INSECTA MUNDI A Journal of World Insect Systematics

0710

The Trichoptera of Panama. XI. Three new species of caddisflies in the genus *Smicridea* McLachlan (Trichoptera: Hydropsychidae) from Omar Torrijos and Santa Fe National Parks

Ernesto Rázuri-Gonzales
Department of Entomology, University of Minnesota
1980 Folwell Ave., 219 Hodson Hall
St. Paul, Minnesota 55108, U.S.A.

Brian J. Armitage
Instituto Conmemorativo Gorgas de Estudio de la Salud
Ave. Justo Arosemena y Calle 35
Apartado Postal No 0816-02593
Panama, Republic of Panama

Date of issue: June 28, 2019

Center for Systematic Entomology, Inc., Gainesville, FL

Author
Title
Insecta Mundi 0710: 1–13
ZooBank Registered: urn:lsid:zoobank.org:pub:D96A51F7-FA29-4CE5-A5CC-06BBDA2FEA37

Published in 2019 by
Center for Systematic Entomology, Inc.
P.O. Box 141874
Gainesville, FL 32614-1874 USA
http://centerforsystematicentomology.org/

Insecta Mundi is a journal primarily devoted to insect systematics, but articles can be published on any non-marine arthropod. Topics considered for publication include systematics, taxonomy, nomenclature, checklists, faunal works, and natural history. Insecta Mundi will not consider works in the applied sciences (i.e. medical entomology, pest control research, etc.), and no longer publishes book reviews or editorials. Insecta Mundi publishes original research or discoveries in an inexpensive and timely manner, distributing them free via open access on the internet on the date of publication.

Insecta Mundi is referenced or abstracted by several sources, including the Zoological Record and CAB Abstracts. Insecta Mundi is published irregularly throughout the year, with completed manuscripts assigned an individual number. Manuscripts must be peer reviewed prior to submission, after which they are reviewed by the editorial board to ensure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

Guidelines and requirements for the preparation of manuscripts are available on the Insecta Mundi website at http://centerforsystematicentomology.org/insectamundi/

Printed copies (ISSN 0749-6737) annually deposited in libraries
CSIRO, Canberra, ACT, Australia
Museu de Zoologia, São Paulo, Brazil
Agriculture and Agrifood Canada, Ottawa, ON, Canada
The Natural History Museum, London, UK
Muzeum i Instytut Zoologii PAN, Warsaw, Poland
National Taiwan University, Taipei, Taiwan
California Academy of Sciences, San Francisco, CA, USA
Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA
Field Museum of Natural History, Chicago, IL, USA
National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
Zoological Institute of Russian Academy of Sciences, Saint-Petersburg, Russia

Electronic copies (Online ISSN 1942-1354, CDROM ISSN 1942-1362) in PDF format
Printed CD or DVD mailed to all members at end of year. Archived digitally by Portico.
Florida Virtual Campus: http://purl.fcla.edu/fcla/insectamundi
University of Nebraska-Lincoln, Digital Commons: http://digitalcommons.unl.edu/insectamundi/
Goethe-Universität, Frankfurt am Main: http://nbn-resolving.de/urn/resolver.pl?urn:nbn:de:hebis:30:3-135240

Layout Editor for this article: Robert G. Forsyth

INSECTA MUNDI 0710: 1–13 2019

The Trichoptera of Panama. XI. Three new species of caddisflies in the genus *Smicridea* McLachlan (Trichoptera: Hydropsychidae) from Omar Torrijos and Santa Fe National Parks

Ernesto Rázuri-Gonzales
Department of Entomology, University of Minnesota
1980 Folwell Ave., 219 Hodson Hall
St. Paul, Minnesota 55108, U.S.A.
razur001@umn.edu

Brian J. Armitage
Instituto Conmemorativo Gorgas de Estudio de la Salud
Ave. Justo Arosemena y Calle 35
Apartado Postal No 0816-02593
Panama, Republic of Panama
barmitage@gorgas.gob.pa

Abstract. Herein we describe three new species of *Smicridea* McLachlan (*S.* (*S.*) *lata*, *S.* (*S.*) *spatulata*, and *S.* (*S.*) *dividua*) from Panama in the nigripennis species group (Trichoptera: Hydropsychidae). The nigripennis species group is characterized by having a rather complex phallic apparatus, open anteroventrally and posterodorsally, with ventral and lateral portions produced into lobes, and with spines and other structures arising from the endothecal membranes. All three species resulted from a 2017 survey of Omar Torrijos and Santa Fe National Parks. Twenty-six species of *Smicridea*, nine of them endemic, are now known from Panama.

Key words. National parks; nigripennis group.

Introduction

In 2017, a new project was initiated involving biological surveys of Panama's national parks. Designated "Proyecto Sistema de Producción Sostenible Conservación de la Diversidad (PSPSCD)", this project is managed by Panama's Ministerio de Ambiente and, in collaboration with the Instituto Conmemorativo Gorgas de Estudios de la Salud (Gorgas Institute), executed by the Colección Zoológica Dr. Eustorgio Méndez (COZEM). These biodiversity surveys are included under the framework of the "Sistema Nacional de Información y Monitoreo de la Diversidad Biológica", or National Biological Diversity Information and Monitoring System to better understand the country's biodiversity. Primary funding was provided by the World Bank. The various components of this project include one on aquatic invertebrates.

The caddisfly genus *Smicridea* McLachlan is widespread, particularly in Mexico, Central and South America, and the Caribbean. Currently, 235 species are recorded (Holzenthal and Calor 2017; Alves et al. 2018; Mey and Ospina-Torres 2018; Sganga and Gibon 2018). The genus is subdivided into two subgenera: *Smicridea* McLachlan (133 species) and *Rhyacophylax* Mueller (102 species) based on differences in hind wing venation. The subgenus *Smicridea* is further subdivided into two species groups: fasciatella (~75 species) and nigripennis (~55 species) based on differences in morphology of both male and female genitalia. Specifically, those species that belong to the nigripennis species group (Flint 1974a) share the following phallic apparatus diagnostic characters: (1) the basal half is open ventrally with the sclerotized part very much enlarged; (2) the apical half is open posterodorsally with spines extending from the membranous central portion, and (3) the lateral and ventral regions are produced into a lobe.

