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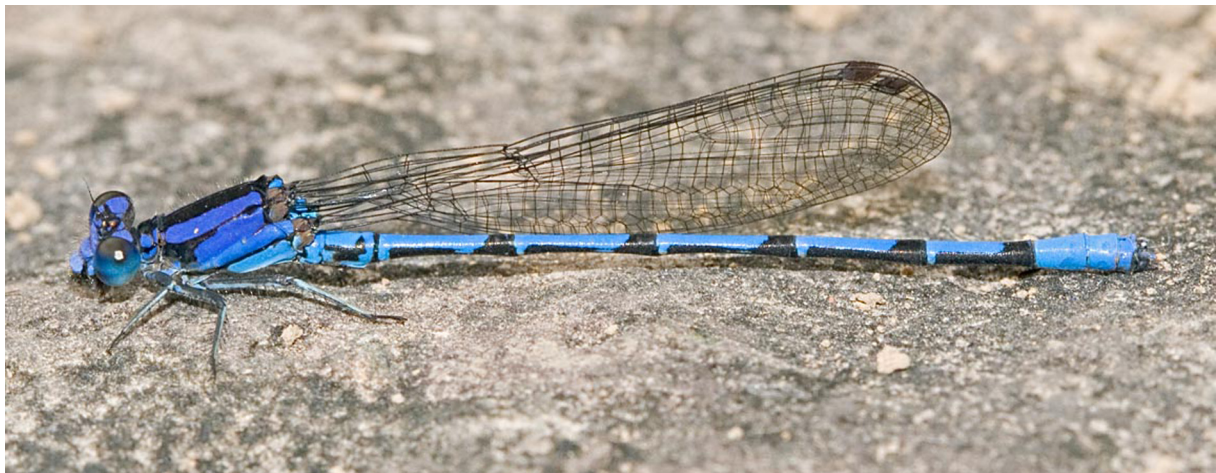
# ZOOTAXA

4235

## New species of the damselfly genus *Argia* from Mexico, Central America and Ecuador with an emphasis on Costa Rica (Insecta: Odonata: Coenagrionidae)

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Male of *Argia elongata* at La Lindora, Monteverde Province, Costa Rica, by William A. Haber



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## Abstract

Seven new species of *Argia* are described, five of which occur in Costa Rica: *Argia calverti* n. sp. (Holotype ♂, Costa Rica, Cartago Prov., Tapantí Reserve, 1,310 m, 6 vii 1963, F. G. Thompson leg., in FSCA); *Argia carolus* n. sp. (Holotype ♂, Costa Rica, San José Prov., El Rodeo Biological Reserve, 7 km W of Villa Colón, 9°54' N, 84°16' W, 561 m, 10–13 vii 1990, T. W. Donnelly leg., in FSCA); *Argia elongata* n. sp. (Holotype ♂, Costa Rica, Cartago Prov., Reventazón river, SE of Turrialba by highway 10, 9°52'56" N, 83°38'49" W, 561 m, 10 viii 1979, R. W. & J. A. Garrison leg., in CSCA); *Argia haberi* n. sp. (Holotype ♂, Costa Rica, San José Prov., Bosque del Tolomuco, km 118 on Pan American highway, in seeps and trickles through brushy pasture on forested hillside, 9°28'18" N, 83°41'48" W, 1,710 m, 27 iii 2006, F. Sibley leg., in FSCA); *Argia schorri* n. sp. (Holotype ♂, Costa Rica, Puntarenas Prov., 2.8 mi E of Golfito, 8°39' N, 83°7' W, 35 m, 4 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg., in USNM), and two which are so far only known from Mexico and Ecuador respectively: *Argia rudolphi* n. sp. (Holotype ♂, Mexico, Puebla State, Zihuateutla, Sierra de Huauchinango, La Unión, in drainage area, 20°14'25" N, 97°53'38" W, 596 m, 21 v 1987, R. Novelo & A. Gómez leg., in CSCA) and *Argia schneideri* n. sp. (Holotype ♂, Ecuador, Napo Prov., Las Palmas, on Anzu river in Napo river watershed, 11 xii 1936, W. Clark-MacIntyre leg., in UMMZ). All the new species, as well as closely related species needed for diagnosis including *A. anceps* Garrison, *A. cupraurea* Calvert, *A. cuprea* (Hagen), *A. extranea* (Hagen), *A. fissa* Selys, *A. fulgida* Navás, *A. oenea* Hagen in Selys, *A. popoluca* Calvert, *A. rhoadsi* Calvert, and *A. westfalli* Garrison, are illustrated and diagnosed from their congeners and their known distribution areas are mapped.

**Key words:** Damselfly, Neotropics, new species, diagnoses, distribution maps

## Resumen

Siete nuevas especies de *Argia* son descritas, cinco de las cuales ocurren en Costa Rica: *Argia calverti* n. sp. (Holotipo ♂, Costa Rica, Cartago Prov., Reserva Tapantí, 1,310 m, 6 vii 1963, F. G. Thompson leg., en FSCA); *Argia carolus* n. sp. (Holotipo ♂, Costa Rica, San José Prov., Reserva Biológica El Rodeo, 7 km O de Villa Colón, 9°54' N, 84°16' W, 561 m, 10–13 vii 1990, T. W. Donnelly leg., en FSCA); *Argia elongata* n. sp. (Holotipo ♂, Costa Rica, Cartago Prov., Río Reventazón, SE de Turrialba por autopista 10, 9°52'56" N, 83°38'49" W, 561 m, 10 viii 1979, R. W. & J. A. Garrison leg., en CSCA); *Argia haberi* n. sp. (Holotipo ♂, Costa Rica, San José Prov., Bosque del Tolomuco, km 118 en autopista Panamericana, en vegas y vertientes sobre una ladera con pasto y árboles, 9°28'18" N, 83°41'48" W, 1,710 m, 27 iii 2006, F. Sibley leg., en FSCA); *Argia schorri* n. sp. (Holotipo ♂, Costa Rica, Puntarenas Prov., 2.8 millas E de Golfito, 8°39' N, 83°7' W, 35 m, 4 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg., en USNM), y dos que hasta la fecha solo se conocen de México y Ecuador respectivamente: *Argia rudolphi* n. sp. (Holotipo ♂, México, Puebla State, Zihuateutla, Sierra de Huauchinango, La Unión, en escurridero, 20°14'25" N, 97°53'38" W, 596 m, 21 v 1987, R. Novelo & A. Gómez leg., en CSCA) y *Argia schneideri* n. sp. (Holotipo ♂, Ecuador, Napo Prov., Las Palmas, en Río Anzu en la Cuenca del Río Napo, 11 xii 1936, W. Clark-MacIntyre leg., en UMMZ). Todas las especies nuevas, así como las especies cercanamente emparentadas necesarias para diagnosis incluyendo a *A. anceps* Garrison, *A. cupraurea* Calvert, *A. cuprea* (Hagen), *A. extra-*

*nea* (Hagen), *A. fissa* Selys, *A. fulgida* Navás, *A. oenea* Hagen in Selys, *A. popoluca* Calvert, *A. rhoadsi* Calvert, y *A. westfalli* Garrison son ilustradas y diagnosticadas de sus congéneres y su distribución conocida es mapeada.

**Palabras clave:** Libélulas, Neotrópico, nuevas especies, diagnosis, mapas de distribución

## Introduction

Costa Rica constitutes a biodiversity hot-spot, with at least 270 species of odonates recorded from this small country of only 51,100 square kilometers (Esquivel 2006; Haber & Wagner 2013). Numerous endemisms and species from both North and South America that reach their distribution limits here are found within its diverse tropical rainforests, deciduous, cloud, and Mangrove forests. Although the odonate fauna of Costa Rica is better known than that of any other Central American country, several undescribed species collected in the past are still awaiting description, and there is a high likelihood of even more new species being discovered.

The genus *Argia*, found exclusively in the New World, is the most speciose genus of Odonata in the world. Approximately 200 names have been proposed or have been used in combination with this name since it was first established by Rambur (1842), and it currently includes 126 described species (Garrison & von Ellenrieder 2016). In Costa Rica, *Argia* is represented by 28 species, including the five new species described here as a continuation of our 2013 contribution (Garrison & von Ellenrieder 2013). For comparative purposes we also describe one new species of *Argia* from Mexico and one from Ecuador that resemble two of the new Costa Rican species.

## Methodology

For this study we examined almost 2,000 specimens of *Argia*, including new species and related congeners. Specimens were first sorted to morphospecies based primarily on morphology of the caudal appendages and genital ligula of males and mesostigmal laminae of females. Other characters such as the number of postquadrangular cells and body color and patterning were also used in allocating specimens to taxa. The main morphological structures of diagnostic value in this genus and their terminology were described by Garrison (1994) in his study of the North American species, and the procedure to prepare them for examination and illustration was detailed by Garrison & von Ellenrieder (2015). Nomenclature follows Garrison *et al.* (2010). Abbreviations used throughout the text are as follows: Fw: forewing; Hw: hindwing; Pt: Pterostigma; PX: Postnodal crossvein; S1–10: abdominal segments 1 to 10; Dept.: Department; Dist.: District; Prov.: Province.

New species are treated alphabetically. Each species account includes type material information, list of specimens examined, description, diagnosis, remarks, habitat from which adults were collected, distribution, and illustrations of all diagnostic characters including variability when observed.

Illustrations were made with the aid of a camera lucida coupled to Nikon SMZ1500 and Zeiss SteREO discovery V20 stereomicroscopes. Multiple drawings are included to illustrate observed variability of characters. Macrophotographs of the head, thorax, and parts of the abdomen of dried specimens were edited with Adobe Photoshop to match colors from photographs of live specimens. Coloration depicted for these illustrations should be considered approximate and may not match field-collected material especially in terms of intensity of pale colors. All photographs were rendered from fully mature specimens; teneral and juvenile specimens normally possess lighter pale colors, and females of some species may be dichromatic (brown or blue) in their pale coloration. Photographs, scans, and illustrations are not to scale, and names on plates referring to new species are framed.

Measurements are given in millimeters; dimensions are given as average  $\pm$  standard deviation followed by range in square brackets and were taken from ten specimens when available; hindwing measurement excludes basal sclerites; total length includes appendages and ovipositor (excluding styli), but abdomen length excludes them.

Maps were created electronically using Arc View 9.3. Longitude/latitude coordinates provided in the original labels are indicated in parentheses; approximate coordinates culled from Brown (1941) and Google Earth when not provided in the original labels are indicated in curly brackets.

The following acronyms for collections and collectors are used throughout the paper:

ACR	Andrew C. Rehn, Sacramento, California, USA
BMNH	British Museum of Natural History, London, UK
CAS	California Academy of Sciences, San Francisco, California, USA
CEH	Carlos Esquivel Heredia, Heredia, Costa Rica
CEUA	Universidad de Antioquia, Medellín, Antioquia, Colombia
CSCA	California State Collection of Arthropods, Sacramento, California, USA
DRP	Dennis R. Paulson, Seattle, Washington, USA
FSCA	Florida State Collection of Arthropods, Gainesville, Florida, USA
INBIO	Instituto Nacional de Biodiversidad, Heredia, Costa Rica
JJ	Jim Johnson, Vancouver, Washington, USA
JJD	Jerrell Daigle, Tallahassee, Florida, USA
KJT	Kenneth J. Tennessen, Wautoma, Wisconsin, USA
LJ	Laurent Juillerat, Neuchâtel, Switzerland
MIZA	Museo del Instituto de Zoología Agrícola, Maracay, Venezuela
MNHN	Muséum National d'Histoire Naturelle, Paris, France
RWG	Rosser W. Garrison, Sacramento, California, USA
TWD	Thomas W. Donnelly, Binghamton, New York, USA
UAC	Universidad de Los Andes, Bogotá, Colombia
UAM	University of Alabama Museums, Tuscaloosa, Alabama, USA
UMMZ	Museum of Zoology, University of Michigan, Ann Arbor, Michigan, USA
UNAM	Universidad Nacional Autónoma de México, Distrito Federal, Mexico
USNM	National Museum of Natural History, Smithsonian Institution, Washington D.C., USA
WAH	William A. Haber, Monteverde, Puntarenas, Costa Rica

Comparative specimens of other *Argia* species examined for diagnosis of the new species, including *A. anceps* Garrison, *A. cupraurea* Calvert, *A. cuprea* (Hagen), *A. extranea* (Hagen), *A. fissa* Selys, *A. fulgida* Navás, *A. oenea* Hagen in Selys, *A. popoluca* Calvert, *A. rhoadsi* Calvert, and *A. westfalli* Garrison, are listed in the Appendix.

To explore genetic differences between color morphs of *Argia fulgida* the 16S gene of mitochondrial DNA of several specimens of both color morphs was sequenced. GenBank accession numbers for sequenced specimens are provided in the Appendix.

Odonate sample DNA extraction, amplification and analysis: From legs of dried single adult specimens, gDNA was extracted using a modified non-destructive insect protocol for the DNEasy Blood and Tissue Kit (Qiagen Inc., Valencia, CA, Cat. No. 69506). Legs were placed in individual 1.5 ml microcentrifuge tubes (USA Scientific) with 20µl Proteinase K solution and 180µl ATL buffer and incubated for 24 hours in a 55° C water bath. 200 µl manufacturer's AL buffer was added to each tube and sample vortexed briefly and incubated at 70° C for ten minutes. 200 µl of 100% EtOH was added to each tube and vortexed briefly. The mixture was pipetted into DNEasy Spin Column and centrifuged at 8,000 g for 1 minute. Flow through was discarded and 500µl of buffer AW1 was added to the column and centrifuged at 8000g for 1 minute. Flow through was discarded, 500µl of buffer AW2 was added to the column. Column was centrifuged at 20000g for 3 minutes to dry the column. 100µl of buffer AE was pipetted onto column filter and allowed to rest for several minutes and then centrifuged at 8000g to elute. Polymerase Chain Reaction (PCR) was carried out in an Eppendorf Mastercycler thermal cycler. PCR was performed with the following conditions for each reaction: 0.5 U Platinum Taq (Invitrogen), 5µl of manufacturer's 10X buffer (20mM Tris –HCl pH8.4 and 500mM KCl), 2.5mM MgCl<sub>2</sub>, 20µM dNTP's (Sigma), 0.1µM each primer —LR-J-12887 (5' CCGGTCTGAACTCAGATCACGT 3') and LR-N- 13398 (5' CGCCTGTTTAACAAAAACAT 3') (Simon *et al.* 1994), and ddH<sub>2</sub>O to 45µl. 5µl of DNA template was added to the reaction. Amplification was carried out for 35 cycles using annealing temperature at 55°C for 30 s and extension at 72°C for 1 min. The PCR products were purified to remove unincorporated primers and nucleotides using Qiagen QIAquick PCR Purification Kit following the manufacturer's protocol. Sanger sequencing reactions were performed by GeneWiz using the same forward and reverse primers. Electropherograms for the CO1 gene were edited and aligned with Sequencher, version 4.6 . Sequences were manually aligned with MacClade, version 4.08 and edited to 503 base

pairs for all taxa. Estimates of evolutionary divergence between sequences were calculated with MEGA5 (Tamura *et al.* 2011). The evolutionary history was inferred by using the Maximum Likelihood method based on the Jukes-Cantor model (Jukes & Cantor 1969). The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (400 replicates) are shown next to the branches (Felsenstein 1985) in the tree (Fig. 191). Branches corresponding to partitions reproduced in less than 50% bootstrap replicates are collapsed. Initial tree(s) for the heuristic search were obtained automatically as follows: when the number of common sites was < 100 or less than one fourth of the total number of sites, the maximum parsimony method was used; otherwise BIONJ method with MCL distance matrix was used. The analysis involved 9 nucleotide sequences. There were a total of 503 positions in the final dataset.

**TABLE 1.** Names used or associated with *Argia* species treated in this paper. Number in brackets (*[n]*) under Reference = reprint pagination for names proposed by Hagen & Selys (1865). Names in ***bold italic*** = new species. Names in *italic* are treated in diagnostic sections under various new species accounts.

Name	Reference	Treated under	Type Status	Location of Type
<i>Argia anceps</i>	Garrison 1996: 33	<i>Argia rudolphi</i>	Holotype ♂	USNM
<b><i>Argia calverti</i></b>	This paper	<i>Argia calverti</i>	Holotype ♂	FSCA
<b><i>Argia carolus</i></b>	This paper	<i>Argia carolus</i>	Holotype ♂	FSCA
<i>Argia cupraurea</i>	Calvert 1902: 85	<i>Argia calverti</i>	Holotype ♂	BMNH
<i>Argia cuprea</i>	Hagen 1861: 96	<i>Argia calverti</i>	Holotype ♂	?lost
<b><i>Argia elongata</i></b>	This paper	<i>Argia elongata</i>	Holotype ♂	CSCA
<i>Argia extranea</i>	Hagen 1861: 92	<i>Argia elongata</i>	Holotype ♂	MCZ
<i>Argia fissa</i>	Selys 1865: 401: 29	<i>Argia rudolphi</i>	Syntypes ♂, ♀	IRSNB
<i>Argia fulgida</i>	Navás 1934a: 137	<i>Argia calverti</i>	Holotype ♂	MNHP
<b><i>Argia haberi</i></b>	This paper	<i>Argia haberi</i>	Holotype ♂	FSCA
<i>Argia mista</i>	Navás 1934b: 70	<i>Argia extranea</i>	Holotype ♂	MNHP
<i>Argia oenea</i>	Hagen <i>in</i> Selys 1865: 407 [35]	<i>A. calverti</i>	Syntypes ♂♂	?lost
<i>Argia popoluca</i>	Calvert 1902: 82	<i>Argia schorri</i>	Holotype ♂	BMNH
<i>Argia rhoadsi</i>	Calvert 1902: 92	<i>Argia haberi</i>	Holotype ♂	BMNH
<b><i>Argia rudolphi</i></b>	This paper	<i>Argia rudolphi</i>	Holotype ♂	CSCA
<b><i>Argia schneideri</i></b>	This paper	<i>Argia schneideri</i>	Holotype ♀	UMMZ
<b><i>Argia schorri</i></b>	This paper	<i>Argia fumigata</i>	Holotype ♀	MCZ
<i>Argia variata</i>	Navás 1935: 34	<i>Argia schorri</i> (footnote)	Lectotype ♂	MNHP
<i>Argia westfalli</i>	Garrison 1996: 42	<i>Argia rudolphi</i>	Holotype ♂	FSCA

## Results

### New species descriptions

#### ***Argia calverti* Garrison & von Ellenrieder, n. sp.**

Figs. 1 (head ♂), 5 (labrum ♀), 13 (head, thorax, S1–4 ♂); 35 (head, thorax, S1–4 ♀); 56 (S7–10 ♂), 80 (S7–10 ♀), 106 (hind margin of prothorax ♀), 107 (mesostigmal plates ♀); 148 (appendages ♂); 165 (map); 172 (field picture of ♂); Table 2 (measurements).

**Etymology.** Named *calverti* (Latinized name) in honor of the late Philip Powell Calvert (1871–1961), in recognition to his valuable contributions to the knowledge of Central American Odonata culminating in his contribution to the Neuroptera volume of the *Biologia Centrali-Americana* (1901–1908).

**Specimens examined.** 35 ♂, 14 ♀. **Types. Holotype** ♂: COSTA RICA, Cartago Prov., Reserva Tapantí, 1,310 m, 6 vii 1963, F. G. Thompson leg. [FSCA]. **Paratypes:** COSTA RICA, Alajuela Prov.: 1 ♂, Peñas Blancas

River Valley, Monteverde Cloud Forest Reserve, Refugio Alemán, small tributary down trail from Refugio (10°18'28" N, 84°44'25" W, 1,037 m), 1 viii 2007, W. A. Haber & L. Ramirez leg. [RWG]; Cartago Prov.: 2 ♂, Río Chiriquí, just N of Peralta (9°58'49" N, 83°36'25" W, 348 m), 25 iii 1910, P. P. Calvert leg. [FSCA]; 2 ♂, 1 ♀, A.C. Amistad, Turrialba, Tayutic, Grano de Oro, Chirripo (9°49'6" N, 83°27'33" W, 1,120 m), 19–30 vi 1993, P. Campos leg. [INBIO]; 2 ♂, 1 ♀, Tapantí {9°43' N, 83°46' W}, 1,310 m, 6 vii 1963, F. G. Thompson leg. [FSCA]; 1 ♂, same data but [RWG]; Guanacaste Prov.: 1 ♂, 1 ♀ [in tandem], Guanacaste National Park, Estación Cacao, SE side of Volcán Cacao (10°55'53" N, 85°27'43" W, 1,299 m), 21–29 v 1992, M. A. Zumbado leg. [INBIO]; 1 ♂, 1 ♀ [in tandem], same data but Estación Biológica Maritza, trail to Cacao Station, river in secondary forest, perching on rocks near water in rapids (10°57'25" N, 85°29'42" W, 590 m), 31 viii 1990, M. A. Zumbado leg. [INBIO]; 1 ♂, 1 ♀ [in copula], same data but Quebrada Tempisquito (10°57' N, 85°30' W, 600 m), 25 viii 1990, G. Varela leg. [INBIO]; 1 ♂ same data but 29 viii 1990, M. A. Zumbado leg. [INBIO]; 1 ♂, 1 ♀ [in tandem], same data but 6 v 1991, J. Zloty leg. [RWG]; 1 ♂, 1 ♀, Río Góngora, on stones in the river and along river margins (10°52'44" N, 85°32'19" W, 600 m), 8 v 1989, CEH leg. [CEH]; Heredia Prov.: 2 ♂, 2 ♀ [in copula], La Selva Biological Station, 10 km SW of Horquetas (10°18' N, 84°3' W, 600 m), 24–26 iii 1995, TWD & A. Ramírez leg. [TWD]; 3 ♂, 1 ♀, La Selva altitudinal transect, 1,070 m, 11 iv 2001, R. Vargas leg. [CEH]; 1 ♂, 1 ♀, Sarapiquí, Magsasay (10°24'6" N, 84°3'18" W), 20 ix 1993, J. Benstead leg. [CEH]; Limón Prov., 1 ♂, 11 km SSW of Pocora, Finca Las Brisas, on main river channel among boulders and rocks, Río Parismina and tributaries (10°4'10" N, 83°37'58" W, 821 m), 31 i 2007, WAH, D. Wagner & M. Thomas leg. [RWG]; San José Prov., 1 ♂, 15 km WNW of San Isidro de El General, on large river below Yoga Ashram of Tamara Budowski, small tributary of Río División, Quebrada Grande (9°24'36" N, 83°49'53" W, 1,124 m), 2 v 2010, WAH leg. [RWG]; 1 ♂, 1 ♀, Braulio Carrillo National Park (10°9'44" N, 83°56'18" W, 472 m), 24 iv 1983, K. D. leg. [RWG]; 2 ♂, 1 ♀, Parque Nacional Braulio Carrillo, Quebrada Sanguijuela (10°9'36" N, 83°57'47" W, 800 m), 6 vii 1989, CEH leg. [CEH]; Puntarenas Prov.: 2 ♂, Finca Las Cruces, 4 mi S of San Vito de Java {8°46'11" N, 82°57'35" W, 1,220 m}, 21 ii 1975, DRP leg. [RWG]; 2 ♂, 1 ♀ [one pair in tandem], Monteverde, Río San Luis Arriba, Río San Luis, along river below waterfall (10°16'42" N, 84°47'3" W, 1,180 m), 7 viii 2013, L. Ramírez leg. [RWG]; 1 ♂, same data but 20 ix 2013 [RWG]; 1 ♂, 1 ♀ [in tandem], same data but [CSCA]. PANAMA, Chiriquí Prov.: 2 ♂, Potrerillos (8°39' N, 82°29' W, 664 m), 18 ii 1935, J. W. MacSwain leg. [UMMZ]; Veraguas Prov.: 1 ♂, near Santa Fe, Quebrada Alto de la Piedra (8°30'53" N, 81°7'19" W, 850 m), 18 vi 2011, A. Donnelly leg. [FSCA]; 1 ♂, 1 ♀ (in tandem) about 3 km NW of Alto de Piedra on N.P. Santa Fe Road, tributary to Río Maluba, branches 1 & 2 (8°31'32" N, 81°7'48" W, 610 m), 25 v 2016, W. Mauffray leg. [FSCA].

A large red-eyed species with a brilliant cupreous thoracic dorsum and with dorsum of S1–7 largely blue, similar to pattern observed in *Argia cupraurea* Calvert.

**Description of male holotype.** Head: Entire face with metallic cupreous-red reflections except for the following: narrow apical margin of labrum, anteclypeus, base of mandibles and genae dark orange, small postocular spots blue, small pale spot anterolateral to lateral ocellus (similar to Fig. 1); antennae black, rear of head including margin except for narrow pale border along eye margin.

Prothorax entirely metallic cupreous-red except for blue anterior lobe. Mesothorax with mesepisternum brilliant cupreous-red, mesepimeron and mesinfraepisternum metallic dark purple; metepisternum and metepimeron blue interrupted by dark stripe along metapleural suture (as in Figs. 13, 172). Wings slightly smoky with venation black; pterostigma trapezoidal, dark brown, surmounting 1.5 cell in left Fw, 1.0 cells in right Fw, 1 cell in left Hw wing, 1.5 cells in right Hw; postnodals Fw 18/18, Hw 15/16; postquadrangular cells Fw 5/5, Hw 4/5; RP<sub>2</sub> at Fw 8/8, Hw 7/7. Coxae and trochanters brown anteriorly becoming blue posteriorly; femora, tarsi and armature black, tibiae black, pale externally.

Abdomen (as in Figs. 13, 56, 172) mostly blue; S1 black at basal 0.40 with ventrolateral extension laterally, remainder blue; S2 blue dorsally, laterally with a black stripe with pointed extension almost meeting dorsally at apical 0.20, below with a complete narrow, largely parallel blue stripe followed by black along ventral margin of tergite, annulus black; S3 blue with a narrow black stripe ventrally with a dorsal pointed extension at apical 0.05 but not meeting above, annulus black; S4–6 similar to S3 but posterior portion of black stripe more extensive; S7 blue with narrow ventral black stripe joining black annulus apically (as in Fig. 56); S8–10, blue dorsally with black stripe laterally, on S10 this stripe extending dorsally along posterior margin; torus pale, appendages black.

Genital ligula as in *Argia cuprea* (Figs. 126, 127), with a pair of small laterally extended lobes at base near flexure (these hidden by membranous terminal fold) followed by a pair of flexible chitinized branches, each arising

from a narrow stem at distal segment base extending laterad of the ligula; distal portion with narrow digit-like hood slightly inflated distally and extending over coiled digit-like paired flagella, the latter fused along a common stem basally and arching entally toward first segment.

Torus small, transversely oval, occupying entire ventral margin of torifer and not overlapping bilobed epiproct (Fig. 148c); base of epiproct and area around base black, apical portion of epiproct pale; cercus (Fig. 148) robust, longer than wide, about subequal to paraproct, strongly convex dorsally, branched apically with distal margin of shorter outer branch ending at approximate right angle to longer decumbent inner branch; medial margin strongly convex; cercus ventrally strongly concave with a basal lobe externobasally (Fig. 148d); paraproct bilobed, its ventral branch narrow, bluntly pointed, its base at about 120° from acutely pointed anteriorly directed dorsal branch.

**Dimensions.** Hw 26.4, abdomen 33.8, total length 44.1.

**Description of female paratype** (Costa Rica: Puntarenas Prov., Monteverde, Río San Luis Arriba, Río San Luis, along river below cataract; ♀ H 9123–4 in tandem with male). Head (Fig. 35): labrum with distal half ochre (as in Fig. 5), basal half metallic cupreous-red; anteclypeus ochre; postclypeus metallic cupreous; antefrons, genae and base of mandibles pale ochre; postfrons and remainder of epicranium metallic cupreous with pair of small spots anterolateral to lateral ocelli and small postocular spots pale bluish green; rear of head including margin except for narrow pale border along eye margin.

Prothorax metallic cupreous, anterior lobe pale blue, lateral 0.20 of posterior margin of hind lobe and propleuron pale ochre; pterothoracic dorsum (Fig. 35) black with cupreous reflections and with a pale ochre antehumeral stripe widening slightly ventrally; entire metepimeron metallic cupreous, divided at upper 0.20 with branches enclosing an irregular elongate pale ochre spot, mesinfraepisternum with anterior half black, remainder ochre; metathorax ochre except for narrow black stripe at metapleural suture; venter of thorax ochre; S1 pale olive with basal ring of black and with narrow posterior black ring; S2 largely black with cupreous metallic reflections with narrow pale middorsal line abruptly widening at apical 0.20 and followed below by a narrower pale longitudinal stripe laterally and bordered ventrally with black, annulus black; S3–7 similar but with a pale basal ring not connected above and with a further narrowing of pale middorsal and lateral stripes (similar to Fig. 87); S8 like S7 but with dorsal black expanding laterally and enclosing a pale middorsal spot at apical 0.20 and with additional pale stripe ventrally, posterior portion of sternum pale; S9 similar to S8 but with dorsal black divided middorsally forming a pair of lobes ending at apical 0.40 and with pale blue area connecting with pale lateral stripe, S10 largely black with pale blue spot dorsally; cerci black, ovipositor pale except for black ventral margin (Fig. 80).

Mesostigmal lobe (Fig. 107b) forming a small stubby upright lobe occupying medial 0.40 of slightly raised plate, medial margin of lobe well separated from branching middorsal carina by a low carina extending from medial base of lobe, medial margin of lobe strongly recurved in posterior view (Fig. 107e); mesostigmal lobe accompanied by a slight mesepisternal tubercle postero-distal to outer margin of erect lobe (Fig. 107c).

**Variation in paratypes.** On one male the pale postocular spot is absent on the right side and present as a small spot on the left side (Fig. 1). The holotype male is more heavily marked with black than majority of other specimens; S2 on most males has a lateral blue stripe extending full length (similar to Fig. 15) and in some, posteriorly connecting with dorsal blue; in others, there is a greater lateral extension of dorsal blue on S10. Females show little variation but some have the majority of S10 blue and the degree of metallic coloration on the thorax is tempered by age; older females tend to be less metallic. One female (Estación Cacao) has a greatly reduced dark humeral stripe similar to Fig. 34. Pterostigma surmounting 1–2 cells in males and females; postnodals: Fw 14–19, Hw 14–16 in males, Fw 15–19, Hw 13–17 in females; postquadrangular cells Fw 5, Hw 4–5 in males, Fw 4–6, Hw 4–5 in females; RP<sub>2</sub> at Fw 7–9, Hw 6–8 in males, Fw 7–8, Hw 6–7 in females. **Dimensions.** ♂: Hw 25.8 ± 1.52 [23.8–27.6], abdomen 33.8 ± 1.71 [31.2–36.1], total length 43.9 ± 2.27 [40.8–47]. ♀: Hw 26.4 ± 1.32 [23.5–28.2], abdomen 31.4 ± 1.77 [29–34], total length 41.3 ± 2.15 [38.2–44.5].

**Diagnosis.** Male belongs to a distinctive group of species possessing an entirely metallic cupreous thoracic dorsum and, in life, dorsal half of compound eyes red, although postmortem preservation may preclude the practical use of the latter as a diagnostic character. Within its range (Costa Rica, Panama, Fig. 165) male can be distinguished from similar metallic red species with largely blue S2–6 (*A. cupraurea*, *A. oenea*) by large size (Hw 23.8–27.2 mm; total length 40.8–47.0 mm; N = 10) compared to *A. cupraurea* (Hw 20.2–22.5 mm; total length 36.1–40.0 mm; N = 10) and *A. oenea* (Hw 18.5–22.6 mm; total length 33.8–39.7 mm; N = 10) and by the robust



and strongly curved cercus (Fig. 148a) versus the almost linear (Fig. 149a) and slightly arched (Fig. 150a) cercus in *A. cupraurea* and *A. oenea* respectively. The paraproct of *A. oenea* in lateral view (Fig. 150b) is almost linear with both branches small and of about the same size, almost bilobate; the dorsal or ventral branches of the paraproct of *A. calverti* (Fig. 148b) and *A. cupraurea* (Fig. 149b) are more robust and are strongly divergent. The labrum in *A. oenea* is largely pale (Fig. 3) but mostly metallic in *A. calverti* (Fig. 1) and *A. cupraurea* (as in Fig. 2). The hood of the genital ligula in *A. oenea* (Fig. 131) is quadrate, not linear and digit-like as in *A. calverti* and *A. cupraurea* (as in Figs. 126, 127).

A *cuprea*-like dark morph of *Argia fulgida* known from Costa Rica, western Panama, and Ecuador (Fig. 165) occurs within the range of *A. calverti*. Male of this color morph is unique among metallic species within the distribution range of *A. calverti* in having dorsum of S2–6 entirely black except for a narrow basal blue ring (Fig. 10); in the three other sympatric metallic species, *A. calverti* (Fig. 13), *A. cupraurea* (Fig. 14), and *A. oenea* (Figs. 15–16), the dorsum of S2–6 has at least basal half or more blue (Figs. 13–15) or violet (Fig. 16). S8 in *A. fulgida* is blue with the posterior half to third black (Fig. 54), differing from the entirely blue S8 in *A. calverti* (Fig. 56), *A. cupraurea* (Figs. 57–59) and *A. oenea* (Figs. 61–62). The broad explanate hood of the apical segment of the genital ligula in *A. fulgida* (Figs. 128–130) is shared with that of *A. oenea* (Fig. 131), and both differ from the largely long linear hood present in *A. calverti* and *A. cupraurea* (as in Figs. 126–127). The genital ligula of *A. fulgida* and *A. oenea* are similar in possessing a broad campanulate (*A. fulgida*, Figs. 128–130) to quadrate (*A. oenea*, Figs. 131b, c) hood but differ as follows: in *A. fulgida* the thickened flagella are not fused at base and they do not arch entally toward first segment (Fig. 128c); in *A. oenea*, the bifurcate flagella are fused into a common stem that arches entally toward first segment (Figs. 131a, c).

The male appendage, genital ligula, and female mesostigmal plate morphology of dark and pale S2–6 morphs of *A. fulgida* are essentially the same. *Argia fulgida* was described from a single male from Muzo, Colombia, which belongs to the pale morph with dorsum of S2–6 with at least the basal half or more blue (Figs. 11–12). Its appendages and genital ligula are illustrated here for comparative purposes (Figs. 129, 147). We have seen only one other specimen representing the pale morph from Colombia (Valle del Cauca Dept., San Jose, Río Dagua), but pale morphs of *A. fulgida* occur on the western side of the Andes of Ecuador (Bolívar, Los Ríos, Manabí, Pichincha, Santo Domingo de los Tsáchilas Provinces, Fig. 165). William Haber and Fred Morrison collected a pair of *A. fulgida* at a shallow forest stream in Ecuador (Pichincha Prov., road from highway to Silanche Bird Sanctuary, 10 km NW of Pedro Maldonado) whose male has a largely dark S2–6 as figured for Central American *A. fulgida* (Fig. 10). Additionally, a molecular analysis comparing mt DNA 16S sequences from one Costa Rican, two Panamanian, and four Ecuadorean specimens of *Argia fulgida* (including the Pichincha pair) shows that specimens displaying the two color morphs do not segregate into two groups based on this ribosomal gene (Table 5, Fig. 191), which was used to separate *Argia* species and to measure genetic divergence in previous studies (Caesar & Wenzel 2009; Nava Bolaños *et al.* 2016). All sequenced dark specimens from Panama are identical to several pale specimens from Ecuador, and the other sequenced specimens differ from them by 2 to up to 6% of the about 500 mtDNA 16S base pairs sequenced. At the present time we have found no evidence—morphological or molecular—that justifies treating these two color morphs as separate species, although future studies involving other genetic markers might prove otherwise.

Female of *A. calverti* can be easily distinguished from other similar species by the short, stubby mesostigmal lobe (Fig. 107) compared to the longer more foliate lobe in *A. fulgida* (Fig. 103), *A. cuprea* (Figs. 104, 105), *A. cupraurea* (Fig. 108), and *A. oenea* (Figs. 109, 110). Thoracic and abdominal coloration for females of all five species are similar (Figs. 30–38, 80–85).

Males of *A. calverti* and *A. fulgida* are two of the five species from North and Central America possessing an entirely metallic cupreous thoracic dorsum. In both of them a pair of chitinized branches arises from a narrow stem at the base genital ligula distal segment. Each branch arches dorsally (ectally), and becomes broader at tip where its outer margin is armed with an irregular series of small spines. These branches, which are best seen in dorsal (ectal) view, are flexible and extend laterally to dorsolaterally depending on preservation (Figs. 128–130). We have not found the armature of these structures to be species specific. Females also have a degree of metallic thoracic coloration, but this is confined to the medial half of the mesepisternum. In addition to their metallic thoracic coloration, they can usually be identified also by the presence of a pair of tuberculate processes or swellings each mediolaterally along the hind lobe of the prothorax, which gives a trilobate appearance to the hind margin (Fig. 106), although this condition may not be so pronounced in some females.

The keys below should allow for the identification of both sexes of these five species, although examination of the male genital ligula and details of the mesostigmal plates and associated mesepisternal tubercles coupled with overall body pattern may be necessary to confirm some identifications.

### Key to Males

1. Dorsum of S2–6 entirely black except for a narrow basal blue ring (Figs. 9, 10; 176) ..... 2
- 1'. Dorsum of S2–6 with at least the basal half or more blue (Figs. 13–15; 172–175) or violet (Fig. 16) ..... 3
- 2(1) Dorsal membranous hood of genital ligula distal segment broadly campanulate basally, covering base of flagella (Figs. 128–130); outer branch of cercus in dorsal view small, quadrate and forming a right angle with the longer inner branch (Figs. 146a, c; 147a, c); Costa Rica, Panama, Colombia, and Ecuador (Fig. 165) ..... *fulgida*
- 2' Dorsal membranous hood of genital ligula distal segment linear, forming a digit-like process (Figs. 126, 127); outer branch of cercus in dorsal view slightly acute and forming an acute angle with the larger inner branch (Figs. 145a, c); Sonora State in Mexico and Texas in USA south through Honduras (Fig. 166) ..... *cuprea*
- 3 (1'). Labrum pale except for dark medial spot (Fig. 3); paraproct linear, with both branches small and of about the same size, almost bilobate (Fig. 150b); hood of genital ligula quadrate or nearly so (Figs. 131b, c); S Arizona and Texas in USA, Baja California in Mexico, south through central Panama (Fig. 166) ..... *oenea*
- 3' Basal half or more of labrum dark metallic (Figs. 1, 2, 5); paraproct with dorsal and ventral branches unequal in size, strongly divergent (Figs. 148a, b, 149a, b); hood of genital ligula linear, digitiform (as in Figs. 126, 127); Guatemala south through Panama and east through Venezuela (Figs. 165, 166) ..... 4
- 4(3') Medial margin of cercus in mediodorsal view strongly arched, with apical portion recurved ventrally at about 90° (Fig. 148a); larger species (Hw 23.8–27.6 mm; total length 40.8–47.0 mm) Costa Rica and Panama (Fig. 165) ..... *calverti*
- 4(3'') Medial margin of cercus in mediodorsal view approximately linear (Fig. 149a); smaller species (Hw 20.2–22.5 mm; total length 36.1–40.0 mm); Guatemala south through Colombia and east to Venezuela (Fig. 166) ..... *cupraurea*

### Key to Females

Note: The following key should work for most females by comparison of all characters and with reference to descriptions and diagnoses under *A. calverti* and *A. fulgida*. However, we have observed variability in morphology of the mesostigmal plates and associated structures as well as color pattern. Interspecific tandems (e.g. male *A. oenea* with female *A. cupraurea*) have also been observed, which may further make specific identifications difficult.

1. Mesostigmal lobes small, occupying medial half or less of posterior margin of plate (Fig. 107), larger species (Hw 23.5–28.2 mm; total length 38.2–44.5 mm); Costa Rica and Panama (Fig. 165) ..... *calverti*
1. Mesostigmal lobes large, foliate, occupying medial half or more of posterior margin of plate (Figs. 103, 104, 108–110), smaller species (Hw 18.5–25.4 mm, Total length 32.8–42.0 mm); Arizona and Texas in USA south through Panama (Fig. 166) ..... 2
- 2(1'). Labrum without metallic coloration (Fig. 4) or with a medial basal spot (Fig. 8), dark humeral thoracic stripe usually forked at basal 0.50 or more (Fig. 37), S3–5 with relatively broad spindle-shaped pale mark dorsally (Fig. 88); Arizona and southern Texas in USA south through Panama (Fig. 166) ..... *oenea*
- 2'. Labrum with metallic coloring at least on its basal half (except for some *A. cuprea*) (Figs. 5–7), dark humeral thoracic stripe usually forked at upper 0.40 or more (Figs. 30–32, 35, 36), S3–5 with thin pale middorsal line only (Fig. 87); southern Texas in USA south through Panama (Fig. 166) ..... 3
- 3(2'). Space between tips of mesostigmal lobes in dorsal view narrow, about one to one-and-a-half times as wide as width of each lobe at base (Figs. 108a, c); mesostigmal lobe elongate, longer than wide, parallel sided, erect, its tip unmodified (Fig. 108b), extending for more than three times the height of the vestigial mesepisternal tubercle when viewed in oblique lateral view (Fig. 108f); Guatemala south through Colombia and east to Venezuela (Fig. 166) ..... *cupraurea*
- 3'. Space between tips of mesostigmal lobes in dorsal view wider, but less than twice as wide as width of each lobe at base (Figs. 103a, c; 104a, c; 109a, c); mesostigmal lobe roundly quadrate, its upper portion thickened, or slightly depressed, or slightly bent posteriorly, its tip extending for less than twice the height of the mesepisternal tubercle when viewed in oblique lateral view (Fig. 103f) ..... 4
- 4 (3'). Mesostigmal lobe with medial margin recurved (visible in posterior view, Fig. 103e); southern Texas in USA south through Honduras (Fig. 166) ..... *cuprea*
- 4'. Mesostigmal lobe with medial margin unmodified (visible in posterior view, Fig. 104e, 105e); Costa Rica, Panama, Colombia, and Ecuador (Fig. 165) ..... *fulgida*

**Habitat.** According to W. Haber (pers. comm.), adults perch on rocks and boulders near rapids and along margins in rivers and streams, within primary and secondary forest. Specimens were taken at elevations ranging from about 470 m (Costa Rica: Braulio Carrillo National Park) to over 1,300 m (Costa Rica: Tapantí). Flight dates range from January (11 km SSW of Pocora) through September (Monteverde).

**Distribution.** Costa Rica and Panama (Fig. 165). It occurs in sympatry with other metallic congeners, including *A. cupraurea*, *A. fulgida*, and *A. oenea* (Figs. 165, 166).

**TABLE 2.** Wing counts and measurements (average and standard deviation followed by range in square brackets) for metallic *Argia* species treated in this study.

n	Pt over # cells	Postquadrangular cells		Px cells		RP <sub>2</sub> origin at Px #		Hw length	Abdomen length	Total length
		Fw	Hw	Fw	Hw	Fw	Hw			
10	1-2	5	4-5	16-19	14-16	7-9	6-8	25.8 ± 1.5 [23.8-27.6]	33.8 ± 1.7 [31.2-36.1]	43.9 ± 2.3 [40.8-47]
10	1-2	4-6	4-5	15-19	13-17	7-8	6-7	26.4 ± 1.3 [23.5-28.2]	31.4 ± 1.8 [29-34]	41.3 ± 2.1 [38.2-44.5]
10	1-2	4-5	4-5	13-16	12-15	6-7	6	21.3 ± 0.6 [20.2-22.5]	29.2 ± 1 [28-30.7]	37.8 ± 1.3 [36.1-40]
10	1-1.5	4-5	4	13-16	12-14	6-8	6-7	21.7 ± 1.1 [19.8-23.5]	27.1 ± 1 [25.4-28.4]	35.5 ± 1.3 [33.4-37.3]
10	1.5-2	4-5	4-6	14-18	13-15	6-8	7-8	21.7 ± 1.6 [18.8-23.9]	29.4 ± 1.9 [26.7-32]	37.9 ± 2.5 [34.2-42]
10	1-1.5	4-5	3-5	14-17	12-15	6-8	6-7	22.3 ± 1.8 [19.1-24.7]	27.4 ± 2 [23.6-30]	35.6 ± 2.7 [30.6-39]
10	1-2	4-6	3-5	13-18	11-16	6-9	6-8	21.7 ± 1.5 [18.4-23.4]	30.3 ± 1.2 [28.5-32.5]	39 ± 1.6 [36.5-43]
10	1-2	4-5	4	11-18	10-14	6-8	5-7	22.7 ± 1.1 [20.5-24]	27.5 ± 1.4 [25.1-29]	35.9 ± 1.5 [33.3-37.7]
10	1	4-6	4-6	13-16	12-14	6-8	5-7	20.7 ± 1.1 [18.5-22.6]	28.7 ± 1.4 [26.1-30.7]	37 ± 1.9 [33.8-39.7]
10	1	4-5	3-4	12-16	11-14	6-8	6-7	21.8 ± 1.5 [18.8-23.8]	26 ± 2.7 [20-29.3]	34.3 ± 3 [28.5-38.5]

**TABLE 3.** Wing counts and measurements (average and standard deviation followed by range in square brackets) for *Argia* species of the *extranea* group treated in this study.

n	Pt over # cells	Postquadrangular cells		Px cells		RP <sub>2</sub> origin at Px #		Hw length	Abdomen length	Total length
		Fw	Hw	Fw	Hw	Fw	Hw			
10	1-2	4-6	3-4	13-17	11-14	6-9	6-7	22.6 ± 1.6 [19.5-25.4]	29.8 ± 2 [25.5-33.5]	38.3 ± 2.6 [32.8-43]
10	1-2	4-5	4	14-18	12-15	6-9	6-7	24.8 ± 1.1 [22.8-26.4]	29.1 ± 1.6 [26-31.5]	37.8 ± 1.9 [34-40.7]
10	1-2	3-4	3	12-17	10-15	7-8	6-7	21.9 ± 1.5 [18.8-23.4]	28.5 ± 1.7 [24.5-30.4]	36.6 ± 1.9 [32.2-38.6]
10	1-1.5	4	2-3	13-18	11-15	7-8	6-7	22.7 ± 1.7 [20-23.9]	26.3 ± 1.4 [23.7-29.1]	34.2 ± 1.8 [31.2-37.8]
10	1-2	3-4	4	11-16	10-14	5-8	5-6	21.6 ± 1.1 [19.9-22.4]	27.8 ± 1.3 [25.8-29.2]	35.8 ± 1.4 [33.6-37.2]
10	1-1.5	3-4	3-4	14-17	12-14	6-8	5-7	22.7 ± 1.3 [21.3-24.5]	26.8 ± 1.3 [25-29.8]	34.8 ± 1.6 [32.8-38.8]
10	1-2	3-5	3-4	13-16	11-14	7-8	6-7	22.2 ± 0.8 [20.3-23]	28.8 ± 1.1 [27-30.7]	36.9 ± 1.3 [34.8-39]
6	1-1.5	4-5	3-4	14-16	12-13	7-8	6-7	23.2 ± 1 [21.3-24.5]	26.5 ± 1.5 [24-28]	34.7 ± 1.8 [31.7-36.7]
10	1-2	3-5	4	16-20	12-18	7-8	6-7	23 ± 1.9 [20-24]	30.3 ± 1.7 [27.6-33.1]	38.4 ± 2.2 [35.4-41.9]
5	1-2	3-4	3	16-20	15-17	7-8	6-7	24.8 ± 1.7 [22.3-26.5]	29.4 ± 2.1 [28.6-31.3]	37.7 ± 2.7 [33.5-40.1]
10	1-2	3-5	4-5	14-19	13-16	7-10	7-9	23.7 ± 0.5 [22.8-24.4]	30.6 ± 0.8 [29.2-31.5]	39.5 ± 0.9 [38-40.5]
8	1-1.5	3-5	3-4	15-16	12-14	7-9	6-9	24.8 ± 0.9 [23.4-26.2]	29 ± 1.1 [27.8-30.8]	37.9 ± 1.3 [36.4-40.5]

***Argia carolus* Garrison & von Ellenrieder, n. sp.**

Figs. 24 (head, thorax, S1–4 ♂); 47–49 (head, thorax, S1–4 ♀); 73 (S7–10 ♂); 96–98 (S7–10 ♀); 119 (mesostigmal plates ♀); 138 (genital ligula); 158 (appendages ♂); 169 (map); 184 (field picture of ♂); 185 (field picture of ♀); Table 4 (measurements).

**Etymology.** Named *carolus* (to be treated as an indeclinable noun) in honor of our friend and colleague Carlos 'Carolus' Esquivel Heredia, in recognition to his valuable contributions to the knowledge of Costa Rican odonates and his kind help and camaraderie during our studies in that country.

**Specimens examined.** 49 ♂, 7 ♀. **Types.** **Holotype** ♂: COSTA RICA, San José Prov.: Reserva Biológica El Rodeo, 7 km W of Villa Colón (9°54' N, 84°16' W, 795 m), 10–13 vii 1990, TWD leg. [FSCA]. **Paratypes:** COSTA RICA, Puntarenas Prov.: 1 ♂, La Guaria, 8 km SSW of Santa Elena on road to Interamerican highway, Quebrada Guaria, small side flood channel (10°14'55" N, 84°50'52" W, 597 m), 4 viii 2006, WAH & E. Cruz leg. [RWG]; 1 ♂, Río Cataratas at Pan-American highway (9°5'29" N, 83°16'14" W, 160 m), 8 iii 2009, F. C. Sibley leg. [RWG]; 1 ♂, Golfito, Gamba (8°42'11" N, 83°11'15" W, 80 m), ii 2007, S. Schneeweis & F. Hofhansl leg. [CEH]; 2 ♂, forest interior W of Gamba (8°42'7" N, 83°10'47" W, 200 m), xii 2015, S. Degenhart leg. [RWG]; 1 ♀, same data but (8°41'2" N, 83°10'51" W, 130 m), i 2016, S. Degenhart leg. [RWG]; 1 ♂, same data but xii 2015 [CSCA]; 1 ♂, 1 ♀, same data but (8°41'8" N, 83°10'48" W) [SD]; 3 ♂ same data but [RWG]; 1 ♂, same data but [CSCA]; 3 ♂, same data but (8°42'5" N, 83°12'46" W, 115 m) [RWG]; 1 ♂, same data but [CSCA]; 3 ♂, same data but (8°41'16" N, 83°10'49" W, 115 m) [RWG]; 1 ♂, same data but [SD]; 2 ♂, same data but (8°41'46" N, 83°12'20" W, 120 m) [RWG]; 1 ♂, same data but [SD]; 1 ♂, same data but (8°40'37" N, 83°11'59" W, 110 m) [RWG]; 1 ♂, same data but (8°40'22" N, 83°12'6" W, 100 m) [SD]; 1 ♂, same data but (8°40'20" N, 83°11'58" W, 120 m) [SD]; 3 ♂ same data but [RWG]; 1 ♂ same data but [CSCA]; 1 ♂, Corcovado National Park, Piedra el Arco (8°34'34" N, 83°41'42" W, 20 m), 10–11 iv 1989, Holzenthal & Blahnik leg. [RWG]; Alajuela Prov.: 1 ♂, Río Quebrada Honda, San Mateo {9°56' N, 84°31' W, 290 m}, 6 iii 1987, J. Belle leg. [RWG]; 1 ♂, Bonnefil Farm, Río Surubres (9°56' N, 84°31' W, 147 m), 16 x 1909, P. P. Calvert leg. [RWG]; 1 ♂, 1 ♀, same data but [UMMZ]; San José Prov.: 1 ♂, Hacienda El Rodeo, 7 km W of Ciudad Colón (9°54'49" N, 84°16'10" W, 859 m), 17 vii 1990, CEH leg. [CEH]; 1 ♀, same data but 10–13 vii 1990, TWD leg. [FSCA]; 3 ♂, 1 ♀, same data but 28 v 2013, N. von Ellenrieder & RWG leg. [CSCA]; 4 ♂, same data but [RWG]; 1 ♀, 4 km S of Tinamaste, Río Diamantes (9°15'44" N, 83°46'53" W, 520 m), 7 iii 2009, F. C. Sibley leg. [RWG]; 5 ♂, same data but F. C. Sibley leg. [FSCA]; 2 ♂, 1 ♀, same data but WAH & F. C. Sibley leg. [RWG]; Cartago Prov.: 1 ♂, Estación de Biología Tropical Río Macho, on trail in secondary forest along Río Juco (9°46'1" N, 83°51'45" W, 1,590 m), 13 ix 1990, CEH leg. [CEH].

A medium-sized largely dark species with forcipate male appendages (Fig. 158).

**Description of male holotype.** Head: entirely black with following parts pale (purple): labrum, base of mandibles, genae, anteclypeus, postfrons, postocular spots and small pale spot anterolateral to lateral ocellus; antennae black, rear of head black except for pale narrow margin bordering eye margin (similar to Fig 24).

Prothorax black with following areas pale: anterior lobe, dorsolateral spot on middle lobe, lateral 0.30 of posterior margin of propleuron. Pale areas of pterothorax purple, with broad black middorsal stripe about four times as wide as pale antehumeral stripe, the latter gradually narrowing dorsally to about 0.50 width of base; black humeral stripe extending from anterior 0.80 base of mesinfraepisternum and narrowing above to about 0.50 of basal width, slightly emarginate posteriorly at mesopleural fossa and connecting narrowly below antealar crest with middorsal stripe above and with a short ventrally directed finger on dorsal portion of obsolete interpleural suture; metapleural suture with a narrow elongate black spot at metapleural fossa; posterior carina of metepimeron narrowly rimmed with black; pale colors on side of thorax purple. Wings hyaline with venation black; pterostigma dark brown, surmounting 1.5 cells in all wings; postnodals Fw 17/17, Hw 15/15; postquadrangular cells Fw 4/4, Hw 4/4; RP<sub>2</sub> at Fw 8/8, Hw 7/7. Coxae and trochanters black with a wash of brown medially; femora, tibiae, tarsi and armature black.

Abdomen (as in Figs. 24; 73; 184) mostly black; S1 with a black basal ring, remainder purple; S2 black with an incomplete pale (purple) dorsal campanulate spot occupying basal 0.60 of segment, laterally black with an indistinct pale lateral stripe; S3 black except for narrow basal ring extended dorsally into a point ending at basal 0.20 of segment; S4 similar to S3 but with only a narrow pale basal ring; S5 with an obscure pale lateral spot basally; S6–8 entirely black; S9–10 blue dorsolaterally and ventrally black; S10 black; torus pale, appendages black.

Genital ligula (Fig. 138), ending in a pair of flexible curved distal flagella strongly arching basally before uniting in a common stem that is partly covered by a broad, quadrate ectal hood (Fig. 138a); ental surface of genital ligula distal to flexure smooth (Fig. 138c); latero-basal portion of apical segment with an acute sclerotized lobe laterally, its tip ending just before flexure; inner fold present, sclerotized portion proximal to flexure lacking a microspinulate patch on ental surface on each side.

