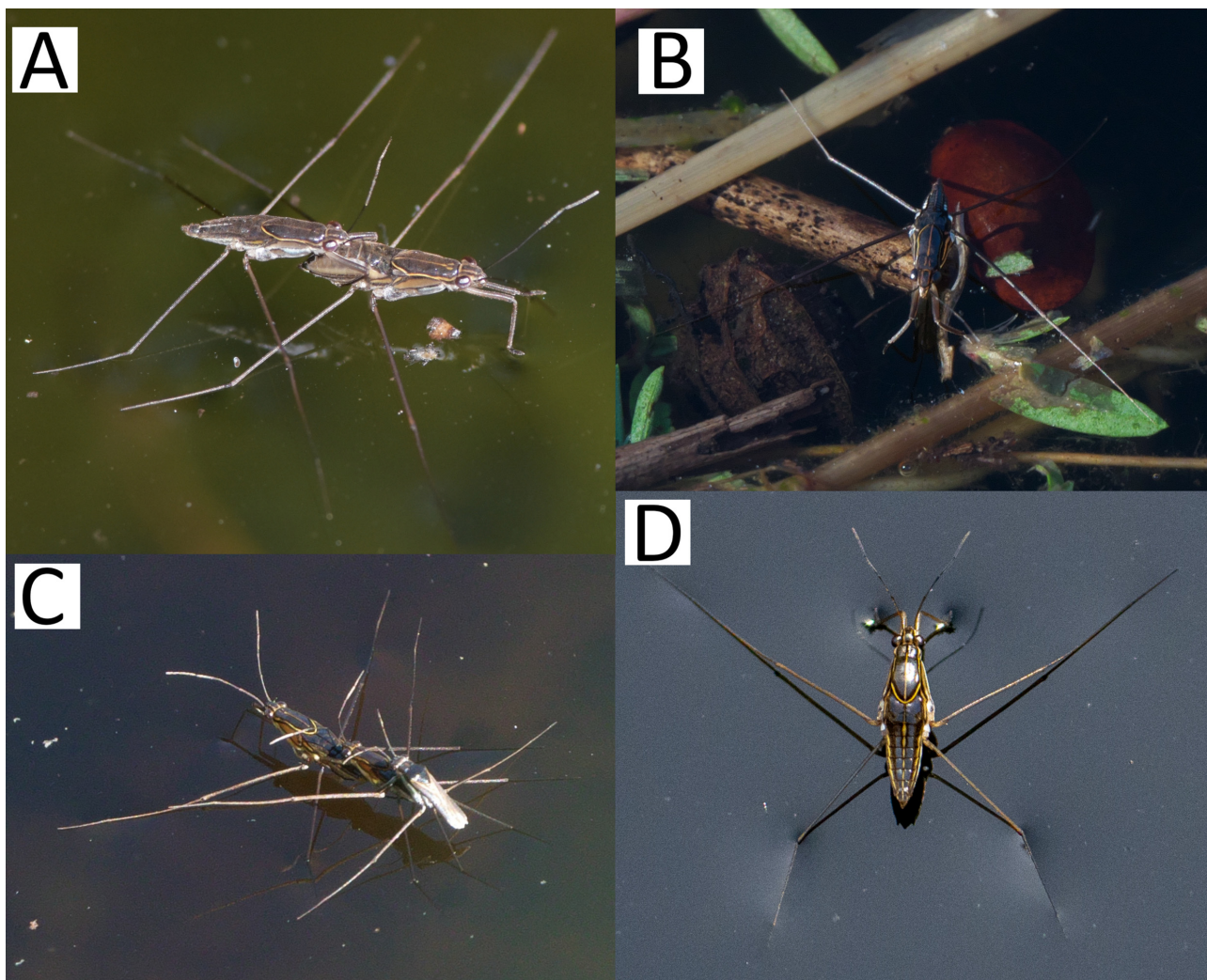


FIGURE 21. Images of live *Limnogonus* from iNaturalist. A) *L. franciscanus* apterous male and gravid female mating in Oleta River State Park, Florida (photo by Joe MDO; CC BY-NC); B) *L. recens* apterous male along the Shark Valley Tram Road, Everglades National Park, Florida (photo by Robert Webster; CC BY-SA); C) attempted mating between *L. franciscanus* female and male along with macropterous *Neogerris hesione* male in Ten Thousand Islands National Wildlife Refuge, Florida (photo by Robert Webster; CC BY-SA); D) apterous female *L. cf. macroconfusus* **sp. nov.** in a botanical garden pond in Culiacán, Sinaloa (photo by Daniel Sosa; all rights reserved). All images are included with permission from the photographers.