While identifying caddisfly material from the 2017 survey of Panamanian national parks, three new species in the nigripennis species group were discovered. Herein we describe and illustrate these new species based on males.

Materials and Methods

Panama has been divided into 52 hydrographic basins (cuencas), established by the Central American Hydrometeorological Project (http://www.hidromet.com.pa/cuencas.php?idioma = ing). Sample stations were selected for each park, where possible, to include all cuencas present. Generally, these cuencas included Caribbean and Pacific Ocean drainages. Four of Panama's national parks were surveyed during 2017. In Kondratieff and Armitage (2019), all of the locations collected during 2017 are listed. In most cases, specimens were collected by UV light traps and Malaise traps, although not all stations were sampled by the latter method. Collections from two of the national parks yielded the new species described herein. Omar Torrijos National Park was visited in the fourth week of March. Santa Fe National Park was visited in the second and third weeks of April.

Specimens were prepared and examined following standard methods outlined in Blahnik and Holzenthal (2004). Forewing length was measured from base to apex using a 5-mm microscale (BioQuip Products, Rancho Dominguez, California, USA). Male genitalia were soaked in 5% KOH overnight, and washed prior to examination. Pencil sketches were made using an Olympus BX41 and SZX12 compound and stereomicroscopes, outfitted with drawing tubes. The sketches were then scanned and placed into an Adobe Illustrator CS6 document to serve as template to prepare digital illustrations. Morphological terminology follows mostly Blahnik (1995), but the terms phallotheca and endotheca are replaced by phallobase and endothecal membranes as in Morse (1975).

Types of the new species and other material examined are deposited in the Colección Zoológica Dr. Eustorgio Méndez (COZEM) of the Instituto Conmemorativo Gorgas de Estudio de la Salud (Gorgas Institute) and the University of Minnesota Insect Collection (UMSP), as indicated in each species treatment.

Species descriptions were prepared using the program DELTA (Dallwitz et al. 2016), and locality data were formatted using the web application AUTOMATEX (Brown 2013) to increase consistency. The distribution map was prepared in QGIS 3.2.2. Bonn (QGIS Development Team 2018). Vector and raster maps were made with Natural Earth (2018) and CIAT-CSI SRTM (Jarvis et al. 2008) data.

Results

Three new species of *Smicridea* collected from either Omar Torrijos National Park or Santa Fe National Park (Fig. 4) are described and illustrated below. A list of all *Smicridea* species now recorded from Panama is presented in Table 1, including distribution information and the original literature citation for Panama.

Table1. Species of *Smicridea* recorded from Panama, with the literature reference first attributing the species to Panama.The type country is marked (*). Members of the nigripennis species group are indicated.

Subgenus *Rhyacophylax*

Smicridea (*Rhyacophylax*) *lobata* (Ulmer) [in Ulmer and Thienemann, 1909]
Primary Literature Reference: Rázuri-Gonzales and Holzenthal 2016
Distribution: Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Venezuela*

Smicridea (*Rhyacophylax*) *murina* McLachlan, 1871
Primary Literature Reference: Flint 1974b
Distribution: Argentina, Bolivia, Chile*, Colombia, Costa Rica, Ecuador, Nicaragua, Panama, Peru, Venezuela

Smicridea (*Rhyacophylax*) *nemorosa* Holzenthal and Blahnik, 1995
Primary Literature Reference: Armitage et al. 2018
Distribution: Costa Rica*, Panama

Smicridea (*Rhyacophylax*) *radula* Flint, 1974a
Primary Literature Reference: original description
Distribution: Costa Rica*, Brazil, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama

Smicridea (*Rhyacophylax*) *talamanca* Flint, 1974a
Primary Literature Reference: McElravy et al. 1981
Distribution: Costa Rica*, Panama

Smicridea (*Rhyacophylax*) *tapanti* Holzenthal and Blahnik, 1995
Primary Literature Reference: Armitage et al. 2018
Distribution: Costa Rica*, Panama

Subgenus *Smicridea*

Smicridea (*Smicridea*) *bivittata* (Hagen, 1861)
Primary Literature Reference: Blahnik 1995
Distribution: Brazil, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama*, Peru, Suriname, Tobago, Trinidad, Venezuela

Smicridea (*Smicridea*) *breviuncata* Flint, 1974
Primary Literature Reference: original description
Distribution: Colombia, Costa Rica*, Panama

Smicridea (*Smicridea*) *campana* Flint, 1974a — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *cartiensis* Flint and Denning, 1989 — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *catherinae* Blahnik, 1995
Primary Literature Reference: original description
Distribution: Costa Rica*, El Salvador, Guatemala, Honduras, Mexico, Panama

Smicridea (*Smicridea*) *circinata* Flint and Denning, 1989 — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *cuna* Flint, 1974 — **nigripennis group**
Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *dividua* Rázuri-Gonzales and Armitage, sp. n. — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *filicata* Flint and Denning, 1989 — **nigripennis group**
Primary Literature Reference: McElravy et al. 1981
Distribution: Costa Rica*, Panama

Smicridea (*Smicridea*) *gemina* Blahnik, 1995
Primary Literature Reference: original description
Distribution: Brazil, Colombia, Costa Rica*, Ecuador, Nicaragua, Panama

Smicridea (*Smicridea*) *hybrida* Blahnik, 1995
Primary Literature Reference: original description
Distribution: Costa Rica*, Guatemala, Honduras, Nicaragua, Panama

Smicridea (*Smicridea*) *lata* Rázuri-Gonzales and Armitage, sp. n. — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *latipala* Flint and Denning, 1989 — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *matagalpa* Flint, 1974a — **nigripennis group**
Primary Literature Reference: original description
Distribution: Costa Rica, Honduras, Nicaragua*, Panama

Table1. Continued.