Torus narrow, transversely oval, swollen ventrally, occupying ventral half of torifer and not overlapping bilobed epiproct (Fig. 158c); area around epiproct black; epiproct black except for small pale medial lobe and margin of lateral lobes; cercus (Figs. 158a, c) about three times longer than wide, narrowing distally abruptly at distal third, extending beyond paraproct, divided apically into a small bluntly triangular lobe and meeting longer linear branch at about a right angle; inner branch long forming slightly inflated capitate glabrous tooth; medial margin slightly concave apically, convex basally, planate dorsomedially; paraproct (Fig. 158b) bilobed, its ventral branch subequal to upper branch, ventral branch triangular, its tip acute; upper branch a rounded lobe.

**Dimensions.** Hw 23.7, abdomen 31.2, total length 39.7.

**Description of female paratype** (Costa Rica: San José Prov., 4 km S of Tinamaste, Río Diamantes). Head, pro-, pterothorax and S1–2 as in male (Fig. 49) but pale colors orange brown; black humeral stripe more deeply divided at distal 0.30, the anterior (main) fork narrow and enlarged at mesopleural sulcus; pale dorsal campanulate spot smaller than in holotype; S3 with incomplete narrow pale basal ring; S4–7 entirely black; S8 black with blue distal spot occupying apical 0.50 with narrowing offshoot extending anteriorly to basal 0.30; S9 black with posterior 0.50 blue extending laterally and projecting anteriorly to basal 0.30; S10 blue dorsally, black ventrally, cerci and ovipositor black (Fig. 98).

Mesostigmal lobe as in Fig. 119, well developed but small, forming a flat, medially directed digit-like lobe elevated above depressed area on mesepisternum and not overlying branch of middorsal carina; base of lobe in dorsal (as in Figs. 119c, d) and anterior (as in Figs. 119a, b) views slightly swollen anteriorly, accompanied by a weak transverse carina; distal base of lobe slightly angulate posteriorly, thus setting off lobe from rest of mesostigmal plate; in posterior view (as in Fig. 119e) lobe thickened externally but lacking a tubercle at juncture with mesepisternum; a small mesepisternal tubercle present at latero-basal margin of mesostigmal lobe.

**Variation in paratypes.** Variation exists in extent of thoracic and abdominal markings as well as pale color. Fully adult male in life is a dark olive purple which turns almost black in preserved material, even if properly acetoned. Fully adult male often dusted with white pruinosity on sides of thorax especially on metathorax; black humeral stripe in most males as in Fig. 24 but in one male (Hacienda El Rodeo), the stripe is not forked, and it gradually narrows above to about the thickness of the metapleural stripe; another male (Hacienda El Rodeo) similar to that in Fig. 47. In contrast to male, female varies in pale thoracic coloration from orange brown (Figs. 47, 49) to dark olive green (Fig. 48) to purplish (Fig. 185) as well as development of black humeral stripe. Pale spots on S8–10 vary in size and reduction as shown in Figs. 96, 97. Some females lack a carina at anterior base of mesostigmal lobe but distal base of lobe slightly angulate posteriorly thus setting off lobe from rest of mesostigmal plate. Pterostigma surmounting 1–2 cell in males, 1–1.5 in females; postnodals: Fw 14–17, Hw 13–15 in males, Fw 14–16, Hw 12–14 in females; postquadrangular cells Fw 4, Hw 3–4 in males and females; RP<sub>2</sub> at Fw 7–8, Hw 6–7 in males and females. **Dimensions.** ♂: Hw 22.2 ± 1.11 [20.8–23.9], abdomen 29.8 ± 1.43 [27.6–32.1], total length 38.5 ± 1.8 [35.8–41.5]. ♀: Hw 21.8 ± 2.3 [18.5–24.7], abdomen 26.5 ± 2.3 [23.3–29.3], total length 34.9 ± 3.3 [30.5–38.5].

**Diagnosis.** Male unique by elongate forcipate shape of cercus (Fig. 158a). No other species within its range is similar. *Argia schneideri* (Fig. 159) also has a forcipate cercus but it is longer, extends beyond the level of the paraproct and it lacks the accessory lobe along the distal margin at the distal fourth of the appendage. The genital ligula of *A. schneideri* (Fig. 139) consists of a long single flagellum instead of the pair present in *A. carolus* (Fig. 138), and the former species also lacks the large quadrate hood and aciculate recurved lateral lobes present in *A. carolus*. In the female, the small, mesally directed mesostigmal lobe accompanied by a swollen base and slightly angulate external base is distinctive. The lobe is similar to that of *A. schneideri* (Fig. 120) but is considerably smaller, about two-thirds the size of that of *A. carolus*. In both sexes of *A. schneideri*, the black humeral stripe is not forked or encompasses a small pale isolated spot just below the alar carina (Figs. 25, 50); in *A. carolus*, a forked humeral stripe of varying height and condition is usually present (Figs. 24, 47–49).

**Habitat.** We collected a few specimens of this dark species at a small, partially shaded, moderately flowing

rocky stream at Hacienda El Rodeo on 28 May 2013. Part of the stream was exposed due to clearing of vegetation. *Argia carolus* was collected at the stream where it entered the shady undisturbed forest. Adults were inconspicuous due to their overall dark color. Other species collected here included *Argia anceps*, *A. cupraurea* (one female in tandem with a male of *A. oenea*), *A. frequentula* Calvert, *A. oculata* Hagen in Selys, *A. oenea* and *A. rogersi* Calvert. Haber and Sibley describe the Río Diamantes as a "stream with small and large rocks, about 5 m across". They noted the following for the female: "Tandem at 11:01 with 5909 [male]. Flew up from riffle area with collected mats of dead vegetable debris; apparently ovipositing." At the Río Cataratas, Sibley found this species to be "Fairly common along fast flowing, rocky stream through forest." Specimens were taken at elevations ranging from about 20 m (Parque Nacional Corcovado) to about 1,600 m (Estación de Biología Tropical Río Macho). Flight dates range from March (Río Diamantes) through September (Estación de Biología Tropical Río Macho).

**Distribution.** *Argia carolus* seems to be endemic to the Pacific slope of Costa Rica. Its most similar congener, *A. schneideri*, is clearly allopatric, being restricted as far as known to Ecuador (Fig. 169). We suspect that *A. carolus* will eventually be found in neighboring Panama.

### ***Argia elongata* Garrison & von Ellenrieder, n. sp.**

Figs. 17 (head, thorax, S1–3 ♂), 39 (head, thorax, S1–4 ♀); 40 (thorax, dorsal, ♀); 63–66 (S7–10 ♂) 89 (S7–10 ♀), 111 (mesostigmal plates ♀); 132 (genital ligula); 151 (appendages ♂); 167 (map); 177 (field picture of ♀); 178 (field picture of ♂); Table 3 (measurements).

*Argia extranea*: Calvert 1902: 93–94 (in part; material south of Mexico misidentified, Tab. 4, Fig. 56*i*); 1907: 375 (in part; material south of Mexico misidentified); Ris 1918: 116 (in part; material south of Mexico misidentified); Calvert 1919: 164 (Guatemala); Paulson 1982: 252 (in part, Costa Rica and Panama); Paulson 1984: 51 (El Salvador); Dunkle 1988: 45 (Honduras); Maes et al. 1988: 32 (Nicaragua); Maes 1989: 5 (Nicaragua); Dunkle 1991: 132 (Honduras); Donnelly 1992: 83 (Panama); Garrison 1994: 309 (in part; material south of Mexico misidentified); Boomsma & Dunkle 1996: 25 (Belize); Gonzáles-Soriano & Novelo-Gutiérrez 1996: 163 (Chiapas); Ramírez et al. 2000: 249 (Costa Rica); Förster 2001: 11, 56, 59 (Central America, key); Westfall & May 2006: 189 (in part; Panama); Heckman 2008: 347, 348, 380 (Central America, Surinam, Colombia).

*Argia* sp. nr. *extranea* Abbott et al. (2002): 127 (Nicaragua).

*Argia* sp. Esquivel 2005: 152–153 (southern Mexico to Panama).

*Argia* n. sp. nr *extranea* Bailowitz, Behrstock & Danforth 2012: 9 (El Salvador).

*Argia* n. sp. (*extranea* group) Garrison & von Ellenrieder 2013: 16 (Costa Rica).

**Etymology.** Named *elongata* (Figs. 151a, b) in reference to its strikingly long male paraprocts.

**Specimens examined.** 455 ♂, 224 ♀. **Types.** **Holotype** ♂: COSTA RICA, Cartago Prov., Río Reventazón, SE of Turrialba by highway 10 (9°52'56" N, 83°38'49" W, 561 m) 10 viii 1979, J. A. Garrison & RWG leg. [CSCA]. Paratypes: MEXICO, Veracruz State: 2 ♂, Agua Caliente, 1 km SE of Sontecomapan (18°29'36" N, 95°0'43" W, 4 m), 30 viii 1988, RWG leg. [RWG]; 1 ♂, stream at San Andres Tuxtla {18°27' N, 95°13' W, 291 m}, 22 vii 1961, J. A. Harshaw leg. [FSCA]; 1 ♂, stream at Coyame {18°26' N, 95°1' W, 400 m}, 1 vii 1965, DRP & M. L. Paulson leg. [RWG]; 4 ♂, 2 ♀, Lake Catemaco, 7 mi N of Hotel Playa Azul {18°25' N, 95°7' W, 330 m}, 16 viii 1963, H. V. Weems Jr. leg. [FSCA]; 2 ♂, Arroyo Claro, Sierra Santa Marta, 9 km E of Tobanca {18°23' N, 95°0' W, 1,100 m}, 29 viii 1988, S. W. Dunkle leg. [FSCA]; 1 ♂, same data but [RWG]; Chiapas State: 2 ♂, small stream below Palenque ruins (17°29'13" N, 92°1'5" W, 64 m), 24 ix 1983, RWG leg. [RWG]; 1 ♂, Canyon below Ixhuatan {17°18' N, 93°0' W, 548 m}, 11 ix 1981, D. E. & P. M. Breedlove leg. [RWG]; 1 ♂, same data but [CAS]; 1 ♂, 1 ♀, Rincón Chamula at km 95, Teapa-Chiapa de Corzo road (17°12'30" N, 92°56'0" W, 1,844 m), 26 ix 1983, RWG leg. [RWG]; 1 ♀, stream 4.7 mi N of Jitotol {17°6' N, 92°51' W, 1,650 m}, 16 vii 1965, DRP leg. [FSCA]; 1 ♂, 2 ♀, Agua Azul (16°45'34" N, 90°46'30" W, 134 m), 25 ix 1983, RWG leg. [RWG]; 3 ♂, stream 20.1 mi NE Tapanatepec {16°21' N, 94°12' W, 820 m}, 2 viii 1965, DRP leg. [FSCA]; 1 ♂, 15.4 mi NE of Arriaga, stream {16°12' N, 93°54' W, 700 m}, 24 vii 1965, DRP & M. L. Paulson leg. [FSCA]; 1 ♂, Lagunas de Montebello (16°7'12" N, 91°43'48" W, 1,475 m), 23 x 1986, E. Fisher leg. [RWG]; 1 ♀, steep ridge above Siltepec on road to El Porvenir {15°30' N, 92°18' W, 2,133 m}, 2 ii 1982, D. E. Breedlove leg. [CAS]; 5 ♂, 1 ♀, 2.7 mi SW Unión Juárez {15°6' N, 92°6' W, 730 m}, 30 vii 1965, DRP & M. L. Paulson leg. [FSCA]; 1 ♂, same data but [RWG]; 1 ♂, 1 ♀, San Jerónimo, Volcán Tacana {15°3' N, 92°8' W, 450 m}, 16 ix 1970, E. C. Welling M. vend. [UMMZ]. BELIZE, Cayo Dist.: 1 ♂, Hidden Valley Inn {19°59' N, 88°48' W, 757 m}, 17 viii 1992, T. Boomsma leg. [RWG]; 1 ♀,



Mountain Pine Ridge, 300 m falls (17°11' N, 88°48' W, 117 m), 15 vii 1990, C. Dow leg. [FSCA]. GUATEMALA, Huehuetenango Dept.: 1 ♂, La Mesilla, 9.3 miles SE on CA 1, {15°36' N, 91°52' W, 980 m}, 23 viii 1967, DRP & M. L. Paulson leg. [FSCA]; Alta Verapaz Dept.: 1 ♀, Panzos, Trece Aguas {15°24' N, 89°40' W, 209 m}, 27 vi 1965, J. P. Miles & J. C. Downey leg. [FSCA]; 1 ♂, 1 ♀, Tamah (15°20' N, 90°10' W, 1,100 m), 16 xi 1963, E. C. Welling leg. [RWG]; El Progreso Dept.: 1 ♀, Tactic, tiny stream {15°19' N, 90°21' W, 1,460 m}, 4 vii 1962, TWD leg. [FSCA]; 1 ♂, streams near El Jute {14°51' N, 89°52' W, 835 m}, 15 viii 1968, TWD leg. [FSCA]; 2 ♀, 2–5 km S of Cumbre, N of Morazán, 1,200 m, 29 viii 1964, TWD leg. [FSCA]; 1 ♂, 1 ♀ (in copula), 6.5 km N of Estancia de la Virgen {14°58' N, 89°53' W, 550 m}, 29 viii 1965, TWD leg. [FSCA]; 1 ♂, Finca La Cajeta near Estación La Virgen {14°47' N, 90°44' W, 700 m}, 27 viii 1964, TWD leg. [FSCA]; 2 ♂, same data but 12 viii 1965 [FSCA]; 1 ♂, San Antonio La Paz {14°45' N, 90°17' W, 1,200 m, 31 vii 1971, TWD leg. [FSCA]; Baja Verapaz Dept.: 1 ♀, Purulha, Los Ranchitos Lodge, Quetzal Reserve {15°12' N, 90°13' W, 1,685 m}, xi 1930, J. B. Heppner leg. [FSCA]; Zacapa Dept.: 3 ♂, Panaluya near Río Hondo {15°2' N, 89°35' W, 174 m}, 21 viii 1970, TWD leg. [FSCA]; 1 ♂, Río Pasebien, 4 km N of Santa Cruz {15°1' N, 89°41' W, 800 m}, 4 vii 1963, TWD leg. [FSCA]; 22 ♂, 8 ♀, La Unión {14°58' N, 89°17' W, 850 m}, 5 ix–28 xii 1972, E. C. Welling M., vend. [UMMZ]; 4 ♂, 2 ♀, same data but [RWG]; 1 ♂, same data but [CSCA]; Chiquimula Dept.: 1 ♂, 1 ♀, Chiquimula {14°48' N, 89°33' W, 419 m}, xi 1930, J.J. White leg. [FSCA]; 1 ♂, 1 ♀, Socorro, 3 km NE of San Juan Ermita {14°46' N, 89°24' W, 1,100 m}, 14 vii 1963 TWD leg. [FSCA]; 2 ♂, 1 ♀, 5 km NNW of Olopa, spring on hillside {14°42' N, 89°20' W, 1,250 m}, 6 vii 1962, TWD leg. [FSCA]; 1 ♂, vicinity Olopa {14°41' N, 89°20' W, 1,150 m}, 11 vii 1963, TWD leg. [FSCA]; Solola Dept.: 1 ♂, 1 ♀, Río Panajachel at Panajachel {14°44' N, 91°9' W, 1,591 m}, 5 ii 1949, L. C. Stuart leg. [RWG]; 1 ♀, same data but 19 viii 1963, M. Irwin & D. Q. Cavagnaro leg. [CAS]; 1 ♂, Río Nahualate, 1.5 km E of Pala {14°43' N, 91°21' W, 1,400 m}, 1 vii 1962, TWD leg. [FSCA]; 1 ♂, near Santa María Visitación {14°43' N, 91°19' W, 2,000 m}, 1 vii 1962, TWD leg. [FSCA]; Chimaltenango Dept.: 3 ♂, 2 ♀, Acatenango {14°33' N, 90°56' W, 1,586 m}, 6 v–3 viii 1948, H. T. Dalmat leg. [FSCA]; 1 ♂, 1 ♀, Yepocapa State Park {14°30' N, 90°57' W, 1,403 m}, 8 v 1948, R. Wenzel leg. [FSCA]; 3 ♀, Yepocapa, 15 v–17 vii 1948, H. T. Dalmat leg. [FSCA]; Suchitepéquez Dept.: 10 ♂, 1 ♀, Finca Moca Grande {14°32' N, 91°15' W, 400 m}, 5–9 vii 1977, M. J. Westfall, Jr. leg. [FSCA]; Escuintla Dept.: 1 ♂, 3 km NE of Palin {14°25' N, 90°40' W, 1,450 m}, 22 viii 1964, TWD leg. [FSCA]; 5 ♂, 2 ♀, Escuintla, Finca El Salto {14°18' N, 90°47' W, 355 m}, 22 vi 1977, M. J. Westfall, Jr. leg. [FSCA]; 1 ♂, same data but 24 vi 1977 [FSCA]; 15 ♂, 6 ♀, same data but 26 vi 1977 [FSCA]; 1 ♂, 1 ♀ (in copula), same data but [CSCA]; 1 ♂, 1 ♀ (in copula), same data but [RWG]; 2 ♂, 3 ♀ same data but 1 vii 1977 [FSCA]; 2 ♂, same data but [UMMZ]; Guatemala Dept.: 2 ♂, Finca El Rosario, 36.5 km SE Guatemala City {14°24' N, 90°26' W}, 15 vi 1975, J. E. Hafernik Jr. [RWG]; 1 ♂, Río Mariscal, 24 v 1980, W. Brehme & TWD leg. [FSCA]. EL SALVADOR, Santa Ana Dept.: 1 ♂, El Limo Ranch and parking lot at main road, 15 km north of Metapan, below large waterfall in protected area {14°24' N, 89°24' W, 1,136 m}, 28 viii 2011, R. Bailowitz leg. [RWG]; 2 ♂, same data but [RWG]; 1 ♂, same data but [CSCA]; 2 ♂, El Limo Ranch, stream, wet foothill forest below family house along main road, about 15 km N of Metapan, on sunny vegetation at (14°24'32" N, 89°24'47" W, 830 m), 23 viii 2011, R. Behrstock leg. [RWG]; Ahuachapán Dept.: 1 ♂, San Francisco Menéndez, summit of Naranjito, above Paso del Imposible {13°50' N, 89°56' W}, 29 xi 1997, V. Hellebuyck leg. [RWG]; La Libertad Dept.: 3 ♂, 5 miles N of Quezaltepeque {13°53' N, 89°16' W, 400 m}, 17 vi 1963, M. Irwin & D. C. Cavagnaro leg. [CAS]; 2 ♂, 1 ♀, Quezaltepeque {13°49' N, 89°16' W, 400 m}, 5 vii 1963, M. Irwin & D. C. Cavagnaro leg. [CAS]; 1 ♂, 1 ♀, waterfall, 2.9 miles SE CA-1 & CA-8 junction on CA-1 {13°41' N, 89°19' W, 791 m}, 25 vi 1966, DRP leg. [FSCA]; 1 ♂, 1 ♀, same data but [RWG]; 1 ♂, Tamanique {13°35' N, 89°25' W, 1,000 m}, 24 xi 1971, S. & L. Steinhauer leg. [FSCA]; La Paz Dept.: 1 ♂, San Juan Tepezontes {13°36' N, 89°0' W, 760 m}, 14 xii 1964, M. E. Irwin leg. [RWG]. HONDURAS, Atlántida Dept.: 2 ♂, 10 km S of Yaruca {15°34' N, 86°39' W, 600 m}, 12 viii 1976, TWD & A. J. Donnelly leg. [FSCA]; Cortés Dept.: 1 ♀, Santo Tomas Camp, river behind camp, muddy, on low vegetation, Cusuco National Park (15°33'39" N, 88°17'53" W, 520 m), 14 vii 2011, M. Jocque leg. [RWG]; 1 ♂, San Pedro Sula {15°3' N, 88°2' W, 83 m}, 22 ii 1905, E. B. Williamson leg. [UMMZ]; 1 ♂, 1 ♀, same data but 24 ii 1905 [RWG]; 1 ♂, Río Yuri, SE of San Isidro, clear, rocky, forest stream, 13 xii 1987, S. W. Dunkle leg. [FSCA]; Olancho Dept.: 1 ♂, 1 ♀ (in tandem), seep trickle on cliff, 15 km N of San Francisco de la Paz {14°57' N, 86°9' W, 1,056 m}, 4 iii 1990, S. W. Dunkle leg. [FSCA]; 3 ♂, 2 ♀, Río Nance and small tributary to NE, just W of Campamento {14°33' N, 86°40' W, 700 m}, 3 iii 1990, S. W. Dunkle leg. [FSCA]; Comayagua Dept.: 2 ♂, Río Guique, bridge and curve, 7.7 km S of Siguatepeque, pools and boulder rapids, about 10 mi SW of Siguatepeque {14°31' N, 87°48' W, 930 m}, 12 xii 1987, S. W. Dunkle leg. [FSCA]; Ocotepeque Dept.: 1 ♂, El

Portillo {14°28' N, 89°4' W, 2,130 m}, 10 v 1993, L. Stange leg. [FSCA]; Francisco Morazán Dept.: 1 ♂, 1 ♀, ponds and rivulet in open, Rancho Billar, 4 km W of Valle de los Angeles on road to San Juancito {14 11' N, 87 30' W, 1,600 m}, 2 iii 1990, S. W. Dunkle leg. [FSCA]; 1 ♂, 22 mi NE of Tegucigalpa in pine forest, 28 xi 1976, W. H. Cross leg. [FSCA]; 6 ♂, 1 ♀, El Rancho, between Zamorano and Tegucigalpa, small rocky stream {14°4' N, 87°3' W, 1,116 m}; 11 xii 1987, S. W. Dunkle leg. [FSCA]; 2 ♂, same data but [RWG]; 2 ♂, 3 ♀, pond just E of El Tigre National Park, at the edge of the pine and cypress zones, 2,000 m, 15 xii 1987, S. W. Dunkle leg. [FSCA]; 2 ♂, 2 ♀, Valle del Zamorano, two trickles on Mt. Uyuca {14°2' N, 87°3' W, 1,400 m}, 2 iii 1990, S. W. Dunkle leg. [FSCA]; 2 ♂, 1 ♀, Zamorano, Escuela Agrícola Panamericana (EAP), 30 km ESE of Tegucigalpa, ponds and Yeguari River with riffles & pools {14°0' N, 87°0' W, 799 m}, 9 xii 1987, S. W. Dunkle leg. [FSCA]; 4 ♂, 2 ♀ (one pair in tandem), same data but Quebrada El Gallo {14°1' N, 87°2' W, 650 m}, 7–15 iii 1990, S. W. Dunkle leg. [FSCA]; El Paraíso Dept.: 1 ♀, Yuscarán {13°56' N, 86°51' W, 1,020 m}, 23 iv 1993, L. Stange leg. [FSCA]; 1 ♂, El Portillo {13°44' N, 86°50' W, 980 m}, 2 viii 1992, L. Stange leg. [FSCA]. NICARAGUA, Jinotega Dept.: 1 ♂, Cerro Kilambe, small stream {13°35' N, 85°44' W, 1,000 m}, 29 vii 2001, TWD leg. [RWG]; 1 ♂, Santa María de Ostuma {13°0' N, 85°55' W, 1,100 m}, 17 vi 1974, TWD leg. [FSCA]; Matagalpa Dept.: 2 ♂, 0.9 mi SSE of Tuma {13°4' N, 85°45' W, 580 m}, 24 viii 1964, F. G. Thompson leg. [FSCA]; 1 ♂, Fuente Pura, 29 iv 1995, V. Hellebuyck leg. [RWG]; 2 ♂, 1 ♀, Hotel Selva Negra (12°59'58" N, 85°54'32" W, 1,270 m), 28 30 viii 2003, F. C. Sibley leg. [FSCA]; 1 ♂, 1 ♀ (in tandem), same data but 3 viii 2001, TWD leg. [RWG]. COSTA RICA, Guanacaste Prov.: 10 ♂, 5 ♀, small stream 5 km N of Santa Elena {10°18' 51" N, 84°49' 30" W, 1300 m}, 27 ii 1987, S.W. Dunkle leg. [FSCA]; 1 ♂, 1 ♀, same data but [CSCA]; 4 ♂, 1 ♀, same data but [RWG]; Alajuela Prov.: 1 ♂, 1 ♀, Guatuzo, Patarra (10 40 N, 84 49 W, 60 m), 29 vi 1988, A. Chacon leg. [INBIO]; 13 ♂, 3 ♀ (two pairs in tandem), Río Sarapiquí, 16 km N of Vara Blanca (10°18'22" N, 84°10'2" W, 505 m), 12 viii 1979, RWG & J. A. Garrison leg. [RWG]; 1 ♂, 1 ♀, same data but [CSCA]; 1 ♂, 1 ♀, on road to Laguna Hule (10°18'2" N, 84°11'14" W), 10 xii 1988, CEH leg. [CEH]; 2 ♂, 1 ♀, 10 mi N Vara Blanca, streams & waterfalls {10°18' N, 84°11' W, 762 m}, 24 vi 1967, M.J. & D.N. Westfall leg. [FSCA]; 2 ♂, 4.7 mi N of Vara Blanca, waterfall, 1,370 m, 2 x 1966, DRP & M. L. Paulson leg. [FSCA]; 1 ♀, 2 km N of Cariblanco {10°17' N, 84°11' W, 730 m}, 15 vi 1963, F. G. Thompson leg. [FSCA]; 2 ♂, 2 ♀, Virgen del Socorro, river and stream (10°16'43" N, 84°10' 6" W), 20 ix – 17 xii 1988, CEH leg. [CEH]; 2 ♂, about 2 km SW of Palmares, 0.8 km NE of km 73 {10°2' N, 84°26' W, 1370 m}, 19 vi 1963, F.G. Thompson leg. [FSCA]; 1 ♂, Los Chorros (10°1'54" N, 84°16'59" W), 3 xii 1988, CEH leg. [CEH]; 1 ♂, disturbed weedy areas within plantation, outskirts of Alajuela {10°1' N, 84°13' W, 757 m}, 26 ii 1984, A. Young, J. Jass & S. Borkin leg. [FSCA]; 1 ♂, Alajuela Mina, 0.5 mi S highway 11 on highway 133 (9°59' N, 84°20' W, 520 m), 9 vii 1967, M. J. & D. N. Westfall leg. [FSCA]; 1 ♂, 1 ♀ Ciruelas (9°58'54" N, 84°15'35" W, 799 m), 14 xi 1915, A. Alfaro leg. [FSCA]; 1 ♂, same data but 15 vii 1915 [FSCA]; 1 ♂, 1 ♀, Turrúcares, small pond {9°57' N, 84°19' W, 610 m}, 16–25 iv 1988, CEH leg. [CEH]; 2 ♂, 2 mi SW of Ojo de Agua, streams and forest {9°56' N, 84°13' W, 850 m}, 21 x 1966, DRP leg. [FSCA]; Heredia Prov.: 1 ♂, OTS, Estación Biológica La Selva (10°25'55" N, 84°0'38" W), iv 1981, CEH leg. [CEH]; 1 ♀, bosque Bioforesta, La Horqueta, Sarapiquí (10°20' N, 83°57' W, 70 m), 17 xi 1993, CEH leg. [CEH]; 1 ♂, Concepción de San Rafael, Río Tibas {10°11' N, 84°7' W, 1,730 m}, 8 v 1988, CEH leg. [CEH]; 1 ♀, 4.3 km NNW of Barva {10°3' N, 84°6' W, 1,500 m}, 28 vii 1963, F.G. Thompson leg. [FSCA]; 1 ♂, Río Mediano, San Isidro (10°1'11" N, 84°3'22" W), 26 iii 1988, CEH leg. [CEH]; 1 ♂, 4.3 mi N of San Rafael {10°1' N, 84°6' W, 1,770 m}, 6 viii 1966, DRP leg. [FSCA]; 1 ♂, UNA, ditch at N entrance {10°0' N, 84°6' W}, 31 v 1988, CEH leg. [CEH]; 4 ♂, 1 ♀, pastizal UNA {9°59' N, 84°6' W}, 7 vii 1988, CEH leg. [CEH]; 4 ♂, 2 ♀, Río Pirro and dam {9°58' N, 84°7' W}, 29 xi 1987, CEH leg. [CEH]; 5 ♂, 2 ♀, same data but, 27 iii 1988, CEH leg. [CEH]; Puntarenas Prov.: 1 ♂, San Luis Valley below Monteverde, Finca Mauricio Ramirez, shaded trickle in secondary forest (10°16'54" N, 84°48'8" W, 1,187 m), 5 vi 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♀, Estación Pittier, 4.2 km SW del Cerro Gemelo (9°1'32" N, 82°57'46" W, 1,670 m), P. Campos leg. [INBIO]; 1 ♀, A.C.L.A.P, Coto Brus, Estación Biológica Las Alturas (8°57'8" N, 82°50'18" W, 1,500 m), 12 xi 1991, M. A. Zumbado leg. [INBIO]; 1 ♂, 1 ♀, Las Alturas Preserve, first stream crossing after entering main gate on way to town of Las Alturas (8°54' N, 82°7' W, 1,220 m), 12 i 2005, F. C. Sibley leg. [FSCA]; 1 ♀, San Vito de Cotobrus, Estación La Altura (8°49' N, 82°57' W, 1,075 m), xi 1991, A. Ramirez leg. CEH leg. [CEH]; 1 ♂, same data but 29 ix 1986, T.C. Emmel leg. [FSCA]; 1 ♂, same data but road to gravel pit near Finca Las Cruces, 1 viii 1970, R. Merritt leg. [FSCA]; 1 ♂, 1 ♀, Pino Colina, 4 miles S of San Vito de Cotobrus (8°47'12" N, 82°57'30" W, 1,230 m), 17 i 2005, F. C. Sibley leg. [FSCA]; 1 ♂, 1 ♀, Wilson Botanical Garden, 4 miles S of San Vito de Cotobrus (8°47'6" N, 82°57'36" W, 1220 m), 21 iii 2009, F. C. Sibley leg. [FSCA]; 1 ♂, road Paso Real-San Vito, pond at Campo

Tres, open area (8°44' N, 82°56' W, 160 m), 19 vii 1990, CEH leg. [CEH]; 3 ♂, same data but 19 vii 1990, TWD leg. [FSCA]; 1 ♂, Río Cantamana at Campo Tres, road to San Vito (8°44' N, 82°56' W, 160 m), 19 vii 1990, CEH leg. [CEH]; Limón Prov.: 3 ♂, 1 ♀, Guapiles, in forest {10°12' N, 83°47' W, 268 m}, 7 vii 1967, M. J. and D. N. Westfall leg. [FSCA]; 1 ♂, junction with road to Siquirres, disrupted forest (10°12' N, 83°46' W, 300 m), 25 v 1990 CEH leg. [CEH]; 1 ♂, about 20 km SE of Siquirres, Las Brisas de Pacuarito (10°6' N, 83°30' W, 59 m), 31 i 1990, CEH & T. Herman leg. [CEH]; Cartago Prov.: 5 ♂, 2 ♀, Orosi, Volcán Irazú {9°57' N, 83°50' W, 1500 m}, v 1912, O. Garlepp leg. [UMMZ]; 1 ♂, Río Chitaria, Jabillos, 2 mi NE {9°55' N, 83°36' W, 795 m}, 2 viii 1966, DRP & M. L. Paulson leg. [FSCA]; 1 ♂, same data but 15 km east of Turrialba, 700 m, 9 vi 1986, TWD leg. [RWG]; 6 ♂, Río Chitara, 30.7 km SW of Siquirres, clear rocky stream in a gorge, and small seepage trickle, 6 iii 1987, S. W. Dunkle leg. [FSCA]; 2 ♂, same data but [RWG]; 1 ♂, 1 ♀, La Suiza de Turrialba {9°54' N, 83°39' W, 1,000 m}, 20 ix – 4 x 1921 [FSCA]; 6 ♂, same data but 9 v 1960, R. B. Cumming leg. [FSCA]; 1 ♂, same data but 25 iv 1970, L. Fernández S. & J. Terán leg. [FSCA]; 6 ♂, 2 ♀, Turrialba, fish ponds and forest trail and clearing, 19–21 vi 1969, Schaaf leg. [UMMZ]; 1 ♀, Turrialba, IICA grounds, 18 vi 1969, Schaaf leg. UMMZ; 2 ♀ same data but Bajo Chino, open areas near ponds, 27 v 1951 [UMMZ]; 1 ♂, Turrialba, IICA, Bajo Reventazón, high forest edge, 20 vii 1968 [UMMZ]; 2 ♂, Turrialba, same data but [CSCA]; 2 ♂, Turrialba, same data but [RWG]; 4 ♂, 5 ♀, Turrialba, Tuna, 1913, O. Garlepp leg. [UMMZ]; 1 ♀, Aguacaliente {9°54' N, 83°50' W, 1,280 m}, 20 v 1909, P. P. Calvert leg. [FSCA]; 1 ♂, 2 ♂, Infiernillo, Reventazón {9°53' N, 83°45' W, 1,000 m}, 1913, Garlepp leg. [UMMZ]; 2 ♂, vicinity Juan Viñas (formerly Infiernillo), río Reventazón, 800 m, 11 vi 1962, TWD leg. [FSCA]; 1 ♂, same data but near Quebrada Honda, 1,000 m [FSCA]; 11 ♂, 1 ♀, Río Reventazón, SE of Turrialba by highway 10 (9°52'56" N, 83°38'49" W, 561 m), 10 viii 1979, RWG & J. A. Garrison leg. [RWG]; 1 ♂, same data but [CSCA]; 2 ♂, Coris, W of Cartago, marsh and ditch {9°52' N, 83°59' W, 1,370 m}, 10 vii 1966, D. R. & M. L. Paulson leg. [FSCA]; 1 ♂, Cachi {9°50' N, 83°48' W, 1,181 m}, 1,877, H. Rogers leg. [UMMZ]; 2 ♂, 1 ♀, Río Naranjo, same data but 1.2 mi E Cachi, 1,160 m, 23 vi 1967, M. J. & D. N. Westfall leg. [FSCA]; 1 ♂, 1 ♀, Tayutic, Grano de Oro, Chirripo (9°49'6" N, 83°27'33" W, 1,100 m), 18 vii 1993, P. Campos leg. [INBIO]; 1 ♂, Protected Area Río Navarro and Río Sombrero, El Muñeco {9°47' N, 83°53' W, 1,143 m}, 27 ix 2011, CEH leg. [CEH]; 2 ♂, 2 ♀ (one pair in tandem), Tapanti {9°47' N, 83°54' W, 1,310 m}, 27 vi – 6 vii 1963, F. G. Thompson leg. [FSCA]; 2 ♂, same data but marsh and stream, 1,190 m, 6 x 1966, DRP & M. L. Paulson leg. [FSCA]; 2 ♂, same data but 23–25 vi 1967, M. J. & D. N. Westfall leg. [FSCA]; 2 ♂, 4 ♀, same data but 26 vi 1969, Schaaf leg. [UMMZ]; 1 ♂, 1 ♀, same data but 1,250 m, 29 ix 1990, CEH leg. [CEH]; 1 ♂, 1 ♀, same data but x 1991, G. Mora leg. [INBIO]; 2 ♂, 4 ♀, Palo Verde {9°47' N, 83°57' W, 1,600 m}, 1913, O. Garlepp leg. [UMMZ]; 6 ♂, 3 ♀, Estación de Biología Tropical Río Macho, in small trickles along road and forest reserve at pond (9°46'1" N, 83°51'45" W, 1,590 m), 27 ix 2011, CEH leg. [CEH]; 1 ♂, estanque Río Macho (9°45'59" N, 83°51'35" W), 8 ix 1988, CEH leg. [CEH]; 1 ♂, Chirripo Valley, 30 mi SE Turrialba, Tspirí River {9°41' N, 83°25' W, 760 m}, 24 iii 1989, J. Ryan leg. [RWG]; San José: 1 ♂, Bajo de la Hondura, 3 km antes de Río Sucio (10°3'45" N, 83°58'58" W), 9 iv 1981, CEH leg. [CEH]; 1 ♂, San José (10°3' N, 84°7' W, 1,600 m), v 1905, P. Biolley leg. [FSCA]; 4 ♂, 6 ♀, same data but 24 vii 1915, R. B. Cumming leg. [FSCA]; 1 ♂ (teneral), 24 vii 1900, H. Schmidt leg. [FSCA]; 7 ♂, 24 vii 1915, A. Alfaro leg. [FSCA]; 1 ♂, 1 ♀ (pair), 4 vii 1900, H. Schmidt leg. [FSCA]; 1 ♂, 17 vii 1900, H. Schmidt leg. [FSCA]; 1 ♂, 7 i 1916, A. Alfaro leg. [FSCA]; 2 ♂, 1 ♀, same data but 1 viii 1900, H. Schmidt leg. [FSCA]; 1 ♂, Río Tiribi at Rancho Redondo, E of San José, 1,520 m, 28 viii 1966, DRP leg. [FSCA]; 1 ♀, pond and river at Juncales, 1.2 mi SE of Desamparados, 1,130 m, 8 vii 1966, M. L. Paulson leg. [FSCA]; 2 ♂, 8 ♀, dump beside Hotel Casa Holanda, San Pedro (10°2'6" N, 84°7'24" W, 1,284 m), 6 viii 1979, RWG & J. A. Garrison leg. [RWG]; 7 ♂, 7 ♀, small stream near Hacienda Zurqui and Finca La Reina on highway 220, NE of San Jose (10°1'44" N, 84°1'31" W, 1,405 m), 11–16 viii 1979, RWG & J. A. Garrison leg. [RWG]; 3 ♂, Lindora pond, Santa Ana (9°56'18" N, 84°11'31" W), 20 vii 1988, CEH leg. [CEH]; 3 ♂, Río Monterrey (9°56'17" N, 84°2'29" W), 2 i 1989, CEH leg. [CEH]; 1 ♂, 5.2 km W of Santa María, 1,420 m 27 vi 1963, F. G. Thompson leg. [FSCA]; 2 ♂, 2 ♀, road Curridabat-San Pedro, 9 vii 1989, CEH leg. [CEH]; 3 ♂, 2 ♀, Escazu, Vista Alegre {9°55' N, 84°8' W, 1,276 m}, 3 vii 2001, CEH leg. [CEH]; 1 ♂, San Pedro {9°55' N, 84°3' W, 1,100 m}, 8 ix 1982, W. Eberhard leg. [UMMZ]; 1 ♂, El Rodeo Protected Area (9°54'49" N, 84°16'10" W, 859 m), 4 ii 1990, CEH leg. [CEH]; 1 ♂, same data but forest (9°54'32" N, 84°16'50" W), 13 vii 1988, CEH leg. [CEH]; 1 ♂, 1 ♀ (in tandem), same data but pond at stream, 15 iv 1988, CEH leg. [CEH]; 2 ♂, same data but 3 ix 1988, CEH leg. [CEH]; 1 ♀, same data but 11 viii 1988, CEH leg. [CEH]; 1 ♂, 1 ♀, same data but stream, CEH leg. [CEH]; 1 ♂, same data but 29 ix 1988, CEH leg. [CEH]; 1 ♀, Guatuso de Patarrá (9°52'13" N, 84°2'12" W, 1,242 m), 24 xii 1988, CEH leg. [CEH]; 5 ♂, 2 ♀, Guatuso de Patarrá, stream

(9°52'53" N, 84°1'8" W), 24 xii 1988, CEH leg. [CEH]; 2 ♂, Río Claro on La Palma-Clarillo road (9°49' N, 83°53' W, 1,190 m), 7 x 1966, DRP & M. L. Paulson leg. [FSCA]; 2 ♂, área abierta, San Ignacio de Acosta (9°48'1" N, 84°9'42" W, 610 m), 2 viii 1988, CEH leg. [CEH]; 1 ♀, Monterrey (9°45'26" N, 84°6'35" W, 1,100 m), 2 i 1989, CEH leg. [CEH]; 1 ♂, 1 ♀ (in copula), km 118 on Pan American highway, Bosque del Tolomuco (9°28'18" N, 83°41'48" W, 1,710 m), 24 i 2005, F. Sibley leg. [FSCA]; 1 ♂, 1 ♀, San Geronimo, Río Agra, ii 1913, J. F. Tristan leg. [FSCA]; 1 ♀, same data but balcony of El Conquistador Apart Hotel, 18 viii 1979, W. Eberhard leg. [RWG]. PANAMA, Chiriquí Prov.: 1 ♂, Pipeline Road {9°11' N, 79°45' W, 140 m}, 7 ii 1970, E. S. Morton leg. [FSCA]; 1 ♂, Cerro Azul (9°10' N, 79°25' W, 646 m) 2 viii 1979, J. A. Garrison & RWG leg. [RWG]; 5 ♂, Finca Hartmann, creek behind house (8°50'35" N, 82°45'44" W, 1,540 m), 17–22 ii 2012, L. G. Bezark leg. [RWG]; 2 ♂, same data but [CSCA]; 4 ♂, 1 ♀, 25.2 km E of Río Sereno {8°49' N, 82°42' W, 1,128 m}, 23 iv 1976, D. C. Rentz, M. S. Carter & C. Millinex leg. [CAS]; Panamá Prov.: 1 ♂, 1 ♀, Barro Colorado Island {9°9' N, 79°51' W, 62 m}, 24 vii 1963, D. C. Cavagnaro & M. Irwin leg. [CAS]; 1 ♀, Panamá (8°58' N, 79°32' W), iii 1912, O. Garlepp leg. [UMMZ]; 1 ♂, Ancon Hill (8°57'28" N, 79°32'57" W, 210 m), 11 ii 2012, L. G. Bezark leg. [RWG]; 1 ♂, Cerro Campana {8°43' N, 79°54' W, 910 m}, 15 iv 1970, E. S. Morton leg. [FSCA]; 1 ♂, same data but (8°41' 35" N, 79°54'10" W, 150 m), 26 xii 1937 [FSCA]; 1 ♂, Paraíso, 15 i 1911, A. Busck leg. [FSCA]; 2 ♂, Mount Totumas Cloud Forest Lodge, stream at lodge (8°53'4" N, 82°41'2" W, 1,910 m), 20 vi 2011, TWD leg. [TWD]; 2 ♂, same data but Puma trail, 10 viii 2012 [FSCA]; 2 ♂, 3 ♀, vicinity Mount Totumas Cloud Forest Lodge, Puma trail, seep stream at lodge (8°53'38" N, 82°40'39" W, 1,910 m), 21 vi 2011, TWD leg. [FSCA]; 1 ♀, vicinity of Mount Totumas Cloud Forest Lodge, Rio Colorado at entrance to lodge (8°52'21" N, 82°41'25" W, 1,670 m), 21 vi 2011, A. Donnelly & TWD leg. [TWD]; 10 ♂, 13 ♀, Lino {8°48' N, 82°26' W, 800 m}, ix 1911, O. Garlepp leg. [UMMZ]; 2 ♂, 2 ♀, same data but [CSCA]; 2 ♂, 2 ♀, same data but [RWG]; 1 ♂, 1 ♀, Alto Lino, 23 vi 1965, H. G. Real leg. [RWG]; 1 ♂, stream below Cerro Punta {8°51' N, 82°34' W, 1,953 m}, 21 viii 1974, M. L. May leg. [FSCA]; 1 ♀, Bambito {8°50' N, 82°36' W, 1,500 m}, 23 viii 1976, H. G. Real leg. [RWG]; 1 ♂, 1 ♀ (in copula), same data but 24 viii 1976, [CSCA]; 1 ♂, Boquete (8°46'29" N, 82°25'55" W, 1,083 m), 15 vii 1911, D. E. Harrower leg. [FSCA]; 2 ♂, 4 ♀, same data but xii 1946, N. L. H. Krauss leg. [UMMZ]; 2 ♀, same data but [RWG]; 2 ♀, Las Lagunas de Volcán (8°46'11" N, 82°40'23" W, 1,500 m), 26 i 2014, L. Bezark leg. [RWG]; Cocle Prov.: 1 ♂, 1 ♀ (in tandem), El Valle de Antón, hotel Valle Verde, streams on hotel property and pond across road (8°36'30" N, 80°7'8" W, 600 m), 21 v 2016, W. Mauffray leg. [FSCA]; 1 ♂, El Valle de Antón, 50 mi NW of Panama City {8°38' N, 80°8' W, 1,340 m}, 22 vii 1963, H. G. Real leg. [FSCA]; 1 ♂, same data but 840 m, viii 1946, N. L. Krauss leg. [UMMZ]; 1 ♂, same data but [RWG]; 8 ♂, 6 ♀, same data but i 1947 [UMMZ]; 2 ♀, same data but [RWG]; 1 ♂, La Mesa, along road between (8°38'6" N, 80°7'10" W, 860 m), 19 viii 2012, A. Donnelly, TWD & J. Michalski leg. [FSCA]; Panama Oeste Prov.: 1 ♂, Mata Ahogado, 1 km S of Alto del María, small streams and seepages (8°39'2" N, 80°5'33" W, 1,015 m), 21 v 2016, W. Mauffray leg. [FSCA]; Veraguas Prov.: 2 ♂, Alto de Piedra near Santa Fe, old road {8°30' N, 81°7' W, 850 m}, 8 viii 2012, TWD leg. [FSCA]; 1 ♂, 1 ♀, Alto de Piedra near Santa Fe, small marsh on terrace (8°30'52" N, 81°7'24" W, 860 m), 23 v 2014, TWD & A. C. A. Donnelly leg. [FSCA].

A common medium-sized vivid blue species similar in appearance to the more northerly *Argia extranea* (Hagen).

**Description of male holotype.** Head (Fig. 17): Labrum, ante- and postclypeus, ante- and postfrons, base of mandibles and genae blue; base of postfrons with black inverted T connecting to black on epicranium, the latter interrupted by large blue postocular spots each broadly confluent with compound eyes, blue occipital bar interrupted forming three spots, two lateral, the third one a small crossbar medially, a small triangular blue spot anterolateral to lateral ocellus and a small longitudinal blue spot between lateral ocelli; antennae black; rear of head pale except for wash of brown on each side of occipital foramen.

Prothorax black with following areas blue: anterior lobe, dorsolateral spot on middle lobe, narrow elongate diagonal spot on lateral portion of propleuron with posterior margin rimmed in black. Pale areas of pterothorax vivid blue, with black middorsal stripe slightly narrowed at basal 0.20, about as wide as blue antehumeral stripe; anterior half of mesinfraepisternum black, continuous with broad humeral stripe at base then abruptly narrowing at basal fifth along mesopleural suture then abruptly forming a thin hairline at 0.50 before expanding again at mesopleural fossa; remainder of thorax blue except for narrow black stripe on metapleural suture (Fig. 17). Wings hyaline with venation black; pterostigma dark brown, surmounting 1 cell in all wings; postnodals Fw 15/16, Hw 15/14; postquadrangular cells Fw 4/4, Hw 3/3; RP<sub>2</sub> at Fw 7/7, Hw 5/5.5. Coxae and trochanters pale except for

black on dorsum of trochanters; femora black, interior surface pale; tibiae black with extensor surface pale, tarsi and armature black.

Abdomen (Figs. 17, 63) mostly blue; S1 blue with a narrow irregular black ring basally; S2 blue with an irregular black lateral stripe ending at apical 0.25, its anterior end connecting as a narrow black ring above, its posterior end sending a narrow triangular offshoot dorsally but connecting above, annulus black; S3 blue, ventrally with broad black stripe beginning at basal 0.10 and interrupted at dorsal margin at distal 0.60 by a narrow elongate blue spot, lateral black stripe extending dorsally at apical 0.20 and connecting dorsally isolating small blue middorsal and lateral spots posteriorly before black annulus; S6–7 similar but blue with no isolated posterior middorsal blue spot; S7 with broad black lateral stripe not interrupted medially; S8–9 blue with incomplete lateral black stripe below, posterior margin of S10 rimmed in black up to torus and with a complete narrow black middorsal stripe connecting basally with a narrow black ring; torus pale, its ventral margin rimmed with black; cercus brown; paraproct blue dorsobasally, remainder black.

Genital ligula (as in Fig. 132) ending in a triangular apical lobe, laterally with a small posteriorly directed lobe at basal 0.50 (as in Fig. 132b); apical portion of genital ligula slightly concave entally (as in Fig. 132c) and lacking any accessory structures; lateral sclerotized portion proximal to flexure lacking a microspinulate patch on ental surface on each side.

Torus large, swollen, transversely oval, occupying entire ventral margin of torifer but not overlapping bilobed epiproct (Fig. 151a); epiproct pale, black laterally; cercus quadrate in dorsal view with outer margin about twice the length of inner margin (Fig. 151c); in mediadorsal view dorsal surface slightly concave with a broadly based distal tooth at basal 0.50 (Figs. 151a, d); in lateral view narrowly triangular, about half length of paraproct (Fig. 151b); paraproct deeply forked, dorsal branch forming a broadly based triangle; ventral branch narrow, digitiform, meeting dorsal branch at a right angle, about 1.5 times as long as dorsal branch, its tip slightly curved mesad (Fig. 151a).

**Dimensions.** Hw 22.7, abdomen 28.6, total length 37.2.

**Description of female paratype** (Honduras: Cortés Dept.: Santo Tomás Camp, river behind camp, muddy, on low vegetation, Cusuco National Park, Figs. 39, 40, 89). Similar to male but pale colors light olive tan. Head, pro-, pterothorax as in male but with pale color on S1–2 more extensive; legs largely tan with streaks of brown on outer surfaces of femora and inner portion of tibiae at distal 0.40; S1–2 similar to male but pale coloration more extensive; S3–6 pale with a complete narrow ventral stripe and above an isolated elongate postbasal streak followed by a shorter apical spot that dorsally connects above; these stripes becoming more extensive on succeeding segments with postbasal and apical lateral spots connecting with ventral stripe; S7 (Fig. 89) mostly black except for narrow pale basal ring and vestiges of a pale lateral stripe; S8–10 pale except for small apical spot laterally on each segment; cerci black; ovipositor pale, sternite 8 and ovipositor pale rimmed with black dorsally and ventrally.

Mesostigmal lobe forming a low evenly raised lobe continuous with distal margin of plate; in anterior view, lobe forming an elongate raised lobe (Figs. 111a, b); an elongate raised tubercle posterior to plate at junction with mesepimeron when viewed posteriorly (Fig. 111e) an elongate depressed area paralleling medial portion of mesostigmal lobe on anterior portion of mesepisternum when viewed dorsally (Figs. 111c, d).

**Variation in paratypes.** Both sexes vary as to extent of dark markings on thorax and especially abdomen. The humeral stripe in both sexes is usually as depicted in Fig. 17 but in rare instances the humeral stripe is forked above (as in Fig. 22) in males (Chiapas State, canyon below Ixhuatan, 2.7 SW of Unión Juárez) or the posterior fork is present but isolated (as in Fig. 21; El Salvador: Santa Ana Dept., El Limo Ranch); five other males (Panama: Cero Azul; Finca Hartmann; Bambito, Mata Ahogado; El Valle de Antón) have the upper hairline portion of the humeral stripe thickened (as in Fig. 21), but all of these conditions are rare. Extent of black markings on S7–10 is variable, ranging from a thin linear stripe on basal 0.70 of S7 (Fig. 66) to a more normal broad stripe (Figs. 63–65); ventral black on S8–9 may occasionally be absent (Figs. 65, 66). Pterostigma surmounting 1–2 cells in males, 1–1.5 in females; postnodals: Fw 12–17, Hw 10–15 in males, Fw 13–18, Hw 11–15 in females; postquadrangular cells Fw 3–4, Hw 3 in males, Fw 4, Hw 2–3 in females; RP<sub>2</sub> at Fw 6–8, Hw 5–7 in males and females. **Dimensions.** ♂: Hw 21.9 ± 1.53 [18.8–23.4], abdomen 28.5 ± 1.71 [24.5–30.4], total length 36.6 ± 1.89 [32.2–38.6]. ♀: Hw 22.7 ± 1.7 [20–23.9], abdomen 26.3 ± 1.42 [23.7–29.1], total length 34.2 ± 1.81 [31.2–37.8].

**Diagnosis.** This species closely approaches the more northerly *A. extranea* in color pattern (Figs. 177–180) and morphology. Both sexes may be separated by the following key:

1.	Males .....	2
1'	Females .....	3
2(1).	Distal segment of genital ligula with a small digitiform appendage on its ental tip (Figs. 133a, c); cercus in medioposterior view with decumbent tooth at approximately basal 0.30 of margin (Figs. 152d, e–g), and with distal margin often produced into a tubercle, this area immediately preceded by a shallow recessed area when viewed dorsally or medioposteriorly (Figs. 152a, c, d; 153a, c); dorsal and ventral branches of paraproct subequal (Figs. 152b, 153b); middorsal thoracic stripe parallel (as in Fig. 42); sides of S8–9 marked with black (Fig. 67); SE Arizona in USA south through Oaxaca and Tamaulipas and Orizaba-Cordoba-Veracruz City region of Veracruz State in Mexico (Fig. 167) .....	<i>extranea</i>
2'	Distal segment of genital ligula lacking a small digitiform appendage on its ental tip (Figs. 132a, c); cercus in medioposterior view with decumbent tooth at approximately basal 0.50 of margin (Figs. 151d, e, f), and with distal margin not produced into a tubercle, no shallow recessed area preceding this area (Figs. 151a, c, d); ventral branch of paraproct usually distinctly longer than upper branch (Fig. 151b); middorsal thoracic stripe usually constricted at base (as in Fig. 40); sides of S8–9 unmarked or mostly so (Figs. 63–66); Chiapas State and Los Tuxtlas region of S Veracruz State in Mexico south through Panama (Fig. 167) .....	<i>elongata n. sp.</i>
3(1').	A low swollen transverse ridge on mesepisternum parallel to posterior margin of mesostigmal lobe extending from lateral tip of lobe to black antehumeral stripe; this ridge narrowly separated from lobe by a groove (Fig. 112c); base of mesostigmal lobe viewed ventrally lacking a transverse tubercle (Fig. 112e); middorsal thoracic stripe parallel (Fig. 42); SE Arizona in USA south through Oaxaca, Tamaulipas and Orizaba-Cordoba-Veracruz City region of Veracruz State in Mexico (Fig. 167) .....	<i>extranea</i>
3'.	No ridge on mesepisternum posterior to mesostigmal lobe (Fig. 111c); base of mesostigmal lobe viewed ventrally with a transverse tubercle (Fig. 111e); middorsal thoracic stripe usually constricted at base (Fig. 40); Chiapas State and Los Tuxtlas region of southern Veracruz State in Mexico south through Panama (Fig. 167) .....	<i>elongata n. sp.</i>

Diagnostic characters of the genital ligula and of the placement of the decumbent tooth on the posterior margin of the cercus in males and morphology of the mesostigmal plates in females appear to be reliable diagnostic characters to recognize *A. elongata* and *A. extranea*. The relative length of ventral and dorsal branches of male paraproct and the constriction of the middorsal stripe are more variable and should not be used as the only means of distinguishing between these two species.