In Florida, *L. franciscanus* and *L. recens* were recorded together only twice, in a pond in Naples and in an area of red mangroves typically harboring shallow freshwater pools in North Miami. Although habitat associations need better study, many habitats where *L. franciscanus* was found tended to be smaller and potentially more ephemeral (Fig. 6; e.g., stormwater retention ponds, experimental mesocosms, and the solution holes and shallow marshes around Big Pine Key) than those where *L. recens* was often found (Fig. 17; e.g., deeper ponds, mangroves, canals, backwaters along creeks). These habitats, along with the observation that *L. franciscanus* adults were more often macropterous than *L. recens* (mostly apterous) and their lack of co-occurrence, suggest that *L. franciscanus* more readily disperses by flight than does *L. recens* and potentially that *L. recens* is competitively dominant. Both species were found only in lentic habitats and almost always surrounded by taller vegetation such as trees (including mangroves), bushes, and occasionally taller marsh vegetation.

In Texas, the majority of the locality records of *L. macroconfusus* are from the Lower Rio Grande Valley with the exception of one old (1932?) specimen from Beeville and a series I collected from the Sabinal River, Uvalde County in November 2024. Many other locations along the edge of the Edwards Plateau and elsewhere in southern Texas have been sampled, but no *Limnogonus* have been found, including at the same Sabinal River site in 2025. Nearly

all of the land on both sides of the international border in the Lower Rio Grande Valley has been developed for agriculture and human habitation. Even the wetlands within the protected areas that were the focus of my collecting efforts are heavily managed and are typically allowed to dry over the summer and then refilled with diverted river water during the fall in preparation for the arrival of migratory birds. The lack of trees surrounding many aquatic habitats and the often-strong wind in this region may play a role in limiting the distribution of *Limnogonus* as many gerrids are susceptible to wind (Spence 1981).

Records of *Limnogonus* at northern localities may be temporary occurrences due to weather. For instance, two 2024 records of *L. franciscanus* in the Tampa Bay area may have been a result of transport due to two large hurricanes that passed through the area earlier in the year. Similarly, in Texas, moist air moving northward from the Gulf of Mexico is forced upward along the Balcones Escarpment. This creates a natural point along the edge of the Edwards Plateau where insects moving from the south may be forced to settle, creating rare occurrences of species like *L. macroconfusus* in the Sabinal River in 2024. As a tropical genus, *Limnogonus* may not survive sub-freezing temperatures that occasionally occur in these areas during winter. My collecting efforts in southern Arizona (250 km north of Hermosillo) did not result in any *Limnogonus* specimens from the state but did produce several new records of aquatic insects for the state and United States (Pintar 2024). The occurrence of many Neotropical species (both insects and other taxa) in southeastern Arizona may indicate that it may potentially have *Limnogonus* recorded there in the future, or even to southeastern California.

No other species of *Limnogonus* were found north of Panama or Trinidad. Lanigan & Hyslop (2011) reported *L. aduncus* from Jamaica; although *L. franciscanus* and *L. macroconfusus* are well-documented from the island, I was unable to verify their record of *L. aduncus* and it seems doubtful (G. Campbell, pers. comm.). The early description of *L. hyalinus* (Fabricius 1803) from throughout the Neotropics and the later descriptions of species such as *L. aduncus* and *L. recens* (Drake & Harris 1933, 1934), including the recent description of *L. carinatus*, have led to the confusion and erroneous identification of specimens throughout the Neotropics. This includes incorrect identifications by Torre-Bueno and Drake, including of specimens Drake himself described. It is possible that the record of *L. aduncus* from Jamaica (Lanigan & Hyslop 2011) was of *L. recens* given its occurrence in the region. However, *L. recens* is not known from elsewhere in the Greater Antilles other than western Cuba (de Kort-Gommers & Nieser 1969; Riviaux *et al.* 2010). Furthermore, a single specimen from Cuba identified as *L. hyalinus* in CAS that Damgaard *et al.* (2014) noted was likely an error; I examined this specimen and it was a female *L. cf. macroconfusus*.

Drake & Harris (1934) originally described *L. recens* as a new species based on specimens that had previously been considered *L. hyalinus*. At the time, *L. recens* was known to occur only in Central America from Belize, Guatemala, and Panama; later, Hungerford (1936, 1939) published the first record from Costa Rica, and Kuitert (1942) published the first records from Cuba and Mexico. Therefore, it is possible that Torre-Bueno's (1911) record of *L. hyalinus* in Florida was not error, but rather a record of the yet to be described *L. recens*, which is more morphologically similar to *L. hyalinus* than to *L. franciscanus*. Hence, it may have been that *L. franciscanus* was never formally reported from Florida, and certainly no detailed records have ever been provided. Alternatively, Torre-Bueno may have misidentified *L. franciscanus* since specimens of *L. franciscanus* from his collection in both SEMC and USNM were incorrectly labeled as *L. hyalinus*. Tropical Heteroptera have been overlooked in areas like southern Florida where recent new records continue to be documented (Polhemus & Rutter 1997; Polhemus & Golia 2006; Pintar 2023). Regardless of the lack of details in past literature, both *L. franciscanus* and *L. recens* are now reported from Florida and *L. macroconfusus* from Texas. Relationships between *L. recens*, *L. carinatus*, the widespread *L. aduncus*, and other South American species will be addressed in a future revision of the genus in the Americas.

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