Smicridea (*Smicridea*) *mirama* Flint and Denning, 1989 — **nigripennis group**
Primary Literature Reference: original description
Distribution: Nicaragua, Panama*

Smicridea (*Smicridea*) *multidens* Flint and Denning, 1989 — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *polyfasciata* Martynov, 1912
Primary Literature Reference: Armitage et al. 2018
Distribution: Bolivia, Colombia, Ecuador, Panama, Peru*

Smicridea (*Smicridea*) *spatulata* Rázuri-Gonzales and Armitage, sp. n. — **nigripennis group**
Primary Literature Reference: original description
Distribution: Panama*

Smicridea (*Smicridea*) *turrialbana* Flint, 1974 — **nigripennis group**
Primary Literature Reference: Flint and Denning 1989
Distribution: Costa Rica*, Panama

Smicridea (*Smicridea*) *varia* (Banks, 1913)
Primary Literature Reference: Flint 1974a
Distribution: Costa Rica*, Ecuador, Guatemala, Mexico, Nicaragua, Panama

***Smicridea* (*Smicridea*) *lata* Rázuri-Gonzales and Armitage, sp. n.**
Fig. 1.

Diagnosis. *Smicridea* (*S.*) *lata* is most similar to *S.* (*S.*) *soyatepecana* Bueno-Soria, 1986 from Mexico, mainly based on the shape of tergum X and the phallic apparatus. Both species have a long narrow tergum X in lateral view with a dorsally-directed apex, but in dorsal view, the apex of tergum X in *Smicridea* (*S.*) *lata* is rounded whereas it is truncate in *S.* (*S.*) *soyatepecana.* Additionally, the phallic apparatus in lateral view in both species has a broad posteroventral process. However, this process is broader, directed dorsad, and with a rounded apex in *Smicridea* (*S.*) *lata* but directed posterad and with slightly truncate apex in *S.* (*S.*) *soyatepecana.* Furthermore, the posteroventral process of the phallobase in ventral view in *Smicridea* (*S.*) *lata* is narrowly divided, more slender apically, and with a pair of processes subapically and midlaterally, while in *S.* (*S.*) *soyatepecana*, this process is broadly divided, broader apically, and without subapical processes but with midlateral spines on the surface of the phallobase.

Description. *Adult male.* Forewing length 4.1 mm (n = 1). Body color light brown (specimen preserved in alcohol). Head and thorax light brown with brown setae, dorsally thorax with dark brown marks anterad. Antennae and legs yellowish brown, legs with short brown setae. Maxillary palps 5-segmented; maxillary palps with fine light brown setae and few thicker dark brown setae dorsally on segments I and II. Forewing membrane brown, with brown setae and whitish transversal band in the nygmal area membrane, mostly denuded. Wing venation typical for the subgenus. Glands on abdominal segments VI and VIII oval.

Male genitalia. Segment IX in lateral view (Fig. 1A) much longer dorsally than ventrally, antero-lateral margin concave, anterodorsal corner not produced, broadly rounded; anterior portion of dorsal margin slightly concave, posterior portion membranous; ventrolateral margin oblique, sinuous; ventral margin short, rounded; in dorsal view (Fig. 1B) anterior margin concave, lateral margin sinuous, inflated mesally, mesally bearing microsetae. Tergum X in lateral view (Fig. 1A) narrow, setose, much shorter than segment IX, apex truncate, posterodorsal corner produced dorsad; in dorsal view (Fig. 1B) narrow, with rounded apices, separated by mesal notch, less than half its length, membranous mesally. Inferior appendage (Figs. 1A–C) two-segmented; first segment extending beyond posterior margin of tergum X, covered with setae, inflated apically; second segment digitate, approximately 1/3 as long as first segment, with short setae on lateral margin and very fine setae on dorsal and mesal surfaces, in dorsal view apex acute, slightly inflated on distal half. Phallic apparatus (Figs. 1D–E) with phallobase enlarged, open

ventrally; apical section open, dorsolateral corner of phallobase rounded, entire; posterodorsal margin of phallobase mesally produced, spatulate; posteroventral margin produced into broad digitate, entire lobe, with rounded apex, directed dorsad, with pair of midlateral processes: (i) a subtriangular process bearing spicules, and (ii) a short subapical process; in ventral view, posteroventral process deeply notched, notch basally narrow, each lobe slender, rounded apically; endothecal membranes with two pairs of long slender acute spines, curved dorsad: (i) dorsal pair shorter than ventral pair, bearing spicules on dorsal surface, and (ii) ventral spines twice as long as dorsal pair.

Female and immature stages. Unknown.

Distribution. Panama (Veraguas Province).

Etymology. From the Latin word *latus*, referring to the very broad posteroventral process of the phallobase in lateral view.

Material examined. HOLOTYPE MALE. PANAMA: Veraguas: Santa Fe National Park, Río Mulaba, afluente del primer brazo, 8.51706°N, 81.12140°W, 770 m, 19–23.iv.2017, T. Ríos, E. Álvarez, and C. Nieto, Malaise trap (COZEM).

***Smicridea* (*Smicridea*) *spatulata* Rázuri-Gonzales and Armitage, sp. n.**
Fig. 2.

Diagnosis. *Smicridea* (*S.*) *spatulata* sp. n. is most similar to *S.* (*S.*) *campana* Flint, 1974 based on the shape of tergum X, especially in dorsal view; the shape of the phallobase in lateral view; and the presence of a semi-membranous ring-like structure in the endothecal membranes. However, *Smicridea* (*S.*) *spatulata* can be distinguished from *S.* (*S.*) *campana* due to its slightly broader tergum X subapically in dorsal view; the crenate dorsolateral corner of the phallobase, which is straight and smooth in *S.* (*S.*) *campana*; the presence of a short spine on the mesal surface of the phallobase; and the broader and more elongate posteroventral process of the phallobase in lateral view, which is shorter and more slender in *S.* (*S.*) *campana.* Additionally, *Smicridea* (*S.*) *spatulata* has five endothecal spines, whereas *S.* (*S.*) *campana* only has two pairs of spines of different size and shapes.

Description. *Adult male.* Forewing length average 4.0 mm (n = 2). Body color light brown (specimen preserved in alcohol). Head and thorax light brown with light brown setae, dorsally thorax with dark brown marks anterad. Antennae and legs yellowish brown, legs with short brown setae. Maxillary palps 5-segmented; maxillary palps with long fine light brown setae. Forewing membrane light brown, with brown setae, without apparent whitish transversal band in the nygmal area membrane, mostly denuded. Wing venation typical for the subgenus. Abdominal segments VI and VIII glands oval, larger than containing segment.