**Remarks.** Calvert (1902) commented on the variability of the paraproct length within *A. extranea*, noting a general increase in length north to south ("...In a general way, it seems that the relative and absolute length of the lower branch of the inferior appendage increases in specimens from north to south, i. e. in those from Mexico to Costa Rica...") and in 1907 ("....in the females [of *Argia extranea*] the black middorsal thoracic stripe is frequently narrowed at its lower end..."). Garrison (1994), in his account of *A. extranea*, discussed the details surrounding Calvert's (1902) broader concept of *A. extranea* and suggested that Calvert included an undescribed violaceous species from Texolo as well as noting the possibility that two species (*A. extranea* and *A. elongata* as treated here) might be involved. The more southerly populations (here treated as *A. elongata*) had long been recognized by the late L. K. Gloyd as separate from the more northerly *A. extranea*, for which she applied the manuscript name "*extensa*" to over 1,000 specimens she examined from numerous collections. Our treatment of this species confirms Gloyd's assertion that *A. elongata*, as treated here, is a closely related species but distinct from *A. extranea*.

Garrison (1994) listed *Argia mista* Navás as a junior synonym of *A. extranea* based on M. Westfall's examination of the holotype of *A. mista* at the MNHN. Through the kindness of Jean Legrand, we have been able to examine the holotype of *A. mista* (Fig. 153) as well as the holotype of *Agrion extraneum* Hagen (Figs. 151a–d) and can confirm their synonymy. Our distribution records of *Argia extranea* show it to occupy the foothills of the Sierra Madre Occidental, del Sur and Oriental; we have seen no records from the lowland areas bordering the Gulf of Mexico and we suggest that Saussure's 1854–5 collection of the holotype likely occurred further west than its stated type locality of Tampico.

Garrison and von Ellenrieder (2015) discussed the confused applications of the name *extranea* to various South American species described by Fraser (1946).

**Habitat.** Rocky to muddy rivers and streams and open areas near trickles and ponds, in primary forest to disturbed habitats. *Argia elongata* is the most common species of *Argia* to be found within its range. Specimens have been collected year round at various localities at elevations ranging from near sea level (Mexico: Agua Caliente) to over 2,000 m (Mexico: steep ridge above Siltepec on road to El Porvenir). This species is primarily an inhabitant of the moist foothills of the Sierra Madre Occidental, del Sur, and Oriental occurring at altitudes over 100 m. It appears to be absent from the central plateau (Altiplanicia Mexicana). Of over 300 localities recorded, only eight yielded collections under 100 m.



**TABLE 4.** Wing counts and measurements (average and standard deviation followed by range in square brackets) for various *Argia* species treated in this study.

	n	Pt over # cells		Postquadangular cells		Px cells		RP <sub>2</sub> origin at Px #		Hw length		Abdomen length		Total length	
		Fw	Hw	Fw	Hw	Fw	Hw	Fw	Hw	Fw	Hw	Fw	Hw	Fw	Hw
<i>carolus</i> ♂	10	1-2	4	3-4	14-17	13-15	7-8	6-7	22.2 ± 1.1 [20.8-23.9]	29.8 ± 1.4 [27.6-32.1]	38.5 ± 1.8 [35.8-41.5]				
<i>Carolus</i> ♀	7	1-2	4	3-4	14-16	12-14	7-8	6-7	21.8 ± 2.3 [18.5-24.7]	26.5 ± 2.3 [23.3-29.3]	34.9 ± 3.3 [30.5-38.5]				
<i>schneideri</i> ♂	10	1-2	3-5	3-4	16-18	14-16	7-9	6-7	20.9 ± 1.1 [19-22.3]	27.3 ± 1.2 [25.7-29.3]	35.2 ± 1.5 [33.3-37.8]				
<i>schneideri</i> ♀	5	1.5-2	4-5	3-4	16-17	14-15	7-8	6-7	22.1 ± 1.4 [20.2-23.7]	27.2 ± 1.8 [25.3-29.4]	35.2 ± 2.1 [33.1-37.7]				
<i>haberi</i> ♂	3	1-2	4	3-4	15-16	13-14	7-8	6-7	22.9 ± 0.4 [22.5-23.3]	29.4 ± 1.0 [28.3-30.2]	37.6 ± 1.1 [36.8-38.4]				
<i>rhoadsi</i> ♂	10	1	3-4	3-4	12-16	11-13	6-8	5-6	20.9 ± 1.1 [18.6-22]	28 ± 1.2 [26.1-29.6]	35.4 ± 1.4 [33.3-37.5]				
<i>rhoadsi</i> ♀	10	1	3-4	3	13-16	12-14	6-8	5-6	21.4 ± 0.8 [20.2-22.5]	27.5 ± 1 [26.2-29.5]	35.1 ± 1.2 [33.7-37.6]				
<i>popoluca</i> ♂	10	1-1.5	3-4	3	13-16	12-14	6-8	5-7	19.1 ± 1.3 [17.1-20.8]	26.3 ± 2.1 [24-29.5]	33.5 ± 2.5 [29.6-37.5]				
<i>popoluca</i> ♀	9	1-1.5	3-4	3	13-15	11-13	7-8	5-6	19.7 ± 2.1 [17.2-22.1]	25.3 ± 2.3 [21.6-28.1]	32.4 ± 2.9 [28-35.8]				
<i>schorri</i> ♂	7	1	3-4	3	12-14	10-11	6-8	5	18.9 ± 0.9 [17.6-20.3]	25.7 ± 1.2 [24-27]	33 ± 1.3 [31.1-34.4]				
<i>schorri</i> ♀	1	1	3	3	13	10	6-7	4	20.1	25.3	32.8				

**TABLE 5.** Estimates of Evolutionary Divergence between Sequences of dark and pale morphs of *Argia fulgida*. The number of base differences per sequence from between sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 9 nucleotide sequences. All ambiguous positions were removed for each sequence pair. There were a total of 503 positions in the final dataset. Evolutionary analyses were conducted in MEGA5.

	Pale Ecuador RG-33	Dark Ecuador RG-34	Dark Ecuador RG-35	Dark Costa Rica RG-35	Dark Panama RG-36	Pale Ecuador RG-37	Dark Panama RG-45	Dark Ecuador RG-46	Dark Panama RG-63
Pale Ecuador RG-33	1.73								
Dark Ecuador RG-34	3	1.73							
Dark Costa Rica RG-35	5	6	2.43						
Dark Panama RG-36	0	3	5	5					
Pale Ecuador RG-37	0	3	5	5	0				
Dark Panama RG-45	0	3	5	5	0	0			
Dark Ecuador RG-46	3	0	6	6	3	3	3		
Dark Panama RG-63	0	3	5	5	0	0	0	3	
Pale Ecuador RG-64	0	3	5	5	0	0	0	3	0

**Distribution.** *Argia elongata* shows an allopatric distribution with its close relative *A. extranea*, extending from Veracruz and Oaxaca states in S Mexico south to Panama (Fig. 167), while *A. extranea* extends from the Los Tuxtlas region of central Veracruz and Oaxaca states north to Arizona in SW USA (Fig. 167). Selys (1865) lists *A. extranea* from Colombia (probably by Nicholas Funck) and Surinam (by Robert H. Schomburgk), but we have seen no specimens of *A. elongata* from South America. The Colombian record, if by Funck, likely corresponds to incorrectly labeled specimens as to locality, as discussed by González-Soriano and von Ellenrieder (2009), and the specimen from Surinam is probably a misidentification (Belle 2002).

***Argia haberi* Garrison & von Ellenrieder, n. sp.**

Figs. 26 (head, thorax, S1–4 ♂); 75 (S7–10 ♂); 124 (wings); 140 (genital ligula); 160 (appendages ♂); 171 (map); Table 4 (measurements).

**Etymology.** Named *haberi* (Latinized name) in honor of our friend and colleague William A. Haber, in recognition to his valuable contributions to the knowledge of Costa Rican odonates and his generous help in our studies.

**Specimens examined.** 4 ♂. **Types.** **Holotype** ♂: COSTA RICA, San José Prov.: km 118 on Pan American highway, Bosque del Tolomuco, in seeps and trickles through brushy pasture on forested hillside (9°28'18" N, 83°41'48" W, 1710 m), 27 iii 2006, F. Sibley leg. [FSCA]. **Paratypes:** COSTA RICA, San José Prov.: 1 ♂, same data as holotype but [RWG]; 1 ♂, same data as holotype but [CSCA]; 1 ♂, same data as holotype but [TWD].

A medium-sized largely blue species with slightly amber wings (Fig. 124) and appendages (Fig. 160) superficially similar to those of *A. rhoadsi* Calvert (Fig. 161).

**Description of male holotype.** Head (Fig. 26): Labium blue lined with black at base and with a small black medial spot connected to basal black, anteclypeus blue; postclypeus blue margined with black at base and with a basal black spot mediolaterally extending from base; base of mandibles and genae blue, antefrons blue; remainder of epicranium black with the following blue: large postocular spot confluent with eye, small triangular spot anterolateral to lateral ocellus, a wash of light brown on posterior most margin of occiput; antennae black, rear of head except for narrow pale margin bordering eye entirely black.

Prothorax black with following areas pale: posterior margin of anterior lobe, dorsolateral spot on middle lobe, laterobasal 0.10 of posterior margin of pronotum, propleuron except for brown notopleural suture. Pale areas of pterothorax blue, with broad black middorsal stripe about three times as wide as pale antehumeral stripe, the latter narrowing dorsally; black humeral stripe extending from anterior half of mesinfraepisternum and constricted above and widening irregularly with a thick posterior fork at upper fourth, anterior portion of stripe narrow connecting below antealar crest with middorsal stripe above and with a short ventrally directed finger on dorsal portion of obsolete interpleural suture; interpleural suture with narrow black stripe separating paler areas on side of thorax (Fig. 26). Wings slightly amber (as in Fig. 124) with venation black; pterostigma dark brown, surmounting 1.5 cells in Fw, 2 cells in Hw; postnodals Fw 15/15, Hw 13/13; postquadrangular cells Fw 4/4, Hw 3/3; RP<sub>2</sub> at Fw 7/7, Hw 6/6. Coxae and trochanters pale except for wash of black on medial portions of coxae and dorsum of trochanters; internal 0.50 base surface of femora and external surface of tibiae pale, remainder of legs and armature black.

Abdomen (Figs. 26, 75) mostly black; S1 blue with a basal black ring at basal 0.50 and with black spot extending dorsally to apical 0.70; S2 black with a campanulate dorsal spot at basal 0.60, laterally with black separated below by blue, genital lobe slightly angulate, annulus black; S3 with distal 0.70 black, this receding above allowing for an extension of middorsal blue stripe ending at basal 0.40 of segment; S4–6 similar to S3 but basal blue further restricted basally; on S6, narrow upper offshoot of black at proximal 0.10 almost isolates dorsal blue, thus almost forming a middorsal spot; S7 black with a narrow blue ring; S8–9 blue except for narrow incomplete vertical black spot apically on intersegmental membrane on S8; S10 black, blue dorsally; torus pale, appendages black.

Genital ligula (Fig. 140) with apical segment spatulate broadening basally with short lateral sclerotized lobes, ental surface of genital ligula concave; small inner fold present, sclerotized portion proximal to flexure lacking a microspinulate patch on ental surface on each side.

Torus large, transversely oval, swollen ventrally, occupying 0.50 ventral margin of torifer and not overlapping bilobed epiproct (Fig. 160c); area around epiproct and base of same black; cercus (Figs. 160a, c) short, quadrangular, about half as long as paraproct (Fig. 160b), outer margin convex, slightly bilobed apically, medial

margin armed with a prominent decumbent tooth, slightly concave medially; medial margin linear, planate dorsomedially; paraproct unilobed, its ventral branch vestigial and much smaller than broadly triangular upper branch, its tip blunt, posterior margin linear.

**Dimensions.** Hw 22.9, abdomen 29.4, total length 37.7.

**Female:** Unknown.

**Variation in paratypes.** Little variation was observed in the series collected at the type locality. One male has reduced black on labrum; the other paratype has the black humeral stripe branched as in holotype but stripe is of uniform width medially. Pterostigma surmounting 1–2 cells; postnodals: Fw 15–16, Hw 13–14; postquadrangular cells Fw 4, Hw 3–4; RP<sub>2</sub> at Fw 7–8, Hw 6–7. **Dimensions.** ♂: Hw 22.9 ± 0.4 [22.5–23.3], abdomen 29.4 ± 1.0 [28.3–30.2], total length 37.6 ± 1.1 [36.8–38.4].

**Diagnosis.** Appendage morphology superficially resembles that of *A. rhoadsi* (Fig. 161), as both possess a quadrate cercus and a unilobate paraproct extending well beyond level of cercus. However, the decumbent tooth is not as prominent and is placed more basally in *A. rhoadsi* (Fig. 161) compared with *A. haberi* (Fig. 160). The torus in *A. rhoadsi* is more elongate and partially overlaps the epiproct (Fig. 161c), compared with the shorter non-overlapping torus in *A. haberi* (Fig. 160c). The greatest difference is in the morphology of the genital ligula: terminal segment rectangular with two flagella and small poorly developed lateral lobes at flexure in *A. rhoadsi* (Fig. 141) versus a spatulate terminal segment lacking flagella and with relatively larger lateral lobes in *A. haberi* (Fig. 140). Although males of both species possess amber-colored wings, the pale coloration in *A. rhoadsi* (Figs. 27, 76) is an aquamarine blue compared to a more intense violaceous blue in *A. haberi* (Figs. 26, 75).

**Remarks.** Despite superficial similarity between *A. haberi* and *A. rhoadsi*, these two species with entirely different genital ligula morphology are probably not closely related.

**Habitat.** The four males known were found along seeps and trickles through brushy pasture on a forested hillside.

**Distribution.** So far known only from its type locality in San José Prov., Costa Rica (Fig. 171).

### *Argia rudolphi* Garrison & von Ellenrieder, n. sp.

Figs. 19 (head, thorax, S1–4 ♂); 43 (head, thorax, S1–4 ♀); 68 (S7–10 ♂); 92 (S7–10 ♀); 113 (mesostigmal plates ♀); 154 (appendages ♂); 168 (map); Table 2 (measurements).

**Etymology.** Named *rudolphi* (Latinized name) in honor of our colleague Rainer Rudolph, in recognition for his generous support of the International Dragonfly Fund, which has helped further the knowledge of Odonata worldwide over the past twenty years.

**Specimens examined.** 18 ♂, 5 ♀. **Types.** **Holotype** ♂: MEXICO, Puebla State, Zihuateutla, Sierra de Huauchinango, La Unión, in drainage area (20°14'25" N, 97°53'38" W, 596 m), 21 v 1987, R. Novelo & A. Gomez leg. [CSCA]. **Paratypes:** MEXICO, Hidalgo State: 6 ♂, 3 ♀, stream with cascade 7 km N of Tlanchinol (21°3'5" N, 98°40'4" W, 1,300 m), 21 vii 1992, G. Harp leg. [RWG]; 2 ♂, same data but 22–23 vii 1992, TWD leg. [RWG]; Puebla State: 1 ♂, Zihuateutla, Sierra de Huauchinango, km 3 road to La Unión, Zona Cafetalera in drainage area (20°15'31" N, 97°52'5" W, 570 m), 23 vii 1987, R. Novelo leg. [CSCA]; 4 ♂, same data but [RWG]; 3 ♂, 1 ♀ (one pair in tandem), same data as holotype [RWG]; Veracruz State: 1 ♂, 1 ♀ (in tandem, female ovipositing), El Muro, km 14 on road 131 Tlapacoyan-Altotonga (19°52'41" N, 97°13'41" W, 1,100 m), 15 vii 2000, R. Novelo leg. [RWG].

A medium-sized largely violaceous-blue species (Figs. 19, 68, based on well-preserved material) with approximate cerci (Fig. 154) the male of which is similar to *A. anceps* (Figs. 20; 69; 181), *A. fissa* (Figs. 21; 70; 183) and *A. westfalli* (Figs. 22, 23, 71, 72).

**Description of male holotype.** Head (Fig. 19): Labium pale except for small black medial spot at base; ante- and postclypeus, antefrons, base of mandibles, anterior half of scape and genae pale, remainder of head black with violaceous postocular spots confluent with eyes, incomplete pale occipital bar and small pale spot anterolateral to lateral ocellus; posterior half of scape and remainder of antennae black, rear of head washed with black, especially medially, margin bordering eye margin pale.

Prothorax black with following areas pale: obscure lateral spot on anterior lobe, dorsolateral spot on middle lobe, lateral 0.30 of posterior margin of pronotum, propleuron except for notopleural suture. Pale areas of

pterothorax violaceous blue, with black middorsal stripe about as wide as pale antehumeral stripe, the latter slightly narrowing dorsally; anterior half of mesinfraepisternum black, continuous with broad humeral stripe at base, then narrowing at basal fifth along mesopleural suture, then abruptly forming a thin hairline at 0.50 before expanding again at mesopleural fossa and connecting narrowly below antealar crest with middorsal stripe above; metapleural suture with a narrow black stripe separating paler areas on side of thorax (Fig. 19). Wings hyaline with venation black; pterostigma dark brown, surmounting 2 cells in both Fw and 2 cells in left Hw [distal 0.80 of right Hw missing]; postnodals Fw 18/19, left Hw 16; postquadrangular cells Fw 4/4, left Hw 3; RP<sub>2</sub> at Fw 8/8, left Hw 6. Coxae and trochanters pale medially washed with brown; extensor surfaces of tibiae pale, remainder of legs and armature black.

Abdomen (Figs. 19, 68) mostly violaceous blue; S1 pale with narrow black basal ring expanding dorsally to form a connected black spot occupying basal 0.50; S2 pale above with an incomplete black lateral stripe widening posteriorly and ending at distal 0.30, this stripe connected to obscure black spot below thus isolating pale areas anteriorly and posteriorly, genital lobe not strongly produced, apical annulus black; S3 pale with a narrow lateral black stripe, apical 0.20 including annulus black except for small isolated transverse spot before annulus; S4 similar to S3 but with remnant of postbasal streak; S5 similar but postbasal streak more extensive with vestigial line connecting to apical black; S6 with postbasal black confluent with apical black thus forming a broad ventral stripe; S7 black except for narrow pale ring with a broad triangular extension middorsally ending at basal 0.20; S8–10 pale dorsolaterally and black ventrally; torus pale, cerci black; dorsal portion of paraprocts pale, ventrally black.

Genital ligula (Fig. 137) similar to *A. elongata* (as in Fig. 132) but tip narrower. Lateral lobes appressed to lateral margin of distal segment

Torus large, transversely triangular, swollen ventrally, occupying ventral half of torifer and overlapping recessed bilobed epiproct (Fig. 154c); narrow area around epiproct and extreme base of same black; cercus roughly quadrate in dorsal view with outer margin about 1.5 times as long as inner margin (Fig. 154c); in mediodorsal view upper surface slightly concave with a broadly based tooth at basal 0.20 (Fig. 154a, d); in lateral view, narrowly triangular, subequal to length of paraproct (Fig. 154b); paraproct slightly bilobed, its ventral branch much smaller than longer, anteriorly directed, bluntly triangular dorsal branch, its tip, viewed mediodorsally (Fig. 154a), directed medially.

**Dimensions.** Hw 21.5, abdomen 30, total length 37.5.

**Description of female paratype** (Mexico: Veracruz State, El Muro, km 14 on road 131 Tlapacoyan-Altotonga). Similar to male but pale color light blue. Head (Fig. 43) as in male but with a black basal spot mediolaterally on labrum and postocular spots larger and confluent with eye, prothorax as in male but black areas less extensive, pterothorax with humeral stripe narrower and more deeply forked; S1 as in male; S2 with dorsal oval spot at basal 0.60, apically and laterally with black interrupted below by a pale lateral stripe narrowed at apical 0.30, pale lateral stripe bordered below by a black stripe; S3 dorsally pale with apical 0.30 black, the latter with a ventral offshoot of black along ventral margin and expanding at basal 0.10 and almost connecting with an elongate postbasal streak, which is at first broad but narrows to a thin line just connecting with apical black; S4–5 similar to S3 but black more extensive, isolating a pale midlateral stripe; dorsal blue also reduced, especially apically, but with an incomplete pale basal ring; S6–7 black with an incomplete pale basal ring; S8 blue dorsally, black at basal 0.20 and laterally; S9 blue dorsally with a black dorsolateral spot at basal 0.50 and connected to lateral stripe below; S10 blue dorsally, black laterally; appendages and ovipositor black.

Mesostigmal lobe forming a broad oval (Fig. 113a, b), about twice as wide as high, occupying medial 0.60 of posterior margin of mesostigmal plate (Fig. 113c), medial margin thickened with a slightly recurved margin (Fig. 113d, e), and slightly overlying fork of middorsal carina; distance between mesostigmal lobes small, barely separated (Fig. 113a, c); in lateral view, lobe erect with posterior margin curving medioposteriorly (Fig. 113g).

**Variation in paratypes.** Little variation was observed in the paratype series. One male (Sierra de Huauchinango) had a small indication of a forked humeral stripe; another male (same locality) had reduced black abdominal markings thus isolating black postbasal streaks on S4–5 similar to S4 in Fig. 19. The small lateral lobes on the genital ligula of the holotype (Fig. 137b) are adjacent to the sides of the ligula, but in paratypes they are usually separated basally as in *A. elongata* (Fig. 132b). Females can be blue (Fig. 43) or brown. Pterostigma surmounting 1–2 cells in males and females; postnodals: Fw 16–20 in males and females, Hw 12–18 in males, 15–17 in females; postquadrangular cells Fw 3–5, Hw 3–4 in males, Fw 4, Hw 3 in females; RP<sub>2</sub> at Fw 7–8, Hw 6–7 in males and females. **Dimensions.** ♂: Hw 23 ± 1.95 [20–24], abdomen 30.3 ± 1.69 [27.6–33.1], total length 38.4 ±

2.17 [35.4–41.9]; ♀: Hw  $24.8 \pm 1.74$  [22.3–26.5], abdomen  $29.4 \pm 2.11$  [28.6–31.3], total length  $37.7 \pm 2.73$  [33.5–40.1].

**Diagnosis.** This species may be confused with three other largely blue species, two of which, *A. anceps* and *A. westfalli*, are sympatric with *A. rudolphi* (Fig. 168). The cerci in male *A. rudolphi* are more approximate, with their inner surfaces nearly touching in normal position (Fig. 154c); in both *A. anceps* (Fig. 155c) and *A. westfalli* (Fig. 157c), the cerci are widely separated by a gap subequal to the basal width of each cercus. In dorsomedial view, the cercus of *A. rudolphi* (Fig. 154d) is less elongate than in either *A. anceps* (Fig. 155d) or *A. westfalli* (Fig. 157d). The nearly approximate condition of the cerci in *A. rudolphi* (Fig. 154d) is similar to that of the more southerly (Costa Rica to Colombia) *A. fissa* Selys (Fig. 156c), but the transverse width of the torus in *A. fissa* (Fig. 156c) is subequal to the transverse width of each cercus; in *A. rudolphi* the transverse width of each torus is about half the transverse width of each cercus (Fig. 154c). The tip of the terminal segment of the genital ligula in *A. rudolphi* is short and narrow, ending in a more or less ridged trough-shaped tip (Fig. 137); the tip in the other three species is longer and flexible and can assume the shapes illustrated here (*A. anceps* Figs. 134–136; essentially the same for *A. fissa* and *A. westfalli*). The ectobasal portion of the terminal segment of the genital ligula in *A. anceps* (Fig. 134a, b), *A. fissa*, and *A. westfalli* has a prominent narrow mound-like lobe that is absent in *A. rudolphi* (Fig. 137a, b). The following field markings will also distinguish male *A. rudolphi* from *A. anceps*, *A. fissa* and *A. westfalli*: The black postbasal streaks (sometimes extensive) present on S4–6 in *A. rudolphi* (Fig. 19) are absent in *A. anceps* (Figs. 20; 181), *A. fissa* (Figs. 21; 183) and *A. westfalli* (Figs. 22, 23); the wings are hyaline in *A. rudolphi* and strongly tinged with yellow in *A. anceps*, *A. fissa* (Figs. 181–183) and *A. westfalli*; and the pale coloration is violaceous blue in *A. rudolphi* and vivid blue in *A. anceps*, *A. fissa* and *A. westfalli*.

The large erect oval mesostigmal plates in *A. rudolphi* (Fig. 113) are almost approximate and are similar only to those of *A. fissa* (Fig. 116) and, to a lesser extent, *A. westfalli* (Figs. 117, 118) and *A. anceps* (Figs. 114, 115). A transverse swollen tubercle is present at the base of the mesostigmal lobe in posterior view in *A. anceps* (Fig. 115e); no tubercle is present in *A. rudolphi* (Fig. 113e), *A. fissa* (Fig. 116e) or *A. westfalli* (Figs. 117e, 118e). In *A. rudolphi*, the medial margin of the mesostigmal lobe is swollen and slightly recurved (Fig. 113d, e); no such swollen area is present in *A. fissa* (Fig. 116e) or *A. westfalli* (Figs. 117e, 118e). In the field, females of *A. rudolphi* (Fig. 43) are easily distinguished from those of the other three species (Figs. 44–46; 181–183) by the overall more extensive dark markings on the head (mostly black epicranium), thorax (prominent middorsal and humeral stripes), and abdomen (postbasal streaks coupled with distal and ventral black); the other three species are almost immaculate, there being only vestiges of black on the epicranium, a thin middorsal thoracic stripe, a narrow to absent humeral stripe, and vestiges of a distal black spot laterally on abdominal segments. The ovipositor in *A. rudolphi* is black (Fig. 92), not pale as in the other three species (Figs. 93–95).

**Habitat.** Streams and drainage areas. Specimens were taken at elevations ranging from about 570 m (Sierra de Huauchinango) to 1,300 m (stream with cascade 7 km N of Tlanchinol). Specimens have been collected in May (Sierra de Huauchinango) and July (stream with cascade 7 km N of Tlanchinol).

**Distribution.** Limited to a small area in the Atlantic slope of central Mexico within Puebla, Hidalgo, and Veracruz states (Fig. 168), where it occurs in sympatry with *A. anceps* and *A. westfalli*.

### *Argia schneideri* Garrison & von Ellenrieder, n. sp.

Figs. 25 (head, thorax, S1–4 ♂); 50 (head, thorax, S1–3 ♀); 74 (S7–10 ♂), 99 (S7–10 ♀); 120 (mesostigmal plates ♀); 139 (genital ligula); 159 (appendages ♂); 169 (map); Table 4 (measurements).

**Etymology.** Named *schneideri* (Latinized name) in honor of our friend and colleague Wolfgang Schneider, in recognition of his valuable contributions to the study of Odonata and his active part in establishing the International Dragonfly Fund, including personal donations, which have helped further our knowledge of Odonata worldwide.

**Specimens examined.** 35 ♂, 5 ♀. **Types.** **Holotype** ♂: ECUADOR, Napo Prov., Las Palmas, on Río Anzu in Río Napo watershed, 11 xii 1936, W. Clark-Macintyre leg. [UMMZ]. **Paratypes:** ECUADOR, Napo Prov.: 3 ♂, upper E branch of Ishpinga-yacu {0°59' S, 77°50' W, 500 m}, 18 ix 1942, W. Clarke-McIntyre leg. [UMMZ]; 1 ♂, 1 ♀, Cushillu-Yacu, Río Napo watershed, El Partidero {1°1' S, 77°50' W, 700 m}, 27 vii 1935, W. Clarke-Macintyre leg. [CSCA]; 2 ♂, 1 ♀, Las Palmas, on Río Anzu in Río Napo watershed {1°4' S, 77°48' W, 900 m}, 11 xii 1936, W. Clark-Macintyre leg. [UMMZ]; 1 ♂, Headwaters of Río Arajuno, Napo watershed, stream # 3 {1°5' S,

77°32' W, 1,000 m}, 27 iv 1941, W. Clarke-Macintyre leg. [UMMZ]; 4 ♂, 1 ♀, same data but stream # 4, 26 iv 1941 [UMMZ]; 1 ♂, 1 ♀, Napo {1°12' S, 77°50' W, 700 m}, Staundinger vendor [UMMZ]; 4 ♂, same data but v 1940 [UMMZ]; 1 ♂, same data but 24 xii 1935, W. Clark-Macintyre leg. [RWG]; 1 ♂, same data but [CSCA]; 1 ♂, Concepción-Río Napo {1°40' S, 77°25' W, 400 m}, xii 1939, W. Clarke-MacIntyre leg. [UMMZ]; 3 ♂, same data but 28–29 xii 1939 [UMMZ]; 1 ♂, same data but Río Pacai-Yacu, 29 xii 1939, W. Clarke-MacIntyre leg. [UMMZ]; Pastaza Prov.: 1 ♂, El Partidero, indian village on E bank of Río Anzu, junction of trails from Mera and Puyo northward to Napo {1°22' S, 78°0' W, 1,000 m}, 29 ix 1935, W. Clarke-Macintyre leg. [UMMZ]; 1 ♂, same data but 12 xi 1935 [UMMZ]; 1 ♂, same data but 27 vii 1935, W. Clarke-Macintyre leg. [CSCA]; 2 ♂, same data but [UMMZ]; 1 ♂, same data but 27 v 1935 [RWG]; 1 ♂, Río Pastaza watershed {1°38' S, 77°50' W, 900 m}, 28 xi 1936, W. Clarke-MacIntyre leg. [UMMZ]; Tungurahua Prov.: 1 ♂, Guamo Yacu (Agoyan), Río Pastaza watershed {1°24' S, 78°22' W, 1,700 m}, 9 xi 1935, W. Clarke-Macintyre leg. [UMMZ]; 1 ♂, 1 ♀, same data but [RWG]; Morona Santiago Prov.: 1 ♂, Mangosisa, Río Upano {2°31' S, 77°53' W, 708 m}, L. Gomez vendor [UMMZ].

A medium-sized largely dark species with strongly forcipate male appendages (Fig. 159).

**Description of male holotype.** Head: labrum pale rimmed with narrow line of black apically and basally, anteclypeus dark brown, base of mandibles, genae, postclypeus pale (purple), remainder of head black except for postocular spots and small pale spot anterolateral to lateral ocellus (as in Fig. 25); antennae black, rear of head black except for pale narrow margin bordering eye margin.

Prothorax black with following areas pale: obscure pale rim on anterior lobe, small dorsolateral spot on middle lobe, lateral 0.30 of posterior margin of propleuron. Pale areas of pterothorax purple, with broad black middorsal stripe about four times as wide as pale antehumeral stripe, the latter slightly narrowing dorsally; broad parallel black humeral stripe extending from base of mesinfraepisternum and connecting below antealar crest with middorsal stripe above and with dorsal portion of obsolete interpleural suture; metapleural stripe narrow; pale colors on side of thorax purple (as in Fig. 25). Wings hyaline with venation black; pterostigma dark brown, surmounting 1.5 cells in right Fw, 2 cells in left Fw; postnodals Fw; 2 cells in left Hw, 1.5 cells in right Hw; postnodals Fw 17/18, Hw 16/15; postquadrangular cells Fw 4/4, Hw 4/3; RP<sub>2</sub> at Fw 8.5/8.5, Hw 7/7. Coxae and trochanters pale except for black on ventral and anterior portions of coxae and dorsum of trochanters; femora, tibiae, tarsi and armature black.

Abdomen (as in Figs. 25, 74) mostly black; S1 with a black basal ring, remainder purple; S2 black with a pale (purple) dorsal campanulate spot occupying basal 0.80 of segment, abruptly narrowing to a thin line almost extending to black apical annulus, laterally black with a pale lateral stripe; S3 black except for narrow basal dorsal inverted triangular spot at basal 0.10; S4–5 similar to S3 but with only a small obscure pale dorsal spot at basal 0.05; S5–7 black; S8 with a dorsolateral pale (purple) spot interrupted basally by a narrow ring of black and posteriorly by black lateral stripe extending dorsally at apical 0.10; S9 pale dorsally, black laterally; S10 black with a pair of purple spots dorsally interrupted by narrow middorsal black stripe; torus pale, appendages black.

Genital ligula (Fig. 139) with a large elongate microspinulate patch on ental surface proximal to flexure on sclerotized area (Fig. 139d); distal segment lacking lateral sclerotized lobes and terminating in a single long curved flagellum.

Torus small, transversely oval, swollen, occupying entire ventral margin of torifer but not overlapping bilobed epiproct (Fig. 159a, c); area around epiproct and base of same black; cercus (Fig. 159a, c) long, about twice as long as paraproct (Fig. 159b), forcipate and ending in a capitate tooth; paraproct bilobed, its ventral branch much smaller than larger dorsal branch, in lateral view, dorsal branch bluntly triangular.

**Dimensions.** Hw 21.5, abdomen 28.4, total length 36.7.

**Description of female paratype** (Ecuador: Napo Prov., Cushillu-Yacu, Río Napo watershed, El Partidero). Head, pro- and pterothorax and S1–2 as in male (Fig. 50), but postocular spots and antehumeral stripe dull purple and pale colors on side of thorax olive brown; S1 as in male; S2 black dorsally with a narrow ventral pale stripe; S3–7 black with vestiges of narrow pale lateral stripe; S8 black with blue distal spot occupying apical 0.40; S9 black with posterior 0.50 blue extending laterally and projecting anteriorly to basal 0.30; S10 blue dorsally, black ventrally, cerci and ovipositor black (Fig. 97).

Mesostigmal lobe as in Fig. 120, well developed but small, forming a flat medially directed digit-like lobe elevated above mesepisternum and not overlying branch of middorsal carina; in posterior view (as in Fig. 120e) lobe thickened externally but lacking a tubercle at juncture with mesepisternum; mesepisternal tubercle absent.

**Variation in paratypes.** Little variation was observed in the paratype series. The dorsolateral spot on S10 in



male can range from present as in holotype to very small (El Partidero) or absent (Río Napo watershed). Pterostigma surmounting 1–2 cells in males, 1.5–2 in females; postnodals: Fw 16–18 in males, 16–17 in females, Hw 14–16 in males, 14–15 in females; postquadrangular cells Fw 3–5, Hw 3–4 in males, Fw 4–5, Hw 3–4 in females; RP<sub>2</sub> at Fw 7–9, Hw 6–7 in males, Fw 7–8, Hw 6–7 in females. **Dimensions.** ♂: Hw 20.9 ± 1.09 [19–22.3], abdomen 27.3 ± 1.22 [25.7–29.3], total length 35.2 ± 1.51 [33.3–37.8]; ♀: Hw 22.1 ± 1.45 [20.2–23.7], abdomen 27.2 ± 1.84 [25.3–29.4], total length 35.2 ± 2.08 [33.1–37.7].

**Diagnosis.** This species is superficially similar to *A. carolus* and is diagnosed under that species. Within its range (Ecuador), it is unlikely to be confused with any other species.

**Habitat.** Streams and rivers in forest. Specimens were taken at elevations ranging from about 400 m (Concepción-Río Napo) to 1,700 m (Guamo Yacu). Flight dates range from April (Headwaters of Río Arajuno) through December (Las Palmas, on Río Anzu).

**Distribution.** As far as known restricted to Ecuador east of the Andes (Fig. 169).

### *Argia schorri* Garrison & von Ellenrieder, n. sp.

Figs. 28 (head, thorax, S1–3 ♂); 51 (head, thorax, S1–3 ♀); 77 (S7–10 ♂); 100 (S7–10 ♀), 101 (S1–5); 121 (mesostigmal plates ♀); 125 (wings); 142 (genital ligula); 162 (appendages ♂); 170 (map); 190 (field picture of ♀); Table 4 (measurements).

**Etymology.** Named *schorri* (Latinized name) in honor of our friend and colleague Martin Schorr, in recognition of his contributions to our knowledge of Odonata through the establishment of the International Dragonfly Fund, which has supported the research of countless odonatologists worldwide, his compilation of the Odonatological Abstract Service, and editing of the IDF-Reports for the past twenty years.

**Specimens examined.** 6 ♂, 1 ♀. **Types.** **Holotype** ♂: COSTA RICA, Puntarenas Prov.: 2.8 miles E of Golfito {8°39' N, 83°7' W, 35 m}, 4 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]. **Paratypes:** COSTA RICA, Puntarenas Prov.: 1 ♂, same data as holotype [USNM]; 1 ♂ same data as holotype but [RWG]; 1 ♂ same data as holotype but [CSCA]; 1 ♂, same data as holotype but [USNM]; 2 ♂, 1 ♀, 2 km NE of Uvita, Finca Carolina, Uvita Tropical Studies Institute, Río Ballena and small tributaries in primary and secondary forest (9°9'47" N, 83°42'49" W, 275 m), 15 xi 2010, W. Haber leg. [RWG].

A dark medium-sized species similar in male appendage morphology (Fig. 162) to *A. popoluca* (Figs. 163, 164).

**Description of male holotype** (colors poorly preserved). Head: Labium pale merging to black at basal half, ante- and postclypeus black, genae and base of mandibles pale, ante- and postfrons and anterior portion of scape pale, remainder of head black with purple postocular spots and small pale spot anterolateral to lateral ocellus; remainder of antennae black, rear of head black except for broad margin bordering eye.

Prothorax black with following areas pale: anterior lobe, dorsolateral spot on middle lobe, propleuron except for notopleural suture. Pale areas of pterothorax dark purple, with black middorsal stripe about as wide as pale antehumeral stripe, the latter gradually narrowing dorsally; black humeral stripe extending from base of mesinfraepisternum and connecting narrowly below antealar crest with middorsal stripe above and encompassing a small pale spot just below carina (similar to Fig. 28); interpleural suture with narrow black stripe separating paler areas on side of thorax (as in Fig. 28). Wings hyaline with venation black; pterostigma short, black, surmounting 1 cell in all wings (as in Fig. 125); postnodals Fw 12/12, Hw 11/11; postquadrangular cells Fw 3/3, Hw 3/3; RP<sub>2</sub> at Fw 7/7, Hw 5/5. Coxae and trochanters pale washed with black anterior portions of coxae; femora, tibiae, tarsi and armature black.

Abdomen (as in Figs. 28, 77) mostly black; S1 with a black basal ring, remainder purple; S1 blue with a narrow irregular black ring basally; S2 pale (purple) above with an irregular black lateral stripe ending just before black annulus, its anterior end connecting as a narrow black ring above, at apical 0.20 sending a narrow triangular offshoot dorsally but connecting above, ventrally with irregular pale stripe; S3–4 black laterally with pale basal ring and middorsal stripe ending at apical 0.20; S5–7 black with incomplete pale basal ring; S8–10 blue dorsally, black laterally (as in Fig. 77); torus pale, appendages black.

Genital ligula (Fig. 142) consisting of a long ridged flagellum, with a pair of entolaterally directed quadrate lobes at base.

Torus small, confined to ventral margin of torifer, the latter slightly triangularly concave, its base approximate to the opposite, and both completely overlapping bilobed epiproct (Fig. 162a, c); cercus (Fig. 162a, c) about twice as long as wide, rectangular, about subequal to paraproct, its tip slightly concave with a small partially hidden recurved tooth on medioapical margin; paraproct bilobed, its ventral branch much smaller than broadly triangular anteriorly directed dorsal branch (Fig. 162a, b).

**Dimensions.** Hw 19.4, abdomen 27, total length 34.4.

**Description of female paratype** (Costa Rica: Puntarenas Prov., 2 km NE of Uvita, Finca Carolina, Uvita Tropical Studies Institute, Fig. 190). Head similar to male but postocular spot not confluent to eye (Fig. 51); pro- and pterothorax and S1 as in male but antehumeral stripe brown and pale areas of pterothorax pale green (Fig. 51); S2 similar to male but with campanulate spot extending to apical 0.40; S3 with a blue basal ring and narrow blue middorsal stripe, apical 0.30 and laterally except for medial pale streak black (Figs. 51, 101); S4 similar but pale middorsal stripe narrower and pale mediolateral streak reduced; S5–7 black except for pale basal ring; S8 blue dorsally, black laterally; S9 narrowly blue dorsally with an offshoot of blue extending cephalad to medial 0.50, remainder black; S10 and ovipositor black (Fig. 100).

Mesostigmal lobe small, forming a raised recurved planar lobe arising laterally on lateral branch of carina just posterior to medial border of mesostigmal plate (Fig. 121d, c); lobe thickened when viewed posteriorly (Fig. 121e); a prominent mesepisternal tubercle medioposteriorly to mesostigmal lobe (Fig. 121b, c, e).

**Variation in paratypes.** Little variation was observed in the paratype series. The metapleural stripe in two males (2 km NE of Uvita, Fig. 28) is about 0.70 as thick as the humeral stripe. Pterostigma surmounting 1 cell in males and female; postnodals: Fw 12–14 in males, 13 in female, Hw 10–11 in males, 10 in female; postquadrangular cells Fw 3–5, Hw 3 in males, Fw 3, Hw 3 in female; RP<sub>2</sub> at Fw 6–8, Hw 5 in males, Fw 6–7, Hw 4 in female. **Dimensions.** ♂: Hw 18.8 ± 0.90 [17.6–20.3], abdomen 25.5 ± 1.11 [24–27], total length 32.7 ± 1.27 [31.1–34.2]; ♀: Hw 20.1, abdomen 25.3, total length 32.8.

**Diagnosis.** Species unique in the male by diminutive rim-like torus and adjacent torifer completely overlapping epiproct (Fig. 162a, c), and in the female by the placement of recurved mesostigmal lobe on lateral branch of middorsal carina. In addition, the genital ligula consisting of a long, ridged single flagellum and a pair of entolaterally directed quadrate lobes at base (Fig. 142) and the shortened pterostigma covering only one cell (Fig. 125) will easily serve to distinguish this species. The male appendages of *A. schorri* (Fig. 162) are superficially similar to those of *A. popoluca* (Figs. 163, 164), as well as its color pattern (Figs. 129; 188, 189). However, *A. popoluca* differs from *A. schorri* by its male tori broadly ovate, occupying the ventral half of the torifer and not overlapping the epiproct (Figs. 163a, c, 164a, c) and by its two long flagella united basally by a common stem, broadened laminate base and lack of a pair of entolaterally directed quadrate lobes at base of genital ligula (Figs. 143, 144). In the field, male *A. popoluca* have smaller postocular spots that are not confluent with the eye, and the pale middorsal stripes are more extensive, often attaining the apical 0.20 of S6 (Figs. 188, 189). In the female, the mesostigmal lobes occupy the medial 0.50 of the hind margin of the mesostigmal plate, and are large broadly upright foliate structures that are almost approximate. Most females of *A. popoluca* have mesostigmal lobes as shown in Fig. 123, but one female (Costa Rica: Braulio Carrillo National Park) has a strongly recurved lobe medially (Fig. 122c, d, e). It was collected with a male the appendages of which are typical for this species.

*Argia popoluca* is apparently a variable species. Calvert (1902) in his original description mentions four postquadrangular cells in the Fw, and most material we have examined from Mexico sustains Calvert's observation. Specimens from farther south generally have only three Fw postquadrangular cells. The extent of the middorsal blue stripe is also variable, extending for most of the dorsum on S3 variably through S7 (Figs. 188, 189)<sup>1</sup>.

**Remarks.** The small series (including holotype) of four males from Golfito was apparently exposed to

1. Garrison *et al.* (2003) examined the syntypes of *Argia variata* Navás, 1935, stating that "...*A. variata* is a *bona fide* species in the [*A.*] *gerhardi* [Calvert, 1909]/*nigrrior* [Calvert, 1909] group." Further examination of specimens of *A. popoluca* from over its entire range show that South American material previously referable to *A. variata* do not significantly differ from Central American material currently going under the name of *A. popoluca*. The genital ligula morphology of *A. variata* is the same as for Central American specimens, and all specimens differ from species (including type material) previously included within the *A. gerhardi*/*kokama*/*nigrrior* complex. Correspondingly, we consider *Argia variata* Navás, 1935, to be a junior synonym of *A. popoluca* Calvert, 1902.

excessive heat, causing the wing membrane and entire body to become excessively shiny and the colors poorly preserved.

**Habitat.** Small trickles within primary and secondary forests. On 31 May 2013, we attempted to locate this species at its type locality (2.8 mi E of Golfito) but were unsuccessful, probably due to overcast weather and intermittent precipitation. The area consisted of a small shaded stream within shaded forest, and no Odonata were seen. Specimens have been collected at elevations ranging from about 35 m (2.8 mi E of Golfito) to 275 m (2 km NE of Uvita), ranging from July (2.8 mi E of Golfito) to November (2 km NE of Uvita). Haber noted the following for two males and female collected at Finca Carolina: "[male & female] Perched on shrubs in sunny spot on high bank of tiny trickle down steep hillside" and [male taken in] "Light gap on high bank of tiny forest trickle down steep hillside".

**Distribution.** Known so far only from the southern Pacific side of Costa Rica, where it is sympatric with its similar-looking congener *A. popoluca* (Fig. 170).

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## APPENDIX. Comparative specimens of other *Argia* species examined in this study.

*Argia anceps* Garrison, 1996 (169 ♂, 37 ♀): MEXICO, Sonora State: 1 ♂, 1 ♀ (in tandem), Yecora, E on Route 16, near km 296, Rancho Cañada Ancha {28°26' N, 108°32' W, 1,460 m}, 21 vii 2006, S. W. Dunkle [FSCA]; Sinaloa State: 1 ♂, stream 44.9 mi NE of Concordia {23°33' N, 105°50' W, 2,029 m} 26 viii 1965, DRP leg. [FSCA]; 1 ♂ **paratype**, same data but stream 15.7 mi NE of Concordia {23°24' N, 105°56' W, 580 m} [FSCA]; Nayarit State: 1 ♂, Jumatán {21°38' N, 105°2' W, 360 m}, 25 viii 1980, R. Lopez leg. [UMMZ]; 4 ♂, 1 ♀, Palapita {21°26' N, 105°4' W, 620 m}, 5 xii 1979–27 viii 1980, R. Lopez leg. [UMMZ]; 2 ♂, 1 ♀, same data but 13 x 1981, A. Luis-Martinez leg. [UMMZ]; 1 ♂, 1 ♀, Tepic, 22. 3 miles SE {21°13' N, 104°56' W, 947 m}, 20 vii 1960 [CAS]; San Luis Potosi State: 1 ♂, Tierra Blanca, 11 km S of Tamazunchale {21°13' N, 98°41' W, 160 m}, 4 ix 1963, TWD leg. [FSCA]; Hidalgo State: 1 ♂, 1 km S of Río Calnali, 22 km E of Ixtalhuaco {20°53' N, 98°35' W, 900 m}, 23 vii 1992, TWD leg. [FSCA]; 2 ♂, same data but [RWG]; Puebla State: 1 ♂ **paratype**, 2 km N Molango, Laguna de Atezca {20°48' N, 98°44' W, 1,450 m}, 24 vii 1992, G. Harp leg. [RWG]; 1 ♂, same data but [RWG]; 1 ♂ **paratype**, same data but 1,450 m, 20 xi 1983, J. Peña leg. [RWG]; 1 ♂ **paratype**, Tecozautla, Río Tecozautla {20°31' N, 99°37' W, 1,730 m}, 14 ix 1992, R. Novelo leg. [RWG]; 1 ♂ **paratype**, stream Piedras Negras {20°23' N, 97°52' W, 240 m}, 25 x 1987, A. Gomez leg. [RWG]; 1 ♀ **paratype**, Puente Necaxa, highway 130, 5 mi NE Huauchinango {20°13' N, 98°1' W, 1,340 m}, 27 viii 1992, B. & C. Villegas leg. [RWG]; Jalisco State: 1 ♂ **paratype**, Sierra de Autlán {19°45' N, 104°20' W, 897 m}, 16 ix 1991, RWG leg. [RWG]; Michoacán State: 1 ♂, stream 3.9 miles N of Tuxpan {19°37' N, 100°28' W, 1,800 m}, 18 viii 1965, DRP leg. [FSCA]; Veracruz State: 2 ♂, Jalapa {19°32' N, 96°55' W, 1,381 m}, 2 vii 1941, H. S. Dyfas leg. [FSCA]; 1 ♂, 1 ♀, stream at Finca las Ánimas, 1 mile E of Jalapa {19°32' N, 96°51' W, 1,430 m}, 11 viii 1957, G. F. Beatty, III leg. [RWG]; 1 ♂, 1 ♀ **paratypes**, Parque Javier Clavijero, Jalapa {19°30' N, 96°56' W, 1,800 m}, 17 viii 1982, RWG & J. A. Garrison leg. [RWG]; 1 ♂, Municipio Teocelo, Puente Texolo {19°24'10" N, 96°59' W, 1,060 m}, 11 x 1980, A. Garces leg. [UMMZ]; 1 ♀, 5 miles N of Huatusco {19°15' N, 96°59' W, 1,318 m}, 13 viii 1963, H. V. Weems, Jr. leg. [FSCA]; 2 ♂, 2 ♀ **paratypes**, pond 28 km NE of Huatusco, by highway 66 {19°12' N, 96°47' W, 743 m}, 11 viii 1976, RWG & J. A. Garrison leg. [RWG]; 1 ♀ **paratype**, same data but [CSCA]; 2 ♂ **paratypes**, stream 4.2 miles N of Fortín de las Flores (18°57' N, 97°0' W, 1,250 m), 11 viii 1965, DRP & M. L. Paulson leg. [FSCA]; 1 ♂, 1 ♀ **paratypes**, Fortín de las Flores {18°54' N, 96°59' W, 1,008 m}, 27 vi 1963, R. E. Woodruff leg. [FSCA]; 5 ♂, 3 ♀ **paratypes** (two pairs in tandem), Río Metlac about 3.5 km WNW of Fortín de las Flores {18°54' N, 97°0' W, 1,000 m}, 10 viii 1976, RWG & J. A. Garrison leg. [RWG]; 1 ♂, 1 ♀ (in copula), same data but electric plant, 10 vii 1968, H. V. Weems leg. [FSCA]; 2 ♂, Posada Loma, Fortin de las Flores, small stream S of highway {18°54' N, 96°59' W, 1,008 m}, G. H. Beatty III leg. [FSCA]; 4 ♂ **paratypes**, stream 12.2 km E of Córdoba, by highway 150 {18°51' N, 96°47' W, 509 m}, 12 viii 1976, RWG & J. A. Garrison leg. [RWG]; 35 ♂, 1 ♀ **paratypes**, stream 6.9 km E of Córdoba, by highway 150 {18°51' N, 96°51' W, 628 m}, 1–13 viii 1976, RWG & J. A. Garrison leg. [RWG]; 1 ♂ **paratype**, same data but CSCA; 1 ♂, La Fraternidad, 17 km E of Córdoba, 22 ix 1983, RWG leg. [RWG]; 2 ♂, stream 2.4 mi W of Ciudad Mendoza {18°49' N, 97°13' W, 1,010 m}, 2 vii 1965, DRP leg. [FSCA]; 2 ♂, stream 6.7 mi N to Los Mangos {18°19' N, 95°5' W, 490 m}, 2 vii 1965, DRP leg. [FSCA]; Morelos State: 2 ♂ **paratypes**, Ixcatepec, Campamento Cammohmila (18°58'33" N, 99°4'47" W, 1,636 m), 16 x 1993, R. Novelo leg. [UNAM]; 1 ♂ **paratype**, same data but [RWG]; 1 ♂ **paratype**, Rt. 115 E. of Cuernavaca, near Tijaipa (18°55' N, 99°15' W, 1,483 m), 23 vi 1963, R. W. Woodruff leg. [FSCA]; 2 ♂, 1 ♀ **paratypes** (one pair in tandem), Balneario Itzamatlán, 5 km SW of Yauatepec {18°54' N, 99°1' W, 1,200 m}, 2 x 1983, RWG leg. [RWG]; 1 ♂

**paratype**, Cañón de Lobo, 19 km E of Cuernavaca {18°51' N, 99°7' W, 1,290 m}, 15 x 1986, E. Fisher leg. [RWG]; 1 ♂ **paratype**, same data but 1 x 1983, RWG leg. [RWG]; 1 ♂, 1 ♀ **paratypes**, Balneario on River S of Temixco {18°49' N, 99°13' W, 1,220 m}, 21 vii 1992, S. W. Dunkle leg. [RWG]; 2 ♂ **paratypes**, Río Sabinos, km 18.3 highway 95, 5 km S Acatlipa {18°48'15" N, 99°13'32" W, 1,100 m}, 14 x 1994, R. Novelo leg. [UNAM]; 1 ♂ same data but 21 vii 1992, KJT leg. [FSCA]; 2 ♂ **paratypes**, same data but [RWG]; 2 ♂ **paratypes**, Cocoyotla, about 5 km N on MX route 421, small clear tributary and adjacent field below dam (18°46'4" N, 99°27'26" W, 1,070 m), 23 vii 1992, W. F. Mauffray leg. [RWG]; 10 ♂, 3 ♀ **paratypes** (one pair in copula), Xochitepec, Balneario Campestre (18°45'53" N, 99°15'39" W, 1,100 m), 21 vii 1992, W. F. Mauffray leg. [FSCA]; 6 ♂, 2 ♀ **paratypes** (two pairs in copula), same data but [RWG]; 1 ♂, 1 ♀, Coalcomán, La Chichihua {18°44' N, 103°13' W, 1,127 m}, 2 iv 2005, R. Novelo & J. A. Gómez leg. [RWG]; 9 ♂, 2 ♀ (two pairs in tandem), La Fuente, Municipio of Jiutepec, 10 km W of Cuernavaca {18°15' N, 99°16' W, 1,300 m}, 17 ix–1 x1983, RWG leg. [RWG]; Guerrero State: 1 ♂ **paratype**, highway 55 between Taxco junction and Huajintlán, small sedimentary bottom stream {18°33' N, 99°34' W, 1,700 m}, 22 vii 1992, W. F. Mauffray leg. [FSCA]; Chiapas State: 2 ♂, stream 4.5 mi N Bochil {17°01' N, 92°52' W, 1,400 m}, 17 vii 1965, DRP leg. [FSCA]; 1 ♂, 1 ♀ **paratypes**, El Chorreadero, 24 km S of Tuxtla Gutiérrez {16°36' N, 93°5' W, 720 m}, 27 ix 1983, RWG leg. [RWG]; 1 ♂, 13 miles SW of Cintalapa {16°33' N, 93°52' W, 630 m}, 19 viii 1963, H. V. Weems, Jr. leg. [FSCA]; Oaxaca State: 1 ♂ **paratype**, 43 mi W of Tehuantepec, at pool of mountain stream {16°26' N, 95°51' W, 800 m}, 22 viii 1963, H. V. Weems, Jr. leg. [FSCA]; 1 ♂, Santa María Huatulco, La Palma, 5.3 km NE junction with road Salina Cruz-Santa Cruz Huatulco (15°48'59" N, 96°10'33" W, 80 m), 10 vii 2005, A. González & E. González leg. [UNAM]. BELIZE, Cayo Distr.: 1 ♂ **paratype**, Privassion Creek {17°2' N, 88°59' W, 290 m}, 10 xii 1992, T. Boomsma leg. [RWG]; 2 ♂, same data but 22 iii 1986, S. W. Dunkle leg. [FSCA]. GUATEMALA, Chimaltenango Dept.: 2 ♂, Río Guancalate in Antigua, close to posada Bellum {14°33' N, 90°44' W, 1,500 m}, R. W. Cruden leg. [UMMZ]; Guatemala Dept.: 2 ♂ **paratypes**, Laguna de Calderas near San Francisco de Sales and Volcán Pacaya {14°24' N, 90°35' W, 1,800 m}, 22 viii 1964, TWD leg. [FSCA]; Escuintla Dept.: 2 ♂, Escuintla, Finca El Salto {14°18' N, 90°47' W, 355 m}, 1 vii 1977, M. J. Westfall, Jr. leg. [FSCA]. EL SALVADOR, Santa Ana Dept.: 2 ♂, Hacienda Guameru, shaded stream in deep ravine surrounded by light woodland and agricultural land, at sunny sandy stream edge (14°21'38" N, 89°28'10" W, 520 m), 27 viii 2011, R. Behrstock leg. [RWG]; Francisco Morazán Dept.: 1 ♂, El Hatillo, 10 km N of Tegucigalpa {14°7' N, 87°9' W, 1,300 m}, 28 vi 1974, TWD leg. [FSCA]; La Libertad Dept.: 1 ♂, Quezaltepeque {13°49' N, 89°16' W, 440 m}, 5 vii 1963, M. Irwin & D. Q. Cavagnaro leg. [CAS]. HONDURAS, Olancho Dept.: Río Nance and small tributary to the NE, just W of Campamento {14°33' N, 86°40' W, 700 m}, 3 iii 1990, S. W. Dunkle leg. [FSCA]; El Paraíso Dept.: 2 ♂, El Rancho, between Zamorano and Tegucigalpa, small rocky stream {14°4' N, 87°3' W, 1,116 m}, 11 xii 1987, S. W. Dunkle leg. [RWG]; 2 ♂, same data but [FSCA]; 1 ♂, 1 ♀ **paratypes**, Danli {14°1' N, 86°34' W, 772 m}, 10 v 1966, J. Matta leg. [FSCA]. NICARAGUA, Matagalpa Dept.: 1 ♂, Hotel Selva Negra (12°59'58" N, 85°54'32" W, 1,270 m), 29 viii 2003, F. C. Sibley leg. [FSCA]. COSTA RICA, Guanacaste Prov.: 1 ♂, small stream on route 145 just E of Tilarán {10°27' N, 84°58' W, 531 m}, 27 ii 1987, S. W. Dunkle leg. [RWG]; 1 ♂, 1 ♀ same data but [FSCA]; San José Prov.: 2 ♂ **paratypes**, 1,153 m, 7 v 1960, R. B. Cumming leg. [FSCA]; 1 ♂ **holotype**, 1 ♀ **allotype**, 4 ♂, 2 ♀ **paratypes**, dump beside hotel Casa Holanda, San Pedro {10°2' N, 84°7' W, 1,284 m}, 9 viii 1979, RWG & J. A. Garrison leg. [USNM]; 1 ♂, 1 ♀ **paratypes** (in copula), San Pedro Montes de Oca, Quebrada los Negritos {9°56'23" N, 84°3'9" W, 1,200 m}, 5 viii 1983, E. A. Rojas M. leg. [RWG]; 2 ♂, Hacienda El Rodeo, 7 km W of Villa Colón (9°54'49" N, 84°16'10" W, 859 m), 28 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, same data but [CSCA]; 2 ♂, 2 ♀ **paratypes** (in copula), same data but 800 m, 10–13 vii 1990, TWD leg. [RWG]; 1 ♂ **paratype**, same data but [FSCA]; 1 ♂ pond and river at Juncuales, 1.2 mi SE of Desamparado {9°54' N, 84°4' W, 1,130 m}, 8 vii 1966, M. L. Paulson leg. [FSCA]; Puntarenas Prov.: 1 ♂ **paratype**, Macacona de Esparta {10°0' N, 84°37' W, 253 m}, 1 i–28 ii 1905, P. Biolley, Jr. leg. [FSCA]; Alajuela prov.: 1 ♂, Mina Alajuela {9°59' N, 84°20' W, 520 m}, 9 vii 1967, M. J. & D. N. Westfall leg. [FSCA]; 1 ♂, Turrucare, along Río Siquiáres {9°58' N, 84°19' W, 640 m}, 19 xii 1909, P.P. Calvert leg. [FSCA]; 1 ♂, The Butterfly Farm, La Guácima de Alajuela (9°56'38" N, 84°15'45" W, 757 m), 4 v 1991, J. Zloty leg. [RWG]; Cartago Prov.: 1 ♂ **paratype**, Juan Viñas, Río Reventazón (9°53' N, 83°45' W, 800 m), 11 vi 1962, TWD leg. [RWG]; 7 ♂, 3 ♀ **paratypes** (one pair in copula), Río Reventazón, SE of Turrialba, by highway 10 {9°53' N, 83°38' W, 561 m}, 10 viii 1979, RWG & J.A. Garrison leg. [RWG].