Male genitalia. Segment IX in lateral view (Fig. 2A) much longer dorsally than ventrally, anterolateral margin concave, anterodorsal corner produced, broadly rounded; anterior portion of dorsal margin slightly concave, mesal portion of dorsal margin convex, bearing small microsetae, closer to tergum X than to anterolateral margin of segment IX, posterior portion membranous; ventrolateral margin oblique, sinuous; ventral margin short, rounded; in dorsal view (Fig. 2B) anterior margin concave, lateral margin sinuous, mesally bearing microsetae. Tergum X in lateral view (Fig. 2A) narrow, setose, much shorter than segment IX, apex rounded; in dorsal view (Fig. 2B) narrow, with rounded apices, separated by mesal notch, less than half its length, membranous mesally. Inferior appendage (Figs. 2A–C) two-segmented; first segment extending beyond posterior margin of tergum X, covered with setae, inflated apically; second segment digitate, approximately 1/3 as long as first segment, with short setae on margins, in dorsal view apex acute, slightly inflated on distal half. Phallic apparatus (Figs. 2D–E) with phallobase enlarged, open ventrally; apical section open, dorsolateral corner of phallobase rounded, crenate, with thick short spine on mesal surface; posterodorsal margin of phallobase mesally produced, acute; posteroventral margin produced into slender digitate, entire lobe, with subacute apex, directed posterad, without spines or processes on lateral surface; in ventral view, posteroventral process entire, spatulate, slightly emarginate apically; endothecal membranes with five acute spines and oval lightly sclerotized "ring": (i) anterior most pair of spines curved ventrad in lateral view, (ii) mesal pair of spines,

curved dorsad, rounded basally and tapering towards apex, slightly longer than anterior most pair, (iii) posteroventral spine acute, with sinuous margins.

Female and immature stages. Unknown.

Distribution. Panama (Coclé Province).

Etymology. From the Latin word *spatulata*, referring to the spatulate posteroventral process of the phallobase in ventral view.

Material examined. HOLOTYPE MALE. PANAMA: Coclé: Omar Torrijos National Park, Quebrada Corazones, 8.6776°N, 80.6001°W, 728 m, 22–26.iii.2017, A. Cornejo, T. Ríos, E. Álvarez, and E. Pérez, Malaise trap (**COZEM**). **PARATYPE.** Same data as holotype, 1♂ (**COZEM**).

***Smicridea* (*Smicridea*) *dividua* Rázuri-Gonzales and Armitage, sp. n.**
Fig. 3.

Diagnosis. *Smicridea* (*S.*) *dividua* sp. n. is most similar to *S.* (*S.*) *cholta* Flint, 1974 from Guatemala and Nicaragua based on the shape of tergum X and the phallic apparatus in ventral view. However, *Smicridea* (*S.*) *dividua* is easily separated from *S.* (*S.*) *cholta* due to the bilobed posteroventral process of the phallobase, which is broad and entire in *S.* (*S.*) *cholta*, and the posterodorsal margin of the phallobase, which is produced into a slender lobe in the new species, but is undulate and bearing a few short spines on the lateral surface in *S.* (*S.*) *cholta.* Furthermore, *S.* (*S.*) *dividua* has a single sinuous spine, which shape is unique in this group whereas *S.* (*S.*) *cholta* has a pair of long slender spines.

Description. *Adult male.* Forewing length average 4.3 mm (n = 7). Body color light brown (specimen preserved in alcohol). Head and thorax light brown with brown setae, dorsally thorax with dark brown marks anterad. Antennae and legs yellowish brown, antennae with short brown setae, legs with long brown setae. Maxillary palps 5-segmented; maxillary palps with long brown setae and a few thick long setae anteroventrally on segment II. Forewing membrane light brown, with brown and dark brown setae, with whitish transversal band in the nygmal area membrane, mostly denuded. Wing venation typical for the subgenus. Abdominal segments VI and VIII glands oval, larger than containing segment.

Male genitalia. Segment IX in lateral view (Fig. 3A) much longer dorsally than ventrally, anterolateral margin slightly concave, anterodorsal corner not produced, forming nearly straight angle; anterior portion of dorsal margin long, slightly concave, mesal portion of dorsal margin convex, bearing small microsetae, closer to tergum X than to anterolateral margin of segment IX, posterior portion membranous; ventrolateral margin oblique, sinuous; ventral margin short, truncate; in dorsal view (Fig. 3B) anterior margin strongly concave, lateral margin sinuous, inflated mesally, mesally bearing microsetae. Tergum X in lateral view (Fig. 3A) narrow, setose, much shorter than segment IX, apex truncate, posterodorsal corner produced dorsad; in dorsal view (Fig. 3B) narrow, with rounded apices, separated by mesal notch, less than half its length, membranous mesally. Inferior appendage (Figs. 3A-C) two-segmented; first segment not extending beyond posterior margin of tergum X, covered with setae, inflated apically; second segment digitate, approximately 1/2 as long as first segment, with short setae on margins, in dorsal view apex acute, slightly inflated on distal half. Phallic apparatus (Figs. 3E-D) with phallobase enlarged, open ventrally; apical section open, dorsolateral corner of phallobase produced into a slender lobe; posterodorsal margin of phallobase mesally produced, acute; posteroventral margin produced into two slender digitate lobes, the ventral one with subacute apex, directed laterad and the dorsal one with bilobed apex, directed dorsolaterad, without spines or processes on lateral surface; in ventral view, posteroventral process deeply notched, notch basally rounded and undulate, each lobe slender, bilobed apically, directed laterad; endothecal membranes in lateral view with a long, sinuous, apically acute spine, in ventral view, bilobed, broad basally and slender apically, deeply notched mesally.

Female and immature stages. Unknown.

Distribution. Panama (Coclé Province).

Etymology. From the Latin word *dividuus*, referring to the unique divided endothecal spine.

Material examined. HOLOTYPE MALE. PANAMA: Coclé: Omar Torrijos National Park, Quebrada La Yayas, 8.66168°N, 80.5952°W, 586 m, 22–26.iii.2017, E. Álvarez, E. Pérez, and T. Ríos, Malaise trap (**COZEM**). **PARATYPES.** Same data as holotype, 6♂ (**COZEM, UMSP**).

Discussion

It is interesting to note that these new species were collected only in Malaise traps, not in UV light traps. Malaise traps are used as a complement to light traps, and they usually harbor species that are active during the day or that are not readily attracted to lights (Blahnik and Holzenthal 2004). In this study, Malaise traps were run only for four days, which is perhaps reflected in the low number of individuals. These species could also be locally rare or were collected at the beginning of the emergence phase of their life cycle. However, this is only speculative as the sampling effort in this study was low and the number of species in the Neotropics with known life histories is minimal (Holzenthal et al. 2015).

To our knowledge, adult caddisflies have not been collected before in these two national parks. Known species of *Smicridea* collected during this study include: *Smicridea* (*S.*) *bivittata* (Hagen, 1861), *S.* (*S.*) *filicata* Flint and Denning, 1989, *S.* (*S.*) *matagalpa* Flint, 1974, *S.* (*R.*) *nemorosa* Holzenthal and Blahnik 1995, *S.* (*R.*) *radula* Flint, 1974, and *S.* (*R.*) *talamanca* Flint, 1974 from Omar Torrijos National Park; and *Smicridea* (*S.*) *campana*, *S.* (*S.*) *filicata*, and *S.* (*R.*) *talamanca* from Santa Fe National Park.

The addition of these three members of the nigripennis species group increases the number of *Smicridea* species in Panama to 26, nine of which are currently endemic. Additionally, the number of species in the nigripennis species group (n = 13) known from Panama equals that of Mexico, a country more than 26 times larger than Panama. This highlights the high species richness in Panama for this group, even when compared with relatively well-sampled countries of comparable size such as Costa Rica (8 species). Finally, the presence of more than a dozen additional species of this genus in countries adjacent to Panama suggests that new country records, in addition to new species to science, are possible from future collecting.

Acknowledgements

We thank the Ministry of the Environment of Panama and COZEM of the Gorgas Institute for making it possible for us to examine this material. We are grateful for the overall coordination of the entomofaunal portion of the national parks project by Aydeé Cornejo. We thank Carlos Nieto, Tomás Ríos, Eric Álvarez, and Edgar Pérez for their significant efforts to collect all of the aquatic insect material. We are indebted to Dr. Steven C. Harris, Clarion University and Dr. Fabio Quinteiro, Universidade de São Paulo for their review of this paper. We appreciate the efforts of Tatiana I. Arefina-Armitage for her editing skills and attention to consistency. ERG was funded through a FONDECYT-CONCYTEC doctoral fellowship (grant contract number 277-2015-FONDECYT) and the University of Minnesota Agricultural Experiment Station Project 017094. We are indebted to the University of Minnesota Insect Collection for providing the space to carry out this work. This support is gratefully acknowledged.

Literature Cited

Alves, A. A., A. P. M. Santos, and J. L. Nessimian. 2018. A new species of *Smicridea* McLachlan 1871 (Trichoptera: Hydropsychidae) from the Caatinga biome and new distributional records from Brazil. Zootaxa 4500(3): 338–396.

Armitage, B. J., S. C. Harris, R. J. Blahnik, A. Cornejo, and T. I. Arefina-Armitage. 2018. The Trichoptera of Panama VII. Additional new records for caddisflies from the Republic of Panama. Insecta Mundi 0614: 1–7.

Banks, N. 1913. Some new neuropteroid insects. Journal of the New York Entomological Society 11: 236–243.

Blahnik, R. J. 1995. New species of *Smicridea* (subgenus *Smicridea*) from Costa Rica, with a revision of the *fasciatella* complex (Trichoptera: Hydropsychidae). Journal of the North American Benthological Society 14(1): 84–-107.

Blahnik, R. J., and R. W. Holzenthal. 2004. Collection and curation of Trichoptera, with an emphasis on pinned material. Nectopsyche, Neotropical Trichoptera Newsletter 1: 8–20.

Bueno-Soria, J. 1986. Estudios en insectos acuáticos VII: Cinco nuevas especies de tricópteros de México y Costa Rica (Trichoptera: Hydropsychidae). Folia Entomológica Mexicana 68: 53–65.

Brown, B. V. 2013. Automating the "Material examined" section of taxonomic papers to speed up species descriptions. Zootaxa 3683(3): 297–299.

Dallwitz, M. J., T. A. Paine, and E. J. Zurcher. 2016. User's guide to the DELTA editor. Available at http://delta-intkey.com/www/delta-ed.htm. (Last accessed November 2018.)

Flint, O. S., Jr. 1974a. Studies of Neotropical caddisflies, XVII: the genus *Smicridea* from North and Central America (Trichoptera: Hydropsychidae). Smithsonian Contributions to Zoology 167: 1–65.

Flint, O. S., Jr. 1974b. Checklist of the Trichoptera, or caddisflies, from Chile. Revista Chilena de Entomología 8: 83–93.

Flint, O. S., Jr., and D. G. Denning. 1989. Studies of Neotropical caddisflies, XL: new species of *Smicridea* (*Smicridea*) from Middle America and the West Indies (Trichoptera: Hydropsychidae). Proceedings of the Biological Society of Washington 102(2): 418–433.

Hagen, H. 1861. Synopsis of the Neuroptera of North America. Smithsonian Miscellaneous Collections 4: 1–347.

Holzenthal, R. W., and R. J. Blahnik. 1995. New species of *Smicridea* (*Rhyacophylax*) (Trichoptera: Hydropsychidae) from Costa Rica. Entomological News 106(5): 213–223.

Holzenthal, R. W., and A. R. Calor. 2017. Catalog of the Neotropical Trichoptera (Caddisflies). ZooKeys 654: 1–566.

Holzenthal, R. W., R. E. Thomson, and B. Ríos-Touma. 2015. Chapter 38: Order Trichoptera. p. 965–1002. *In*: J. H. Thorp and D. C. Rogers (eds.). Thorp and Covich's Freshwater Invertebrates. Academic Press, New York. 836 p.

Jarvis, A., H. I. Reuter, A. Nelson, and E. Guevara. 2008. Hole-filled seamless SRTM data V4. International Centre for Tropical Agriculture (CIAT). Available at http://srtm.csi.cgiar.org. (Last accessed August 2018.)