*Argia cupraurea* Calvert, 1902 (87 ♂, 37 ♀): GUATEMALA, Izabal Dept.: 6 ♂, 4 ♀, 4 mi SW of Puerto Matías de Galvez, 22 vi 1964, F. G. Thompson & D. A. Dean leg. [FSCA]; 3 ♂, 2 ♀, 8 mi SW of Puerto Matías de Galvez (15°35'46" N, 88°34'23" W, 46 m), 22–24 vi 1964, F. G. Thompson & D. A. Dean leg. [RWG]; 2 ♂, 1 ♀, same data but [FSCA]; 1 ♂, 7.3 mi NE of Quirigua, river (15°16' N, 89°5' W, 68 m), 8 vii 1964, F. G. Thompson leg. [FSCA]. HONDURAS, Atlántida Prov.: 1 ♀, Lancetilla, near Tela (15°47' N, 87°27' W, 30 m), 28 viii 1930, Honduras Expedition ANSP leg. [FSCA]; 2 ♀, Pico Bonito National Park, Río Zacate (15°41'35" N, 86°55'58" W, 35 m), 23 iv 2001, J. Machado leg. [FSCA]. NICARAGUA, Río San Juan Dept.: 1 ♂, 1 ♀, San Juan River, Refugio Bartola (10°58'12" N, 84°20'24" W, 30 m), 5 iv 2001, G. Grether leg. [RWG]. COSTA RICA, Alajuela Prov.: 1 ♂, 1 ♀, San Mateo, 9.1 km E (9°57'47" N, 84°26'57" W, 641 m), 18 vii 1963, D. M. Thompson leg. [RWG]; Limón Prov.: 5 ♂, 1 ♀ (one pair in tandem), Río Santa Clara, 1 km E of Guapiles, clear rocky stream and tributaries (10°13' N, 83°47' W, 268 m), 3 iii 1987, S. W. Dunkle leg. [RWG]; 2 ♂, 3 ♀ (two pairs in tandem), same data but stream through open marshy cow pasture near secondary forest on dirt road 1 km S of highway 32 between La Unión and Flores (10°12'17" N, 83°51'31" W, 287 m), 26 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 6 ♂, 6 ♀ (five pairs in tandem), same data but rocky river through secondary forest 1.5 km south of highway 32 between La Unión and Flores (10°12'3" N, 83°51'26" W, 279 m), 27 v 2013 [RWG]; 2 ♂, 2 ♀ (one pair in tandem), same data but [CSCA]; 2 ♂, 3 ♀ (two pairs in tandem) same data but rocky river through secondary forest on dirt road 4 km S of highway 32 between La Unión and Flores (10°10'57"

N, 83°51'30" W, 351 m) [RWG]; 2 ♂, 2 ♀, Río Herediana (10°7'11" N, 83°34'21" W, 194 m), 5 vi 1991, J. Zloty leg. [RWG]; 1 ♂, 2 ♀ (one pair in tandem), Río Parismina WNW of Iroquois, medium clear rocky river (10°11'40" N, 83°38'46" W, 78 m), 5 iii 1987, S. W. Dunkle leg. [RWG]; Puntarenas Prov., 3 ♂, 1 ♀, Villa Colón, 16 mi S of Palmar Norte (8°43'57" N, 83°10'30" W, 73 m), 3 vii 1967, O. S. Flint Jr. & M. A. Ortiz B. leg. [USNM]; 2 ♂, 1 ♀, Osa Peninsula near Rincón (8°42' N, 83°29' W, 13 m), 2 viii 1969, D. Schaaf leg. [USNM]; 1 ♂, same data but 25 ii 1968, J. Vandermeer leg. [UMMZ]; 1 ♂, same data but [RWG]; 1 ♂, 1 ♀, same data but above water of Agua Buena, 0.5 mi upstream of station, 4 iii 1968, J. Vandermeer leg. [UMMZ]; 2 ♂, 2 ♀ (in copula), San José Prov.: 1 ♀, Hacienda El Rodeo, 7 km W of Villa Colón (9°54'49" N, 84°16'10" W, 859 m), 28 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 2 ♂, 2 ♀ (in copula), 16 mi south of San Isidro (9°12'24" N, 83°38'21" W, 720 m), 2 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]. PANAMA, Panama Prov.: 8 ♂, 2 ♀, Ward's Nat. Sci. Estab. (9°3'49" N, 79°39'42" W) [RWG]; 5 ♂, 1 ♀, same data but 5 xii 1916 [RWG]; 1 ♂, forest road at Gaillard highway, at milepost 12, 7.4 km SE of Gamboa (9°4' N, 79°40' W, 75 m), 5 viii 1979, J. E. Hafernik leg. [RWG]; 1 ♂, Pipeline road, 31 iii 1970, E. S. Morton leg. [FSCA]; 1 ♂, 1 ♀ (in copula), same data but Río Agua Salud (9°6' N, 79°42' W, 78 m), 8–13 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [RWG]; 1 ♂, Pipeline road, Río Frijoles (9°12' N, 79°12' W), 12 v 1979, K. W. Knopf leg. [RWG]; 3 ♂, 1 ♀, Río Sardanilla (9°7'10" N, 79°35'27" W, 145 m), 5 xii 1916, E. B. Williamson leg. [RWG]; Oeste Prov.: 1 ♂, El Cacao, about 3 km W off unnamed road, shallow rocky stream (8°45'29" N, 80°2'37" W, 340 m), 20 v 2016, W. Mauffray leg. [FSCA]; Chiriquí Prov., 1 ♂, David {8°26' N, 82°26' W, 42 m}, 22 iv 1881–13 iii 1883, G. C. Champion leg. [BMNH]; 1 ♂, stream and nearby trail in dry forest, about 8 km southeast of Boquete (8°46'29" N, 82°25'55" W, 1,083 m), 28 i 2002, ACR leg. [ACR]; Darien Prov.: 1 ♂, 1 ♀ (in copula), Parque Nacional Darien, about 3 miles upstream from confluence of Río Tuira and Río Pucuro along Río Pucuro {8°14' N, 77°29' W, 110 m}, 17 ii 1985, J. Louton leg. [USNM]; 3 ♂, 1 ♀, Parque Nacional Darien, Río Perrecénege at Estación Rancho Frío (Pirre Station), 14 km S of El Real (8°2'24" N, 77°45'0" W, 200 m), 27–31 iii 2002, J. L. Hogue & F. Hertel leg. [RWG]. COLOMBIA, Antioquia Dept.: 1 ♂, 1 ♀, Remedios, Vereda La Cruz, Finca La Brillantina (6°53'28" N, 74°34'17" W, 450 m), 26 xii 2009, J. Cardona & C. Bota leg. [CEUA]; 1 ♂, 1 ♀, Cristalina {6°29' N, 74°50' W, 320 m}, 14 ii 1917, J. H. & E. B. Williamson leg. [UMMZ]; 2 ♂, 2 ♀, same data but 17 ii 1917 [UMMZ]; 2 ♂, 1 ♀, same data but [RWG]; 1 ♂, 1 ♀, same data but 20 ii 1917 [UMMZ]; 1 ♂, 1 ♀, same data but 20 ii 1917 [RWG]; Bolívar Dept.: 1 ♂, Bolívar {10°16' N, 75°28' W, 88 m}, 24 xii 1916, J. H. & E. B. Williamson leg. [UMMZ]; Cauca Dept.: 4 ♂, Tambo {2°44' N, 76°49' W, 1900 m}, i 1909 [UMMZ]; Chocó Dept.: 1 ♂, Acandi, Vereda Captain, Quebrada Tomas, secondary forest with 30% cover and high exposure (8°34'9" N, 77°19'24" W, 34 m), 15 xii 1997, C. Botero leg. [CEUA]; Huila Dept.: 1 ♂, Rivera, urban perimeter {2°47' N, 75°15' W, 600 m}, 24 vi 1997, M. García & U. Vidal leg. [TWD]; 1 ♂, Rivera, Los Cauchos (2°48'25" N, 75°17'50" W, 500 m), 12 viii 2012, E. A. Ussa Cristiano & E. R. Realpe leg. [RWG]; 1 ♂, 1 ♀, stream, 200 m by route 45 just west of Hobo (2°34'53" N, 75°27'24" W, 579 m), 12 viii 2012, E. A. Ussa Cristiano & E. R. Realpe leg. [UAC]; La Guajira Dept.: 1 ♂, Río Dulce, between Bolívar and Cincinatti {10°55' N, 72°50' W, 180 m}, 1 i 1917, E. B. Williamson leg. [UMMZ]; Magdalena Dept.: 8 ♂, 2 ♀, Santa Marta Mountains {11°6' N, 74°5' W, 1,370 m}, 1 i 1917, J. H. & E. B. Williamson leg. [RWG]; 8 ♂, 1 ♀, same data but [UMMZ]; Tolima Dept.: 5 ♂, Mariquita {5°12' N, 74°54' W, 450 m}, 4 ii 1917, J.H. & E.B. Williamson leg. [UMMZ]; Tolima Dept.: 5 ♂, 1 ♀ (one pair in tandem), Mariquita {5°12' N, 74°54' W, 450 m}, 4 ii 1917, J.H. & E.B. Williamson leg. [RWG]; 3 ♂, same data but 5 ii 1917, J. H. & E. B. Williamson leg. [RWG]; 8 ♂, 1 ♀ (one pair in tandem), same data but [UMMZ]; 1 ♂, Armero, malaise trap (4°57'53" N, 74°54'18" W, 339 m), 30 i 5 ii 1977, E. L. Peyton leg. [USNM]; Valle del Cauca Dept.: 2 ♂, Laguna El Darien (Calima) {3°55' N, 76°29' W, 1,620 m}, 15 iii 15 iv 1969, G. Wolffhugel leg. [FSCA]. VENEZUELA, Sucre State: 2 ♂, Puerto Viejo (village stream), Paria Peninsula (10°43'8" N, 62°28'45" W, 42 m), 4 iv 1995, O. S. Flint, Jr. leg. [USNM]; Táchira State: 1 ♂, 1 ♀, La Fria {8°13' N, 72°14' W, 155 m}, 16 iv 1920, J. H. & E. B. Williamson & W. H. Ditzler leg. [RWG]; 1 ♂, 1 ♀, Táchira (San Félix) {8°7' N, 72°15' W, 429 m}, 5 iv 1920, J. H. & E. B. Williamson & W. H. Ditzler leg. [RWG]; 1 ♂, 1 ♀, same data but [BMNH]; 1 ♂, 1 ♀, same data but 7 iv 1920 [UAM]; 1 ♂, 1 ♀, same data but 9 iv 1920 [RWG]; 1 ♂, San Félix, Quebrada La Resbalosa (8°6' N, 72°15' W, 350 m), 13 iv 1996, J. De Marmels leg. [MIZA]; Uracá (8°9' N, 72°15' W, 190 m) [MIZA]; Vargas State: 1 ♂, La Guaira (10°36' N, 66°56' W), 4 vii 1900, M. W. Lyon, Jr. & Robinson [USNM]; 1 ♀, same data but 27 vii 1900, M. W. Lyon, Jr. & Robinson [USNM]; 1 ♂, San Julián (Caraballeda) {10°37' N, 66°51' W}, 20 vii 1900, M. W. Lyon, Jr. leg. [USNM]; Yaracuy State: 12 ♂, 3 ♀, Aroa {10°26' N, 68°53' W, 434 m}, 13 iii 1920, J. H., E. B. Williamson & W. H. Ditzler leg. [RWG]; 2 ♂, 1 ♀, same data but [CSCA]; 22 ♂, 8 ♀, same data but [UMMZ]; 1 ♂, same data but 12 iii 1920 [RWG]; 1 ♂, 1 ♀ (in tandem), same data but 13 iii 1920 [RWG]; 1 ♂, Boquerón {10°34' N, 68°49' W, 91 m}, 16 iii 1920, J. H. & E. B. Williamson & W. H. Ditzler leg. [RWG]; 1 ♂, same data but [UMMZ]; 19 ♂, 6 ♀, same data but 21 iii 1920 [UMMZ].

*Argia cuprea* (Hagen, 1861) (31 ♂, 22 ♀): U.S.A., Texas State: Bandera Co.: 1 ♂, Los Maples State Natural Area (29°49' N, 99°36' W, 670 m), 1 v 1983, RWG leg. [UMMZ]; Real Co.: 1 ♂, Nueces River at Barksdale on route 55 (29°43'16" N, 100°2'4" W, 449 m), 13 vii 2001, N.von Ellenrieder leg. [CSCA]; 2 ♂, 1 ♀, same data but RWG leg. [RWG]; 2 ♂, 1 ♀, same data but 22–23 vii 1977 [RWG]; 1 ♂, 1 ♀, Nueces River, route 5, Campwood 29 vi 1985, JJD leg. [RWG]; Uvalde Co., 1 ♂, Frio river at rest area, just N of Garner State Park (29°36'17" N, 99°44'15" W, 427 m), 23 vii 1977, RWG leg. [RWG]. MEXICO, Nuevo León State: 1 ♂, Monterrey {25°40' N, 100°19' W, 540 m}, S. N. & W. C. Rhoads leg. [UMMZ]; 1 ♂, 1 ♀, El Diente, near Monterrey {25°38' N, 100°21' W, 520 m}, S. N. & M. C. Rhoads leg. [UMMZ]; 2 ♂, Las Adjuntas (25°22'13" N, 99°57'12" W, 341 m), 29 iv 1988, J. T. & D. A. Polhemus leg. [USNM]; 2 ♂, 2 ♀ (in tandem), Municipio de Santiago, Rancho Los Pinos (25°25'37" N, 100°9'6" W, 483 m), 3 vii 1987, M. J. Westfall, G. Luna & A. Contreras leg. [FSCA]; Tamaulipas State: 1 ♂, 0.5 miles E of Nuevo Morelos {22°32' N, 99°13' W, 256 m}, J. Graham & M. C. Johnston leg. [UMMZ]; San Luis Potosí State: 4 ♂, 3 ♀, Las Pozas de Xilitla (21°23'25" N, 98°59'45" W, 540 m), 23 viii 1999, RWG & J. A. Garrison leg. [RWG]; Queretaro de

Artega State: 1 ♂, stream near Ahuacatlán {21°7' N, 99°32' W, 1,830 m}, 29 vi 1990, KJT leg. [FSCA]; Veracruz State: 1 ♂, 1 ♀ (in copula), Estación de Biología Tropical Los Tuxtles, 27.9 km N of Catemaco (18°35'13" N, 95°4'23" W, 124 m), 4 v–5 iv 1981, C. M. & O. S. Flint, Jr. leg. [USNM]; 2 ♂, same data but 16–19 vii 1992, TWD leg. [FSCA]; 1 ♂, 4 ♀, vicinity Lagunas Azul and Emilia, Biología Tropical Los Tuxtles, about 30 km NE of Catemaco (18°25'10" N, 95°7'28" W, 343 m), 27 viii 1988, RWG leg. [RWG]; 1 ♂, 1 ♀ (in copula), same data but near Balzapote, Los Tuxtles area [USNM]; 1 ♂, Arroyo Claro, Sierra Santa Marta, 9 km E of Tobanca (18°23' N, 95°0' W, 1,100 m), 29 viii 1988, M. J. Westfall leg. [FSCA]; 2 ♂, same data but [RWG]; 1 ♂, 1 ♀, Arroyo near Playa Escondida, about 30 km NE of Catemaco (18°40'46" N, 95°9'16" W, 35 m), 27 vii 13 viii 1982, RWG leg. [RWG]; 1 ♂, between Laguna Catemaco and Volcán Santa Marta, about 1 mi E of Quetzalapan, 13 viii 1961, J. A. Harshaw leg. [FSCA]; Chiapas State: 2 ♂, 7.8 miles E of Pichucalco, road to Padilla at km. 66 (17°30'47" N, 93°12'17", 118 m), 27–28 vii 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 4 ♂, Route 195, 9 km N Ixhuatan {17 21' N, 93 0' W, 266 m}, 8 xii 1975, C. M. & O. S. Flint, Jr. leg. [USNM]; 4 ♂, 5 ♀, small stream below Palenque ruins (17 29'13" N, 92 1'5" W, 64 m), 24 ix 1983, RWG leg. [RWG]; 1 ♀, same data but 18 vii 1949, M. L. & C. J. Goodnight leg. [UMMZ]; 1 ♂, Cascada Mizolja, 20 km S of Palenque (17°20'3" N, 91°58'37" W, 94 m), 17–18 v 1981, C. M. & O. S. Flint Jr. leg. [USNM]; 1 ♂, 1 ♀, Pichucalco, at stream {17°7' N, 93°6' W, 42 m}, 4 iv 1967, D. R. & M. L. Paulson leg. [FSCA]; 1 ♂, 2 ♀, stream 4 mi W Pichucalco, 4 vii 1965, D. R. & M. L. Paulson leg. [FSCA]; 2 ♂, 2 ♀, La Revancha, about 30 km NE of Lagunas de Montebello {16°14' N, 91°34' W, 764 m}, 17–25 viii 1972, E. C. Welling M. vend. [UMMZ]; 1 ♂, same data but [RWG]. BELIZE, Toledo Dist.: 1 ♂, 1 ♀ (in tandem), Columbia Branch of San Pedro Columbia River, just N of San Pedro Columbia (16°16'13" N, 88°57'12" W, 30 m), 23 vii 1992, T. Boomsma leg. [RWG]; 2 ♂, 2 ♀, San Antonio, W at Crique Jute below the falls (16°14'9" N, 89°2'4" W, 118 m), 6 vi 1993, W. F. Mauffray leg. [FSCA]; 2 ♂, 2 ♀ # (in tandem), Río Blanco E of Río Blanco Village (16°13'47" N, 89°6'31" W, 252 m), 6 vi 1993, S. W. Dunkle leg. [FSCA]; 1 ♂, Blue Creek Village along Blue Creek (16°11'52" N, 89°2'32" W, 42 m), 7–8 i 1989, N. E. Adams leg. [USNM]; 1 ♂, 1 ♀, Punta Gorda {16°5' N, 88°48' W, 18 m}, v 1933, J. J. White leg. [UMMZ]. GUATEMALA, Izabal Dept.: 2 ♂, Puerto Matías de Galvez {15°42' N, 88°37' W, 7 m}, 14–15 viii 1965, P. J. Spangler leg. [USNM]; 1 ♂, 1 ♀, Las Escobas, 5 km SW of Puerto Matías de Galvez {15°41' N, 88°38' W, 56 m}, 4–16 viii 1971, TWD leg. [RWG]; 2 ♂, 3 ♀, same data but [FSCA]; 3 ♂, 1 ♀, same data but 4–16 viii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, 1 ♀, same data but 27 vi 1966 {15°41' N, 88°38' W, 56 m}, O. S. Flint, Jr. & M. A. Ortiz B. [USNM]; 1 ♂, 8 mi SW of Puerto Matías de Galvez {15°35'46" N, 88°34'23" W, 46 m}, 24 vi 1964, F. G. Thompson & D. A. Dean leg. [FSCA]; Alta Verapaz Dept.: 1 ♂, 1 ♀, Tamah (15°20' N, 90°10' W, 1,100 m), 16 xi 1963, E. C. Welling leg. [UMMZ]; Zacapa Dept.: 1 ♂, La Unión {14°58' N, 89°17' W, 850 m}, 25 xi 1972, E. C. Welling M., vend. [UMMZ]; Guatemala Dept.: 2 ♂, 1 ♀, El Fiscal (14°43'18" N, 90°23'30" W, 1,120 m), 3–6 vi 1909, E. B. Williamson leg. [RWG]. HONDURAS, Atlantida Dept.: 1 ♂, Tela, Lancetilla, rocky stream in heavily wooded valley {15°47' N, 87°27' W, 2 m}, 6 iv 1923, T. H. Hubbell leg. [UMMZ]; Cortés Dept.: 1 ♂, 1 ♀, Santo Tomas Camp, river behind camp, muddy, on low vegetation, Cusuco National Park (15°33'39" N, 88°17'53" W, 520 m), 14 vii 2011, M. Jocque leg. [RWG]; 1 ♀, San Pedro Sula {15°30' N, 88°2' W, 83 m}, 28 ii 1905, E. B. Williamson leg. [UMMZ].

*Argia extranea* (Hagen, 1861) (55 ♂, 16 ♀): U.S.A., Arizona State, Maricopa County: 1 ♂, Verde River, 4.5 miles N of Verde River Junction, on rock on edge of river {33°46' N, 111°39' W, 470 m}, 2 iv 1988, M. Chilos leg. [RWG]; Cochise County: 1 ♂, Hot Springs Canyon, about 2 miles NW of Hookers Hot Springs (32°21'10" N, 110°14'38" W, 1,250 m), 21 ix 1996, RWG leg. [RWG]; 1 ♂, Scotia Canyon, Coronado National Forest, Huachuca Mountains (31°26'57" N, 110°24'4" W, 1,821 m), 28 ix 2002, RWG & N. von Ellenrieder leg. [RWG]; 1 ♂, San Bernardino Ranch, 17 miles W of Douglas (31°20'13" N, 109°16'41" W, 1,153 m), 20 viii 1987, JJD leg. [RWG]; Pima County: 2 ♂, Sabino Canyon, Coronado National Forest (32°20'20" N, 110°47'10" W, 953 m), 5 viii 1992, RWG leg. [RWG]; 1 ♂, Molino Basin Forest Camp, Coronado National Forest, Santa Catalina Mountains (32°20'12" N, 110°41'24" W, 1,350 m), 24 vii 1984, J. A. Garrison & RWG leg. [RWG]; 2 ♂, same data but 1 viii 2000, RWG leg. [RWG]; 5 ♂, Box Canyon at bridge on road 62, Santa Rita Mountains, Coronado National Forest (31°47'56" N, 110°47'51" W, 1,328 m), 7 viii 1992, RWG leg. [RWG]; 2 ♂, same data but 28 viii 1998 [RWG]; Santa Cruz Co.: 2 ♂, Patagonia Mountains, Harshaw Creek (31°30'36" N, 110°40'56" W, 1,359 m), 23 viii 2002, J. A. Garrison, RWG & N. von Ellenrieder leg. [RWG]; 4 ♂, same data but [CSCA]; 1 ♂, Sycamore Canyon (31°25'37" N, 111°11'39" W, 1,196 m), 8 viii 1992, Van Dam Family leg. [RWG]; 3 ♂, same data but 27 ix 2002, RWG & N. von Ellenrieder leg. [CSCA]; 3 ♂, same data but [RWG]. MEXICO, Sonora State: 1 ♂, El Jaralito, W of Baviacora (29°31' N, 110°16' W, 631 m), 5 i 2002, S. Upson leg. [RWG]; Sinaloa State: 1 ♂, Potrerillos {25°26' N, 107°34' W, 245 m}, 22 viii 1964, M. E. Irwin leg. [RWG]; 1 ♀, La Guayanera, highway 40, near km 240 (23°24'16" N, 105°53'11" W, 940 m), 9 viii 1992, B. & C. Villegas leg. [RWG]; San Luis Potosí State: 1 ♂, Puente de Dios, NW of Tamasopo (21°55'49" N, 99°25'1" W, 42 m), 21 vii 1999, RWG & J.A. Garrison leg. [RWG]; Nayarit State: 1 ♂, Jalcocotán {21°28' N, 105°5' W, 508 m}, 27 viii 1980, R. Lopez leg. [RWG]; 1 ♂, Jumatán {21°38' N, 105°2' W, 360 m}, 1 xii 1979, R. Lopez leg. [RWG]; 2 ♂, Tepic {21°30' N, 104°54' W, 900}, 5 xi 1923, J. H. Williamson leg. [RWG]; 1 ♂, 1 ♀, Mina El Progreso Compostela {21°14' N, 104°53' W, 900 m}, 12 vi–28 vii 1932, A. E. Maas leg. [RWG]; 1 ♀, vicinity of Compostela, 21 ii 1934, A. E. Maas leg. [RWG]; 1 ♂, same data but ix 1934 [RWG]; Hidalgo State: 1 ♂, Río Calnali, 1 km S, 22 km E Ixtalhuaco {20°53' N, 98°35' W, 900 m}, 23 vii 1992, TWD leg. [RWG]; Jalisco State: 2 ♂, Rancho San Diego near Cocula {20°20' N, 103°48' W, 1,300 m}, 13 xi 1923, J. H. Williamson leg. [RWG]; 3 ♂, 4 ♀, Hacienda de San Marcos, near Villegas {20°13' N, 103°53' W, 1,500 m}, 22–23 xi 1923, J. H. Williamson leg. [RWG]; Michoacan State: 1 ♂, 1 ♀, El Sabino, 20 miles SSE of Uruapán {20°0' N, 102°19' W, 1,560 m}, 27 vii 1936, H. D. Thomas leg. [UMMZ]; Veracruz State: 1 ♂, 1 ♀ (in tandem), Municipio Teocelo, Puente Texolo (19°24'10" N, 96°59'12" W, 1,065 m), 16–17 viii 1982, J. A. Garrison & RWG leg. [RWG]; 1 ♂, same data but 26 viii 1988, RWG leg. [RWG]; 1 ♂, Texolo waterfall, Río Texolo near



Xico, 20 vii 1992, TWD leg. [RWG]; 1 ♂, Teocelo, Santa Rosa {19°23' N, 96°59' W, 1,220 m}, 22 ix 1980, R. Lopez leg. [UMMZ]; 10 ♂, 3 ♀, 4.9 km N of Coscomatepec, by highway 156 (19°55' N, 97°23' W, 1,370 m), 11 viii 1976, RWG leg. [RWG]; 8 ♂, 3 ♀, Río Metlac about 3.5 km WNW of Fortín de las Flores (18°54'27" N, 97°0'45" W, 1,000 m), 10–12 viii 1976, RWG & J. A. Garrison leg. [RWG]; 1 ♂, 1 ♀, stream 12.2 km E of Córdoba, by highway 150 (18°51'25" N, 96°47'33" W, 509 m), 12 viii 1976, RWG & J. A. Garrison leg. [RWG]; Morelos State: 1 ♂, Cuernavaca {18°56' N, 99°13' W, 1,569 m} [RWG]; 2 ♂, River on 421, 0.3 km N Pueblo Cocoyutla {18°45' N, 99°27' W, 1,045 m}, 23 vii 1992, S. W. Dunkle leg. [RWG]; 1 ♂, La Fuente, Municipio Jiutepec, 10 km W of Cuernavaca (18°15'21" N, 99°16'56" W, 1,300 m), 17 ix 1983, RWG leg. [RWG]; Guerrero State: 2 ♂, Rincón, 10 miles S of Chilpancingo {17°23' N, 99°30' W, 850 m}, 25 vi 1932, H. M. Smith & E. H. Taylor leg. [RWG]; 1 ♂, 20 miles S of Chilpancingo (17°17'27" N, 99°29'5" W, 756 m), 11 viii 1936, H. R. Roberts leg. [ANSP]; Oaxaca State: 1 ♀, Miahutlan {16°19' N, 96°36' W, 150 m}, 1 vii 1971, E. C. Welling M. leg. [RWG]; 2 ♀, Candelaria Loxicha {15°54' N, 96°31' W, 534 m}, 18 xi 1967, E. C. Welling M. leg. [RWG]; 1 ♂, same data but 18 viii 1973 [RWG].

*Argia fissa* Selys, 1865 (53 ♂, 22 ♀): COSTA RICA, San José prov.: 1 ♀, 13 km S of San Isidro de El General {9°16' N, 83°38' W, 550 m}, 21 v 1946, H. H. & F. M. Brown [UMMZ]; Puntarenas Prov.: 1 ♂, Guaymí Indian Reservation near Río Limón {8°59' N, 83°12' W, 610 m}, 31 iii 2011, F. C. Sibley leg. [FSCA]; 2 ♂, outlet San Joaquín wetlands, 1.5 miles E of San Vito {8°49' N, 82°57' W, 990 m}, 16 iii 2009, F. C. Sibley leg. [FSCA]; 1 ♂, Wilson Botanical Garden, 4 miles S of San Vito {8°47' N, 82°57' W, 1,220 m}, 21 iii 2009, F. C. Sibley leg. [FSCA]; 4 ♂, 2 ♀, 1 mile SSW of Agua Buena {8°43' N, 82°56' W, 1,040 m}, 21 iii 2009, F. C. Sibley leg. [FSCA]; 1 ♂, Campo Dos y Medio, stream along Villa Neily-San Vito road, 19 vii 1990, TWD leg. [RWG]; 2 ♂, same data but [FSCA]; 1 ♂, branch of Quebrada Seca, 3 km S of Agua Buena on highway 237, shallow rocky stream 5 m across (8°42'56" N, 82°56'25" W, 1,020 m), 10 iii 2009, W. Haber & F. Sibley leg. [RWG]; 1 ♂, 1 ♀, 5 km by road from Agua Buena on road to Ciudad Neily, forest stream {8°42' N, 82°56' W, 1,050 m}, 20 iii 2006, F. C. Sibley leg. [FSCA]; 1 ♂, 1 ♀ (in tandem), same data but 7 km, church pond, 17 viii 2009 [FSCA]. PANAMA, Chiriquí prov.: 1 ♂, Las Lagunas de Volcán, Volcán (8°46'11" N, 82°40'23" W, 1,500 m), 26 i 2014, L. Bezark leg. [RWG]; 1 ♀, same data but 13 iii 1975, E. S. Ross leg. [CAS]; 1 ♂, 1 ♀, Chiriquí Mountains, Boquete {8°46' N, 82°25' W, 1,083 m}, 8–24 iii 1923, F. M. Gaige leg. [RWG]; 2 ♂, 1 ♀, same data but [UMMZ]; 2 ♂, Potrerillos {8°39' N, 82°29' W, 664 m}, 8–18 ii 1935, J. W. MacSwain leg. [RWG]; 2 ♀, same data but [UMMZ]; 1 ♀, same data but 27 vi 1965, H. Real leg. [RWG]; Panamá Prov.: 2 ♂, Cerro Campana {8°43' N, 79°54' W, 180 m}, 21 i 1970, E. S. Morton leg. [RWG]; 1 ♂, small stream near Chica {8°39' N, 76°56' W, 200 m}, 21 viii 2012, T. W. & A. Donnelly & J. Michalski leg. [FSCA]; Coclé Prov.: 1 ♂, El Valle de Antón, 50 miles NW of Panama City {8°37' N, 82°8' W, 624 m}, i–viii 1947, N. L. H. Krauss leg. [RWG]; 2 ♀, same data but [UMMZ]; 1 ♀, same data but 27 i 1946, D. Jenkins leg. [UMMZ]; 1 ♀, same data but 7 ii 1937, A. Bliss leg. [FSCA]; 2 ♂, El Valle de Antón, hotel Valle Verde, streams on hotel property and pond across road (8°36'30" N, 80°7'8" W, 600 m), 21 v 2016, W. Mauffray leg. [FSCA]. COLOMBIA, Antioquia Dept.: 1 ♂, Quebrada Minitas, NW of San Felix {6°21' N, 75°36' W, 2,500 m}, 13 ii 1983, H. Gloger leg. [RWG]; 2 ♂, 2 ♀, La Estrella {6°10' N, 75°40' W, 2,220 m}, 30 v 1959, H. Gloger leg. [UMMZ]; 2 ♂, 2 ♀, same data but [RWG]; 1 ♂, mountainside near Medellín {6°14' N, 75°32' W, 1,170 m}, 23 vii 1938, N. A. Weber leg. [UMMZ]; 1 ♂, 1 ♀, near Porcecito on Río Porce, E of Medellín, along small stream with patches of bog with sedges {6°33' N, 75°14' W, 1,153 m}, 18–20 vii 1938, N. A. Weber leg. [UMMZ]; Cundinamarca Dept.: 2 ♂, 1 ♀, Fusa, Finca Beatrix {4°18' N, 74°23' W, 1,600 m}, 7 i 2012, M. Sánchez leg. [RWG]; 2 ♂, Santa Fe de Bogotá {4°36' N, 74°5' W, 2,620 m}, O. Staudinger vend. [UMMZ]; Valle del Cauca Dept.: 1 ♂, Anchicayá Dam {3°37' N, 76°54' W, 240 m}, 13–14 iii 1979, J. Monsalve leg. [FSCA]; 1 ♂, Yumbo, i 1909 [UMMZ]; Cauca Dept.: 11 ♂, Cauca {2°34' N, 76°46' W, 1,650 m} [UMMZ]; 3 ♂, 1 ♀, same data but [RWG].

*Argia fulgida* Navás, 1934 (69 ♂, 27 ♀) COSTA RICA: Guanacaste Prov.: 2 ♂, Estación Biológica Pitilla, 9 km S of Santa Cecilia, Parque Nacional Guanacaste (10°59' N, 85°25' W, 700 m), 3 x 1991–18 x 1991, C. Moraga leg. [INBIO]; Heredia Prov.: 3 ♂, 2 ♀, La Selva Biological Station, 10 km SW of Horquetas (10°18' N, 84°3' W, 600 m), 22 v 1988, CEH leg. [CEH]; 1 ♂, same data but 24 viii 1988, CEH leg. [CEH]; 1 ♂, 1 ♀, same data but 24 iii 1995–26 iii 1995, TWD & A. Ramírez leg. [TWD]; 1 ♂, 1 ♀, same data but [RWG]; 1 ♂ 1 ♀ [in copula], Braulio Carrillo National Park, Quebrada Cantarrana, 11 km ES E La Virgen, stream (10°21' N, 84°3' W, 320 m), 17 ii 2004, D. L. Wagner leg., DNA RG-35, GenBank # KY594031 [DRP]; 1 ♂, same data but 10 km SE La Virgen, vicinity of El Ceibo Ranger Station, along Quebrada Cascante, rocky stream (10°20' N, 84°5' W, 470 m), 15 ii 2003, D. L. Wagner leg. [DRP]; Limón Prov.: 1 ♂, Guápiles, in forest (10°12'57" N, 83°47'12" W, 268 m), 5 vii 1967, M. J. & D. N. Westfall leg. [FSCA]. PANAMA, 1 ♂, Veraguas Prov.: Santa Fe National Park, new road to Caribbean large stream near Santa Fe (8°33'1" N, 81°9'54" W, 450 m), 6 viii 2012, TWD leg. [FSCA]; 1 ♂, Santa Fe, ca 11 km NW of Alto de Piedra on P. N. Santa Fe Rd; tributary to Río Maluba, (8°31'53" N, 81°8'58" W, 750 m), 25 v 2016, W. Mauffray leg., DNA RG-45, GenBank # KY594034 [FSCA]; Colón Prov.: 2 ♂, Río Rita Arriba, Sierra Llorona Lodge, Río Llano Sucio (9°20'48" N, 79°46'23" W, 140 m), 24 viii 2012, J. Michalski leg., DNA RG-36, GenBank # KY594032 [TWD]; Panama prov.: 1 ♀, La Chorrera Falls (8°52'34" N, 7°46'36" W, 78 m), 13 iv 1912, A. Busck leg. [USNM]; 1 ♂, Cerro Azul (9°10' N, 79°25' W, 646 m), 25 ii 1970, E. S. Morton leg. [RWG]; 1 ♀, same data but [TWD]; Veraguas Prov., 1 ♂, near Santa Fe, Alto de la Piedra, stream 3 km WNW of Santa Fe (8°31'43" N, 81°8'22" W, 700 m), 11 vi 2010, TWD leg. DNA RG-63, GenBank # KY594036 [TWD]; 1 ♂, about 11 km NW of Alto de Piedra on N.P. Santa Fe Road, tributary to Río Maluba (8°31'53" N, 81°8'58" W, 750 m), 25 v 2016, W. Mauffray leg. [FSCA]; 1 ♂, same data but [RWG]. COLOMBIA, Boyaca Dept.: 1 ♂ **holotype**, Muzo {5°32' N, 74°6' W, 800 m}, vii 1918 [MNHN]; Valle del Cauca Dept.: 1 ♂, San José, Río Dagua {3°51' N, 76°52' W, 180 m}, v 1909 [UMMZ]. ECUADOR, Pichincha Prov.: 1 ♂, 1 ♀ (in tandem) road from highway to Silanche Bird Sanctuary, 10 km NW of Pedro Maldonado; shallow forest stream with gravel and silt bottom, (0°7'11 N, 79°8'12" W, 200 m) 3

ii 2012, WAH & Fred Morrison leg., female: DNA RG-34, GenBank # KY594030; male DNA RG-46, GenBank # KY594035 [RWG]; Esmeraldas Prov.: 1 ♂, Urbina, 36.5 km NW of Lita on San Lorenzo highway, pools, seeps and stream (0°59' N, 78°40' W, 340 m), 3 ii 1997, W. Mauffray leg. [FSCA]; Manabi Prov.: 1 ♂, Cojimies {0°22' N, 80°2' W}, iii 1949, W. Clarke-MacIntyre leg. [RWG]; 2 ♂, Palmar {0°56' S, 80°14' W, 200 m}, 25 iv 1941, D. B. Laddey leg. [UMMZ]; 1 ♂, 1 ♀ [RWG]; Santo Domingo Tsáchilas Prov.: 5 ♂, 3 ♀, Santo Domingo de los Colorados {0°15' S, 79°9' W, 604 m}, 1–28 ix 1940, D. B. Laddey leg. [UMMZ]; 2 ♂, 2 ♀, same data but [CSCA]; 2 ♂, 2 ♀, same data but [RWG]; 1 ♂, 1 ♀, same data but Hacienda La Lorena, 21–28 ii 1941 [UMMZ]; 1 ♂, same data but [RWG]; 7 ♂, 6 ♀, same data but Rio Pove, 27 ix 1940 [UMMZ]; 4 ♂, 2 ♀, same data but [RWG]; Pastaza Prov.: 1 ♂, Puyo {1°28' S, 77°59' W, 1,000 m}, 30 iv 2009, T. & K. Miyashita leg. [RWG]; Bolivar Prov.: 1 ♂, tributary to rocky stream 5 km E of Caluma, Gauranda road (1°35'39" S, 79°13'51" W, 480 m), 5 iii 2010, JJD leg., DNA RG-33, GenBank # KY594029 [JJD]; 1 ♂, stream 5 km east of Caluma (1° 35'39" S, 79° 13'51" W, 480 m), 5 iii 2010, J. Johnson leg., DNA RG-37, GenBank # KY594033 [JJ]; Los Ríos Prov.: 1 ♂, 4–5 iii 1938, W. Clarke-MacIntyre leg. [UMMZ]; 1 ♂, same data but [RWG]; 7 ♂, 3 ♀, Playas de Juan Montalvo, near Balzapamba (1°41' S, 79°17' W, 30 m), 28 ii–17 iv 1938, W. Clarke-MacIntyre leg. [RWG]; 1 ♂, same data but 31 vii 1941 [RWG]; El Oro Prov.: 2 ♂, 1 ♀, Piedras {3°38' S, 79°55' W, 300 m}, 3–4 vii 1941, D. B. Laddey leg. [UMMZ]; 2 ♂, Portovelo (3°43' S, 79°37' W, 650 m), 1–29 vii 1941, D. B. Laddey leg. [RWG]; 1 ♂, Buenaventura, Río Principal (3°39'22" S, 79°46'24" W, 329 m), 19 vi 2016, A. Cordero leg., DNA RG-64, GenBank # KY594037 [RWG].

*Argia oenea* (Hagen in Selys, 1861) (341 ♂, 125 ♀): U.S.A., Arizona State, Yavapai Co.: 1 ♂, Fossil Creek, road 502 S of Fossil Creek road, Coconino National Forest (34°23'42" N, 111°39'1" W, 1,065 m), 2 viii 1992, RWG leg. [RWG]; 1 ♂, Tangle Creek Administration Site, Tonto National Forest (34°8'0" N, 111°46'25" W, 819 m), 1 viii 1992, C. Fujita leg. [RWG]; Maricopa County: 1 ♂, Seven Springs Campground, about 12 miles N of Carefree, Tonto National Forest (33°58'0" N, 111°51'53" W, 1,012 m), J. A. Garrison & RWG leg. [RWG]; 20 ♂, 1 ♀, same data but 29 vii 1987, RWG leg. [RWG]; 1 ♂, same data but 20 vi 1987, RWG leg. [RWG]; 15 ♂, 3 ♀ (two pairs in tandem), same data but 26 ix 1988 [RWG]; 1 ♂, 1 ♀ (in tandem), same data but 4 ♂, 3 ♀ (three pairs in tandem), same data but 1 viii 1992 [RWG]; 1 ♂, same data but [UAM]; 12 ♂, 11 ♀, same data but 12 viii 1995 [RWG]; 1 ♂, 1 ♀, Rackensack Canyon at Camp Creek, on Cave Creek road, 12 miles NE of Carefree (33°54'7" N, 111°48'54" W, 995 m), 8 viii 1992, C. Fujita leg. [RWG]; 8 ♂, 3 ♀, Cave Creek at Ocotillo road (33°50'37" N, 111°57'45" W, 619 m), 13 viii 1995, RWG leg. [RWG]; Graham County: 4 ♂, 1 ♀, Bonita Creek (32°55'44" N, 109°29'42" W, 1,011 m), 29 ix 2002, RWG & N. von Ellenrieder leg. [RWG]; 5 ♂, 2 ♀, same data but [CSCA]; 3 ♂, 2 ♀, same data but J. A. Garrison, N. von Ellenrieder & RWG leg. 18 viii 2002 [RWG]; 5 ♂, 2 ♀, same data but [CSCA]; Cochise County: 5 ♂, 1 ♀ (one pair in tandem), Hot Springs Canyon, about 2 miles NW of Hookers Hot Springs (32°21'10" N, 110°14'38" W, 1,250 m), 20–21 ix 1996, RWG leg. [RWG]; 3 ♂, same data but 10 viii 1997, RWG, J. A. & P. A. Garrison leg. [RWG]; 1 ♂, Muleshoe Ranch, Bass Creek, Hot Springs (32°21'10" N, 110°15'26" W, 1,196 m), 17 viii 2002, J. A. Garrison, N. von Ellenrieder & RWG leg. [CSCA]; 1 ♂, same data but [RWG]; Pima County: 2 ♂, Sabino Canyon, Coronado National Forest (32°20'20" N, 110°47'10" W, 953 m), 5 viii 1992, RWG leg. [RWG]; U.S.A., Texas State, Presidio County: 1 ♂, Chinati Hot Springs Resort N of Riodosa (30°2'18" N, 104°35'58" W, 1,063 m), 12 ix 2005, J. C. Abbott leg. [RWG]. MEXICO, Baja California Sur State: 2 ♂, La Purísima {26°11' N, 112°4' W, 85 m}, 12 x 1923, J. H. Williamson leg. [UMMZ]; 9 ♂, 1 ♀, San José de Comondu (26°3' N, 111°49' W, 260 m), 10–12 x 1923, J. H. Williamson leg. [UMMZ]; 1 ♂, same data but [FSCA]; 4 ♂, same data but [RWG]; 1 ♂, same data but [RWG]; 1 ♂, stream 14 km W of highway 1 on road to San Javier, SW of Loreto (25°58'32" N, 111°26'10" W, 165 m), 31 viii 1985, RWG & J. A. Garrison leg. [RWG]; 4 ♂, 1 ♀ (one pair in tandem), same data but 5 x 1984 [RWG]; 1 ♂, Las Parras, about 18 km W of highway 1 on route to San Javier, SW of Loreto (25°58'2" N, 111°29'20" W, 442 m), 1 ix 1985, RWG leg. [RWG]; Nuevo León State: 1 ♂, Monterrey, Arroyo Elizondo {25°36' N, 100°18' W, 843 m}, 2 vii 1987, M. J. Westfall, Jr. & H. Quiroz leg. [FSCA]; 2 ♂, S of Monterrey, Río Elizondo {25°34' N, 100°15' W, 630 m}, 19–20 vi 1965, O. S. Flint, Jr. leg. [USNM]; Tamaulipas State: 1 ♂, Ciudad Victoria {23°44' N, 99°8' W, 320 m}, i 1903, S. N. Rhoads leg. [USNM]; Sinaloa State: 1 ♂, 2 ♀, stream at km 265 on highway 40, E of Mazatlan {23°14' N, 106°7' W, 72 m}, 12 vii 1976, S. W. Dunkle leg. [RWG]; 1 ♂, same data but 30 vi 1976 [FSCA]; Nayarit State: 2 ♂, San Blas, stream 18.1 mi NE {21°39' N, 105°6' W, 58 m}, 26 viii 1965, DRP leg. [FSCA]; 7 ♂, 1 ♀, Jumatán {21°38' N, 105°2' W, 360 m}, 28 ix 1979–22 xi 1980, R. Lopez leg. [UMMZ]; 1 ♂, 1 ♀, same data but 28 iii 1981, J. Morales leg. [UMMZ]; 2 ♂, same data but 14 vii 1981, P. Escalante leg. [UMMZ]; 1 ♂, 1 ♀, Mecatán {21°32' N, 105°7' W, 300 m}, 9 ix 1980, E. González-Soriano leg. [FSCA]; 5 ♂, Río Tepic, on rocks protruding in rapids {21°30' N, 104°54' W, 900 m}, 5 8 xi 1923, J. H. Williamson leg. [UMMZ]; 1 ♂, same data but [RWG]; 1 ♂, La Bajada {21°30' N, 105°9' W, 398 m}, 15 iii 1981, E. González & R. Lopez leg. [RWG]; 1 ♂, La Palma {21°29' N, 105°11' W, 30 m}, 14 iii 1981, E. González & R. Lopez leg. [RWG]; San Luis Potosí State: 1 ♂, 1 ♀, Huichihuayan {21°28' N, 98°58' W, 100 m}, 4 vi 1967, O. S. Flint, Jr. leg. [USNM]; 1 ♂, same data but 23 vi 1990, KJT leg. [FSCA]; 1 ♂, 1 ♀ (in copula), 5 km S of Xilitla turnoff, 30 km N of Tamazunchale {21°21' N, 99°2' W, 100 m}, 5 ix 1963, TWD leg. [FSCA]; 1 ♂, 1 ♀ (in copula), Palictla, N of Tamzunchale {21°17' N, 98°47' W, 180 m}, 25 vi 1965, O. S. Flint, Jr. leg. [USNM]; 2 ♂, 1 ♀, same data but 4 vi 1967, O. S. Flint, Jr. [USNM]; 1 ♂, 1 ♀ (in tandem), same data but 28 vi 1990, KJT leg. [FSCA]; 4 ♂, 2 ♀, stream 20.5 miles NW of Tamazunchale, 90 m, 26 vi 1965, DRP & M. L. Paulson leg. [FSCA]; 2 ♂, 2 ♀, 6 miles N of Tamazunchale, 240 m, 4 ix 1957, DRP & M. L. Paulson leg. [FSCA]; 1 ♂, stream at Palitla, 5.5 NW of Tamazunchale, 19 vi 1966 DRP & M. L. Paulson leg. [FSCA]; 1 ♀, Tamazunchale {21°16' N, 98°47' W, 180 m}, 22 xi 1946, E. C. van Dyke & E. S. Ross leg. [CAS]; Jalisco State: 1 ♂, Guadalajara {20°40' N, 103°20' W, 1,552 m}, 16 ix 1903, J. F. McClendon leg. [USNM]; 1 ♂, km 155.1, ruta 200 Melaque-Puerto Vallarta, 25 vii 1994, E. González, R. Mendoza & A. Godínez leg. [FSCA]; 2 ♂, 1 ♀, La Toma, spring 1.9 miles NW and 1.2 miles NE of Tequila, 1, 130 m}, 25 viii 1965, DRP leg.