Kondratieff, B., and B. J. Armitage. 2019. The Plecoptera of Panama III. The genus *Anacroneuria* (Plecoptera: Perlidae) in Panama's national parks: 2017 survey results. Zootaxa 4565(3): 407–419.

Martynov, A. V. 1912. On two collections from Peru. Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de Saint Pétersbourg 17: 1–40.

McElravy, E. P., V. H. Resh, H. Wolda, and O. S. Flint, Jr. 1981. Diversity of adult Trichoptera in a 'non-seasonal' tropical environment. p. 149–156. *In:* G. P. Moretti (ed.) Proceedings of the 3rd International Symposium on Trichoptera. Dr. W. Junk; The Hague. 500 p.

McLachlan, R. 1871. On new forms, etc., of extra-European Trichopterous insects. Journal of Linnean Society of London, Zoology 11: 98–141.

Mey, W., and R. Ospina-Torres. 2018. Contribution to the Trichoptera fauna of the river La Vieja, Bogotá, Colombia (Insecta: Trichoptera). Zootaxa 4504(1): 023–040.

Morse, J. C. 1975. A phylogeny and revision of the caddisfly genus *Ceraclea* (Trichoptera, Leptoceridae). Contributions of the American Entomological Institute 11(2): 1–94.

Natural Earth. 2018. Free vector and raster map data. Available at http://naturalearthdata.com. (Last accessed 2019)

QGIS Development Team. 2018. QGIS Geographic Information System. Open Source Geospatial Foundation Project. Available at https://qgis.osgeo.org. (Last accessed 2019)

Rázuri-Gonzalez, E., and R. W. Holzenthal. 2016. New synonyms in the highly diverse caddisfly genus *Smicridea* (Trichoptera: Hydropsychidae). ZooKeys 637: 21–31.

Sganga, J. V., and F. M. Gibon. 2018. New Species, New Records, and Distribution of *Smicridea* McLachlan 1871 in Bolivia (Trichoptera: Hydropsychidae). Neotropical Entomology. DOI: 10.1007/s13744-018-0645-0.

Ulmer, G., and A. Thienemann. 1909. Südamerikanische Trichopteren aus den Kopenhagener Museum. Deutsche Entomologische Zeitschrift 1909: 305–311.

Received April 10, 2019; accepted May 10, 2019.
Review editor Andy Rasmussen.

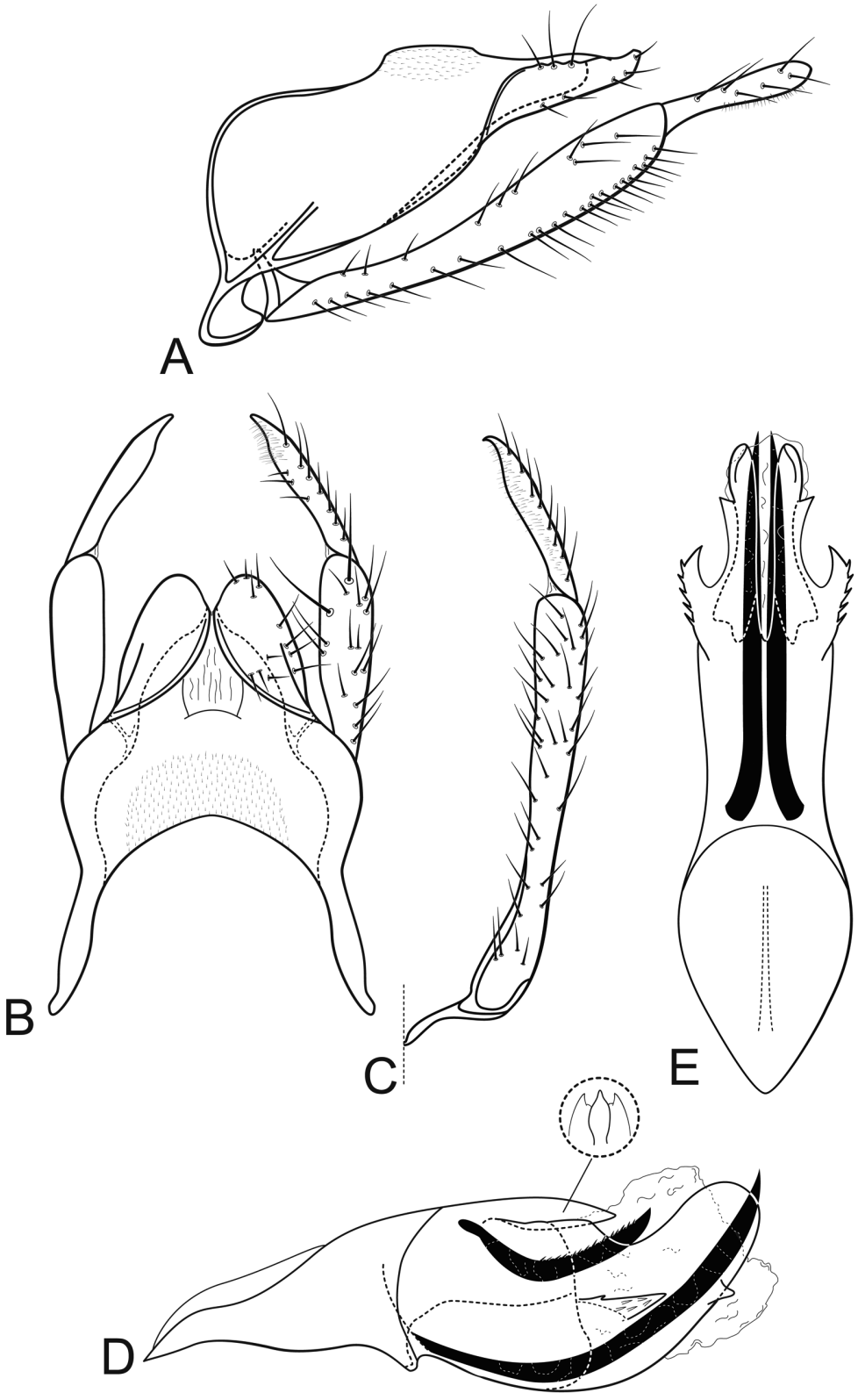

Figure 1. *Smicridea* (*Smicridea*) *lata* Rázuri-Gonzales and Armitage, sp. n., male genitalia. **A)** Lateral view. **B)** Dorsal view. **C)** Left inferior appendage, ventral view. **D)** Phallic apparatus, lateral view (inset: posterodorsal margin projection, dorsal view). **E)** Phallic apparatus, ventral view.