[FSCA]; 9 ♂, Rancho San Diego near Cocula {20°20' N, 103°48' W, 1,300 m}, 13–15 xi 1923, J. H. Williamson leg. [UMMZ]; 4 ♂, same data but [RWG]; 4 ♂, 1 ♀, Lake Chapala region {20°7' N, 102°52' W, 1,600 m}, 2–5 xii 1923, J. H. Williamson leg. [UMMZ]; 1 ♂, same data but [USNM]; 2 ♂, same data but [RWG]; 3 ♀, about 4 km SW of La Huerta at km 1104–1106, shallow clear running water {19°27' N, 104°39' W, 500 m}, 30 viii 1966, R. W. Cruden leg. [UMMZ]; Hidalgo State: 3 ♂, Tecozautla, Río Tecozautla (20°31'12" N, 99°37'31" W, 1,730 m), 14 ix 1992, R. Novelo leg. [RWG]; Veracruz State: 1 ♀, Parque Javier Clavijero, Jalapa (19°30'51" N, 96°56'44" W, 1,800 m), 17 viii 1982, RWG & J. A. Garrison leg. [RWG]; 1 ♂, Chavarrillo {19°25' N, 96°48' W, 940 m}, iv 1899, O. S. Barrett leg. [USNM]; 2 ♂, Puente Nacional, Carretera Jalapa to Veracruz on route 125 {19°19' N, 96°29' W, 60 m}, 21 ii 1964, R. D. Coyler leg. [FSCA]; 2 ♂, same data but 31 vii 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, 1 ♀ (in tandem), same data but 11 vii 1987, M. J. Westfall leg. [FSCA]; 1 ♂, Dos Rios, route 140 km 347 {18°56' N, 97°2' W, 1,200 m}, 22 vii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 8 ♂, 3 ♀, stream 6.9 km E of Cordoba by highway 150 {18°51' N, 96°51' W, 628 m}, 12 viii 1976 RWG & J. A. Garrison leg. [RWG]; 1 ♂, La Fraternidad, 17 km E of Cordoba (18°51'56" N, 96°51'11" W, 627 m), 22 ix 1983, RWG leg. [RWG]; 1 ♂, 1 ♀, stream 7.6 km E of Cordoba by highway 150 {18°53' N, 96°47' W, 580 m}, 13 viii 1965, DRP leg. [FSCA]; 2 ♂, 1 ♀ (one pair in copula), Cuitlahuac {18°49' N, 96°44' W, 390 m}, 24–25 vii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, Río Otapa, 8 km S of La Tinaja {18°41' N, 96°26' W, 90 m}, 13 viii 1976, RWG & J. A. Garrison leg. [RWG]; 2 ♂, Arroyo near Playa Escondida, about 30 km NE of Catemaco (18°40'46" N, 95°9'16" W, 35 m), 23 vii–13 viii 1982, RWG leg. [RWG]; 2 ♂, 2 ♀, Río Tacolapan, route 180, km 551 {18°39' N, 95°32' W, 5 m}, 25–26 vii 1966, O.S. Flint, Jr. & M.A. Ortiz B. leg. [USNM]; 4 ♂, 1 ♀, Río Maquinas, Villa Cariño (18°37'27" N, 95°5'31" W, 18 m), 13–15 v 1981, C. M. & O. S. Flint, Jr. [USNM]; 4 ♂, 4 ♀, same data but 14 vi 2009, RWG & N. von Ellenrieder leg. [RWG]; 1 ♂, Río Michapa, affluent of Río San Juan, at km 212, route {18°34' N, 95°19' W, 174 m}, 23 ix 1983, RWG leg. [RWG]; 1 ♂, Lago Escondido and inlet, NW of Sontecomapán {18°33' N, 95°3' W, 18 m}, 5 xii 1975, C. M. & O. S. Flint, Jr. [USNM]; 1 ♂, Río La Palma, Sontecomapán, near Los Tuxtlas Biological Station, 7–14 v 1981, C. M. & O. S. Flint, Jr. leg. [USNM]; 1 ♀, 8.2 mi N Florida, SW Santiago Tuxtla {18°27' N, 95°18' W, 266 m}, 28 vi 1961, J. A. Harshaw leg. [FSCA]; 1 ♂, 1 ♀ (in tandem), stream 4.2 km E of Sontecomapan {18°25' N, 95°7' W, 346 m}, 16 viii 1976, RWG & J. A. Garrison leg. [RWG]; 1 ♂, near Balzapote, Los Tuxtlas area {18°25' N, 95°7' W, 343 m}, 15 v 1981, C. M. & O. S. Flint, Jr. leg. [USNM]; 1 ♂, vicinity Lagunas Azul and Emilia, Estación de Biología Tropical Los Tuxtlas, about 30 km NE of Catemaco (18°25'12" N, 95°6'36" W, 600 m), 7–14 viii 1982, RWG leg. [RWG]; 1 ♂, 2 km W of Las Cabañas, Los Tuxtlas area {18°19' N, 95°4' W, 690 m}, 4–7 v 1981, C. M. & O. S. Flint, Jr. leg. [USNM]; Morelos State: 2 ♂, Lagunas Zempoala National Park {19°3' N, 99°18' W, 2,800 m}, 10–11 vii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 2 ♂, 1 ♀, small clear flowing stream 1.6 km S of Pueblo Cocoyotla on highway 421 (18°46'4" N, 99°27'26" W, 1,070 m), 22 vii 1992, W. F. Mauffray leg. [FSCA]; 1 ♂, same data but KJT leg. [FSCA]; 2 ♂, same data but S. W. Dunkle leg. [FSCA]; 1 ♂, Balneario Xochitepec, km 19.5, Temixco, 7 km from Acetlipa {18°45' N, 99°15' W, 1,100 m}, 12–14 vii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 2 ♂, Río Amacuzac at Tehuixtla and stream at Balneario Las Palmas (18°32'51" N, 99°16'13" W, 866 m), 20 vii 1992, S.W. Dunkle leg. [RWG]; 1 ♂, 1 ♀, same data but [FSCA]; 4 ♂, same data but JJD leg. [RWG]; 1 ♂, 2 ♀, same data but W. F. Mauffray leg. [FSCA]; Guerrero State: 1 ♂, MX-55 between Taxco junction and Huajintlán, small sedimentary bottom stream {18°33' N, 99°34' W, 1,700 m}, 22 vii 1992, W. F. Mauffray leg. [FSCA]; 2 ♂, 1 ♀ (one pair in copula), Route C.P. 95 km 162, near Iguala {18°18' N, 99°30' W, 860 m}, 15 vii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Oaxaca State: 2 ♂, San Mateo Yetla, 3 km S of Valle Nacional {17°45' N, 96°18' W, 128 m}, 25 v 1981, C. M. & O. S. Flint, Jr. leg. [USNM]; 2 ♂, stream 14 miles E of El Camarón {16°29' N, 95°47' W, 850 m}, 26 viii 1967, DRP & M. L. Paulson leg. [FSCA]; 2 ♂, Route 190, km 698, near El Coyul {16°29' N, 95°53' W, 19 m}, 11 vii 1966, O. S. Flint, Jr. & M. A. Ortiz, B. leg. [USNM]; 2 ♂, 1 ♀ (one pair in tandem), route 190, km 717–718, Puente los Pilettes, rocky stream with some pools {16°24' N, 95°24' W, 200 m}, 15 viii 1966 [UMMZ]; 2 ♂, Route 190, km 934, Puente Las Minas {16°23' N, 94°8' W, 190 m}, 9 vii 1966, O. S. Flint, Jr. & M. A. Ortiz, B. leg. [USNM]; 1 ♀, Candelaria Loxicha {15°55' N, 96°29' S, 500 m}, 26 viii 1972 [UMMZ]; 1 ♂, same data but 5.3 km NE of La Palma (15°48'59" N, 96°10'33" W, 80 m), 10 vii 2005 [UNAM]; 9 ♂, 4 ♀, Santa María Huatulco, Arroyo El Arenoso (15°47'59" N, 96°9'47" W, 96 m), 6 vii 2005, A. & E. González leg. [UNAM]; 2 ♂, same data but 6.7 km SW of Puente Arroyo Xuchitl (15°46'46" N, 96°12'31" W, 80 m), 9 vii 2005 [UNAM]; 5 ♂, 3 ♀, same data but Puente Arroyo Guajiniquil (15°46'22" N, 96°14'5" W, 116 m), 4 5 ix 2005, E. González leg. [UNAM]; 1 ♂, in ravine at Finca La Concordia near Pochutla {15°44' N, 96°27' W, 151 m}, 2 iv 1933, C. V. Morton leg. [USNM]; Chiapas State, 1 ♂, Route 195, 9 km N Ixhuatan {17°21' N, 93°0' W, 266 m}, 8 xii 1975, C. M. & O. S. Flint, Jr. leg. [USNM]; 2 ♂, Route 190, km 1024, beyond Cintalapa {16°41' N, 93°40' W, 500 m}, 6 viii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 4 ♂, 1 ♀, Santa Isabel, route 35, S of Tierra y Libertad {16°23' N, 93°51' W, 680 m}, 9 xii 1975, C. M. & O. S. Flint, Jr. leg. [USNM]; 2 ♂, route 185, km 135, near Arriaga {16°15' N, 93°53' W, 80 m}, 9 vi 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 62 ♂, 30 ♀, La Revancha, about 30 km NE of Lagunas de Montebello {16°14' N, 91°34' W, 764 m}, 10 viii–5 ix 1972 [UMMZ]; 2 ♂, 1 ♀, same data but [CSCA]; 6 ♂, 1 ♀, same data but [RWG]; 2 ♂, 2 ♀, Puente Los Horcones, near Tonala, route 200, km 46 {16°0' N, 93°40' W, 80 m}, 9 vi 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, 1 ♀ (in copula), Río Urbina, 4.2 miles NW of Pijijiapan {15°43' N, 93°16' W, 46 m}, 1 viii 1965, DRP leg. [FSCA]; 1 ♂, 2 ♀ (one pair in copula), Route 200, km 141, Arroyo Viejo, 28.6 mi S of Puente Pijijiapan {15°26' N, 92°52' W, 60 m}, 7 vii 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 3 ♂, 1 ♀, Río Naranjo, 16.9 miles NW Huixtla, 31 vii 1965, DRP leg. [FSCA]. BELIZE, Orange Walk Dist.: 1 ♂, forest stream at Chan Chich Lodge, W of Gallon Jug (17°32'16" N, 89°6'12" W, 119 m), 16 iii 2008, R. A. Behrstock leg. [RWG]; Cayo Dist.: 1 ♂, 1 ♀ (in tandem, ovipositing), small stream 3 miles W of Ontario Village on Western highway, narrow shady riffles and wider pools {17°13' N, 88°55' W, 54 m}, 20 iii 1986, S. W. Dunkle leg. [FSCA]; 1 ♂, 1 ♀, river 17 miles SE of Belmopan on Hummingbird highway (17°8'57" N, 88°42'34" W, 59 m), 31 v 1993, S. W. Dunkle leg.

[FSCA]; 1 ♂, pools by Río On Creek on Chiquibul Road, N of Augustine {16°59' N, 88°58' W, 442 m}, 10 xii 1992, T. Boomsma leg. [RWG]; 1 ♂, Little Vaquero Creek on Chiquibul Road, N of Augustine, mostly in granite bedrock, also small tributary through grass {16°53' N, 89°0' W, 568 m}, 22 iii 1986, S. W. Dunkle leg. [FSCA]; 1 ♂, 12 km SW of Augustine {16°50' N, 89°3' W, 560 m}, 27 v 1986, P. Spangler & Faitoute leg. [USNM]; 1 ♂, 1 ♀ (in tandem), stream 21.5 miles SE of Belmopan on Hummingbird highway, 31 v 1993, S. W. Dunkle leg. [FSCA]; Stann Creek Dist.: 1 ♀, Hummingbird highway, about 6 km NW of Middlesex (17°6' N, 88°37' W, 180 m), 30 iii 1991, J. Louton leg. [USNM]; Toledo Dist.: 1 ♂, Río Blanco E of Río Blanco Village {16°13' N, 89°6' W, 252 m}, 6 vi 1993, S. W. Dunkle leg. [FSCA]; 1 ♂, Blue Creek Village {16°11' N, 89°2' W, 42 m}, 10 vi 1981, D. H. Messersmith & W. E. Steiner leg. [RWG]; 1 ♂, same data but [USNM]. GUATEMALA, Baja Verapaz Dept.: Izabal Dept.: 1 ♂, 4 mi SW of Puerto Matías de Galvez, 22 vi 1964, F. G. Thompson & D. A. Dean leg. [FSCA]; 1 ♂, 8 mi SW of Puerto Matías de Galvez {15°35' N, 88°34' W, 46 m}, 24 vi 1964, F. G. Thompson & D. A. Dean leg. [FSCA]; 1 ♂, Route 17, km 123.7, Los Encuentros {15°3' N, 90°12' W, 1,300 m}, 25–26 vi 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Zacapa Dept.: 1 ♂, 1 ♀, Gualán {15°6' N, 89°21' W, 138 m}, 20–22 i 1905, E. B. Williamson leg. [USNM]; 1 ♂, same data but 12 vi 1905 [USNM]; 1 ♂, 1 ♀, same data but [UMMZ]; El Progreso Dept.: 2 ♂, Río Hondo, San Agustín Acasaguastlán {14°56' N, 89°58' W, 300 m}, 11 21 viii 1965, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, 1 ♀ (in copula), Estancia de La Virgen {14°56' N, 89°53' W, 320 m}, 11–12 viii 1965, O. S. Flint, Jr. & M. A. Ortiz B. [USNM]; 2 ♂, Route 17, km 97, near Aldea Marajuma {14°55' N, 90°6' W, 320 m}, 26 vi 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Chiquimula dept.: 2 ♀, near Tierra Colorada {14°34' N, 89°20' W, 800 m}, 19 vii 1962, TWD leg. [FSCA]; 2 ♂, Padre Miguel {14°34' N, 89°27' W, 889 m}, 19 viii 1965, O. S. Flint, Jr. & M.A. Ortiz B. leg. [USNM]; Suchitepequez Dept.: 2 ♂, 2 ♀ (in copula), Cuyotenango, Finca San Rafael Olimpo (14°32' N, 91°34' W, 520 m), 10 20 vi 1966, O. S. Flint Jr. and M. N. Ortiz leg. [USNM]; Escuintla Dept.: 1 ♂, 1 ♀ (in copula), Escuintla, Finca El Salto {14°18' N, 90°47' W, 355 m}, 24 vi 1977, M. J. Westfall, Jr. leg. [FSCA]. HONDURAS, Colón Dept. 1 ♀, Trujillo {15°55' N, 85°57' W, 26 vii 1968 [FSCA]; Cortes Dept.: 1 ♂, 1 ♀ (mating pair), ditch 3 miles N of Río Lindo {15°2' N, 87°59' W, 252 m}, 29 viii 1964, F. G. Thompson leg. [FSCA]; Olancho Dept.: 1 ♂, 1 ♀, Río Nance and small NE tributary, just W of Campamento {14°33' N, 86°40' W, 700 m}, 3 iii 1990, S. W. Dunkle leg. [FSCA]; Comayagua Dept.: 1 ♂, 3.4 miles NW of Comayagua {14°28' N, 87°40' W, 560 m}, 3 viii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 2 ♀, Rancho Chiquito, 11.8 miles SE of Villa de San Antonio {14°17' N, 87°31' W, 980 m}, 2–3 viii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; El Paraíso Dept.: 2 ♂, Río Chiquito near Ojo de Agua, medium sized rocky river (14°3' N, 86°53' W, 610 m), 17 iii 1990, S. W. Dunkle leg. [FSCA]; 1 ♂, 1 ♀, narrow rocky small stream on Pan American highway, E of El Zamorano near Jacaleapa {14°0' N, 86°14' W, 829 m}, 13 xii 1987, S. W. Dunkle leg. [RWG]; 1 ♂, Yuscarán, Río Aguacate (13°56'38" N, 86°51'0" W, 1,020 m), 12 v 1993, L. Stange leg. [FSCA]; Francisco Morazán Dept.: 1 ♂, 1 ♀ (in tandem), Zamorano, Escuela Agrícola Panamericana (EAP), 30 km ESE Tegucigalpa, ponds and Yeguari River with riffles & pools {14°0'31" N, 87°0'35" W, 799 m}, 14 xii 1987, S. W. Dunkle leg. [FSCA]; 1 ♂, same data but 11 xii 1987 [USNM]; Choluteca Dept.: 1 ♂, 1 ♀ (in copula), 2 miles E of San Francisco de la Paz {13°22' N, 86°54' W, 1,280 m}, 25 viii 1964, F. G. Thompson leg. [FSCA]; 2 ♂, 1 ♀, Buenos Aires, Route 1, km 110 {13°18' N, 87°11' W, 50 m}, 13 vi 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]. EL SALVADOR, Santa Ana Dept.: 6 ♂, 4 ♀ (one pair in copula), El Limo Ranch, stream on wet foothill forest below family house along main road, about 15 km N of Metapán (14°24'32" N, 89°24'47" W, 830 m), 26 viii–11 ix 2011, R. Ballowitz & D. Danfourth leg. [RWG]; 1 ♂, Hacienda Guameru, shaded stream in deep ravine surrounded by light woodland and agricultural land, taken at sunny sandy stream edge (14°21'38" N, 89°28'10" W, 520 m), 27 viii 2011, R. Behrstock leg. [RWG]; 2 ♂, 2 ♀ (in copula), route 1, km 90, 2 miles N of Candelaria de la Frontera {14°8' N, 89°39' W, 860 m}, 7 viii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Ahuachapán Dept.: 1 ♂, San Francisco Menéndez, Río San Francisco, Bosque El Imposible {13°51' N, 90°0' W, 250 m}, 14 xii 1983, V. Hellebuyck leg. [UMMZ]; La Libertad Dept.: 1 ♂, 1 ♀, 4.7 miles S of Mizata {13°30' N, 89°33' W, 70 m}, 2 vii 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, 1 ♀ (in tandem), 4.7 miles S of Mizata {13°30' N, 89°33' W, 70 m}, 2 vii 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 2 ♂, Río Majagual, km 40, near La Libertad {13°29' N, 89°21' W, 20 m}, 1 vii 1966, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]. NICARAGUA, Esteli Dept.: 2 ♂, Río La Trinidad, La Trinidad {12°58' N, 86°14' W, 600 m}, 31 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Matagalpa Dept.: 1 ♀, Río Grande de Matagalpa, Ciudad Darío {12°43' N, 86°7' W, 450 m}, 30 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Boaco Dept.: 2 ♂, route 7, km 69, 3.2 miles W of Boaco junction {12°24' N, 85°47' W, 140 m}, 29–30 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Chontales Dept.: 1 ♂, route 7, km 183, 4.2 miles W of Villa Somosa {12°3' N, 84°59' W, 200 m}, 29 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 2 ♂, La Flor, route 7, km 159, 4 miles W of Acopyapa junction {12°0' N, 85°13' W, 200 m}, 29 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; Granada Dept.: 1 ♂, 2 ♀, Domatila - Río Pital, E of Hotel {11°42' N, 85°57' W, 40 m}, 24–26 viii 2003, F. C. Sibley leg. [FSCA]. COSTA RICA, Guanacaste Prov.: 4 ♂, 1 ♀, Río Azufrado, 14 miles N of Liberia (10°48' N, 85°32' W, 122 m), 26 v 1991, J. Zloty leg. [RWG]; 2 ♂, Río Jabillo, 11 ix 1983, E. A. Rojas M. leg. [UMMZ]; 2 ♂, Sardinal, Río Sardinal {10°31' N, 85°39' W, 100 m}, 11 ix 1983, E. A. Rojas M. leg. [UMMZ]; Heredia Prov.: 1 ♂, Sarapiquí Dist. near Puerto Viejo, Chilimate, on the grounds of Selva Verde Lodge, over small stream (10°45' N, 83°98' W, 500 m), 1 iii 1992, S. Sullivan Borkin leg. [RWG]; Puntarenas Prov.: 3 ♂, Río La Vieja, 20 miles N of Palmar Norte {10°22' N, 84°31' W, 700 m}, 3 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 3 ♂, stony muddy creek about 11 km N of Sardinal (10°9'38" N, 84°51'12" W, 246 m), 8 vi 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, same data but [CSCA]; 4 ♂, 1 ♀ (one pair in tandem), same data but (10°9'20" N, 84°51'5" W, 214 m) [RWG]; 2 ♂, same data but [CSCA]; 1 ♂, 1 ♀, Río Seco, stream 11.4 miles NW of 8.1 miles WNW Esparta {10°4' N, 84°46' W, 60 m}, 23–24 vii 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, Río Barranca at route 1, rocky river with some gravel mining {9 59' N, 84 41' W, 51 m}, 25 ii 1987, S. W. Dunkle leg. [RWG]; 1 ♂, 1 ♀, Esparta {9 59' N, 84 40' W, 60 m}, ii 1905, P. Biolley leg. [USNM]; 1 ♂, 1 ♀, stream 8.1 miles

WNW Esparta, 9 ii 1967, DRP & M. L. Paulson leg. [RWG]; 8 ♂, 3 ♀, same data but 26 vi 1967, O. S. Flint, Jr. & M. A. Ortiz B. leg. [USNM]; 1 ♂, wide sandy gravel stream between Playa Hermosa and Quebrada Amarilla on route 34 (9°34'58" N, 84°34'20" W, 35 m), 1 vi 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, narrow sandy gravel stream between Hatillo and Matapalo on route 34 (9°19'3" N, 83°56'8" W, 23 m), 1 vi 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, Buenos Aires {9°10' N, 83°20' W, 382 m}, 9 vi 1989 [FSCA]; 4 ♂, 1 ♀, Río km 20, 12 km E of Golfito on route 14, sandy stream {8°37' N, 83°3' W, 25m}, 31 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, Quebrada Diecinueve, sandy stream 11 km E of Golfito on route 14 (8°36'56" N, 83°3'56" W, 25 m), 31 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 5 ♂, 2 ♀ (two pairs in tandem), Río Purrujas, 5 km E of Golfito on route 14, rocky stream (8°36'14" N, 83°6'42" W, 38 m), 31 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, 1 ♀, wide sandy stream, 3 km E of Golfito on route 14 (8°36'5" N, 83°7'7" W, 23 m), 31 v 2013, N. von Ellenrieder & RWG leg. [RWG]; Limón Prov.: 7 ♂, 1 ♀ (one pair in tandem), stream through open marshy cow pasture near secondary forest on dirt road 1 km S of route 32 between La Unión and Flores (10°12'17" N, 83°51'31" W, 287 m), 26 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 1 ♂, 1 ♀, same data but [CSCA]; 1 ♂, Río Herediana (10°7'11" N, 83°34'21" W, 194 m), 5 vi 1991, J. Zloty leg. [RWG]; 1 ♂, Finca La Lola, Agricultural Research Station, near Siquirres {10°6' N, 83°22' W, 15 m}, 1 vii 1987, S. Sullivan Borkin & R.J. Sullivan leg. [FSCA]; 1 ♂, 1 ♀, Distrito Najara, Río Bejuco {9°56' N, 83°10' W, 184 m}, 4 iv 1987, J. Belle leg. [RWG]; San José Prov.: 1 ♂, 2 ♀, Finca about 5.5 km W of Villa Colón, Bajo Limón, stony river through secondary forest (9°55'3" N, 84°18'16" W, 559 m), 28 v 2013, N. von Ellenrieder & RWG leg. [RWG]; 6 ♂ (one ♂ in tandem with ♀ *Argia cuparurea*), Hacienda El Rodeo, 7 km W of Villa Colón (9°54'49" N, 84°16'10" W, 859 m), 28 v 2013, N. von Ellenrieder & RWG leg. [RWG]. PANAMA, Panamá Prov.: 2 ♂, Chepo Dist., 2.3 km E of El Llano {9°12' N, 78°56' W, 10 m}, 25 ii 1985, O. S. Flint, Jr. & J. Louton leg. [RWG]; 6 ♂, same data but [USNM]; 1 ♀, Albrook Field open stream through high grass {8°58' N, 79°33' W, 5 m}, 11 i 1938, R. Bliss leg. [ANSP]; Chiriquí Prov.: 1 ♂, 1 ♀, 9 km N of David, La Cascada at Balneario San Francisco {8°33' N, 82°25' W, 200 m}, P. J. Spangler leg. [USNM]; 1 ♂, 1 ♀, Bugaba, Río Guleala {8°29' N, 82°37' W, 200 m}, 23 i 1987, E. S. Ross leg. [CAS]; 1 ♂, Río Tabasara, by Pan-American highway {8°12' N, 81°53' W, 133 m}, 23 i 1987, E. S. Ross leg. [CAS]; Veraguas Prov.: 1 ♂, 3 ♀, 12.3 km SW of Los Algarrobos on Río San Pedro {8°4' N, 81°5' W, 35 m}, 21 vi 1973, T. Erwin & G. Hevel leg. [USNM]; 1 ♂, 1 ♀, same data but [RWG]; Coclé Prov.: 1 ♂, Mano de Piedra, about 4.6 km N of Penonome, tributary to Río Coclé del Sur, wide shallow intermittent rocky river (8°33'39" N, 80°22'3" W, 70 m), 23 v 2016, W. Mauffray leg. [FSCA].

*Argia popoluca* Calvert, 1902 (54 ♂, 9 ♀): MEXICO, Veracruz State: 3 ♂, Estación de Biología Tropical Los Tuxtlas, 27.9 km N of Catemaco {18°35' N, 95°4' W, 124 m}, 27 ix 1977, E. González-Soriano leg. [UMMZ]; 1 ♂, same data but [RWG]; 1 ♂, same data but [CSCA]; 1 ♂, 1 ♀, same data but 27 ix 1986 [UNAM]; 1 ♂, Laguna Zacatal (18°25'12" N, 95°6'36" W, 600 m), 26 vii 1986, R. Mendoza leg. [UNAM]; Tabasco State: 1 ♂ **holotype**, Teapa {17°33' N, 92°57' W, 95 m}, iii 1888, H. H. Smith leg. [BMNH]. HONDURAS, Atlántida Dept.: 1 ♂, Lancetilla Botanic Garden, 5 km SE of Tela, mostly at Laguna de la Ninfa Lily Pond and feeder seepages (15°44'30" N, 87°27'25" W, 42 m), 11 iii 1990, S. W. Dunkle leg. [RWG]; Gracias a Dios Dept.: 1 ♂, Misquito Coast, Las Marías, near Río Plátanos (15°40'36" N, 84°50'24" W), 27 x 1999, TWD leg. [TWD]. COSTA RICA, Heredia Prov.: 1 ♂, Sarapiquí, La Selva Biological Station, 1.5 mi S of Puerto Viejo (10°28' N, 84°1' W, 60 m), 25 iv 1988, CEH leg. [CEH]; 1 ♂ same data but [RWG]; 2 ♂, same data but 19 vii 1988, CEH leg. [CEH]; 5 ♂, 1 ♀, same data but Puerto Viejo, Peje trail, xi 2000, CEH & R. Vargas leg. [CEH]; 2 ♂, same data but swamp in primary forest (10°25'44" N, 84°0'17" W), 26 vi 1988, CEH leg. [CEH]; 4 ♂, 1 ♀, same data but 19–21 ix 1966, DRP & M.L. Paulson leg. [DRP]; 1 ♂, same data but [FSCA]; 2 ♂, same data but [UMMZ]; 2 ♂, same data but 13 viii 1967 [RWG]; 1 ♂, 1 ♀, same data but 24–26 iii 1995, TWD & Ramírez leg. [TWD]; 1 ♂, Magsasay, previously known as El Plástico (10°24'6" N, 84°3'18" W) [CEH]; 1 ♂, same data but 20 ix 1993, J. P. Benstead leg. [CEH]; 1 ♂, same data but 29 iii 1994 [CEH]; 1 ♂, Braulio Carrillo National Park, Quebrada Cantarrana, 11 km ESE of La Virgen, seepage area along dark Quebrada (10°21'0" N, 84°3'24" W, 300 m), 20 ii 2004, D. L. Wagner leg. [RWG]; 1 ♂, same data but [CSCA]; 3 ♂, same data but 19 ii 2004, E. Lopez leg. [RWG]; Alajuela Prov.: 1 ♂, forest and streams 1 mi S of La Marina {10°21' N, 84°22' W, 550 m}, 30 x 1966, DRP & M. L. Paulson leg. [FSCA]; 2 ♂, Ruta 9, Río Angel, 1.1 km S of Cariblanco (10°15'30" N, 84°11'0" W, 930 m), 30 x 1989, CEH leg. [CEH]; 1 ♂, Bonnefil Farm, Río Surubres {9°56' N, 84°31' W, 147 m}, 16 x 1909, P. P. Calvert leg. [UMMZ]; Limón Prov.: 1 ♂, Guapiles, in forest {10°12' N, 83°47' W, 268 m}, 5 vii 1967, M. J. and D. N. Westfall leg. [FSCA]; 1 ♂, Braulio Carrillo National Park, Estación González, Quebrada González, near highway from San José to Limón, small quebrada crossing Ceibo trail (10°9'44" N, 83°56'18" W, 472 m), 3 ii 2006, WAH leg. [RWG]; 1 ♂, about 20 km SE of Siquirres, Las Brisas de Pacuarito (10°6' N, 83°30' W, 59 m), 1 iv 1990, T. Herman leg. [CEH]; San José Prov.: 1 ♂, 20 km ENE of Quepos, Londres road, tributary of Río Savegre, small rocky stream crossing road, spring trickle on rocky road bank (9°29'8" N, 83°59'28" W, 650 m), 16 viii 2012, WAH leg. [WAH]; Puntarenas Prov.: 1 ♂, vicinity of Rincón de Osa, forest stream below falls (8°42' N, 83°29' W, 13 m), 18 iii 1967, DRP leg. [FSCA]; 3 ♂, 2 ♀, same data but 10 iii 1967, DRP & M. L. Paulson leg. [RWG]; 3 ♂, 1 ♀ (one pair in tandem), same data but waterfall stream, 10 iii 1969 [FSCA]; 2 ♂, Estación Biológica Marengo {8°41' N, 83°42' W, 41 m}, 30 vii 1988, CEH leg. [CEH]; 4 ♂, Corcovado National Park, trail in forest (8°34'15" N, 83°30'20" W), 29 xii 1988, CEH leg. [CEH]; 1 ♂, Refugio de Vida Silvestre Golfito, grassland and streams (8°39' N, 83°10' W, 100 m), 16–18 vii 1990, CEH leg. [CEH]. PANAMA, San Blas Prov.: 1 ♂, 1 ♀ (in copula), Nusagandi {9°1' N, 77°48' W, 12 m}, 1–6 iii 1985, O. S. Flint, Jr. & J. Louton leg. [RWG]; Veraguas Prov.: 1 ♂, 1 ♀, near Santa Fe, Alto de la Piedra, water supply in forest (8°30'35" N, 81°7'0" W, 900 m), 15 vi 2010, TWD leg. [RWG]; 1 ♂, NW of Alto de Piedra on N.P. Santa Fe Road, first small stream N of Río Maluba brazo 3 (8°31'57" N, 81°8'41" W, 785 m), 23 v 2016, W. Mauffray leg. [FSCA]; Herrera Prov.: 1 ♂, Porto Bello (8°1' N, 80°36' W, 49 m), 18 iv 1912, A. Busck leg. [FSCA]. COLOMBIA, Antioquia Dept.: 1 ♂, Cristalina {6°29' N, 74°50' W, 320 m}, 19 ii 1917, J. H. & E.

B. Williamson leg. [RWG]; Boyaca Dept.: 1 ♂ (syntype of *Argia variata* Navás, 1935), Muzo {5°32' N, 74°6' W, 800 m, vii 1918 [UMMZ]; Meta Dept.: 2 ♂, Villavicencio {4°9'12" N, 73°38'6" W, 500 m}, vii 1918, Muro leg. [UMMZ]. ECUADOR, Pinchincha Prov.: 1 ♂, Séptimo Paraíso Lodge, 3 km NE of Mindo, small forest stream (0°1'51" S, 78°45'48" W, 1,555 m), 18 x 2012, WAH & F. Morrison leg. [WAH]; 1 ♂, 1 ♀, Río Tulambi, Forestry Station Maquipucuna, about 5 km E of Nanegalito (0°7'1" S, 78°37'47" W, 1,344 m), 5 ix 1990, O. S. Flint, Jr. leg. [USNM]; 1 ♂, 1 ♀, same data but [RWG]; Esmeraldas Prov.: 1 ♂, Río Canande Reserve, 35 km NE of Quininde, tributary of Río Hoja Blanca, small gravel stream in forest 3 km NE of Mindo (0°31'35" S, 79°12'44" W, 345 m), 20 x 2012, WAH & Fred Morrison leg. [WAH].

*Argia rhoadsi* Calvert, 1902 (30 ♂, 16 ♀): U.S.A., Texas State, Uvalde County: 1 ♀, Nueces River, Park Chalk Bluff (29°21'38" N, 99°59'7" W, 355 m), 12 vii 2001, KJT leg. [KJT]; Kinney County: 1 ♂, Las Moras Creek in Fort Clark Springs at Brackettville {29°18' N, 100°25' W, 345 m}, 15 vii 2001, DRP leg. [RWG]; Cameron County: 2 ♂, 1 ♀, in shade under thick brush, Las Palomas Wildlife Refuge near Farm road 511, SE of Brownsville {25°51' N, 97°24' W, 6 m}, 23 viii 1975, RWG leg. [RWG]; 1 ♂, Palm Grove 6 miles E of Brownsville, 20 ix 1935, L. K. Gloyd leg. [UMMZ]. MEXICO, Tamaulipas State: 1 ♂, below El Monte, 17 viii 1941, H. Devlin Thomas leg. [UMMZ]; 1 ♂, Ciudad Victoria {23°44' N, 99°8' W, 320 m}, 29 viii 1944, H. Devlin Thomas leg. [UMMZ]; 3 ♂, Río Sabinas, Pano Ayuctle near Gomez Farias {23°0' N, 99°5' W, 99 m}, 17–18 iii 1949, G. M. Sutton leg. [UMMZ]; 1 ♂, same data but [RWG]; 2 ♂, 2 ♀, same data but 19 iii 1992, S. W. Dunkle leg. [RWG]; Nuevo León State: 1 ♂, 6 ♀, near Sabinas Hidalgo, flying over stream of northernmost mountain range in Nuevo León {26°33' N, 100°14' W, 714 m}, 7–8 vi 1932, H. M. Smith & E. H. Taylor leg. [UMMZ]; 1 ♂, 1 ♀, same data [RWG]; 1 ♂ (holotype), Monterrey (25°40' N, 100°19' W, 540 m), S. N. Rhoads leg. [BMNH]; 1 ♂, 9 mi N of Linares {24°51' N, 98°33' W, 356 m}, 23 iv 1930, E. P. Creaser, Ostos & Gordon leg. [UMMZ]; 1 ♂, 4.8 km west of Iturbide {24°42' N, 99°55' W, 1,475 m}, 22 viii 1980, E.S. & C.E. Ross leg. [RWG]; San Luis Potosi State: 1 ♂, 1 ♀, Nacimiento del Río Coy, 28 km S of Ciudad Valles {21°43' N, 98°58' W, 42 m}, 21 viii 1999, RWG & J. A. Garrison leg. [RWG]; 4 ♂, 3 ♀, Río Ojitipa, NW of Palmira Viejo (21°41'54" N, 99°0'29" W, 41 m), 19 viii 1999, RWG & J. A. Garrison leg. [RWG]; 3 ♂, 2 ♀, Bridge at Río Huichihuayan, just S of Huichihuayan, in dry understory settling on ground and dry leaves (21°28'35" N, 98°58'5" W, 95 m), 18 viii 1999, RWG & J. A. Garrison leg. [RWG]; 3 ♂, 1 ♀, Huehuetlan, Río Huichihuayan, highway 85, SW Huichihuayan (21°27'8" N, 98°56'18" W, 90 m), 23 vi 1990, JJD leg. [RWG]; 1 ♂, Axtla River near Xilitla {21°23' N, 98°59' W, 540 m}, 1 i 1952, M. S. Gordon leg. [UMMZ]; Hidalgo State: 1 ♂, 1 ♀ (in tandem), Laguna Azteca, 2 km N of Molango {20°48' N, 98°44' W, 1,310 m}, 24 vii 1992, G. Harp leg. [RWG]; Puebla State: 1 ♂, Piedras Negra, stream {20°23' N, 97°52' W, 240 m}, 25 x 1987, A. Gomez leg. [RWG]; 1 ♂, same data but [CSCA].

*Argia westfalli* Garrison, 1996 (54 ♂, 15 ♀): MEXICO, Nuevo Leon State: 1 ♂ **paratype**, Santiago, Rancho Los Pinos {25°25' N, 100°9' W, 483 m}, 3 vii 1987, M. J. Westfall, G. Luna & A. Contreras leg. [FSCA]; 1 ♂ **holotype**, 1 ♀ **allotype**, Santiago, 2.5 km W of Rancho Los Atascoscos {25°22' N, 100°9' W, 650 m}, 2 vii 1987, M. J. Westfall, H. Quiroz & A. Contreras leg. [FSCA]; 15 ♂ **paratypes**, same data but [FSCA]; 2 ♂ **paratypes**, same data but [RWG]; 3 ♂, Horsetail Falls, 38 km SW of Monterrey {25°21' N, 100°9' W, 550 m}, 6 ix 1962, TWD leg. [TWD]; 5 ♂, same data but 2 ix 1963 TWD leg. [TWD]; 4 ♂ **paratypes**, same data but stream at entrance, 25 vi 1965, DRP & M. L. Paulson leg. [FSCA]; 2 ♂ **paratypes**, same data but [RWG]; 1 ♂ **paratype**, same data but [CSCA]; Tamaulipas State: 1 ♂, 1 ♀, about 7 km SE of Gomez Farias, Parque La Florida, along Río Frío (22°59'32" N, 99°8'34" W, 94 m), 23 x 2002, R. A. Behrstock leg. [RWG]; 1 ♀, El Salto falls near El Mico, about 12 km N of El Naranjo (22°35'9" N, 99°22'78" W, 400 m), 24 x 2002, R. A. Behrstock leg. [RWG]; 2 ♂, MX 80 between km 159 & 160 (22°29'7" N, 99°25'1" W, 920 m), 24 x 2002, R. A. Behrstock leg. [RWG]; San Luis Potosi State: 1 ♂, Axtla River near Xilitla {21°23' N, 98°59' W, 540 m}, 29 xii 1953, M. S. Gordon leg. [TWD]; 3 ♂, 1 ♀ (one pair in copula), El Salto Falls, at top of falls (22°21'42" N, 99°15'53" W, 250 m), 17 i 1963, A. & G. Beatty, III leg. [RWG]; 1 ♂, same data but [UMMZ]. Veracruz State: 1 ♂ **paratype**, Orizaba, Ojo de Agua {19°1' N, 97°16' W, 1,160 m}, 10 viii 1965, DRP & M. L. Paulson leg. [FSCA]; 1 ♂, same data but 24 viii 1958, A. & G. Beatty, III leg. [RWG]; 1 ♂ **paratype**, same data but [RWG]; 1 ♂ **paratype**, Tlilapán {18°48' N, 97°5' W, 1,170 m}, 2 v 1980, E. González leg. [RWG]; 4 ♂, 1 ♀ **paratypes**, 3.6 miles S of Orizaba, spring at Matzinga {18°47'11" N, 97°5'30" W, 1,240 m}, 13 viii 1965, DRP & M. L. Paulson leg. [FSCA]; Chiapas State: 1 ♂, 1 ♀ **paratypes**, 40 miles E of Comitán, Lagunas de Montebello {16°7' N, 91°43' W, 1,475 m}, 8 ii 1963, G. Beatty, III leg. [RWG]; 2 ♂, 4 ♀, same data but 23 x 1986, E. Fisher leg. [RWG]; 2 ♀, La Trinitaria, Lago Tziscaco, Lagunas de Montebello National Park {16°5' N, 91°40' W, 1,371 m}, 14 viii 1981, D. Breedlove leg. [CAS]; 2 ♀, same data but [RWG].





*A. calverti* – male PARATYPE  
COSTA RICA, Braulio Carrillo N.P.



*A. fulgida* – male  
COSTA RICA, La Selva



*A. oenea* – male  
MEXICO, Máquinas River



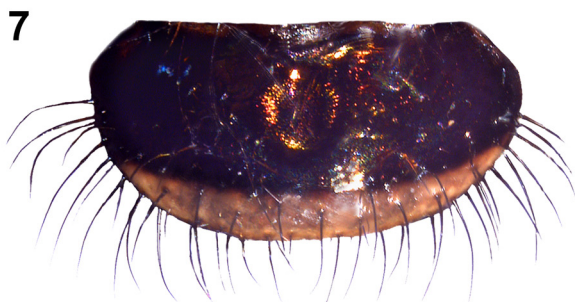
*A. oenea* – female  
MEXICO, Máquinas River



*A. calverti* – female PARATYPE  
COSTA RICA, La Selva



*A. fulgida* – female  
COSTA RICA, La Selva



*A. fulgida* – male  
PANAMA, Sierra Llorona



*A. oenea* – female  
COSTA RICA, near La Unión

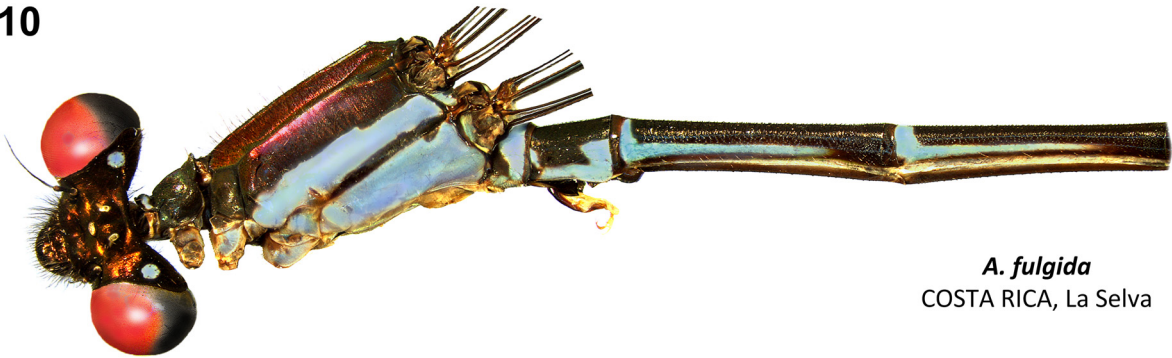
FIGURES 1–8. Color pattern of head of metallic species. Head, anterior view (1–4); labrum, anterior view (5–8).

9



*A. cuprea*  
USA, Nueces River

10



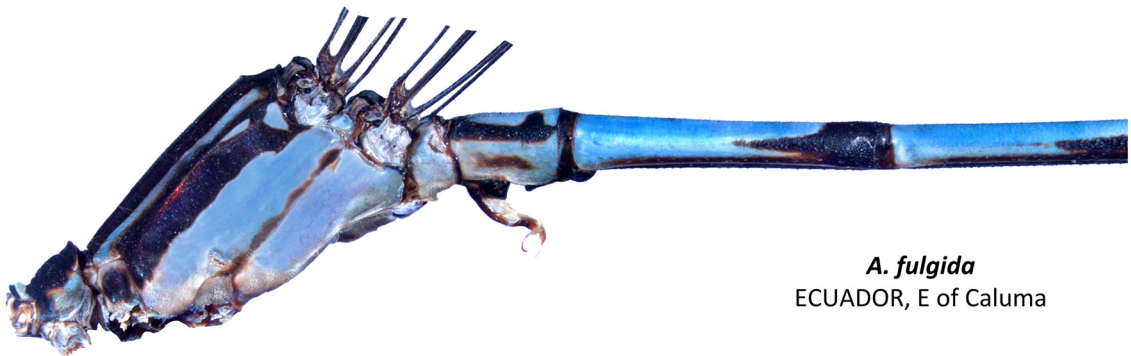
*A. fulgida*  
COSTA RICA, La Selva

11



*A. fulgida*  
ECUADOR, E of Caluma

12

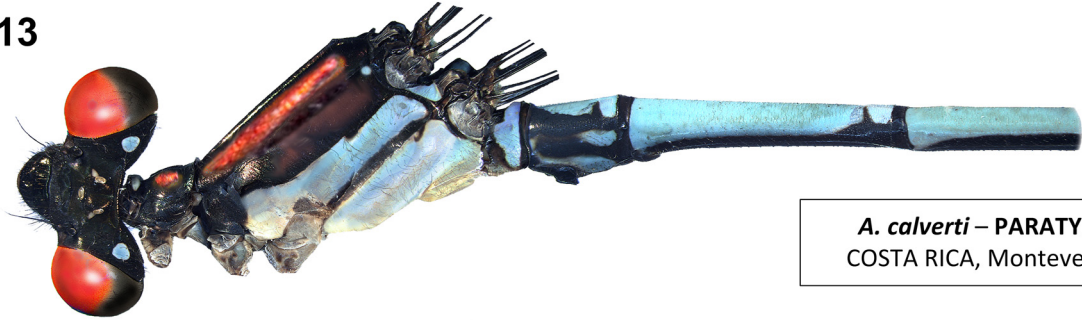


*A. fulgida*  
ECUADOR, E of Caluma

FIGURES 9–12. Color pattern of male head, thorax, and S1–4 of metallic species. Head, dorsal view, thorax and S1–4, lateral view.

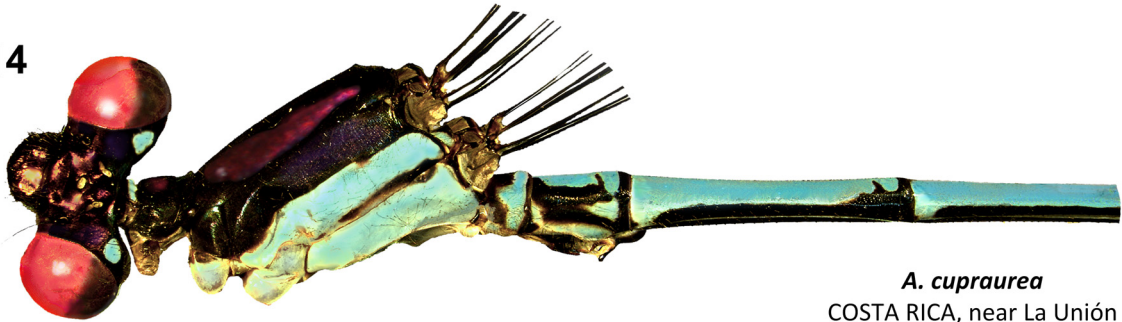


13



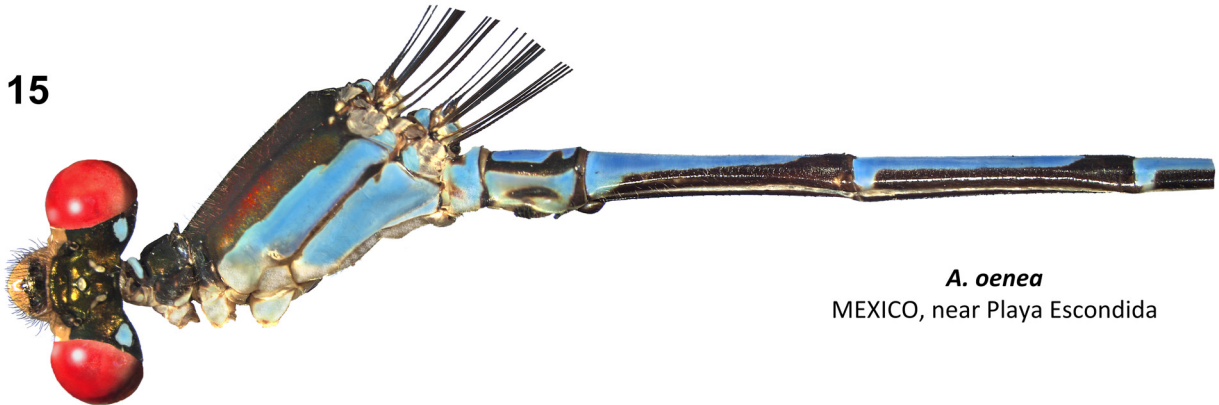
*A. calverti* – PARATYPE  
COSTA RICA, Monteverde

14



*A. cupraurea*  
COSTA RICA, near La Unión

15



*A. oenea*  
MEXICO, near Playa Escondida

16



*A. oenea*  
U.S.A., Seven Springs

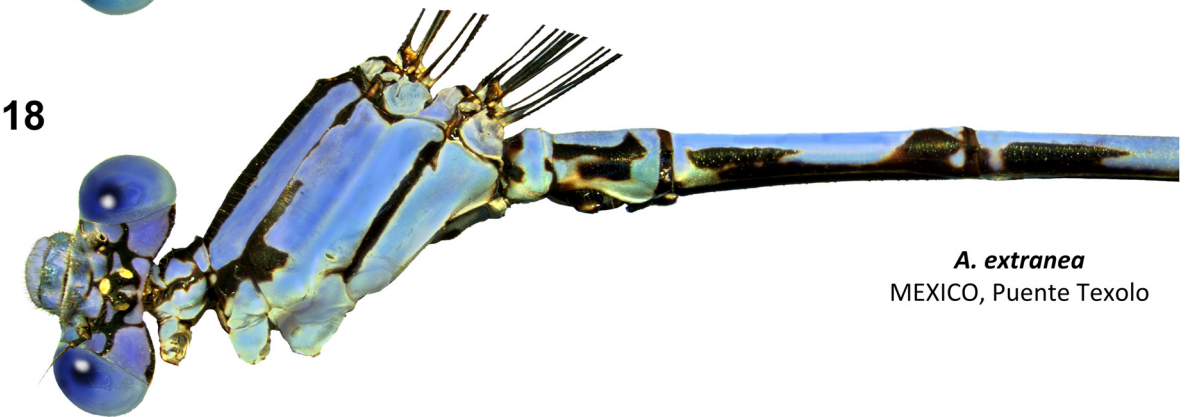
**FIGURES 13–16.** Color pattern of male head, thorax, and S1–4 of metallic species. Head, dorsal view, thorax and S1–4, lateral view.

17



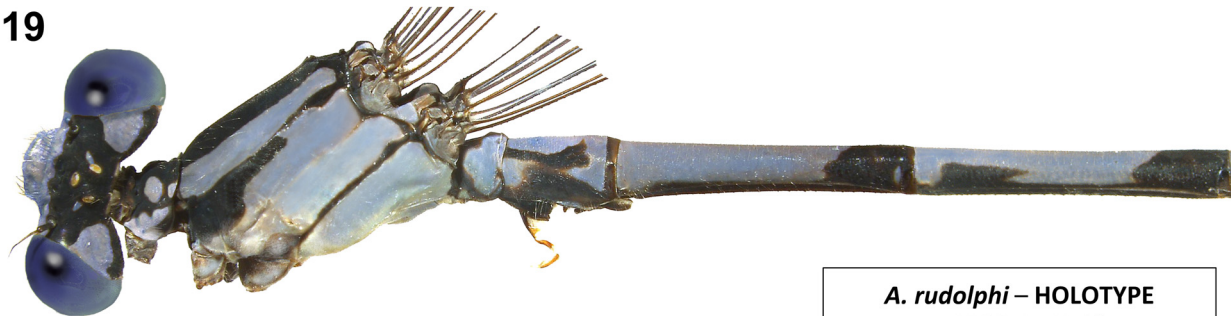
*A. elongata* – HOLOTYPE  
COSTA RICA, Reventazón River

18



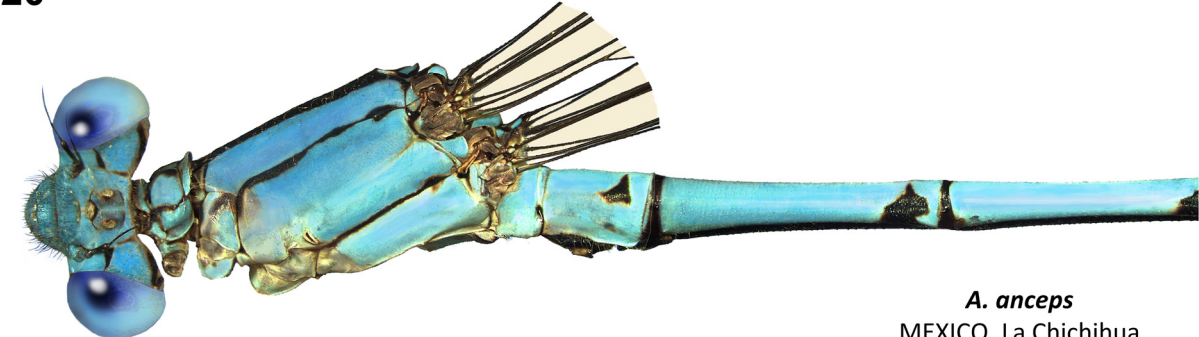
*A. extranea*  
MEXICO, Puente Texolo

19



*A. rudolphi* – HOLOTYPE  
MEXICO, La Unión

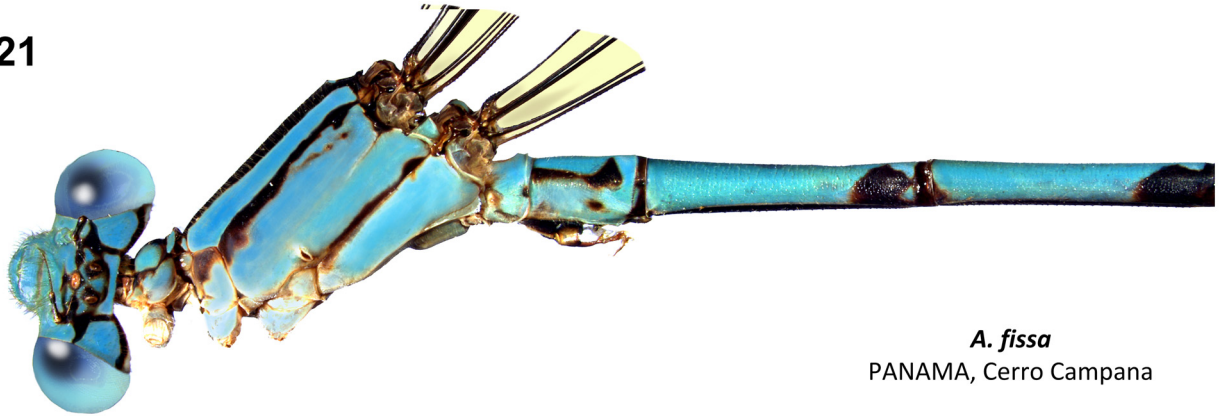
20



*A. anceps*  
MEXICO, La Chichihua

FIGURES 17–20. Color pattern of male head, thorax, and S1–4 of *extranea*-group species. Head, dorsal view, thorax and S1–4, lateral view.

21



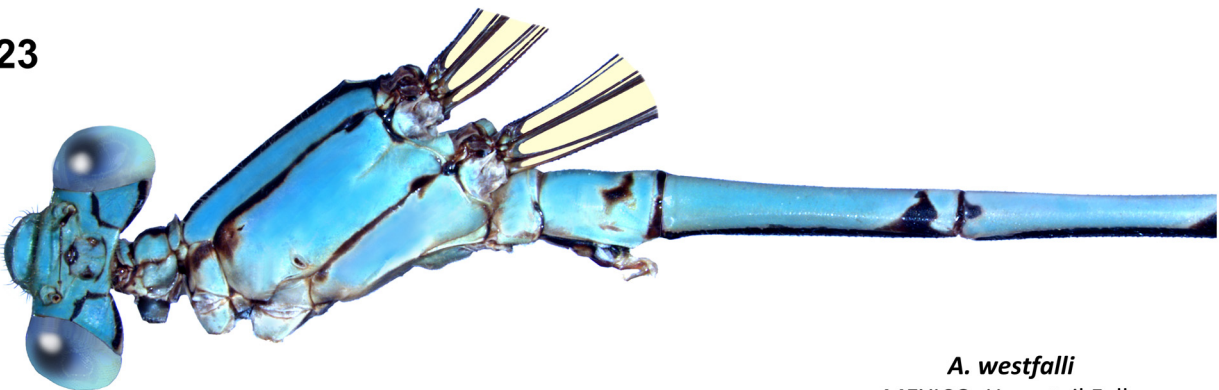
*A. fissa*  
PANAMA, Cerro Campana

22



*A. westfalli*  
MEXICO, Lagunas de Montebello

23



*A. westfalli*  
MEXICO, Horsetail Falls

**FIGURES 21–23.** Color pattern of male head, thorax, and S1–4 of *extranea*-group species. Head, dorsal view, thorax and S1–4, lateral view.