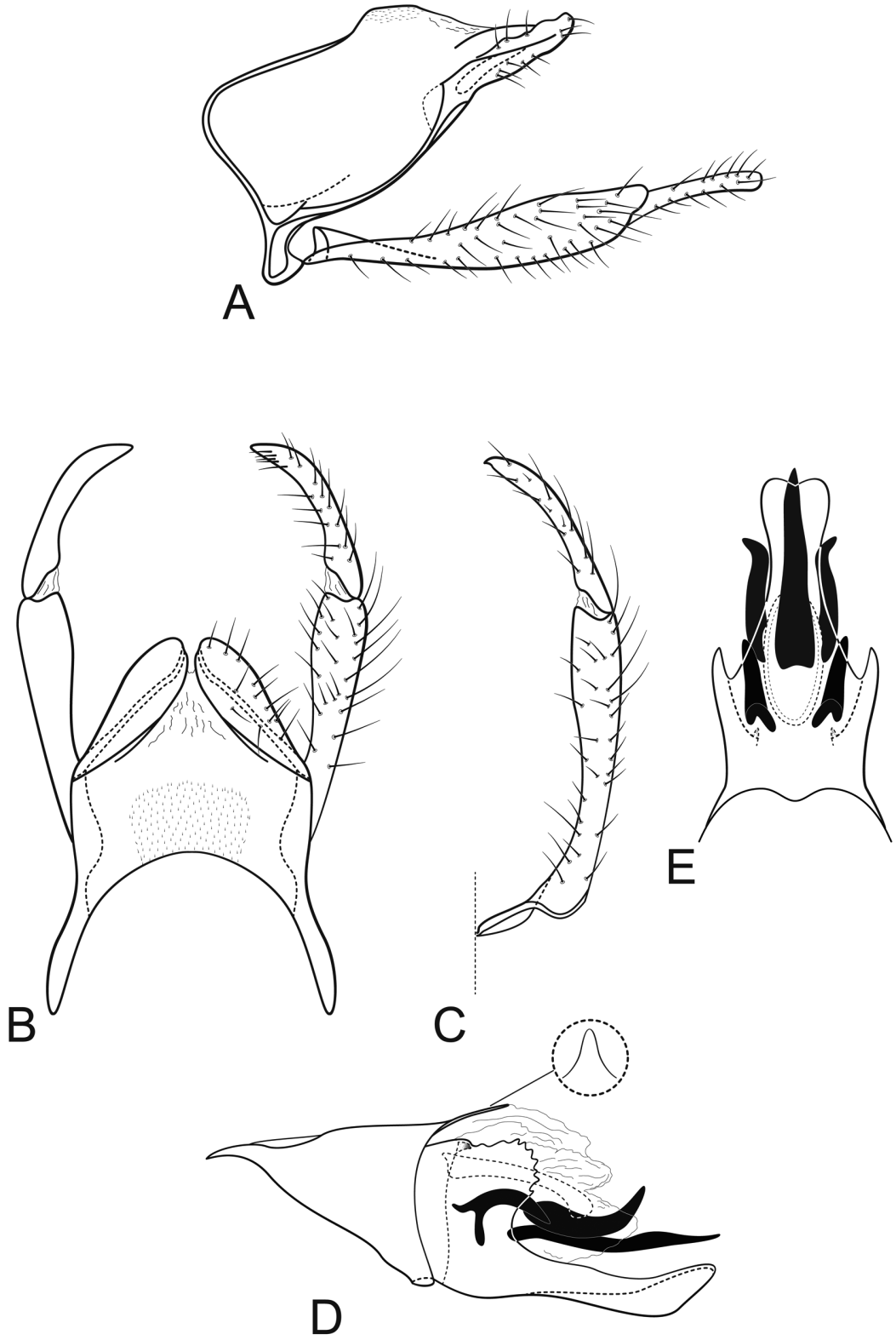

Figure 2. *Smicridea* (*Smicridea) spatulata* Rázuri-Gonzales and Armitage, sp. n., male genitalia. **A)** Lateral view. **B)** Dorsal view. **C)** Left inferior appendage, ventral view. **D)** Phallic apparatus, lateral view (inset: posterodorsal margin projection, dorsal view). **E)** Phallic apparatus, ventral view.