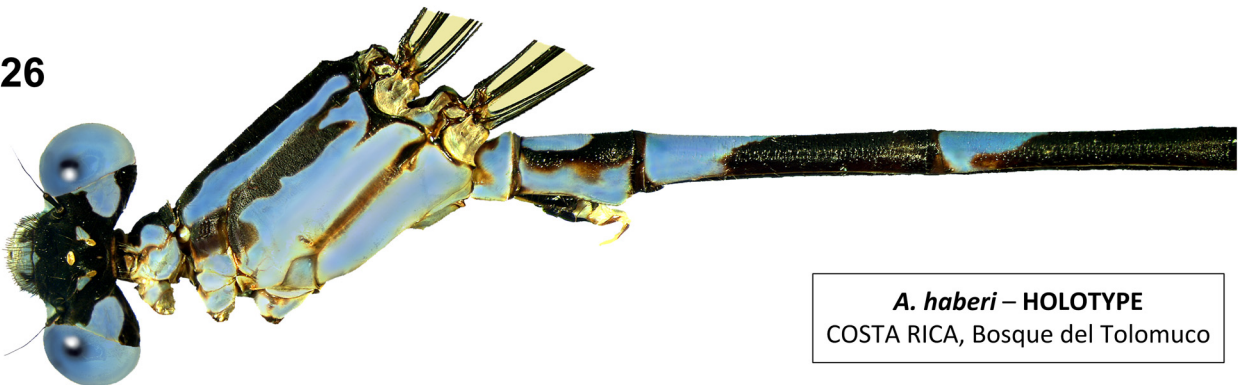
24



25



26



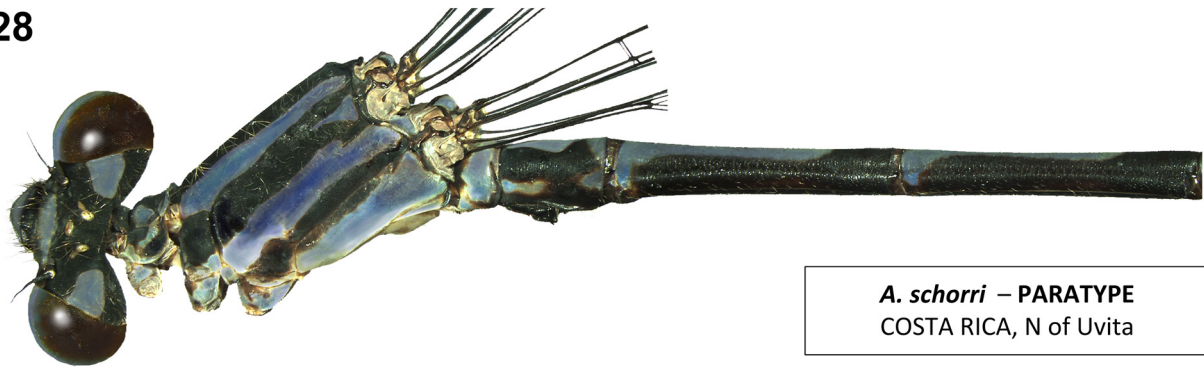
FIGURES 24–26. Color pattern of male head, thorax, and S1–4 of other species. Head, dorsal view, thorax and S1–4, lateral view.

27



*A. rhoadsi*  
U.S.A., Las Moras Creek

28



*A. schorri* – PARATYPE  
COSTA RICA, N of Uvita

29



*A. popoluca*  
MEXICO, Los Tuxtlas

**FIGURES 27–29.** Color pattern of male head, thorax, and S1–4 of other species. Head, dorsal view, thorax and S1–4, lateral view.

30



*A. cuprea*  
MEXICO, Palenque Ruins

31



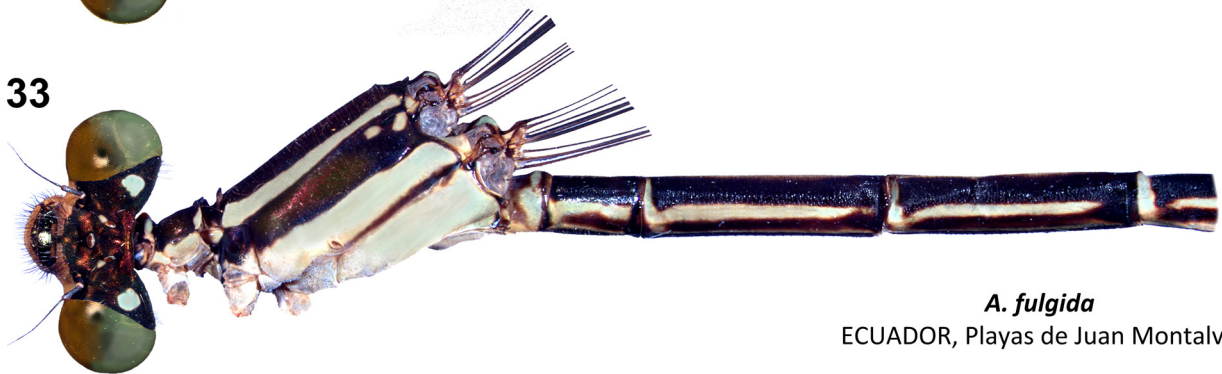
*A. cuprea*  
MEXICO, Las Pozas de Xilitla

32



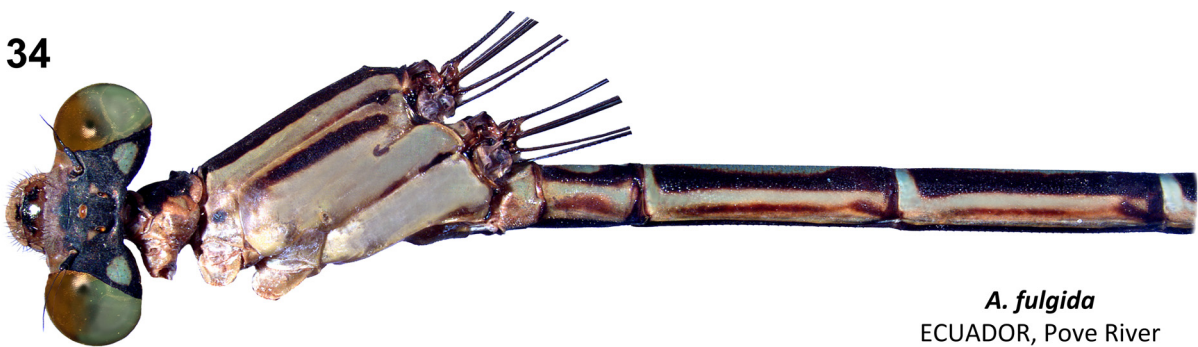
*A. fulgida*  
PANAMA, Cerro Azul

33



*A. fulgida*  
ECUADOR, Playas de Juan Montalvo

34

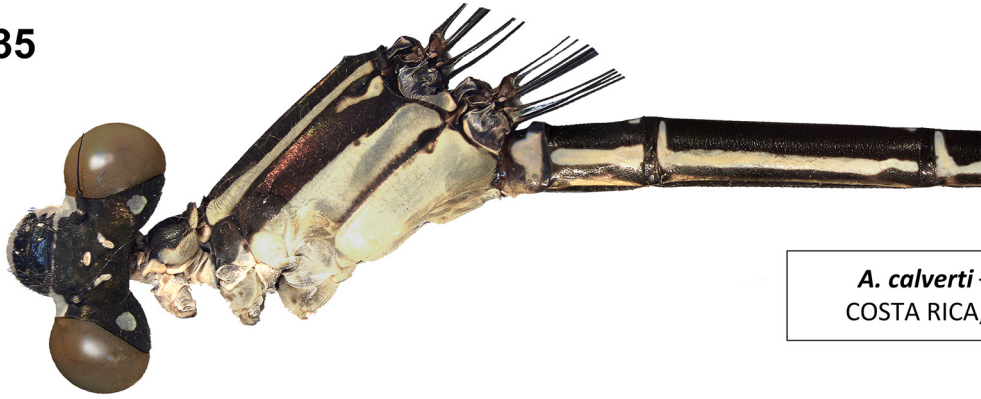


*A. fulgida*  
ECUADOR, Pove River

FIGURES 30–34. Color pattern of female head, thorax, and S1–4 of metallic species. Head, dorsal view, thorax and S1–4, lateral view (30, 31); pterothorax, lateral view (32).



35



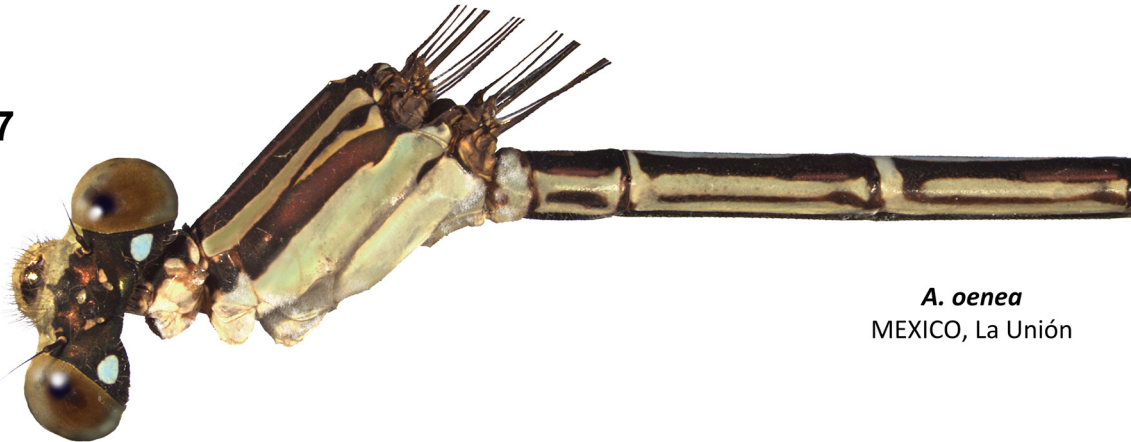
*A. calverti* – PARATYPE  
COSTA RICA, Monteverde

36



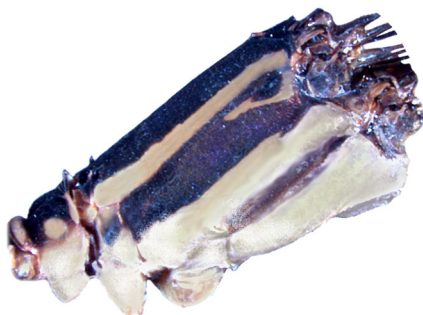
*A. cupraurea*  
COSTA RICA, near La Unión

37



*A. oenea*  
MEXICO, La Unión

38



*A. oenea*  
PANAMA, Los Algarrobos

**FIGURES 35–38.** Color pattern of female head, thorax, and S1–4 of metallic species. Head, dorsal view, thorax and S1–4, lateral view (35–37); pterothorax, lateral view (38).

39



*A. elongata* – PARATYPE  
HONDURAS, Santo Tomás

40



constricted

41



*A. extranea*  
MEXICO, Puente Texolo

42

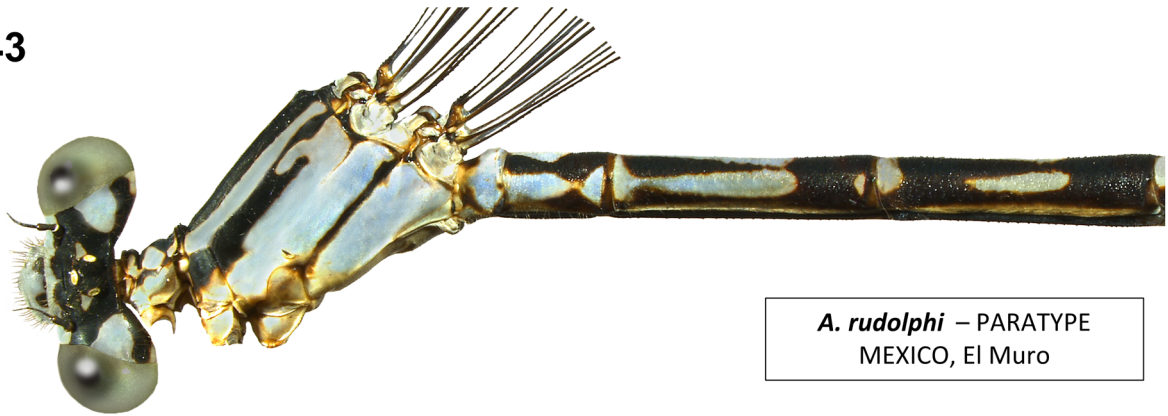


not constricted

FIGURES 39–42. Color pattern of female head, thorax, and S1–4 of *extranea*-group species. Head, dorsal view, thorax and S1–4, lateral view (39, 41); pterothorax, dorsal view (40, 42).



43



*A. rudolphi* – PARATYPE  
MEXICO, El Muro

44



*A. anceps*  
MEXICO, La Chichihua

45



*A. fissa*  
PANAMA, Chiriqui Mountains

46



*A. westfalli*  
MEXICO, Lagunas de Montebello

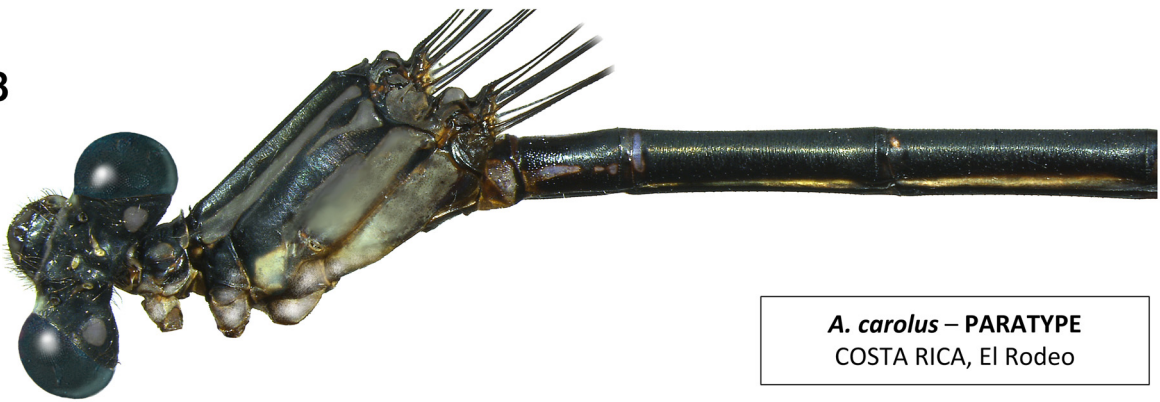
**FIGURES 43-46.** Color pattern of female head, thorax, and S1–4 of *extranea*-group species. Head, dorsal view, thorax and S1–4, lateral view.

47



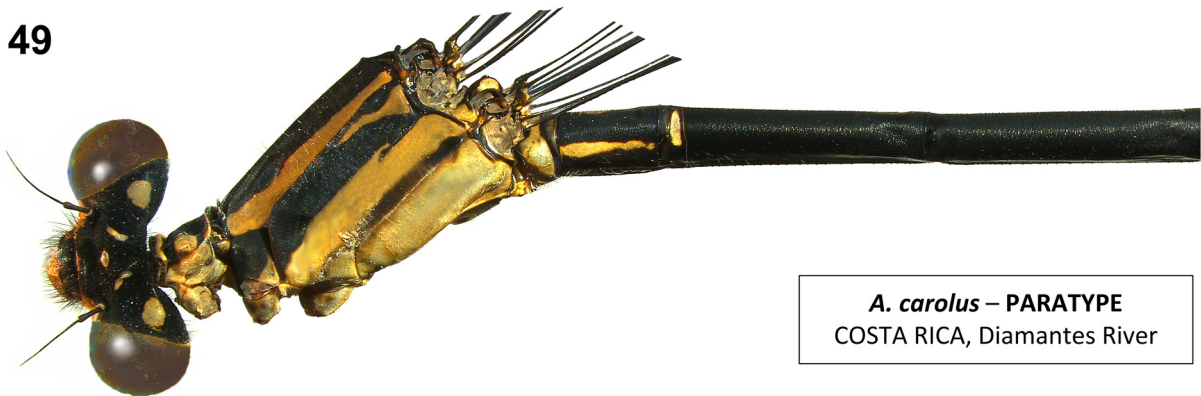
*A. carolus* – PARATYPE  
COSTA RICA, El Rodeo

48



*A. carolus* – PARATYPE  
COSTA RICA, El Rodeo

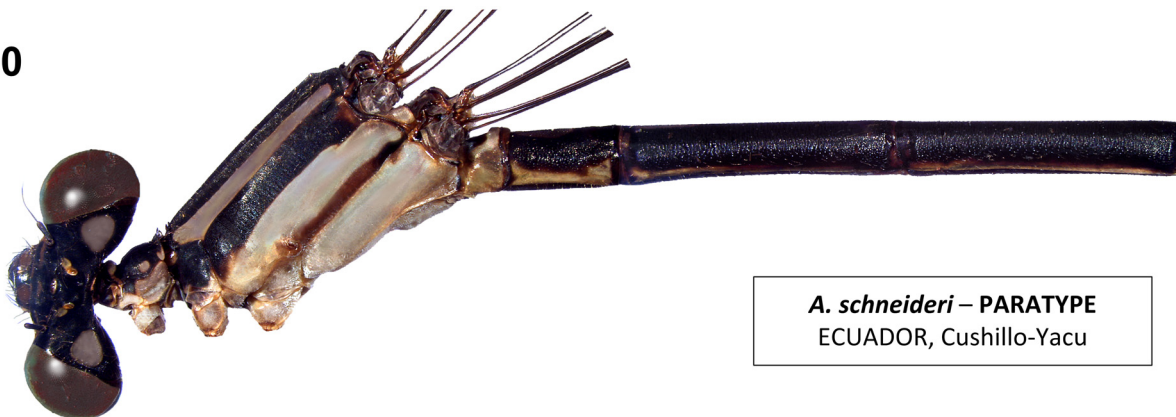
49



*A. carolus* – PARATYPE  
COSTA RICA, Diamantes River

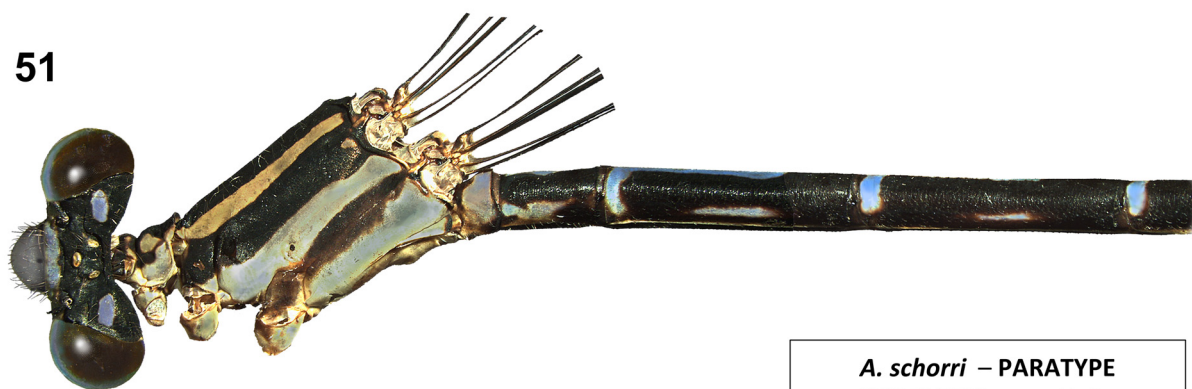
**FIGURES 47–49.** Color pattern of female head, thorax, and S1–4 of other species. Head, dorsal view, thorax and S1–4, lateral view.

50



*A. schneideri* – PARATYPE  
ECUADOR, Cushillo-Yacu

51



*A. schorri* – PARATYPE  
COSTA RICA, near Uvita

52



*A. popoluca*  
PANAMA, Veraguas

FIGURES 50–52. Color pattern of female head, thorax, and S1–4 of other species. Head, dorsal view, thorax and S1–4, lateral view.



53



*A. cuprea*  
U.S.A., Nueces River

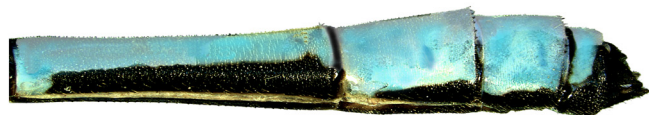


56 *A. calverti* – PARATYPE  
COSTA RICA, Monteverde

54

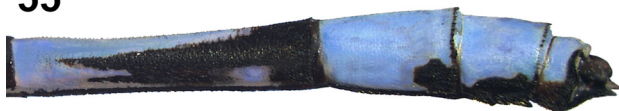


*A. fulgida*  
COSTA RICA, La Selva



57 *A. cupraurea*  
COSTA RICA, near La Unión

55



*A. fulgida*  
ECUADOR, E of Caluma



58 *A. cupraurea*  
PANAMA, Canal Zone



59 *A. cupraurea*  
PANAMA, SE of Boquete



60 *A. cupraurea*  
VENEZUELA, Parangula



61 *A. oenea*  
MEXICO, near Playa Escondida



62 *A. oenea*  
U.S.A., Seven Springs

FIGURES 53–62. Color pattern of male S7–10 of metallic species, lateral view.

63



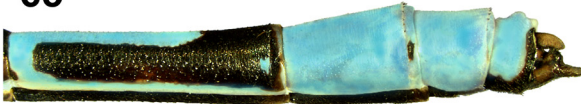
*A. elongata* – HOLOTYPE  
COSTA RICA, Reventazón River

64



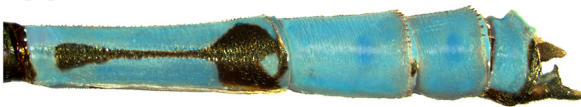
*A. elongata* – PARATYPE  
COSTA RICA, San Luis Valley

65



*A. elongata* – PARATYPE  
MEXICO, Arroyo Claro

66



*A. elongata* – PARATYPE  
PANAMA, Bambito

67



*A. extranea*  
MEXICO, Puente Texolo

68



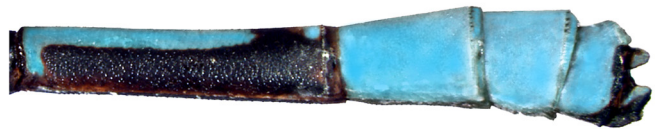
*A. rudolphi* – HOLOTYPE  
MEXICO, La Unión

69



*A. anceps*  
MEXICO, La Chichihua

70



*A. fissa*  
PANAMA, Cerro Campana

71



*A. westfalli*  
MEXICO, Lagunas de Montebello

72



*A. westfalli*  
MEXICO, Horsetail Falls

FIGURES 63–72. Color pattern of male S7–10 of *extranea*-group species, lateral view.

73



*A. carolus* – PARATYPE  
COSTA RICA, Cataratas River

77



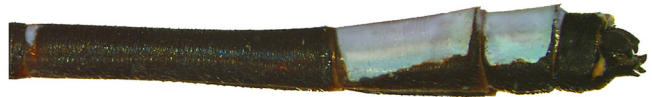
*A. schorri* – HOLOTYPE  
COSTA RICA, N of Uvita

74



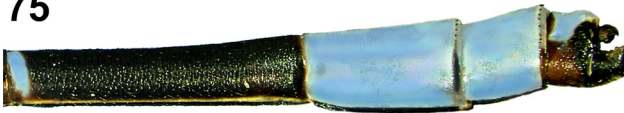
*A. schneideri* – PARATYPE  
ECUADOR, El Partidero

78



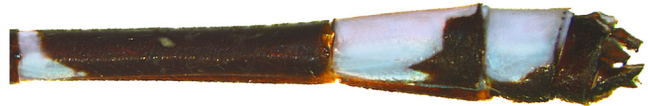
*A. popoluca*  
MEXICO, Los Tuxtlas

75



*A. haberi* – HOLOTYPE  
COSTA RICA, Bosque del Tolomuco

79



*A. popoluca*  
COSTA RICA, Corcovado N.P.

76



*A. rhoadsi*  
U.S.A., Las Moras Creek

FIGURES 73–79. Color pattern of male S7–10 of other species, lateral view.



80



*A. calverti* – PARATYPE  
COSTA RICA, Monteverde

84



*A. fulgida*  
ECUADOR, Playas de Juan Montalvo

81



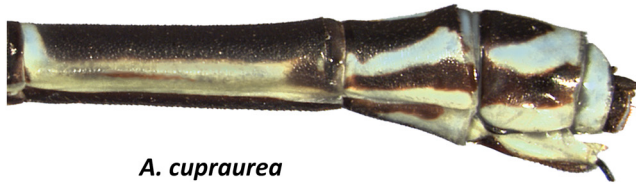
*A. cuprea*  
MEXICO, Palenque Ruins

85



*A. fulgida*  
COSTA RICA, Cerro Azul

82



*A. cupraurea*  
COSTA RICA, near La Unión

86



*A. oenea*  
COSTA RICA, near La Unión

83



*A. fulgida*  
ECUADOR, Pove River

87



*A. cuprea*  
MEXICO, Palenque Ruins

88



*A. oenea*  
COSTA RICA, near La Unión

FIGURES 80–88. Color pattern of female S7–10 of metallic species, lateral view (80–86); S2–5, dorsolateral view (87, 88).

89



*A. elongata* – PARATYPE  
HONDURAS, Santo Tomás

92



*A. rudolphi* – PARATYPE  
MEXICO, El Muro

90



*A. extranea*  
MEXICO, Aconchi Hot Springs

93



*A. anceps*  
MEXICO, La Chichihua

91



*A. extranea*  
MEXICO, Puente Texolo

94



*A. fissa*  
PANAMA, Chiriqui Mountains

95

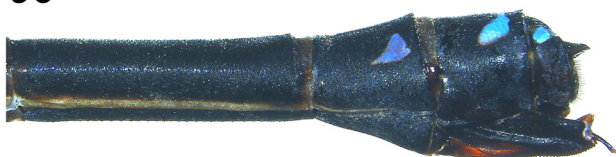


*A. westfalli*  
MEXICO, Lagunas de Montbello

FIGURES 89–95. Color pattern of female S7–10 of *extranea*-group species, lateral view.



96



*A. carolus* – PARATYPE  
COSTA RICA, El Rodeo

97



*A. carolus* – PARATYPE  
COSTA RICA, El Rodeo

98



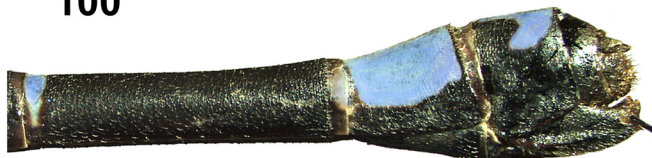
*A. carolus* – PARATYPE  
COSTA RICA, Diamantes River

99



*A. schneideri* – PARATYPE  
ECUADOR, Cushillu-Yacu

100



*A. schorri* – PARATYPE  
COSTA RICA, NE of Uvita

101



*A. schorri* – PARATYPE  
COSTA RICA, NE of Uvita

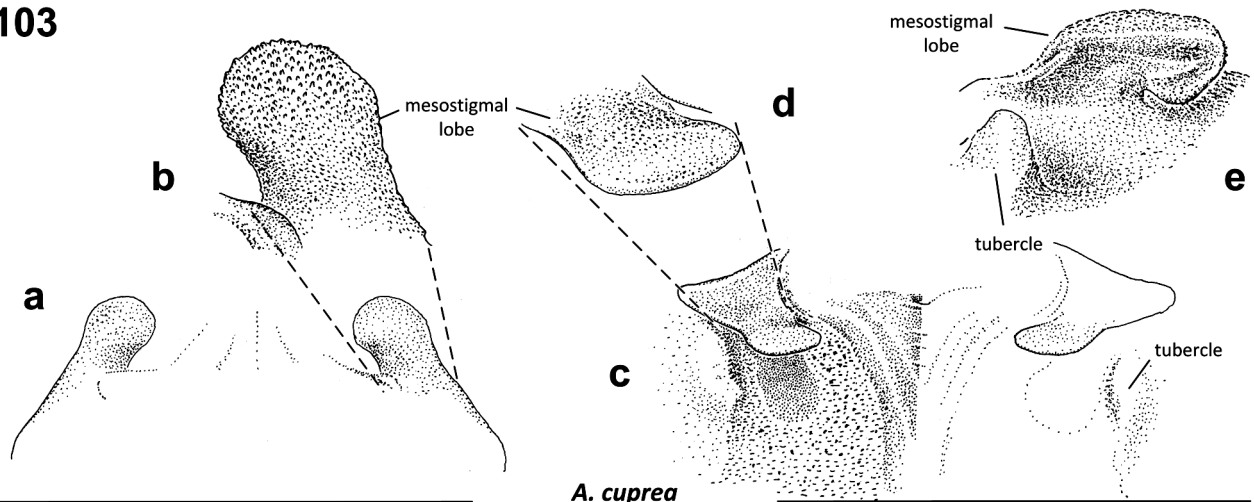
102



*A. popoluca*  
COSTA RICA, Corcovado N.P.

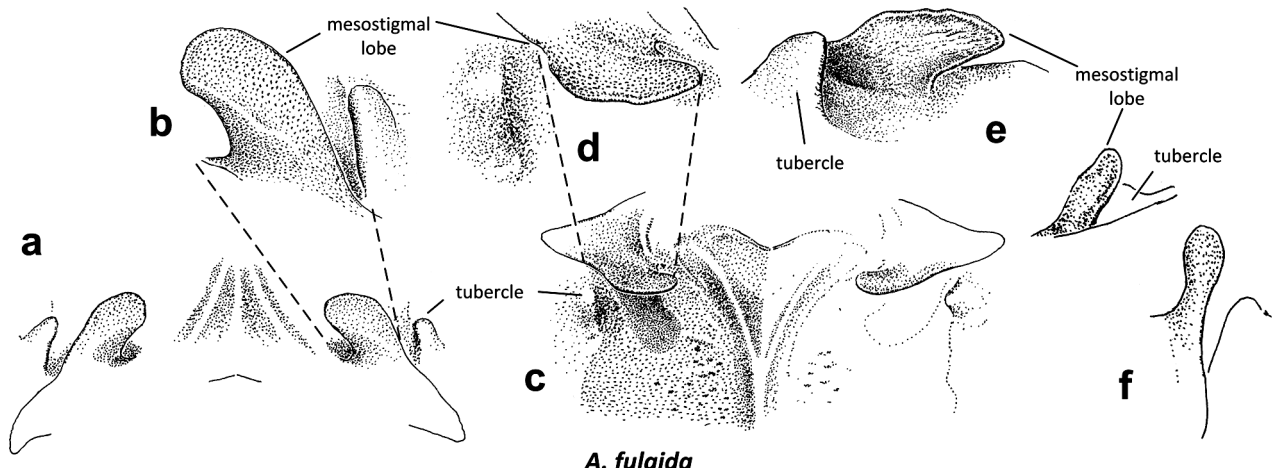
FIGURES 96–102. Color pattern of female S7–10 of other species, lateral view (93–100, 102); S1–5, dorsolateral view (101).

103



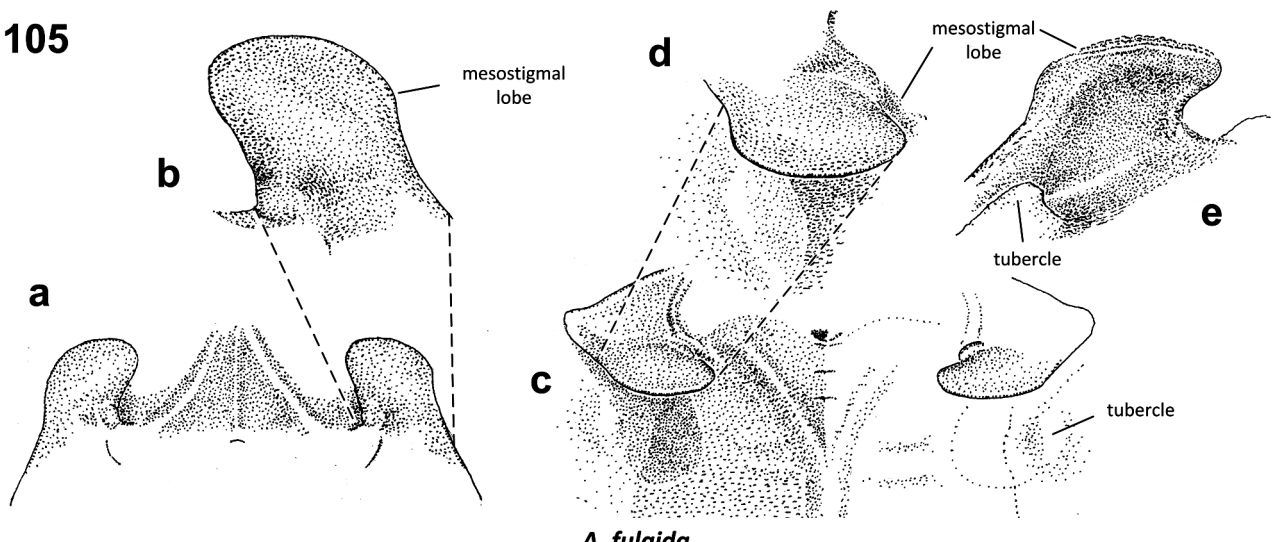
*A. cuprea*  
MEXICO, Palenque Ruins

104



*A. fulgida*  
COSTA RICA, La Selva

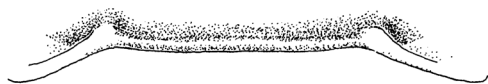
105



*A. fulgida*  
ECUADOR, Pove River

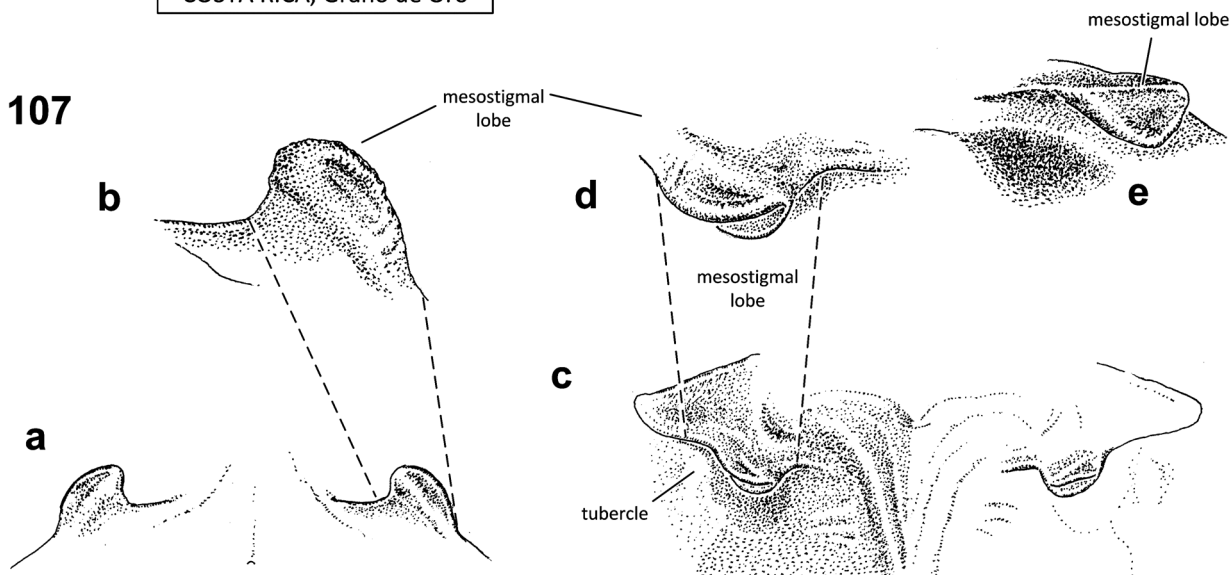
**FIGURES 103–105.** Female mesostigmal plates of metallic species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view; (f) anterolateral view.

106



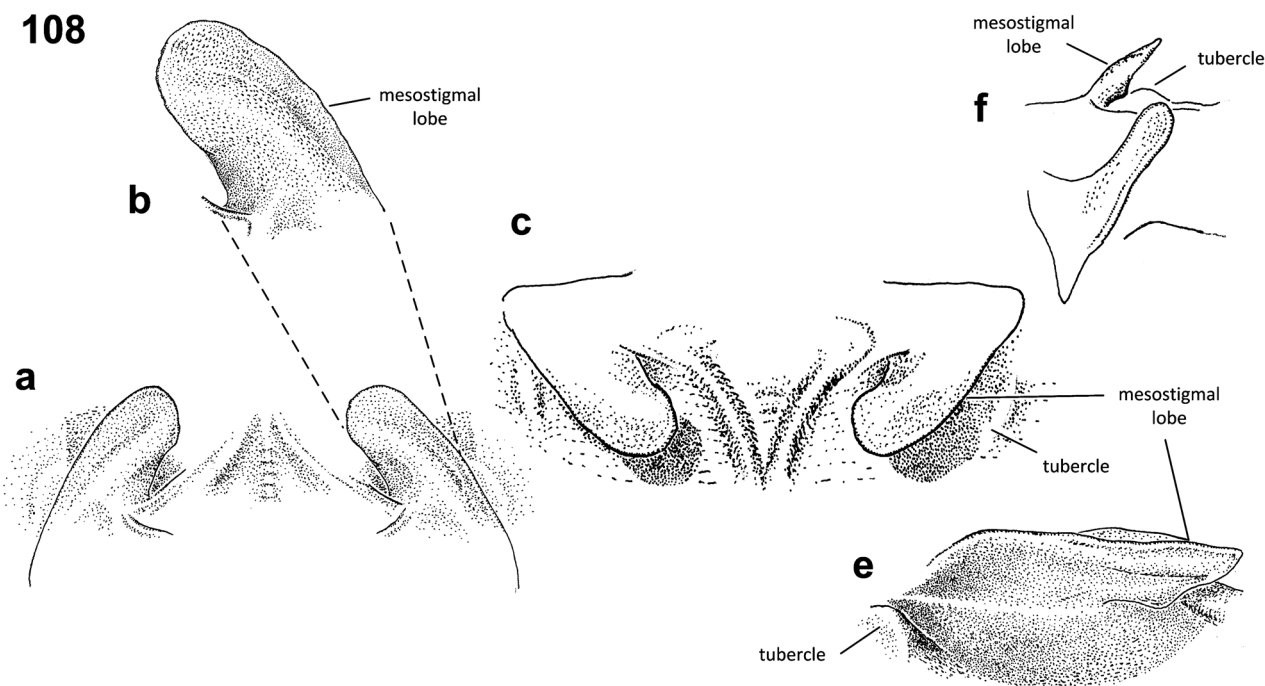
*A. calverti* – PARATYPE  
COSTA RICA, Grano de Oro

107



*A. calverti* – PARATYPE  
COSTA RICA, Grano de Oro

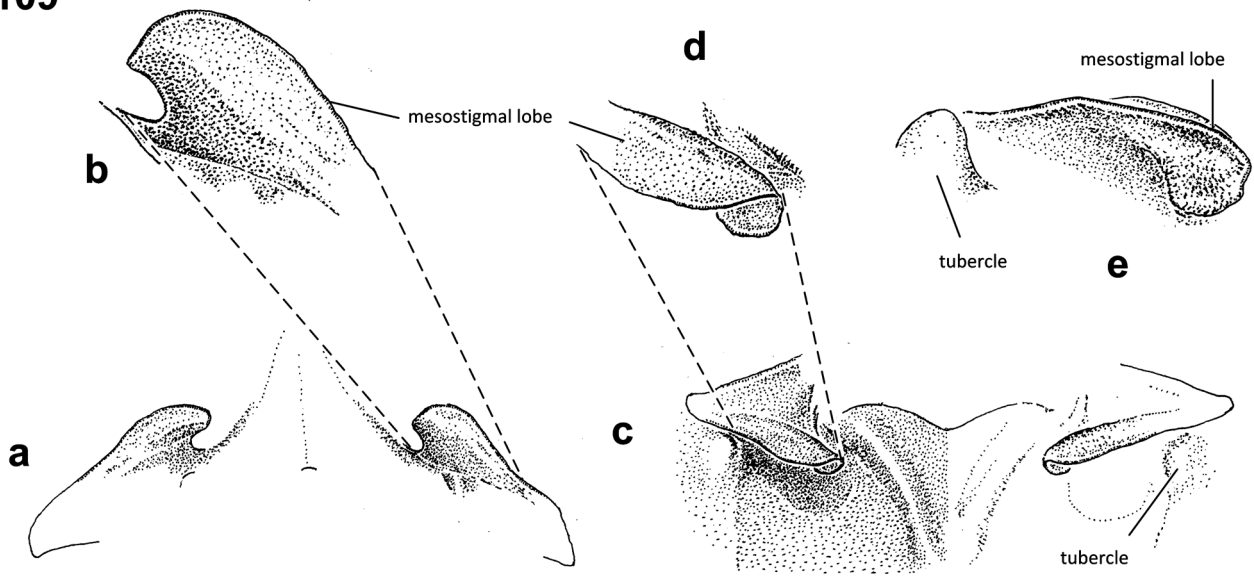
108



*A. cupraurea*  
COSTA RICA, San Mateo

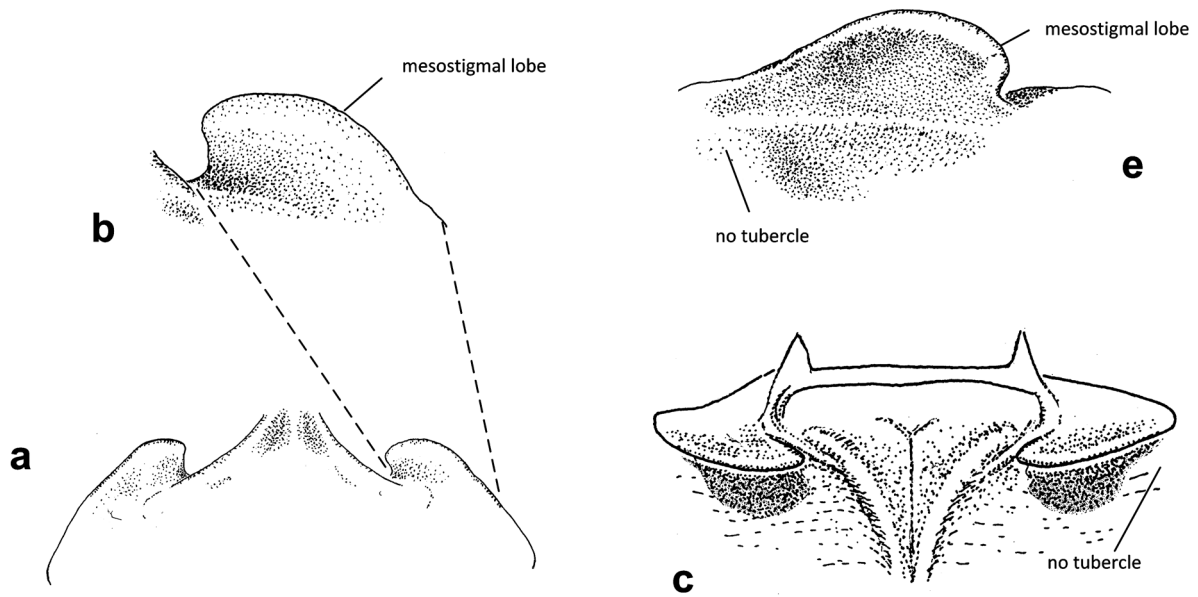
**FIGURES 106–108.** Female thoracic structures of metallic species. Pronotal posterior lobe, dorsal view (106). Mesostigmal plates (107–108): (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of right mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view; (f) anterolateral view.

109



*A. oenea*  
MEXICO, Máquinas River

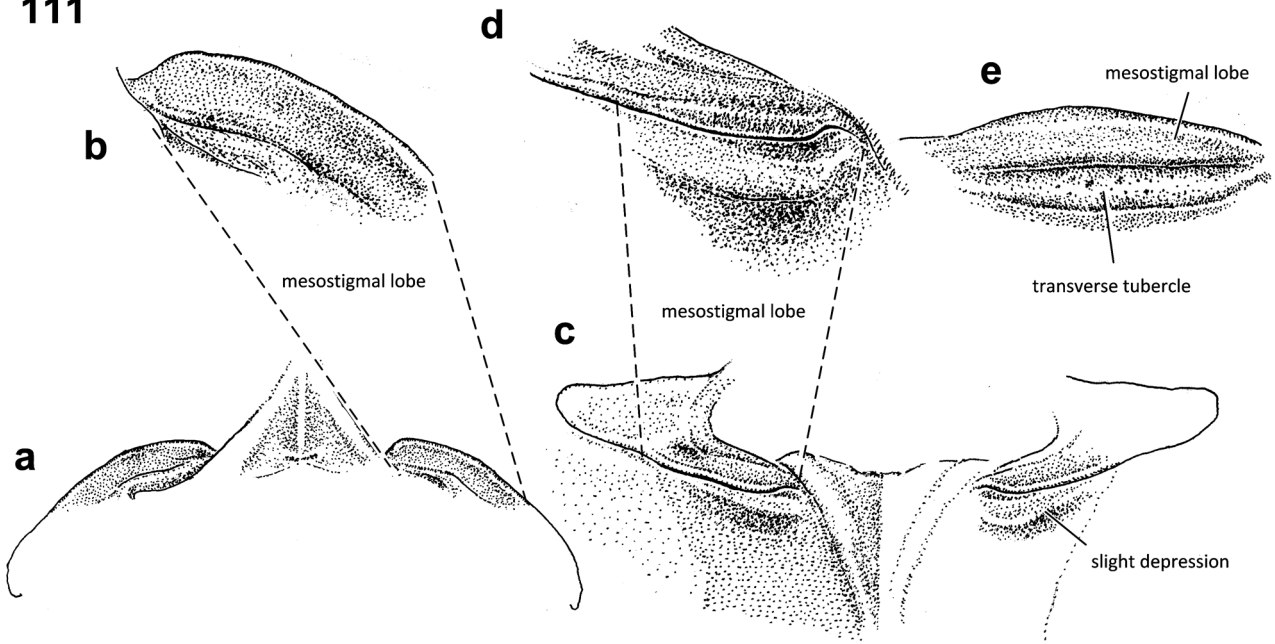
110



*A. oenea*  
USA, Seven Springs

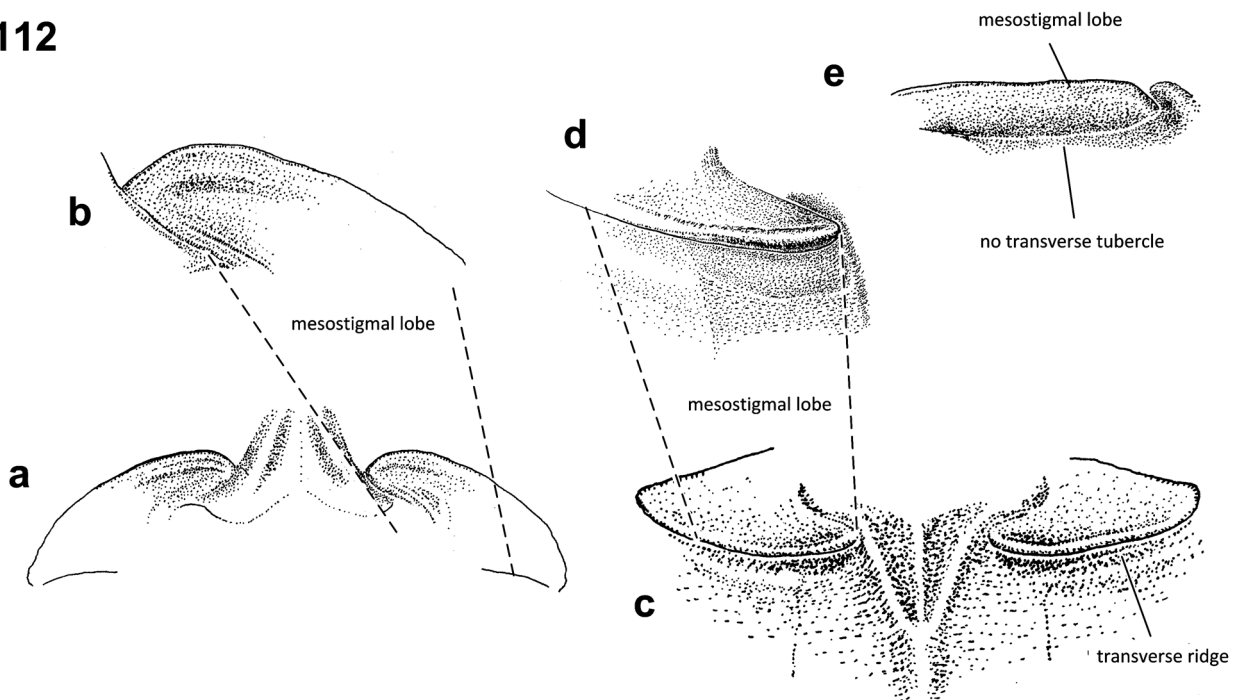
**FIGURES 109–110.** Female mesostigmal plates of metallic species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view.

111



*A. elongata* – PARATYPE  
Costa Rica, Hotel Holanda

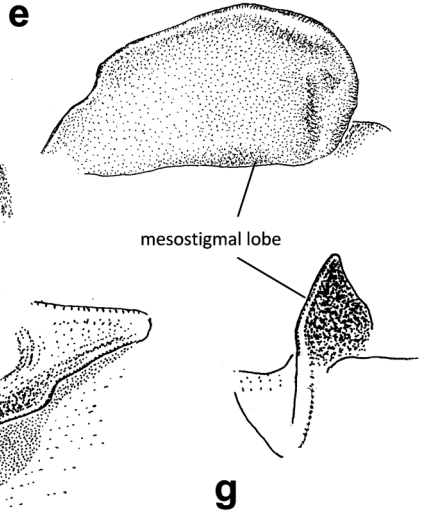
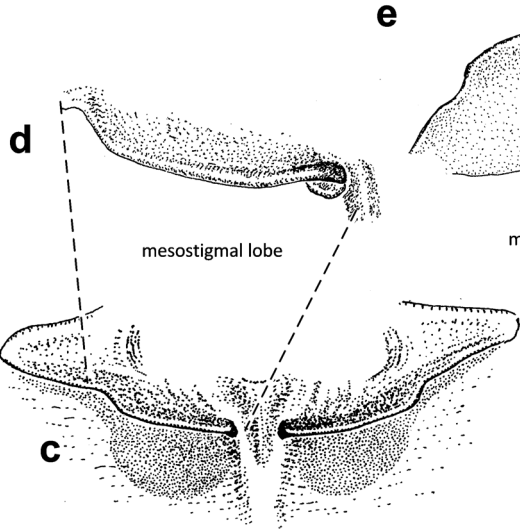
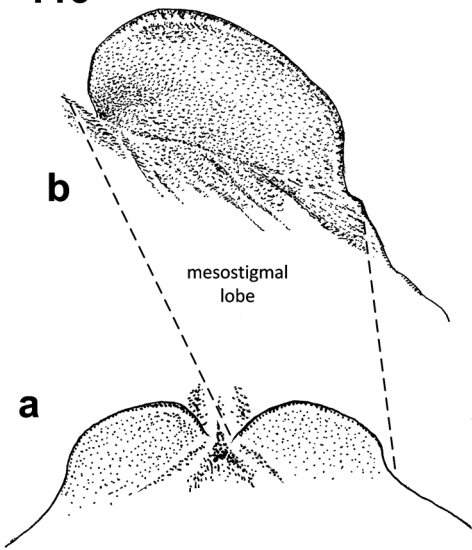
112



*A. extranea*  
MEXICO, La Guayanera

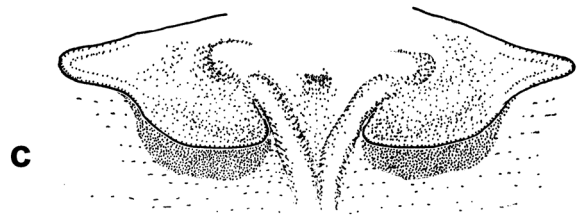
**FIGURES 111–112.** Female mesostigmal plates of *extranea*-group species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view.

113



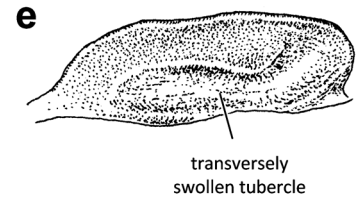
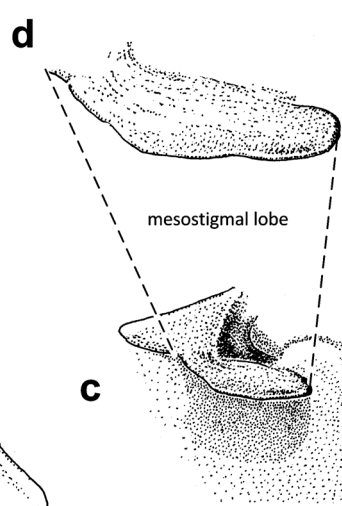
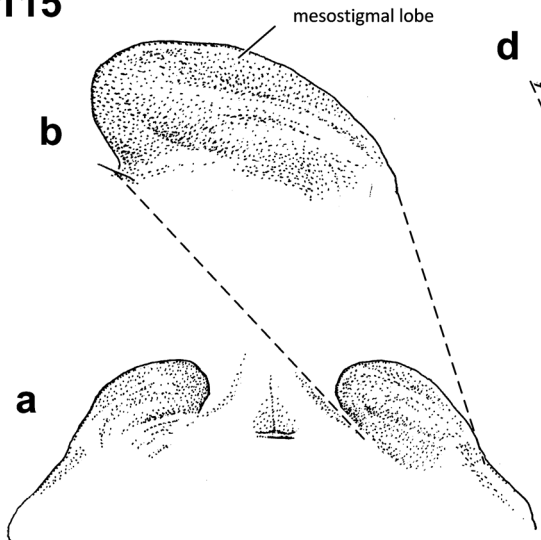
***A. rudolphi* – PARATYPE**  
MEXICO, N of Tlachinol

114



***A. anceps* – ALLOTYPE**  
COSTA RICA, Hotel Holanda

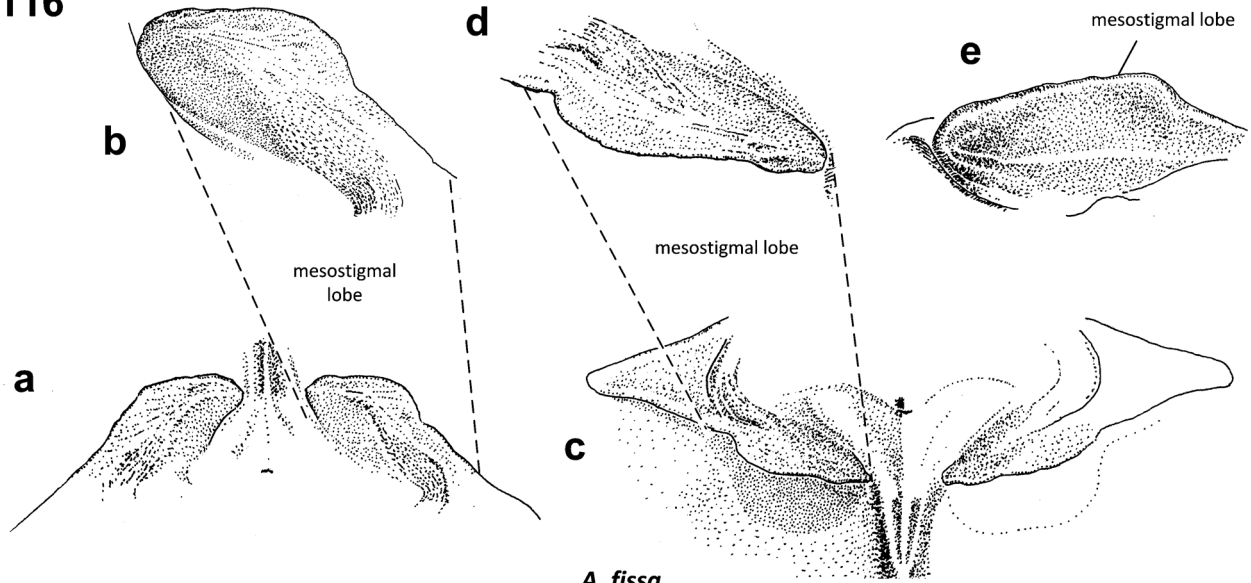
115



***A. anceps***  
MEXICO, La Chichihua

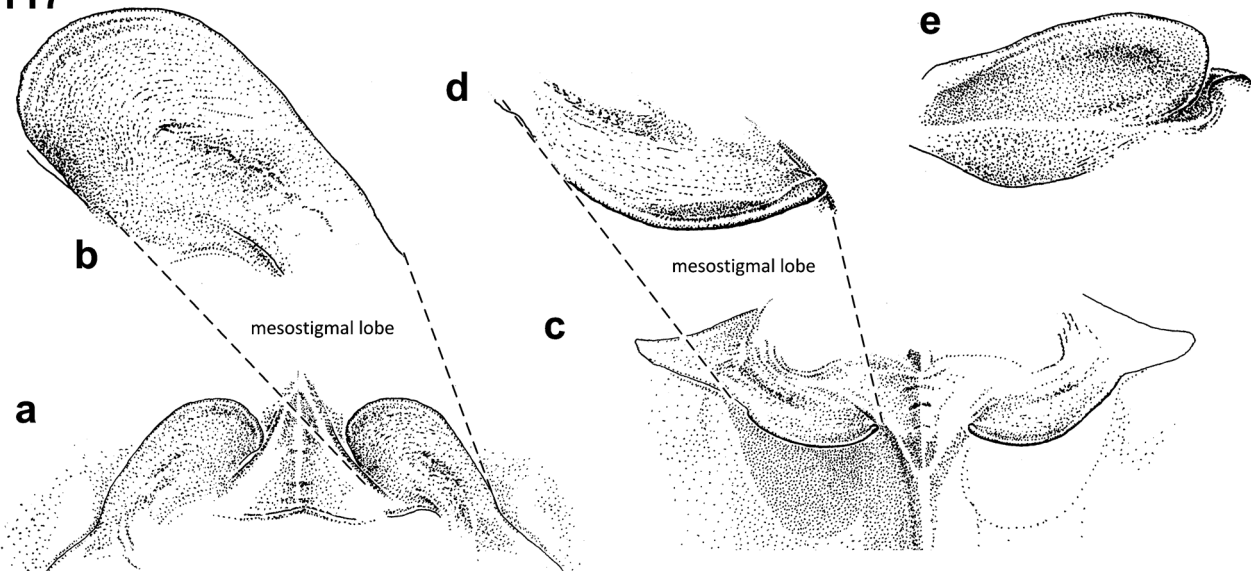
**FIGURES 113–115.** Female mesostigmal plates of *extranea*-group species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view; (g) lateral view.

116



*A. fissa*  
PANAMA, Potrerillos

117



*A. westfalli*  
MEXICO, Lagunas de Montebello

118

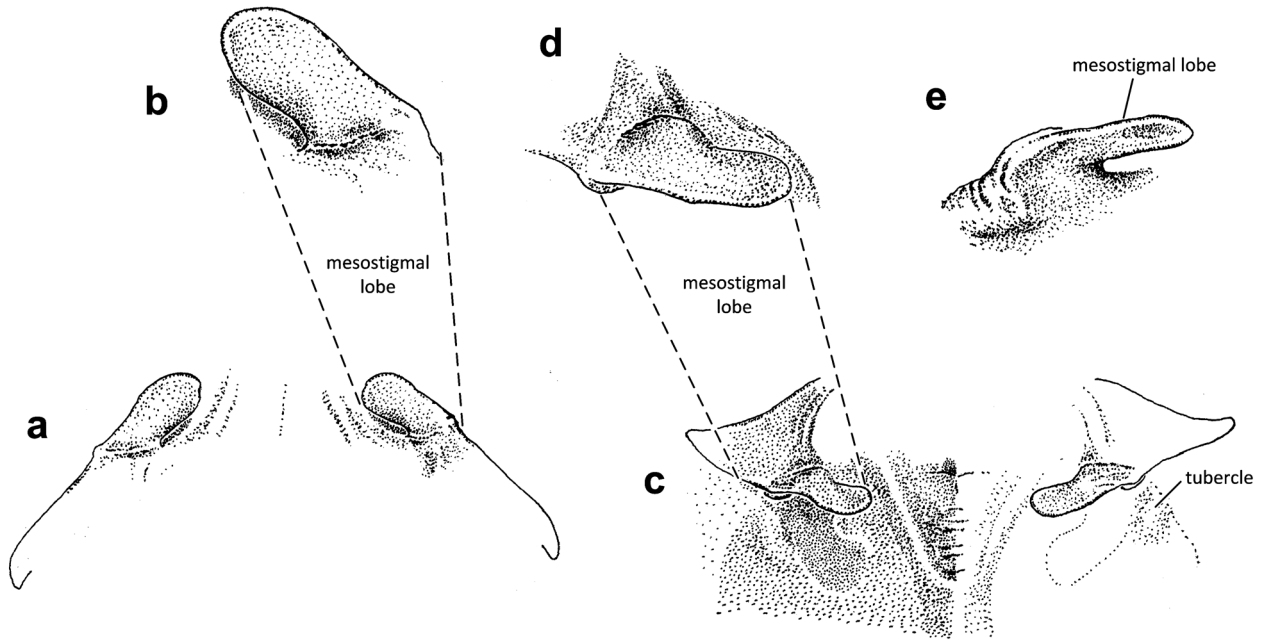


*A. westfalli* – ALLOTYPE  
MEXICO, Rancho Los Atascosos

**FIGURES 116–118.** Female mesostigmal plates of *extranea*-group species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view.

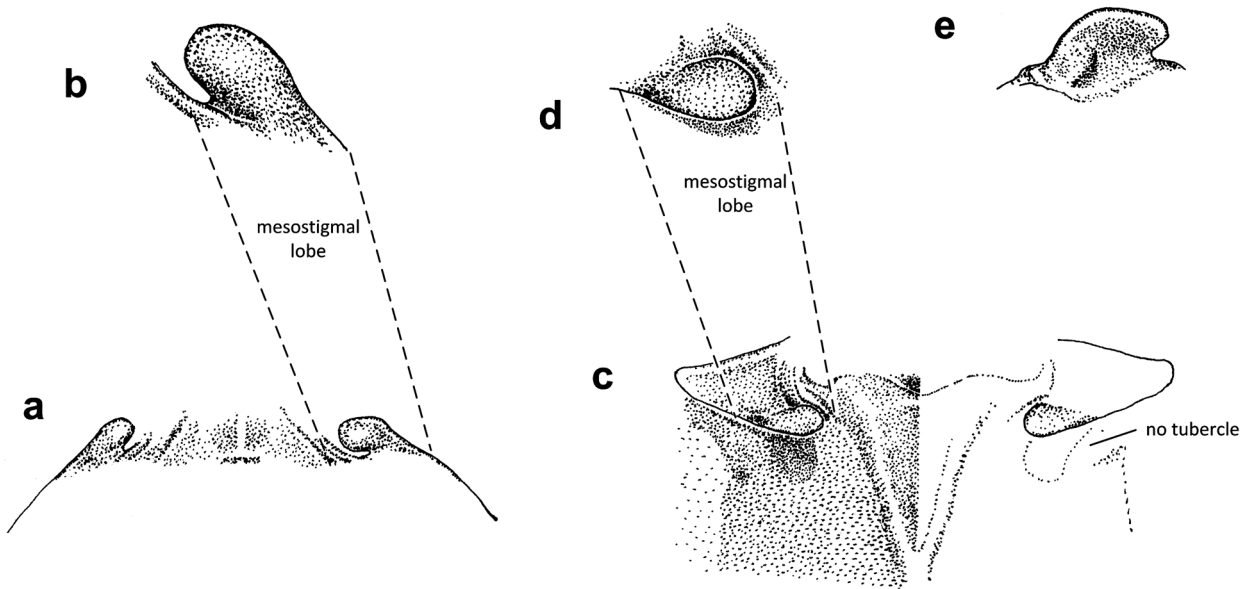


119



*A. carolus* – PARATYPE  
COSTA RICA, Bonnefil Farm

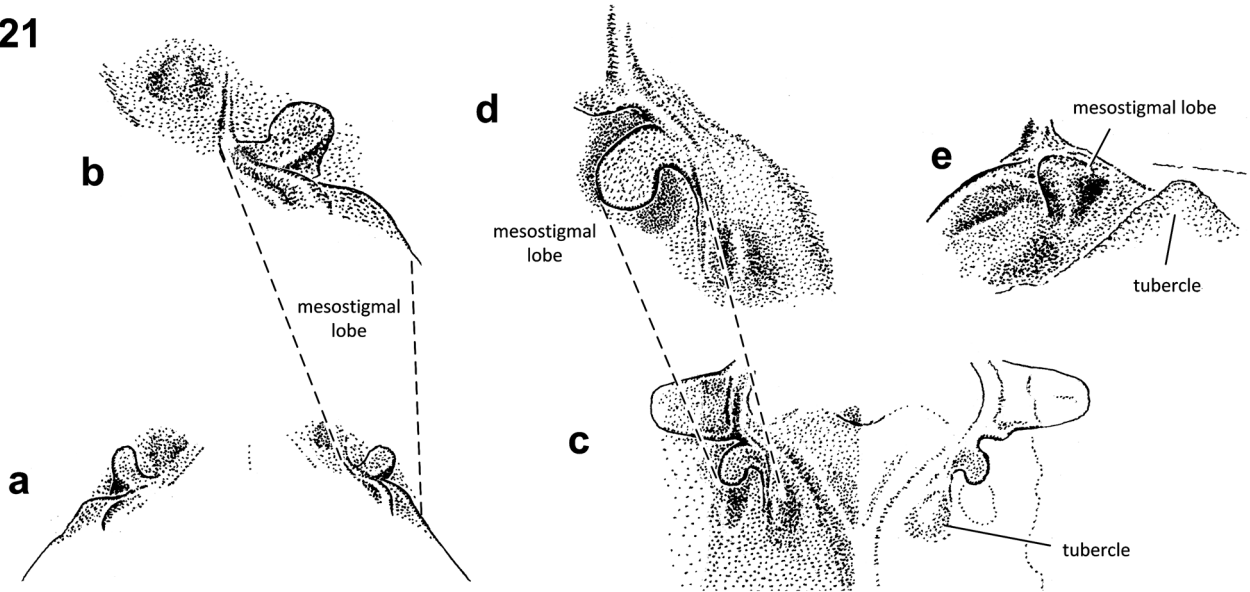
120



*A. schneideri*  
ECUADOR, Araujo River

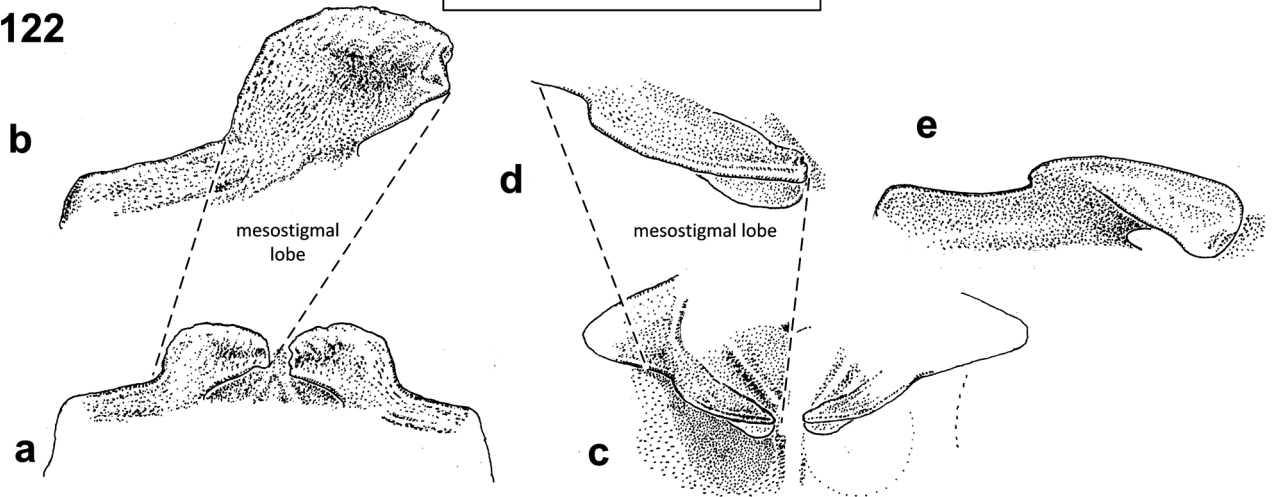
**FIGURES 119–120.** Female mesostigmal plates of other species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view.

121



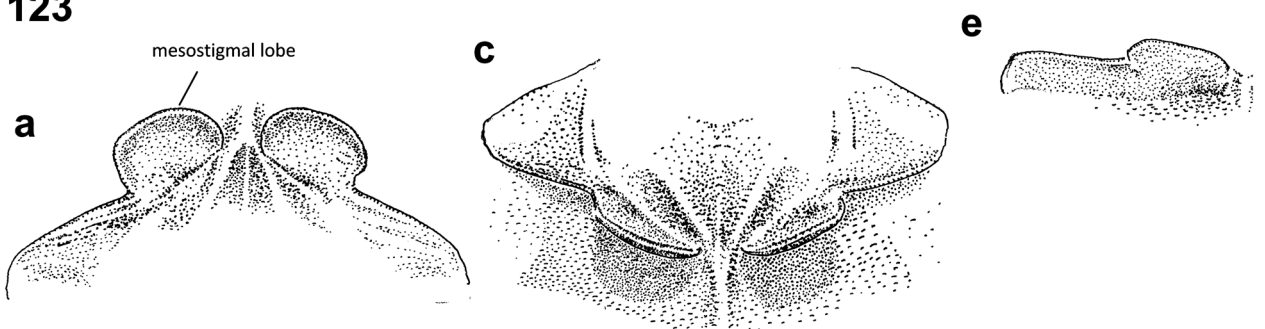
*A. schorri* – PARATYPE  
COSTA RICA, NE of Uvita

122



*A. popoluca*  
COSTA RICA, Braulio Carrillo NP

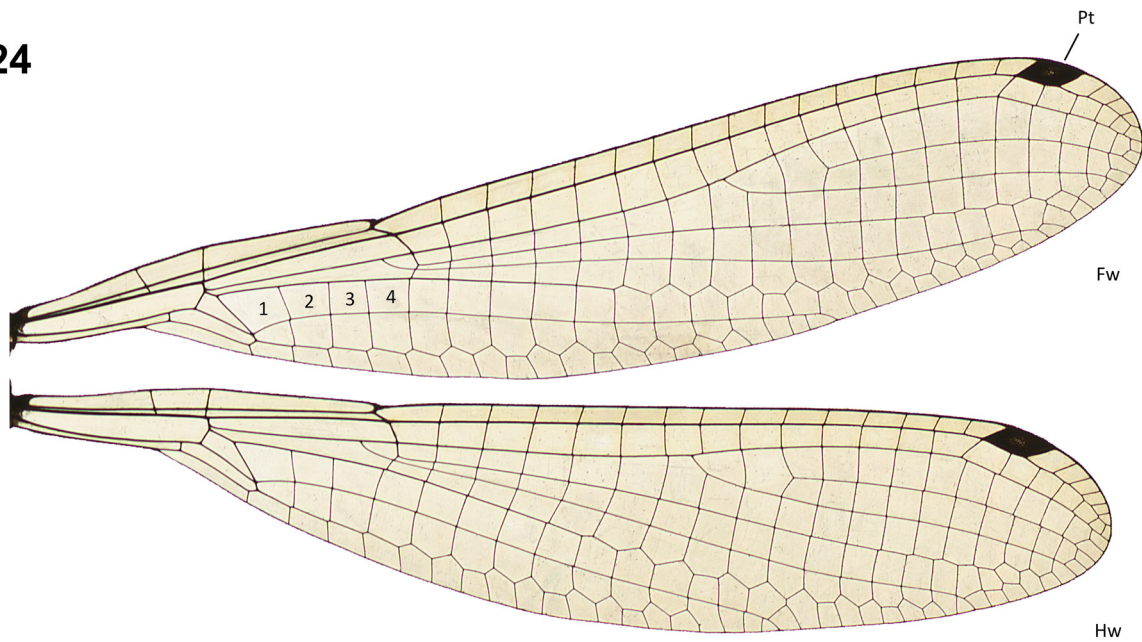
123



*A. popoluca*  
MEXICO, Los Tuxtlas

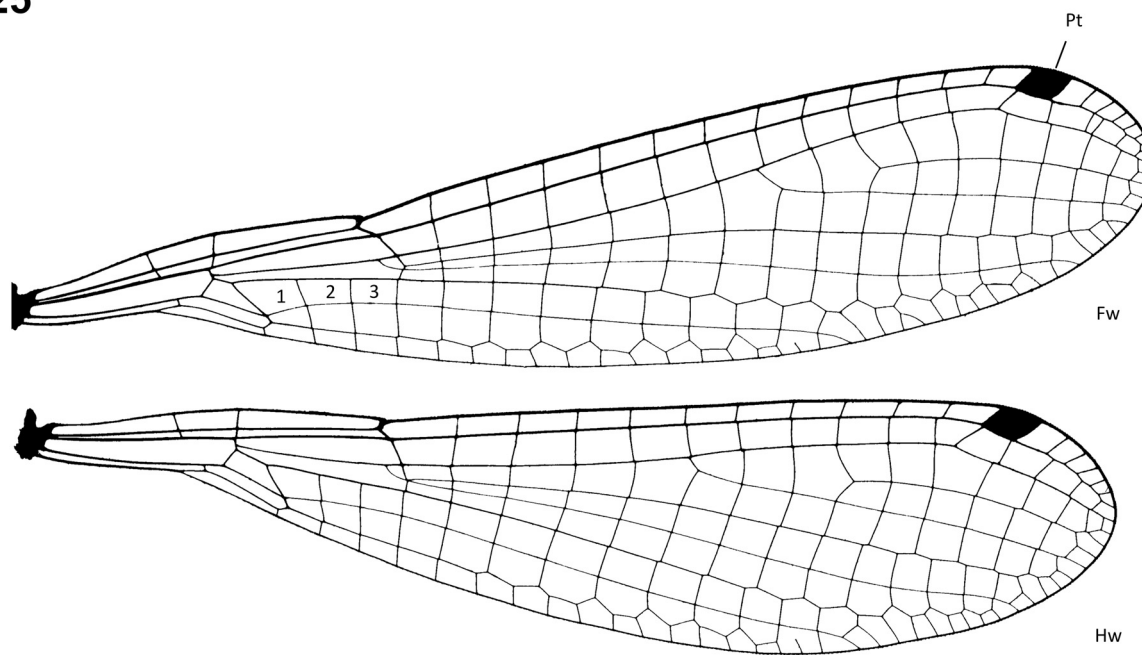
**FIGURES 121–123.** Female mesostigmal plates of other species. (a) frontal (anterior) view; (b) detail of left mesostigmal lobe, frontal view; (c) dorsal view; (d) detail of left mesostigmal lobe, dorsal view; (e) detail of right mesostigmal lobe, posterior view.

124



*A. haberi* – PARATYPE  
COSTA RICA, Bosque del Tolomuco

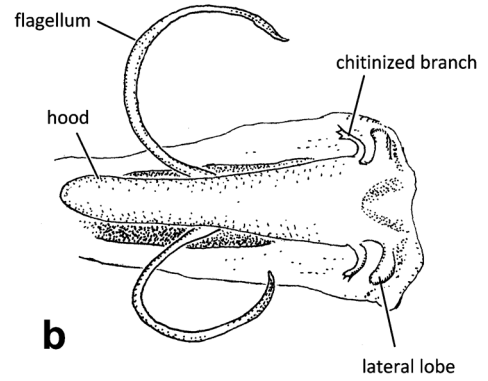
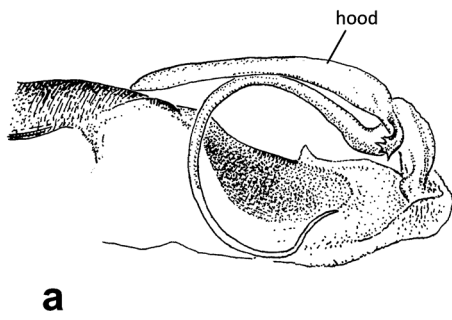
125



*A. schorri* – PARATYPE  
COSTA RICA, Golfito

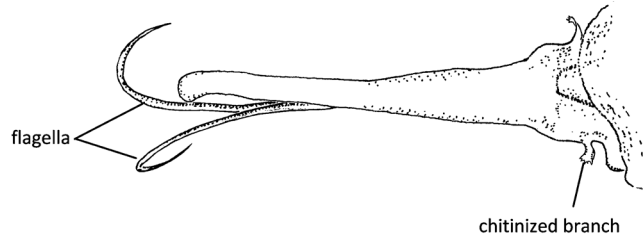
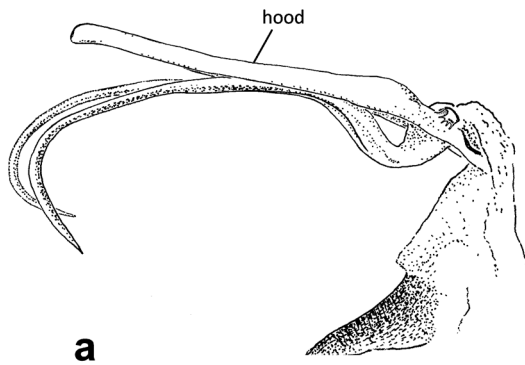
FIGURES 124–125. Male wings, right pair.

126



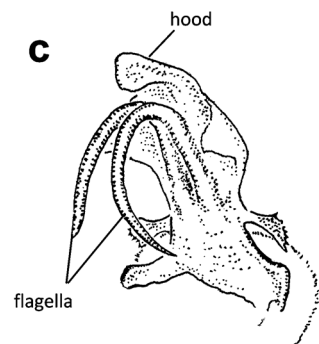
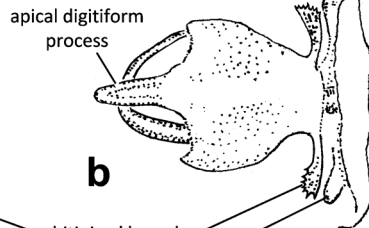
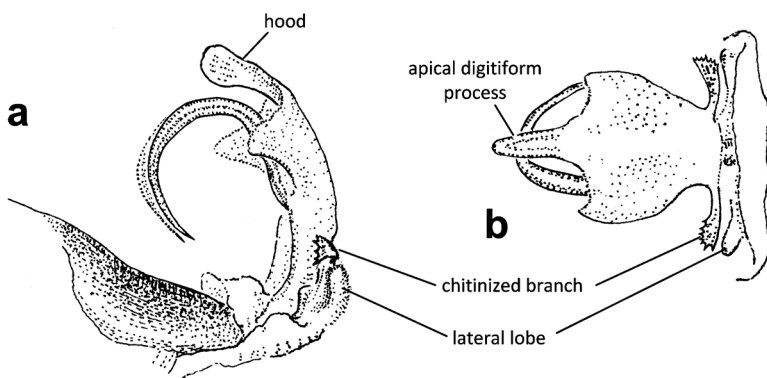
*A. cuprea*  
MEXICO, Laguna Azul

127



*A. cuprea*  
MEXICO, Las Pozas de Xilitla

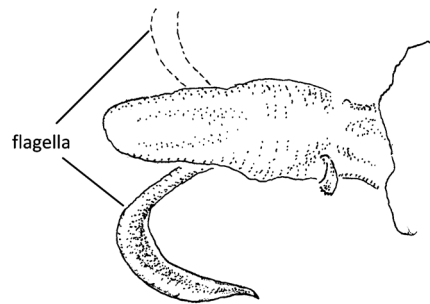
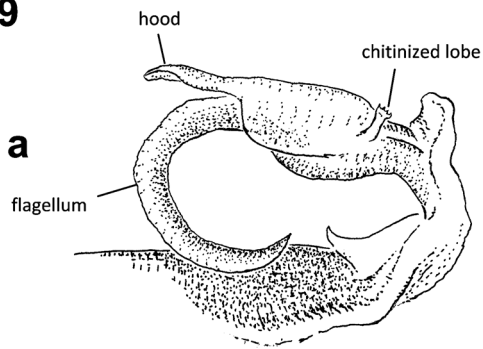
128



*A. fulgida*  
PANAMA, Santa Fe

FIGURES 126–128. Genital ligula of metallic species. (a) lateral view; (b) ectal view; (c) entolateral view.

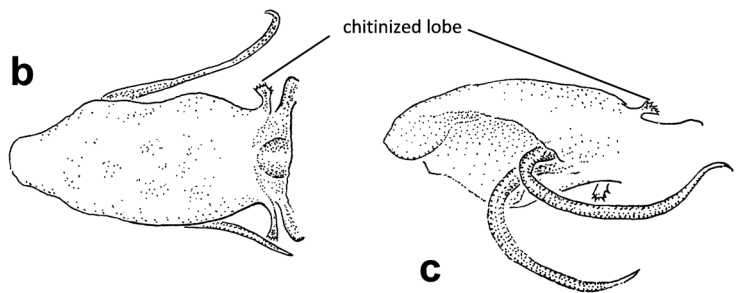
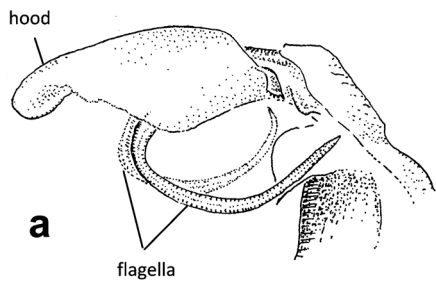
129



*A. fulgida* – HOLOTYPE

COLOMBIA, Muzo

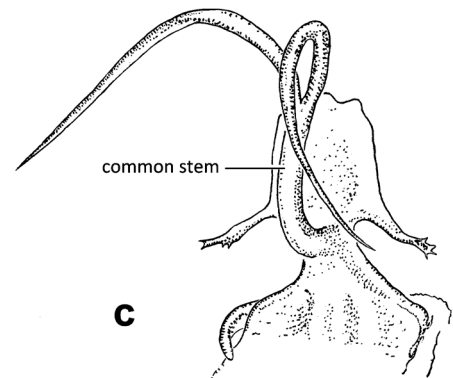
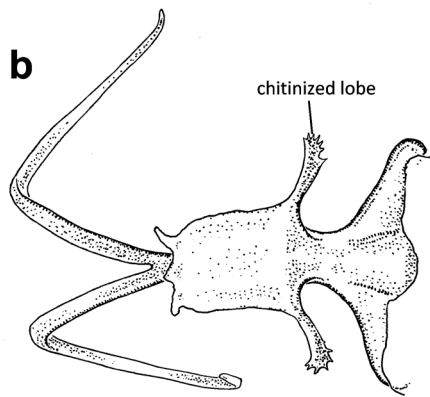
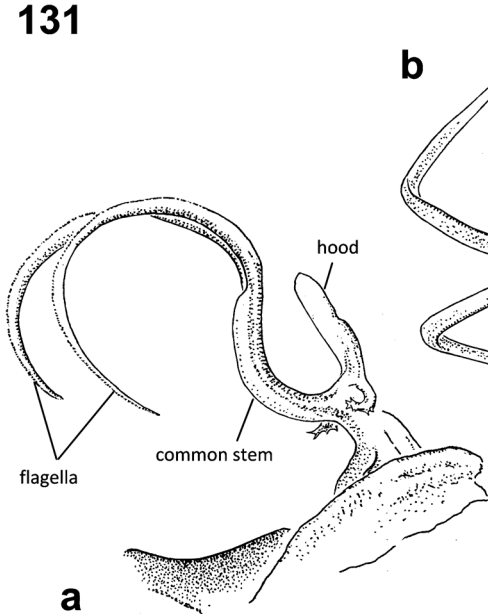
130



*A. fulgida*

ECUADOR, E of Caluma

131

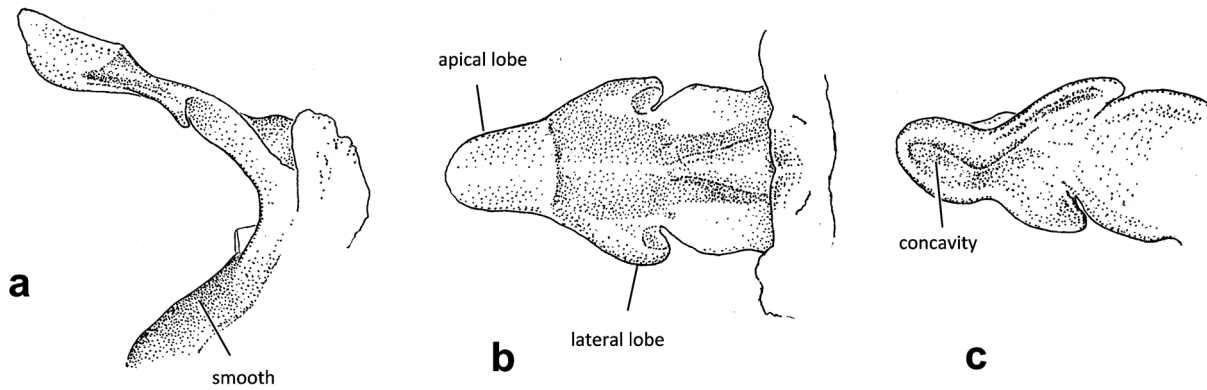


*A. oenea*

ECUADOR, W of Villa Colón

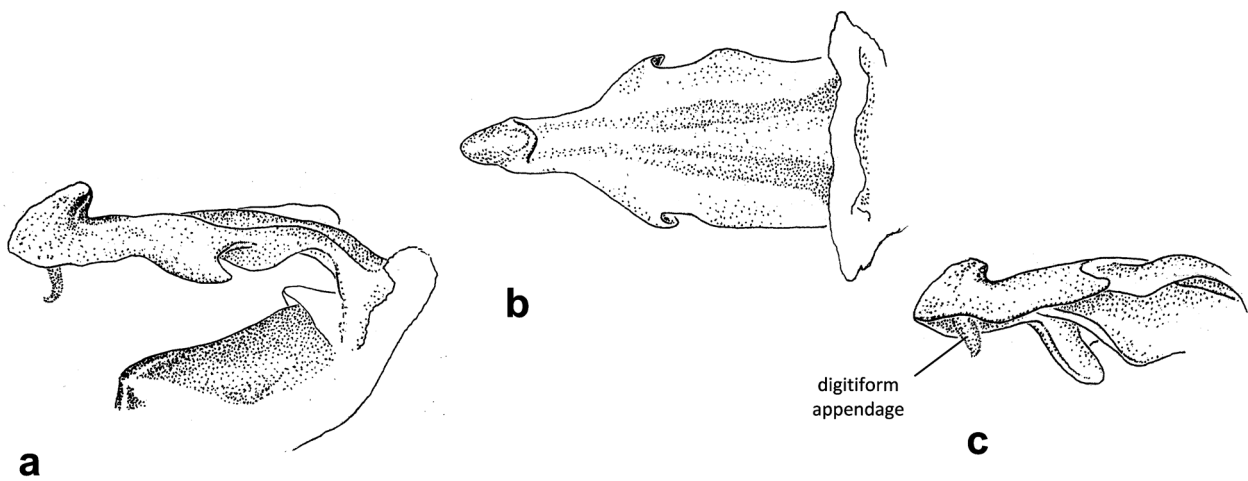
FIGURES 129–131. Genital ligula of metallic species. (a) lateral view; (b) ectal view; (c) entolateral view.

132



*A. elongata* – PARATYPE  
GUATEMALA, Tamahu

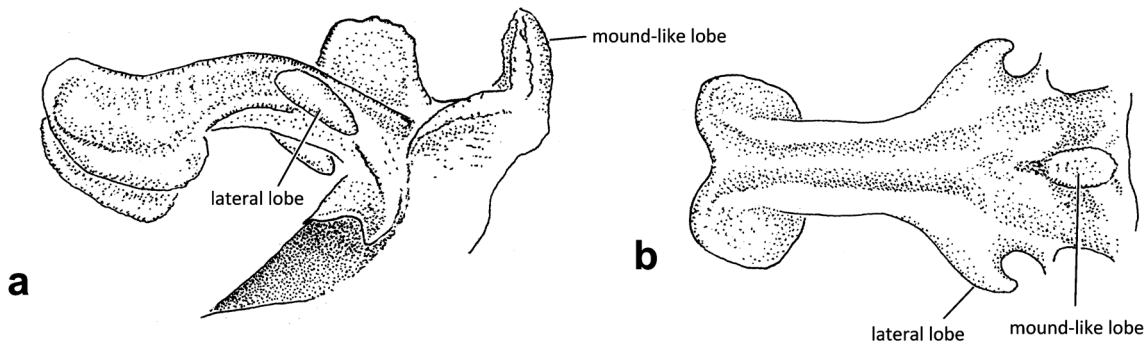
133



*A. extranea* – HOLOTYPE of *A. mista*  
MEXICO, San Juan Teotihuacán

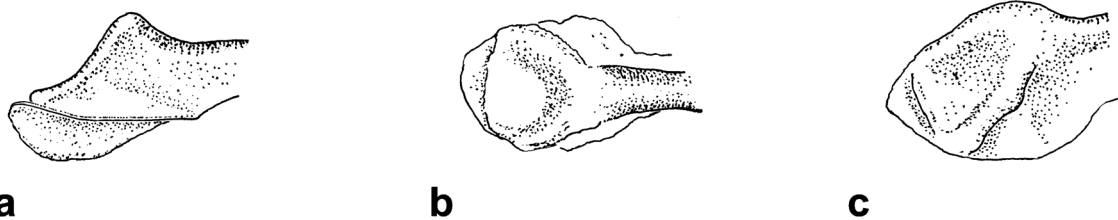
FIGURES 132–133. Genital ligula of *extranea*-group species. (a) lateral view; (b) ectal view; (c) entolateral view.

134



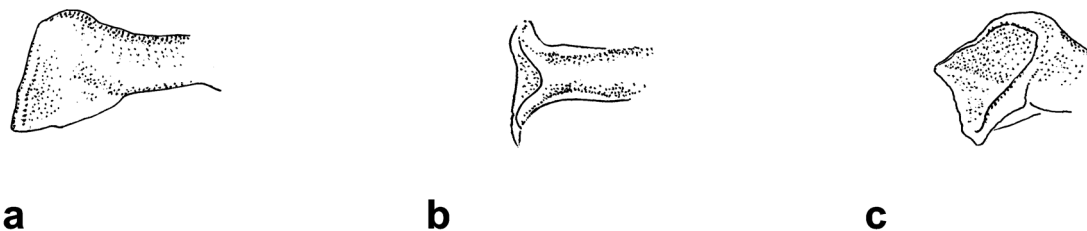
*A. anceps*  
COSTA RICA, El Rodeo

135



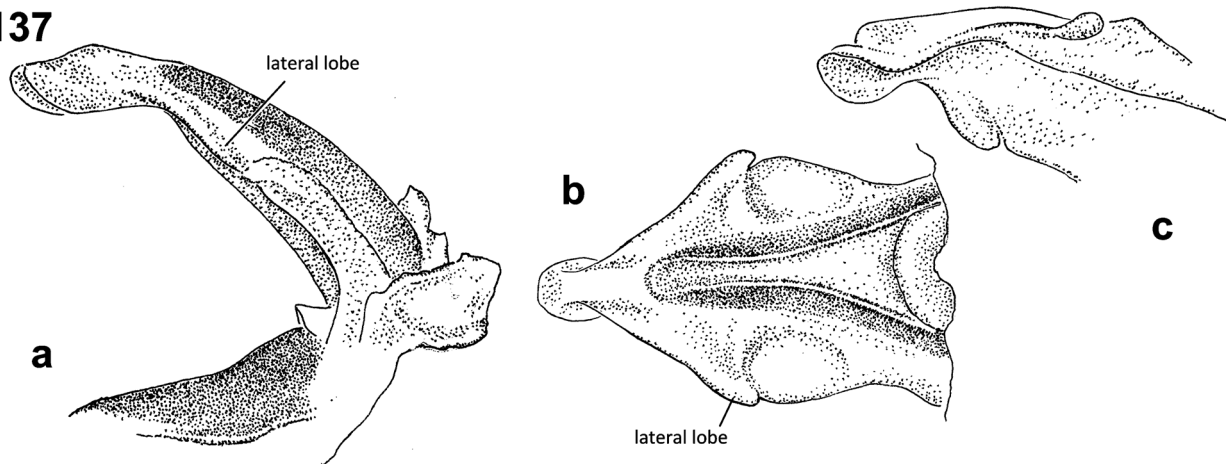
*A. anceps*  
COSTA RICA, Reventazón River

136



*A. anceps*  
MEXICO, Sierra de Autlán

137

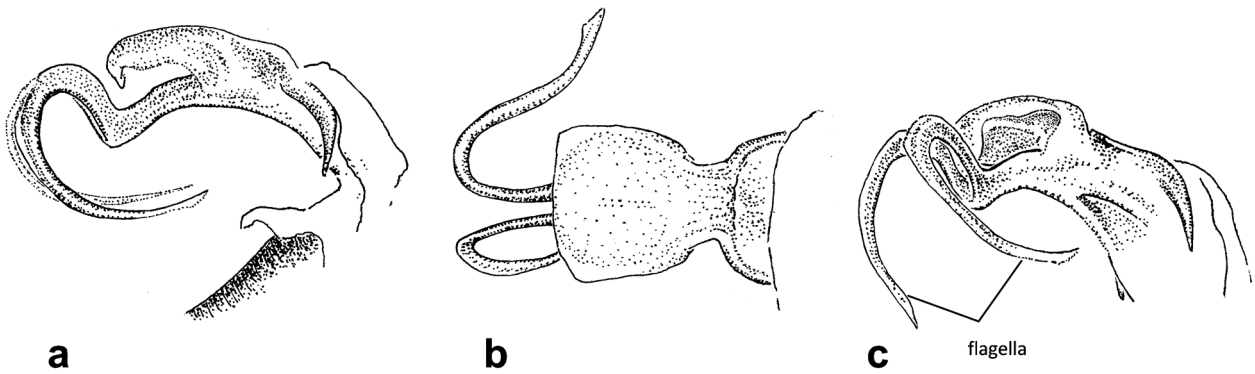


*A. rudolphi* – HOLOTYPE  
MEXICO, La Unión

FIGURES 134–137. Genital ligula of *extranea*-group species; complete view (134, 137) and partial view of apex (135, 136). (a) lateral view; (b) ectal view; (c) entolateral view.

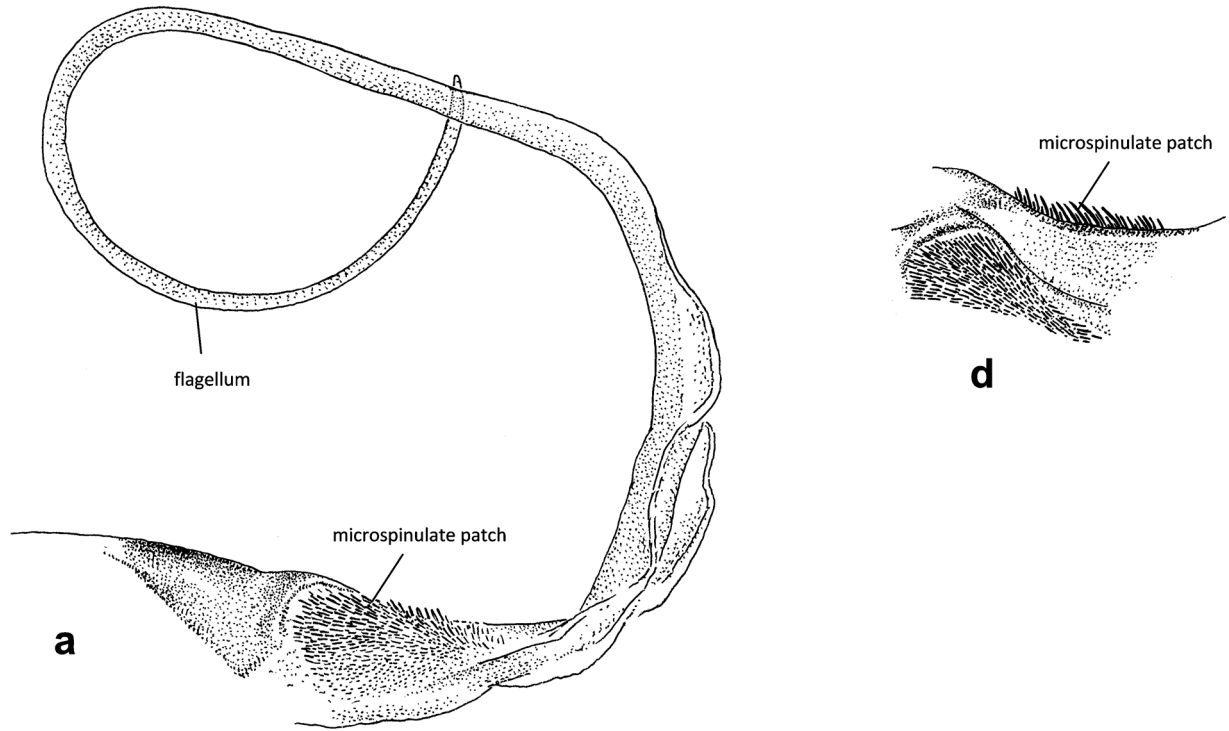


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***A. carolus* – HOLOTYPE**  
COSTA RICA, El Rodeo

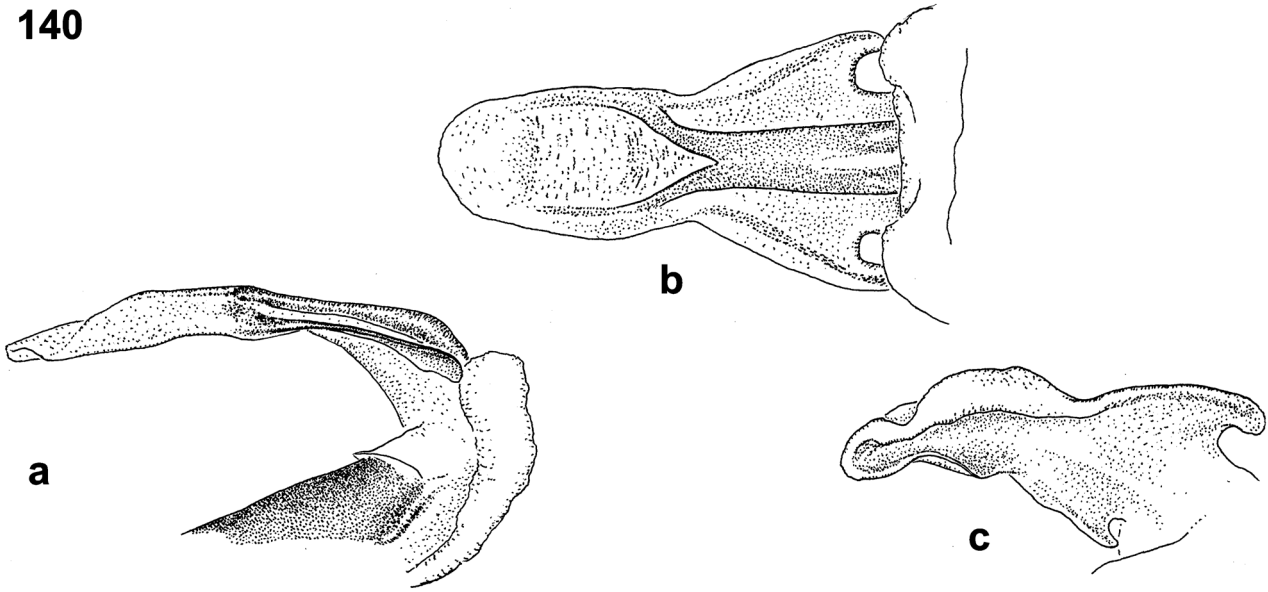
139



***A. schneideri* – HOLOTYPE**  
ECUADOR, Las Palmas

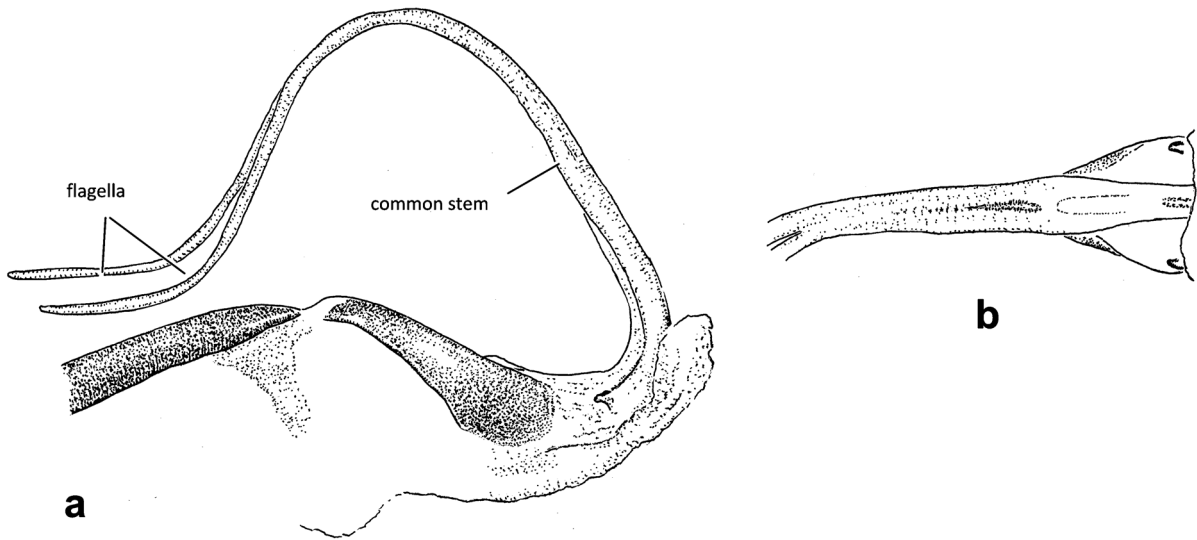
**FIGURES 138–139.** Genital ligula of other species. (a) lateral view; (b) ectal view; (c) entolateral view; (d) detail of field of microtrichia on distal segment's base.

140



*A. haberi* – HOLOTYPE  
COSTA RICA, Tolomuco

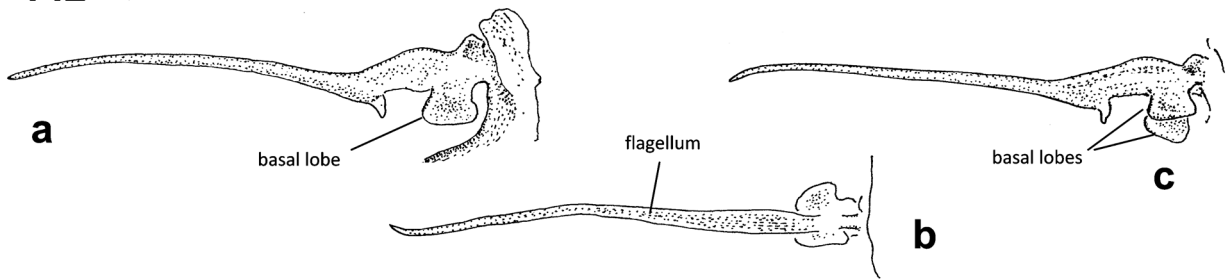
141



*A. rhoadsi*  
MEXICO, Ojitipa River

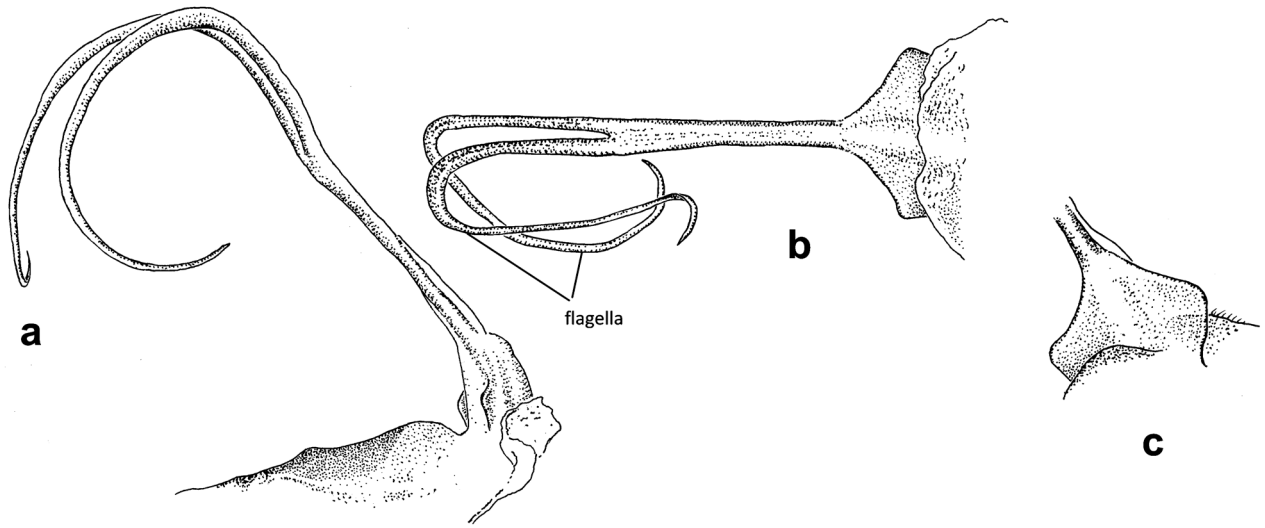
FIGURES 140–141. Genital ligula of other species. (a) lateral view; (b) ectal view; (c) entolateral view.

142



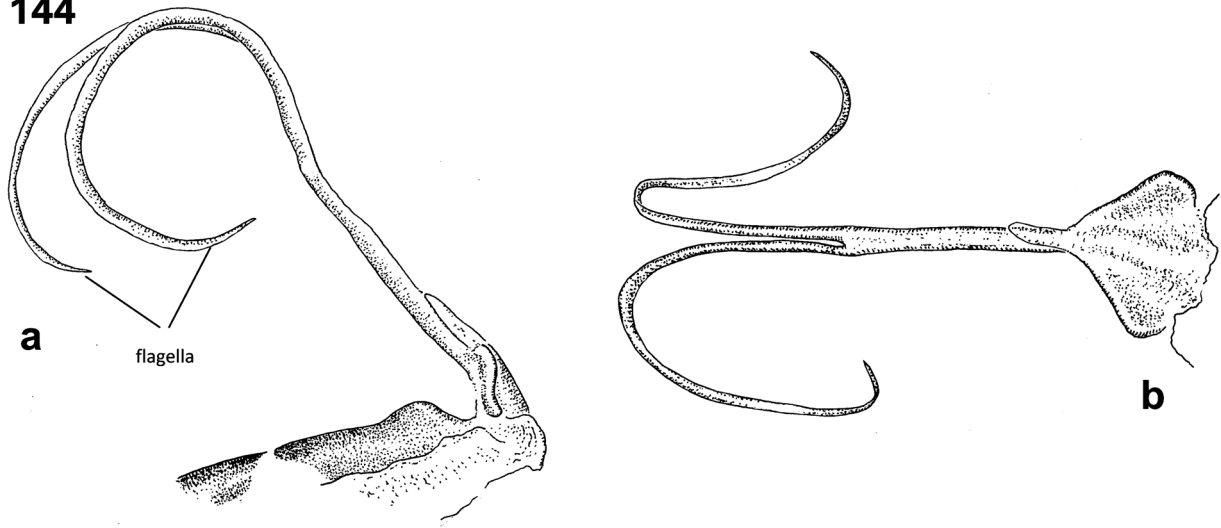
***A. schorri* – HOLOTYPE**  
 COSTA RICA, Golfito

143



***A. popoluca***  
 MEXICO, Laguna Zacatal

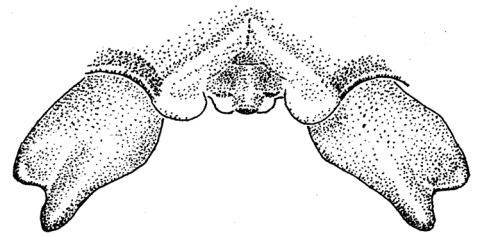
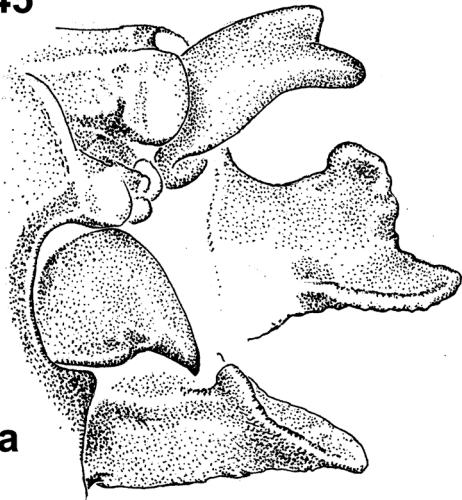
144



***A. popoluca***  
 MEXICO, Los Tuxtlas

FIGURES 142–144. Genital ligula of other species. (a) lateral view; (b) ectal view; (c) entolateral view.