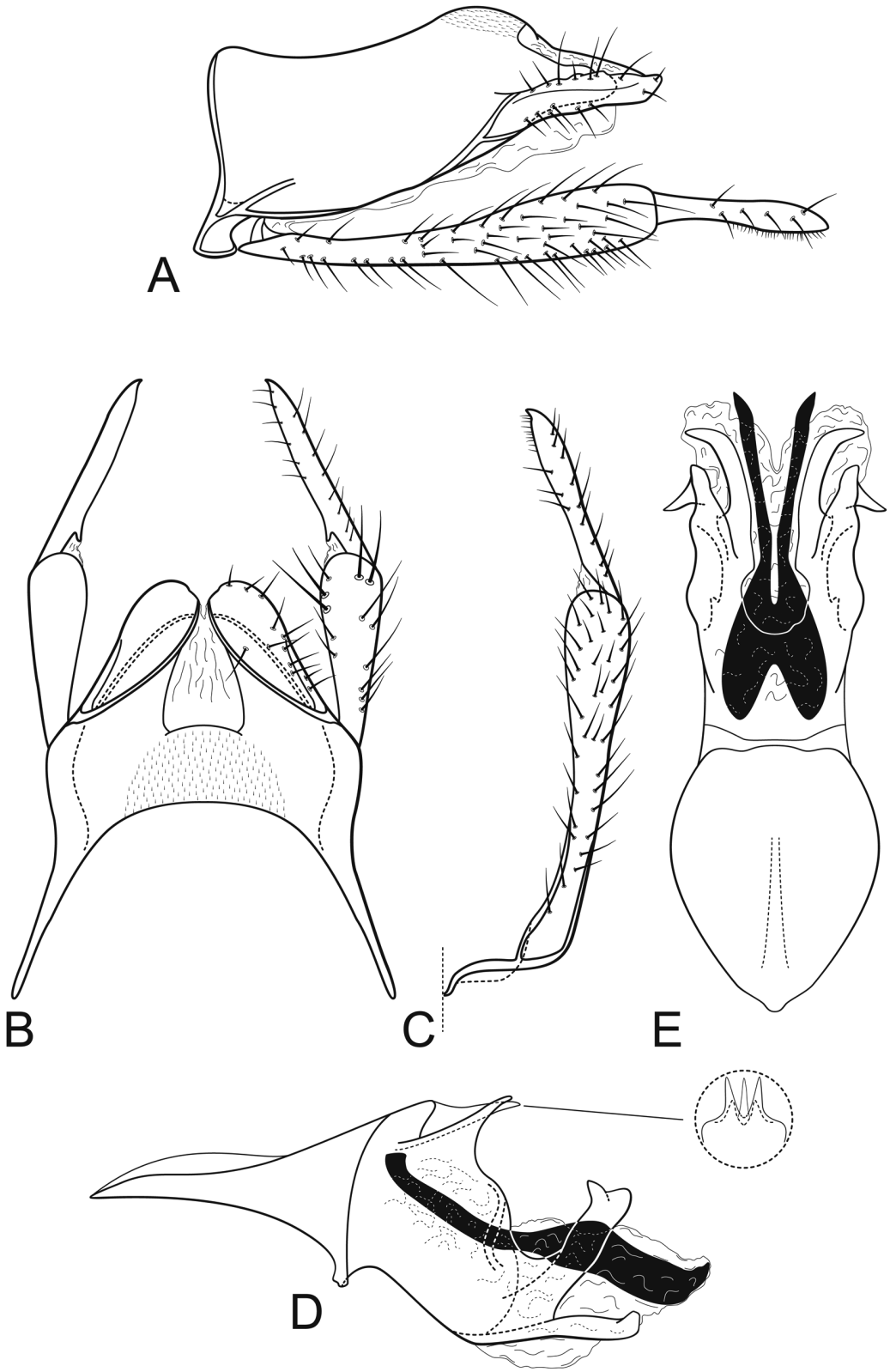

Figure 3. *Smicridea* (*Smicridea) dividua* Rázuri-Gonzales and Armitage, sp. n., male genitalia. **A)** Lateral view. **B)** Dorsal view. **C)** Left inferior appendage, ventral view. **D)** Phallic apparatus, lateral view (inset: posterodorsal margin projection, dorsal view). **E)** Phallic apparatus, ventral view.

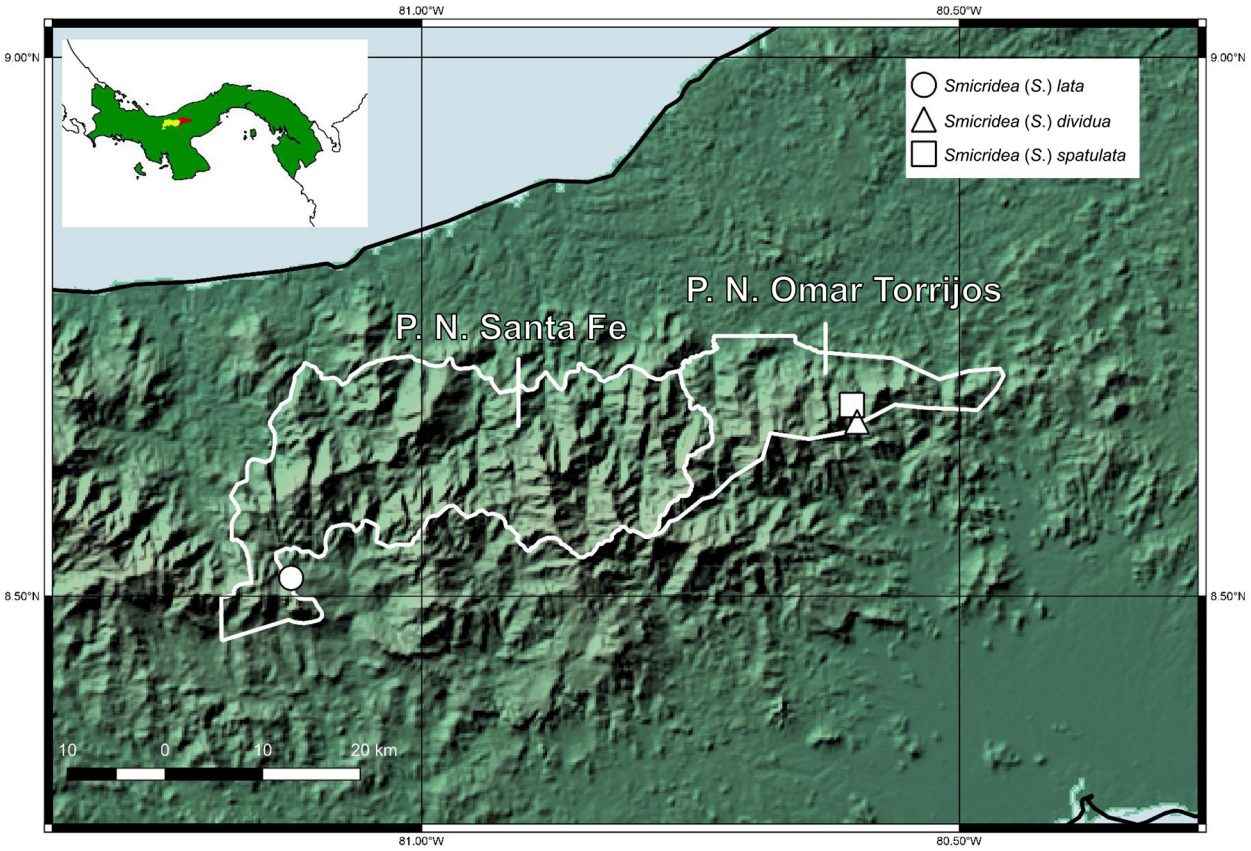

Figure 4. Distribution map for the new *Smicridea* species described from Panama.