145



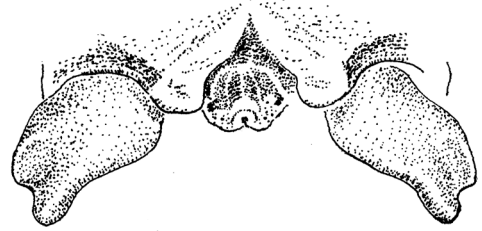
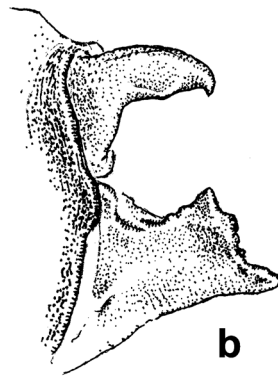
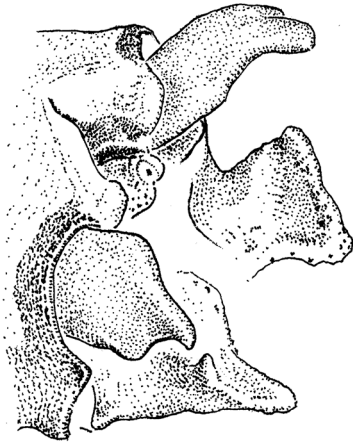
a

b

c

*A. cuprea*  
MEXICO, Palenque Ruins

146



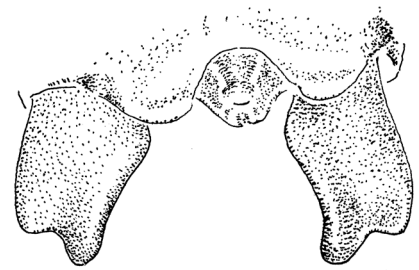
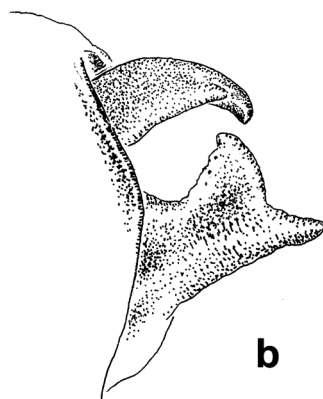
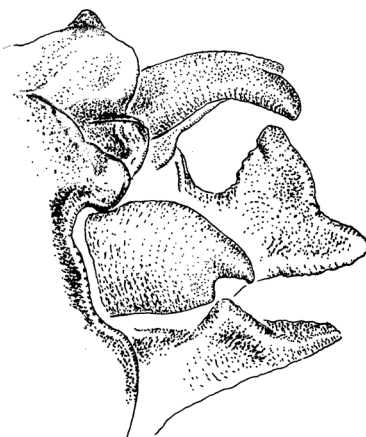
a

b

c

*A. fulgida*  
PANAMA, Santa Fe

147



a

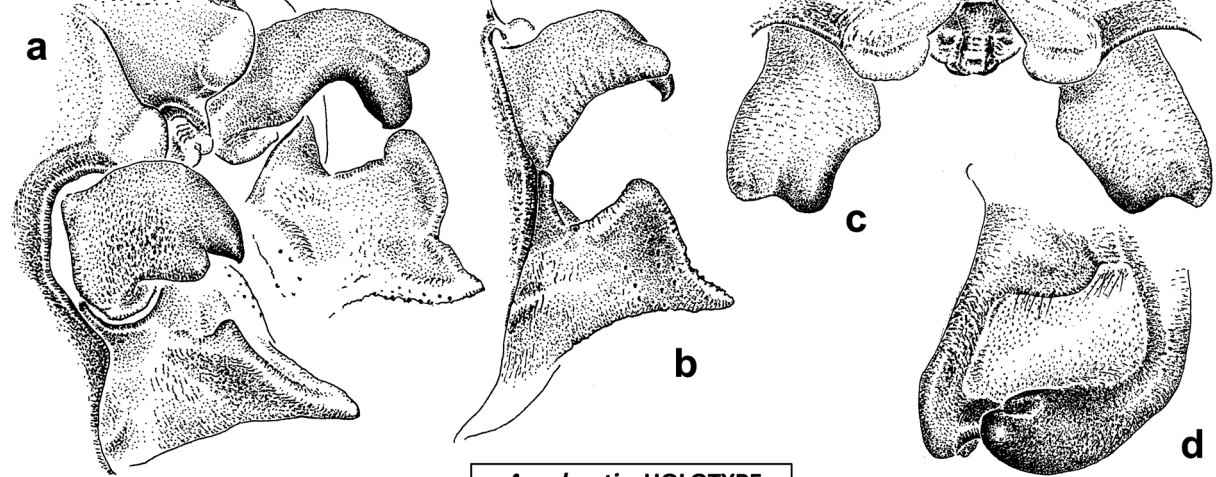
b

c

*A. fulgida* – HOLOTYPE  
COLOMBIA, Muzo

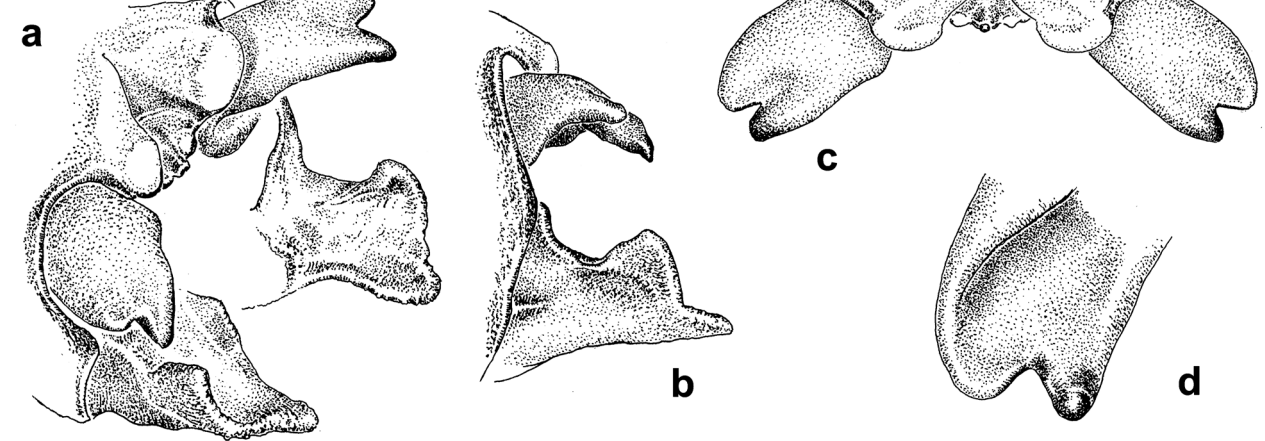
FIGURES 145–147. Male caudal appendages of metallic species. (a) mediodorsal view; (b) lateral view; (c) dorsal view.

148



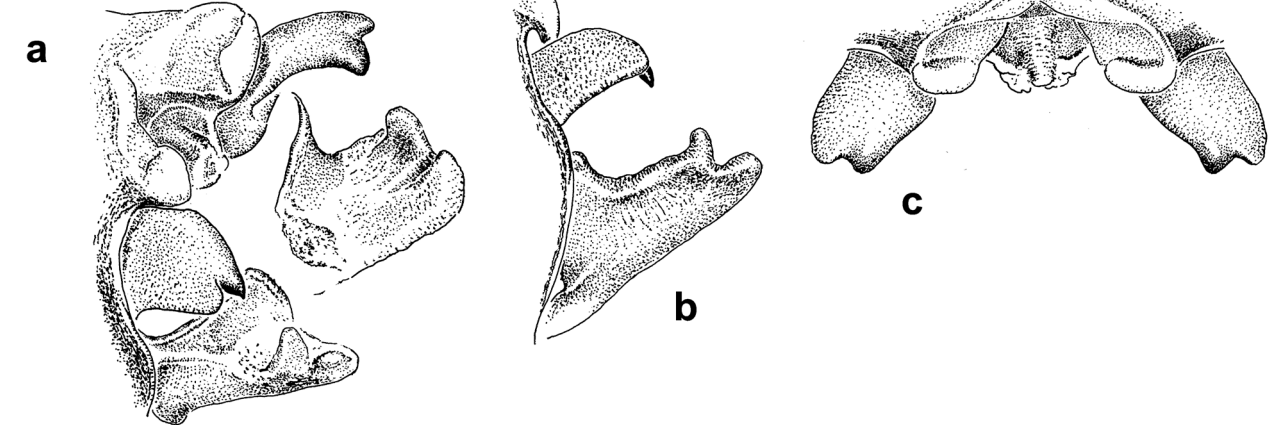
*A. calverti* – HOLOTYPE  
COSTA RICA, Tapandi

149



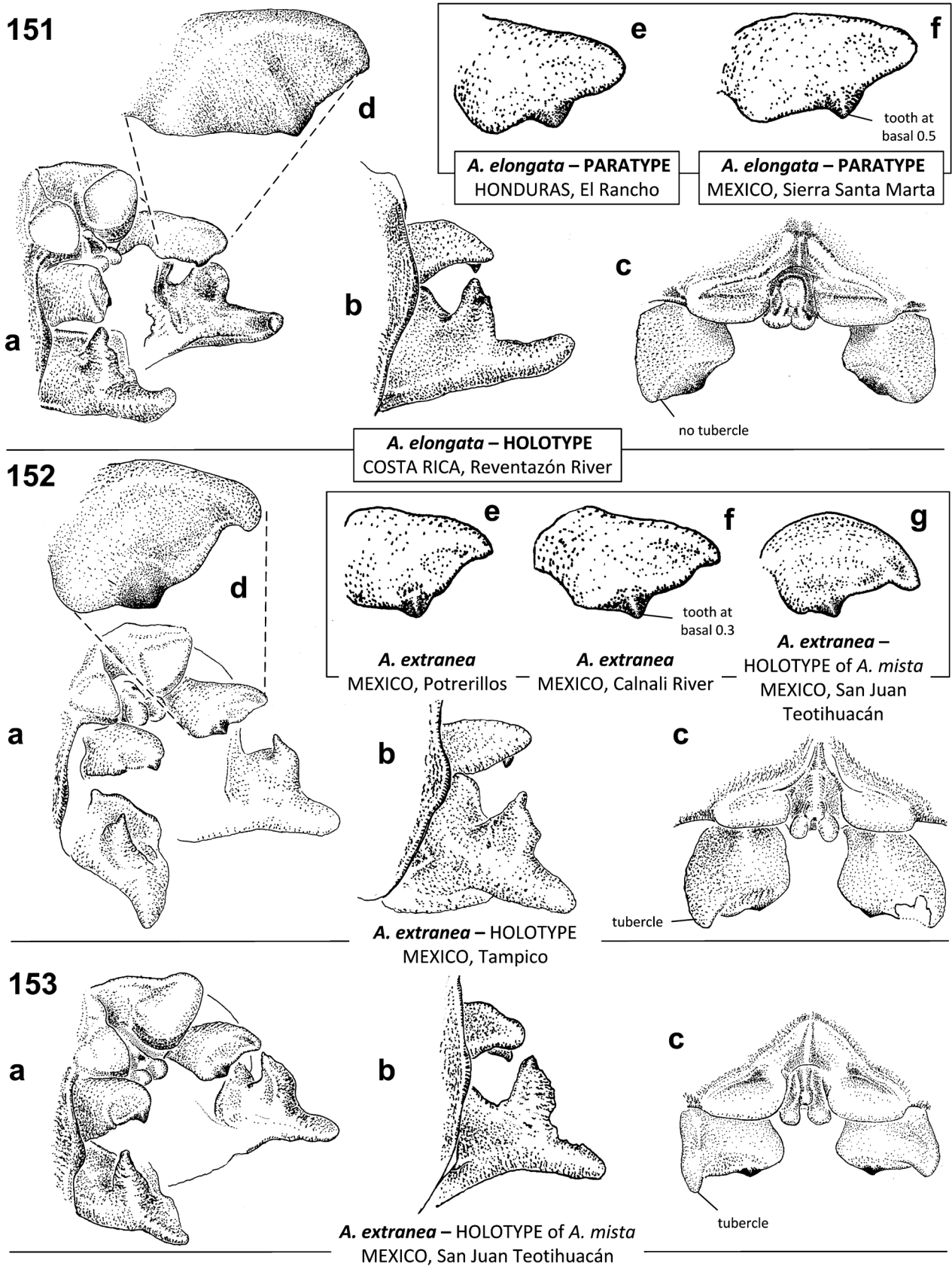
*A. cupraurea*  
PANAMA, Sardanilla River

150



*A. oenea*  
MEXICO, La Fraternidad

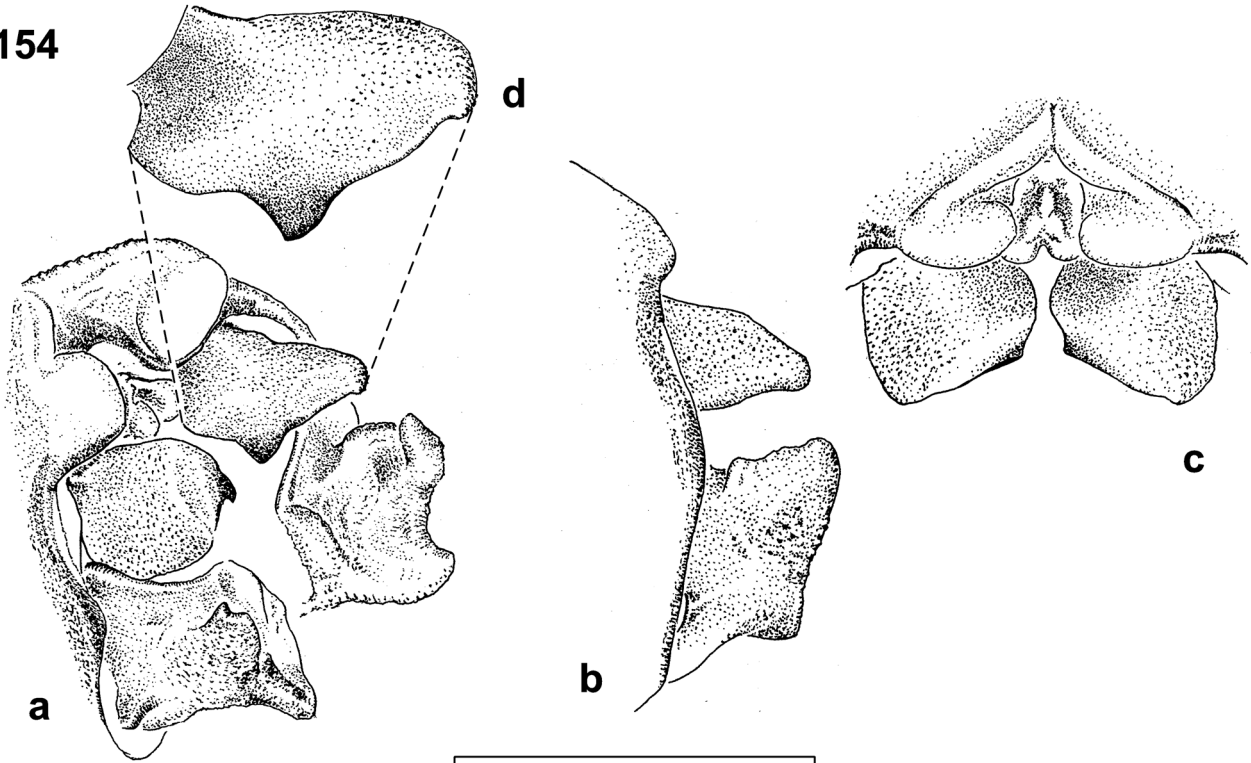
FIGURES 148–150. Male caudal appendages of metallic species. (a) mediodorsal view; (b) lateral view; (c) dorsal view; (d) left cercus, ventral view.



**FIGURES 151–153.** Male caudal appendages of extranea-group species. (a) mediiodorsal view; (b) lateral view; (c) dorsal view; (d–f) right cercus, mediiodorsal view; (g) left cercus, flipped.

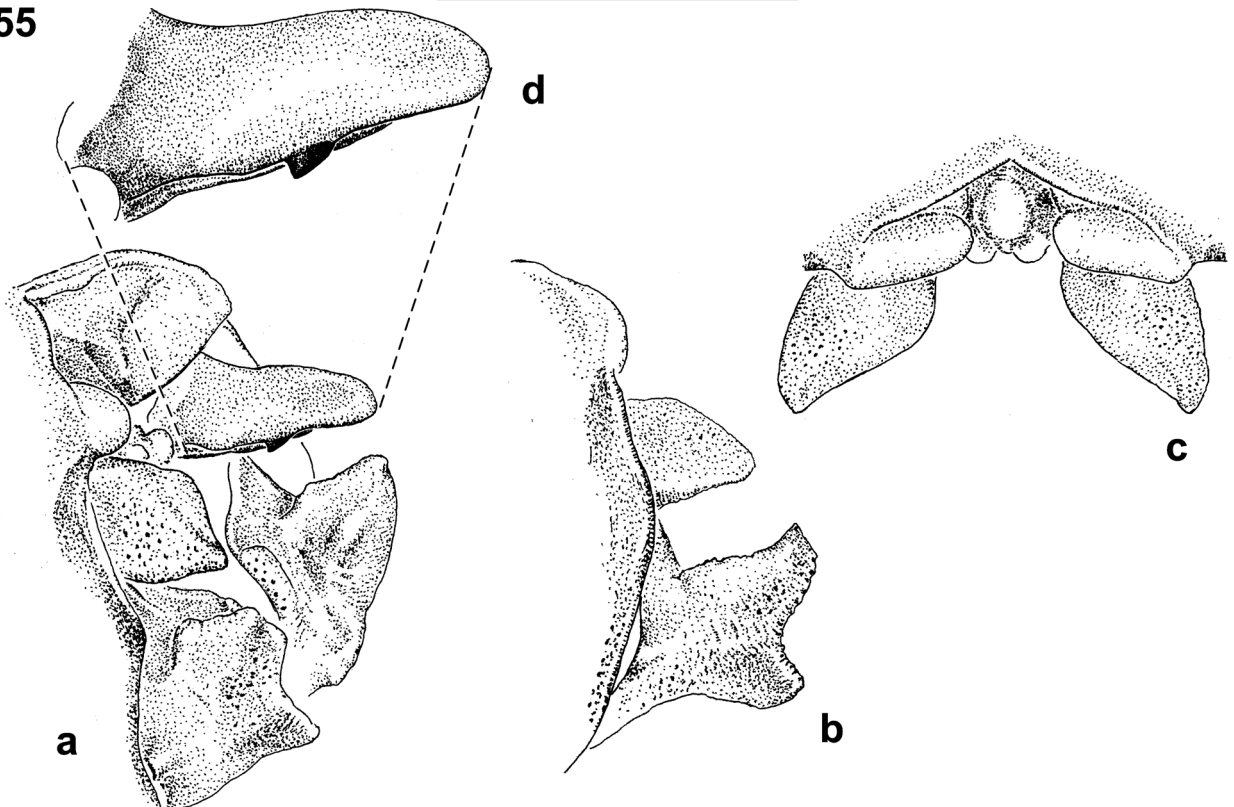


154



*A. rudolphi* – HOLOTYPE  
MEXICO, La Unión

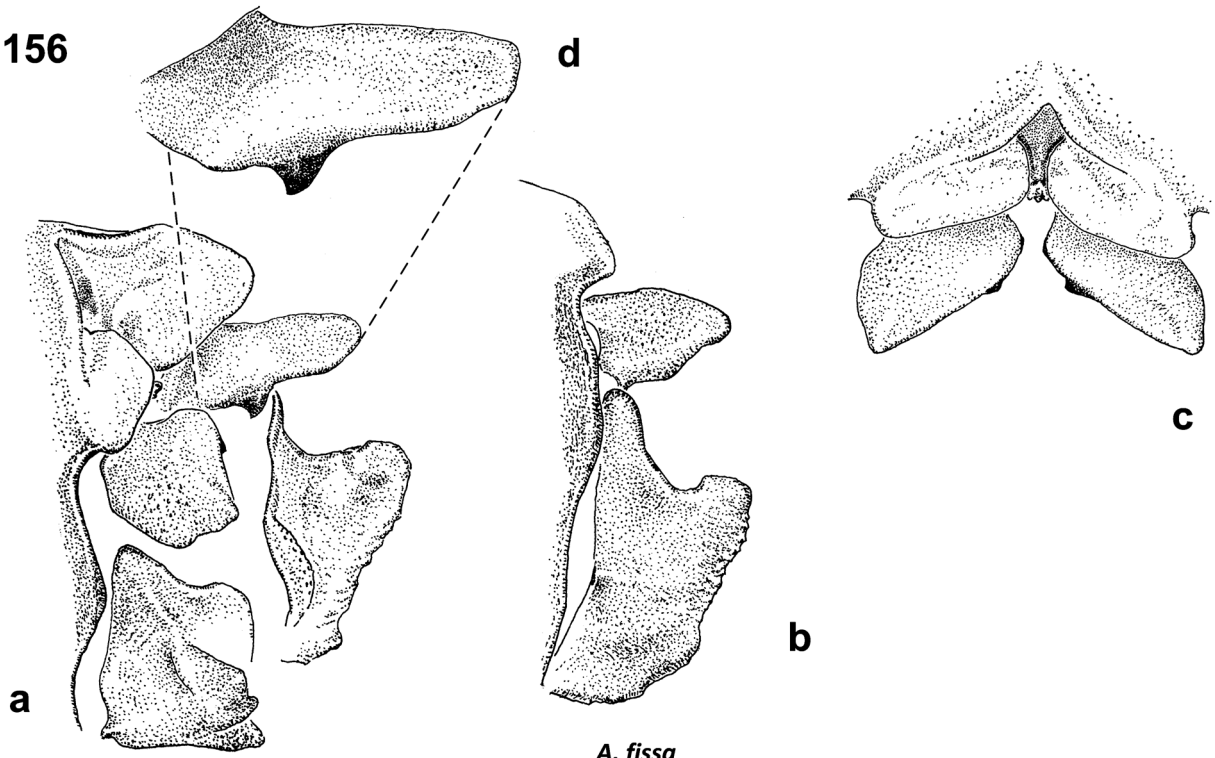
155



*A. anceps*  
MEXICO, La Fuente

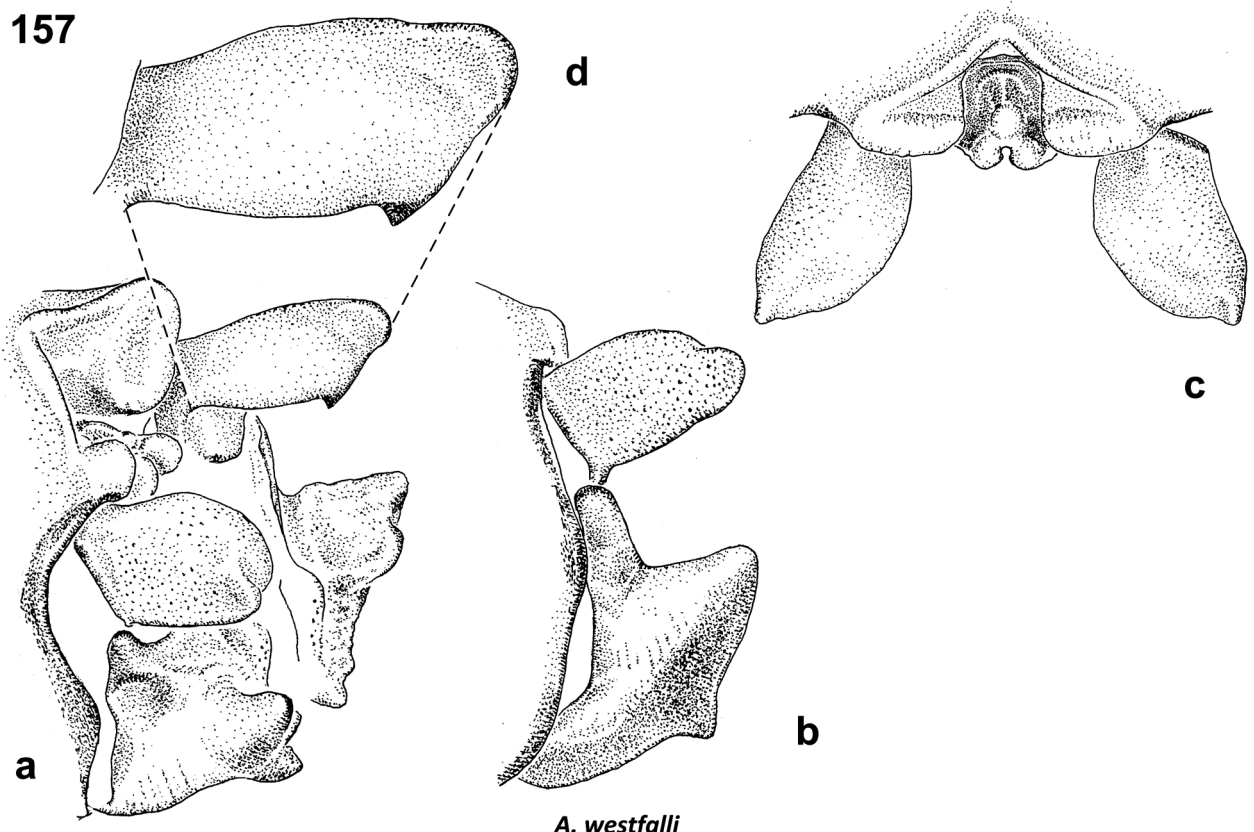
FIGURES 154–155. Male caudal appendages of extranea-group species. (a) mediodorsal view; (b) lateral view; (c) dorsal view; (d) right cercus, mediodorsal view.

156



*A. fissa*  
COLOMBIA, Fusa

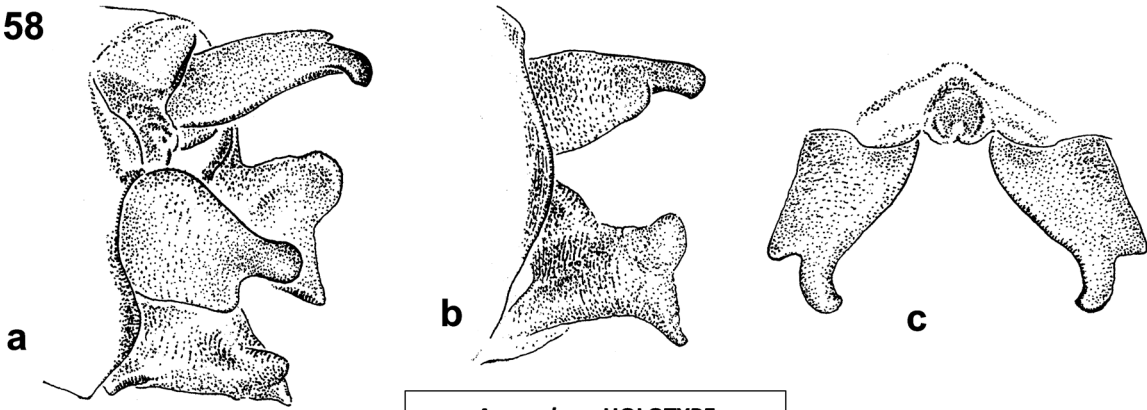
157



*A. westfalli*  
MEXICO, Horsetail Falls

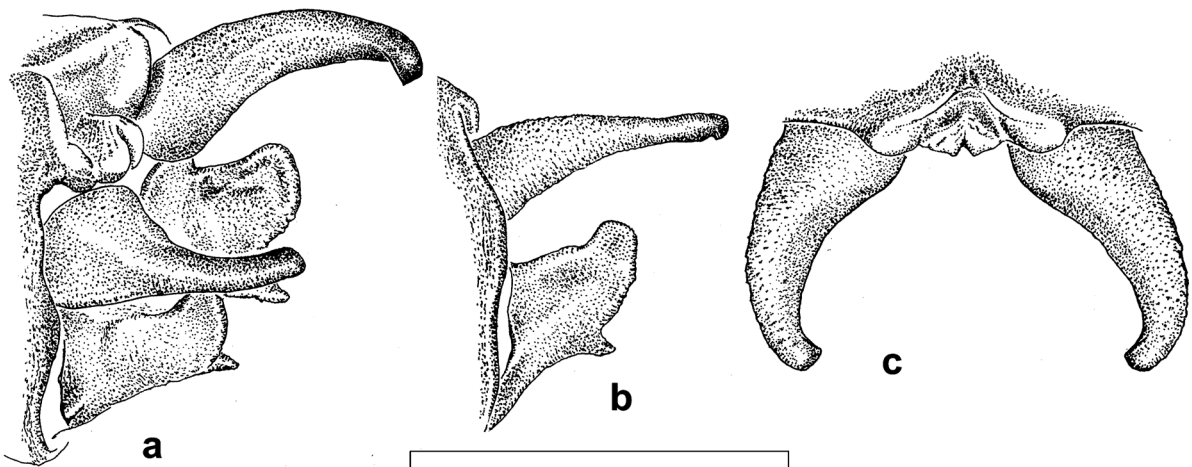
FIGURES 156–157. Male caudal appendages of extranea-group species. (a) mediodorsal view; (b) lateral view; (c) dorsal view; (d) right cercus, mediodorsal view.

158



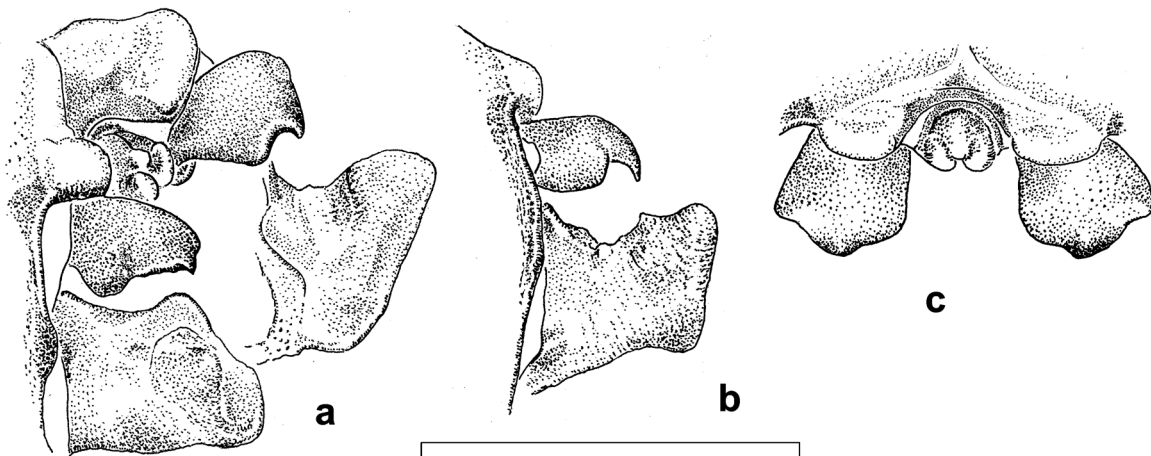
*A. carolus* – HOLOTYPE  
COSTA RICA, El Rodeo

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*A. schneideri* – HOLOTYPE  
ECUADOR, Las Palmas

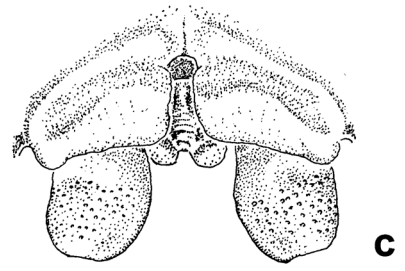
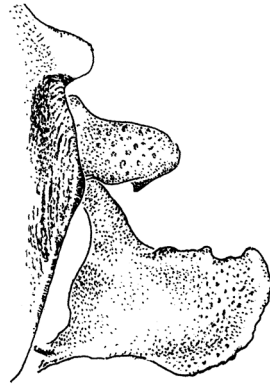
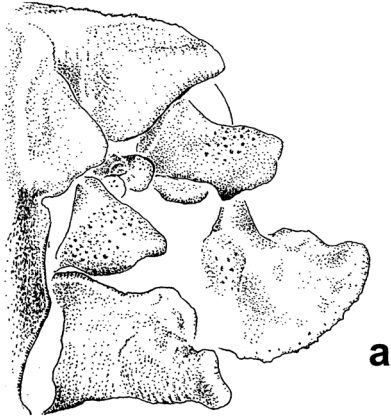
160



*A. haberi* – HOLOTYPE  
COSTA RICA, Tolomuco Forest

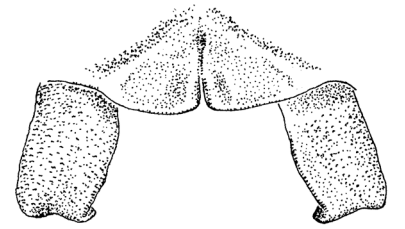
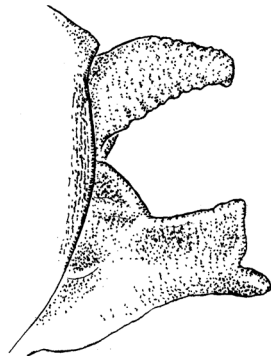
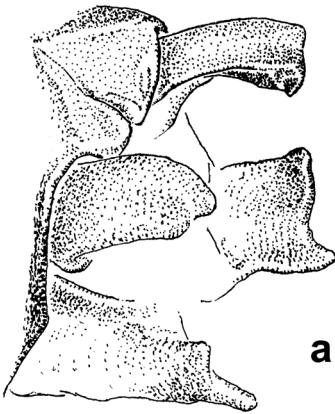
FIGURES 158–160. Male caudal appendages of other species. (a) mediodorsal view; (b) lateral view; (c) dorsal view.

161



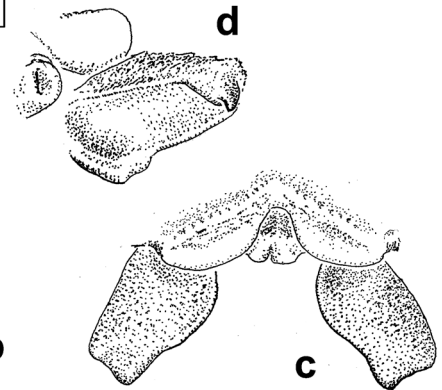
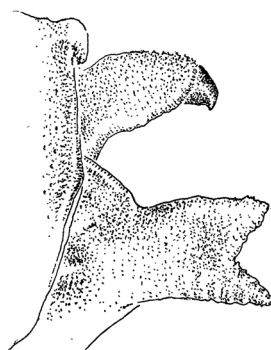
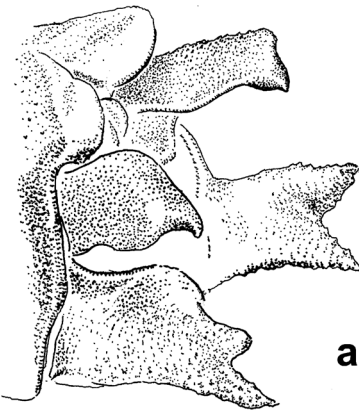
*A. rhoadsi*  
MEXICO, Ojitipa River

162



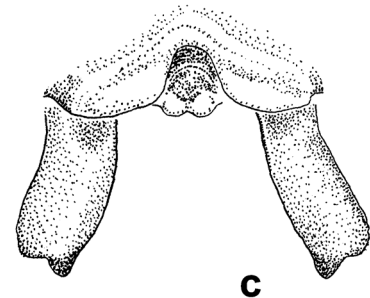
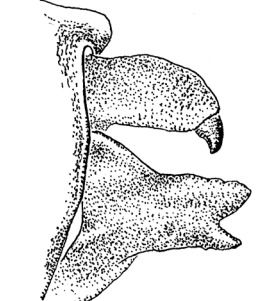
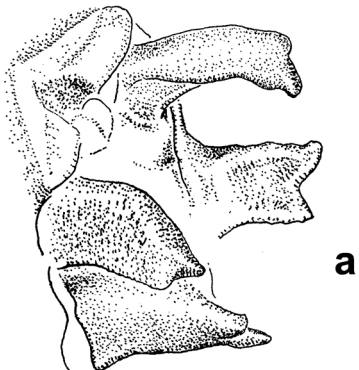
*A. schorri* – HOLOTYPE  
COSTA RICA, Golfito

163



*A. popoluca*  
COSTA RICA, La Selva

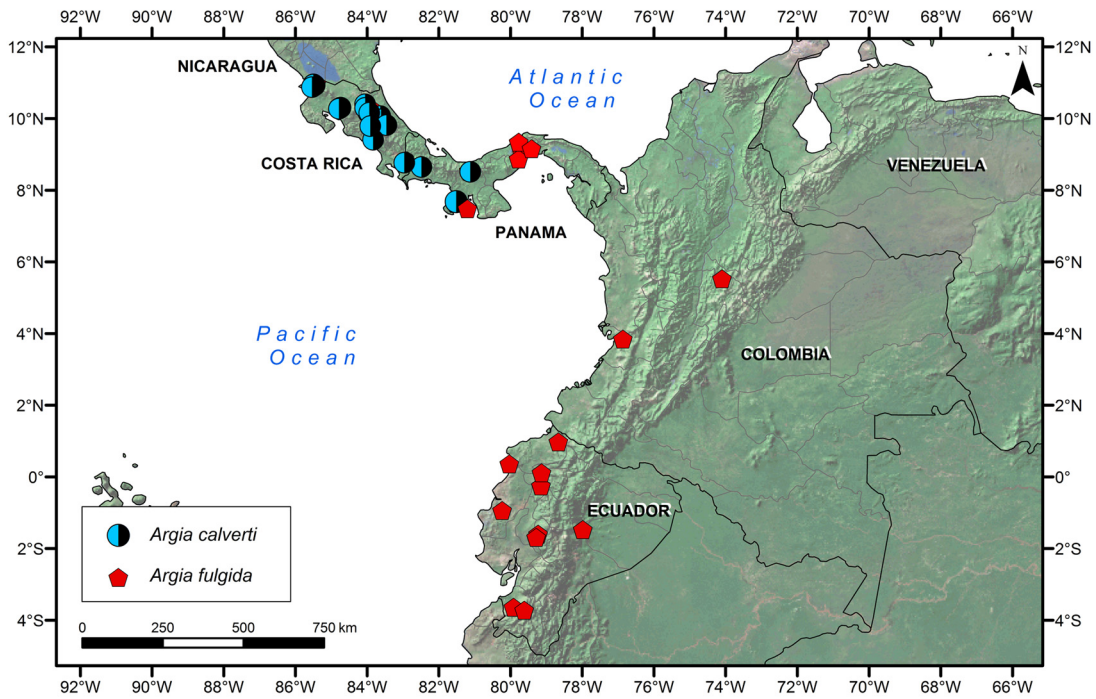
164



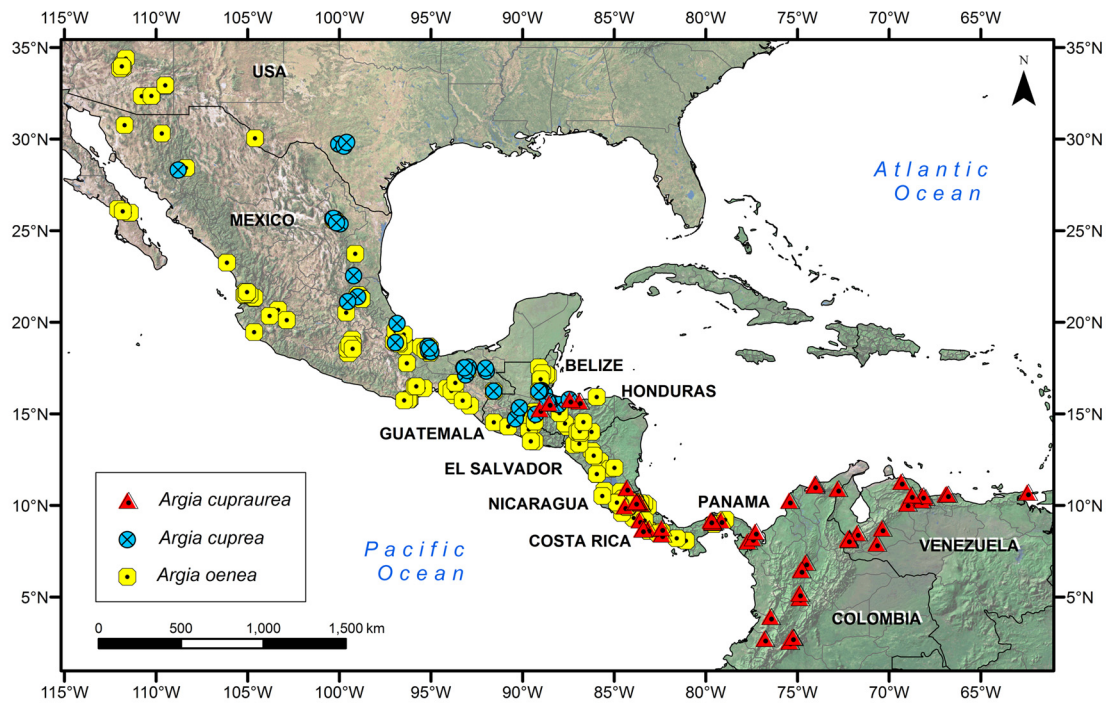
*A. popoluca* – HOLOTYPE  
MEXICO, Teapa

FIGURES 161–164. Male caudal appendages of other species. (a) mediodorsal view; (b) lateral view; (c) dorsal view; (d) right cercus, ventral view.

165



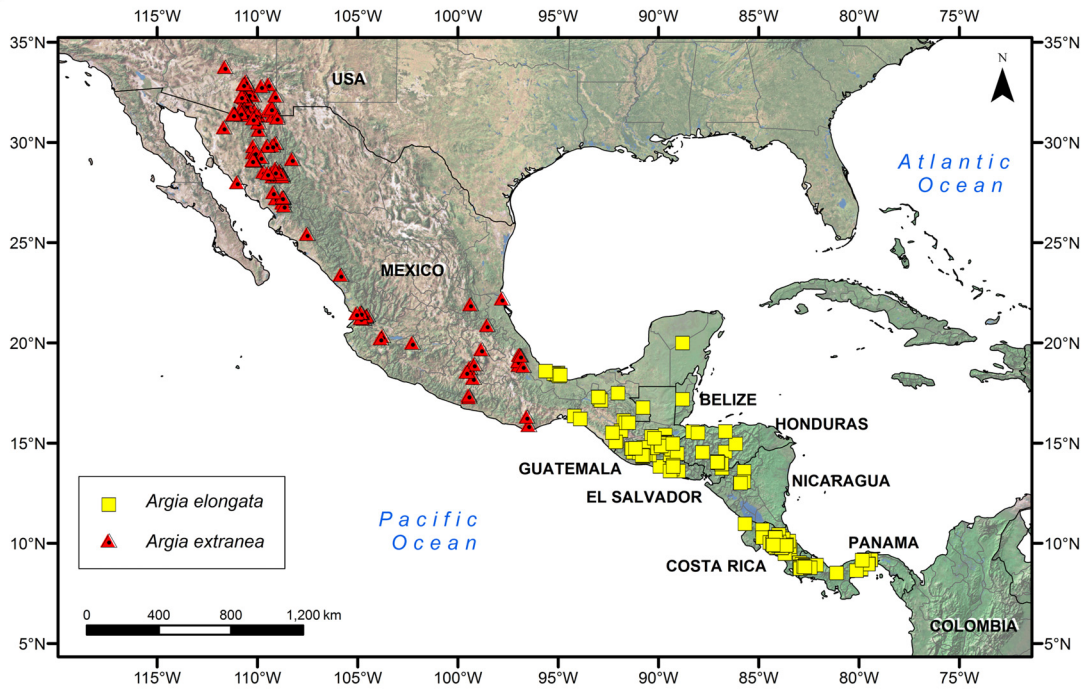
166



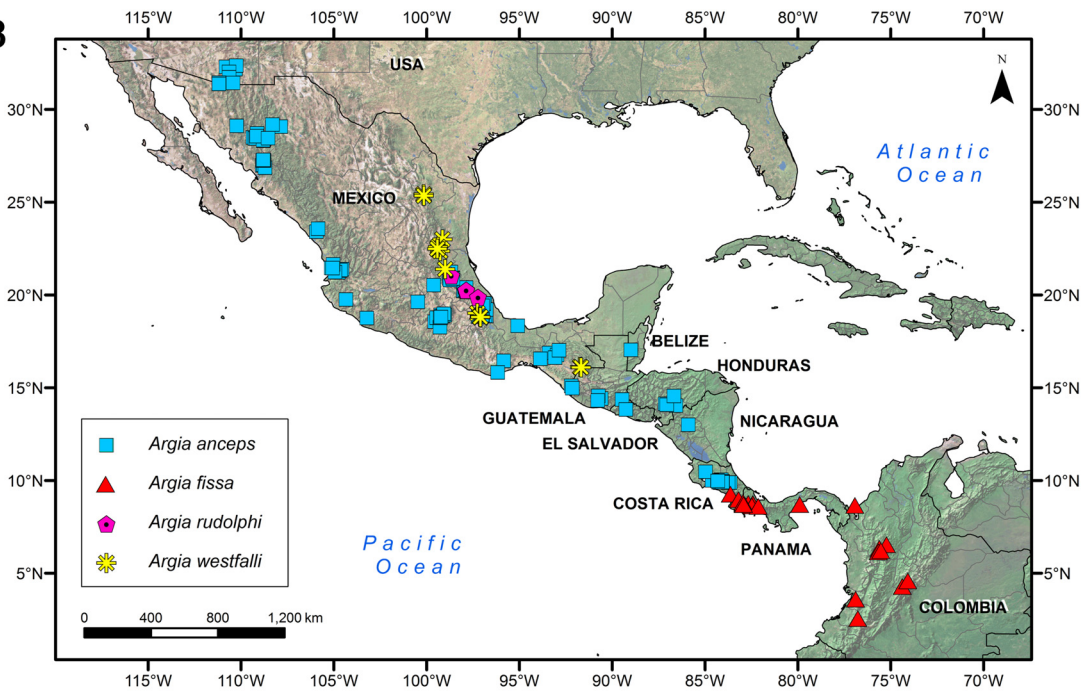
FIGURES 165–166. Distribution of metallic species.



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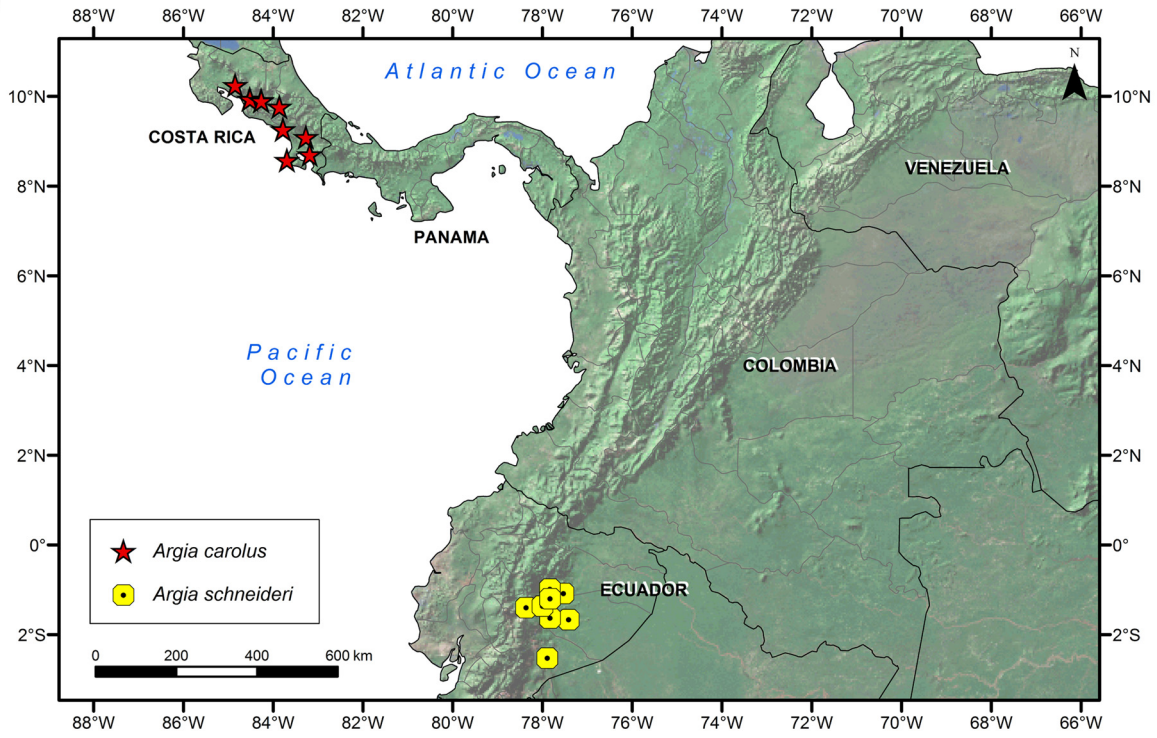
168



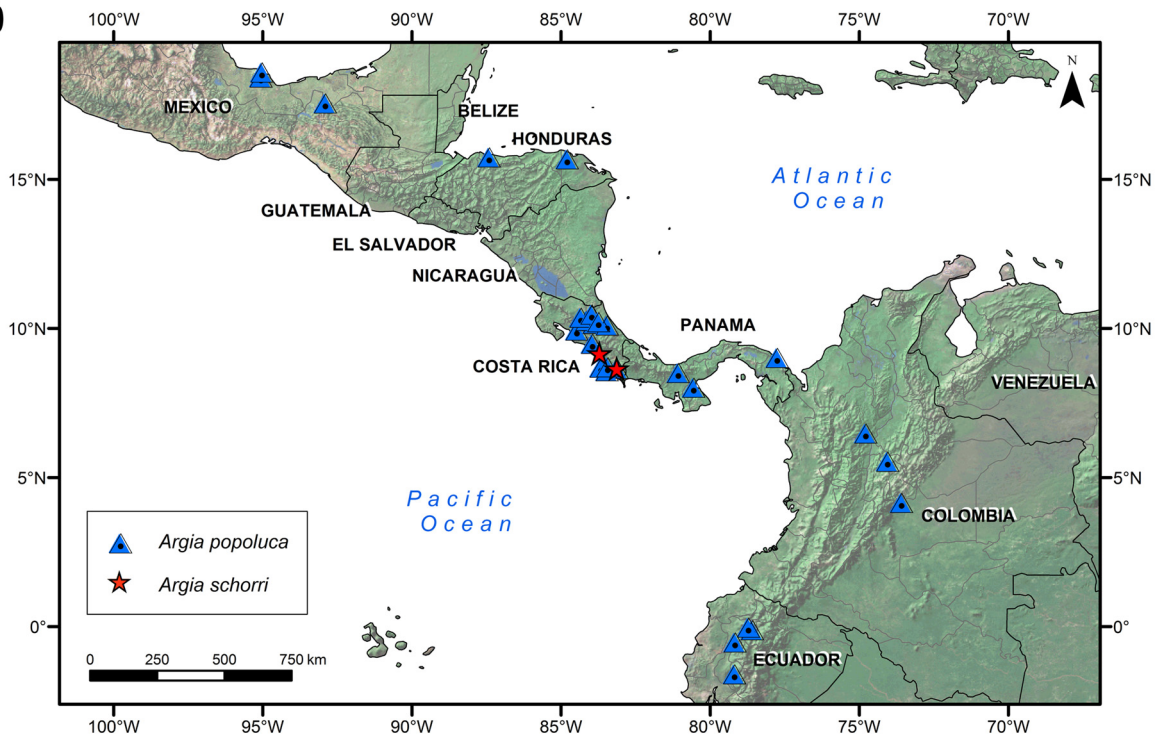
FIGURES 167–168. Distribution of extranea-group species.



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FIGURES 169–170. Distribution of other species.

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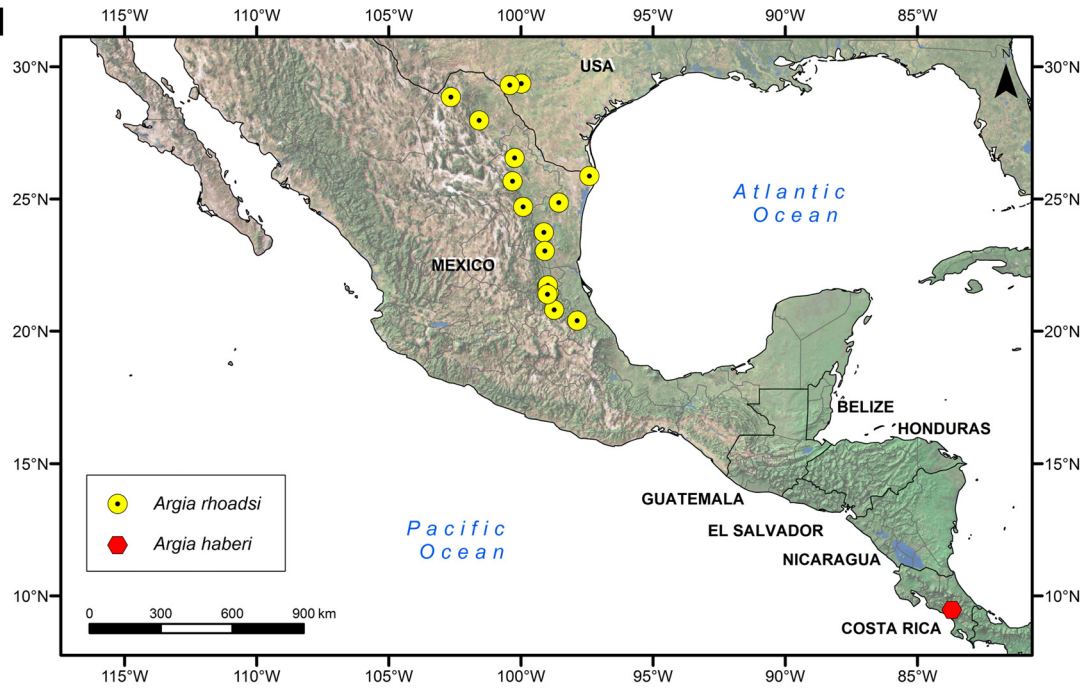


FIGURE 171. Distribution of other species.



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173



174



**FIGURES 172–174.** Field photographs of metallic species. (172) *A. calverti*, male from Alto San Luís, Puntarenas Prov., Costa Rica, 20 x 2013; (173) *A. cupraurea*, male at rocky river 4 km S of Route 32 between La Unión and Flores, Limón Prov., Costa Rica, 27 v 2013; (174) male of *A. oenea* from Hacienda El Rodeo, San José Prov., Costa Rica, 28 v 2013. Photograph (172) by WAH; (173) by NVE; (174) by RWG.



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176



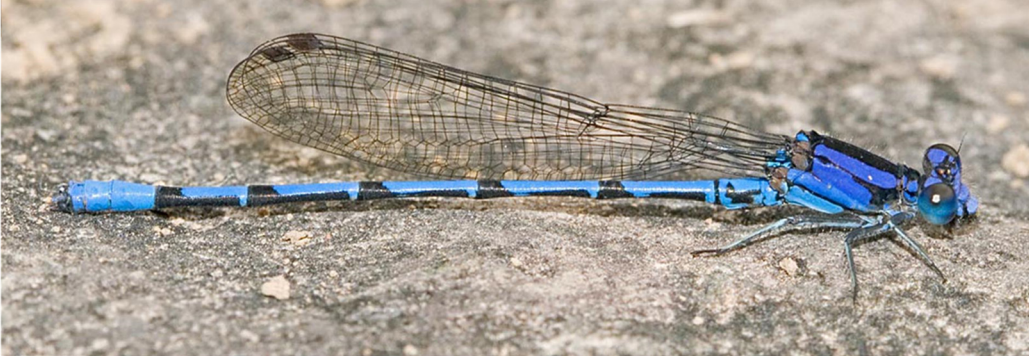
**FIGURES 175–176.** Field photographs of metallic species. (175) *A. oenea*, pair in tandem from Hacienda Solimar, Guanacaste Prov., Costa Rica, 14 viii 2010; (176) *A. cuprea*, pair in tandem from Montell Creek at highway 55, 0.5 mi S of Montell, Texas State, USA, 25 vii 2004. Photograph (175) by N. Smith; (176) by DRP.



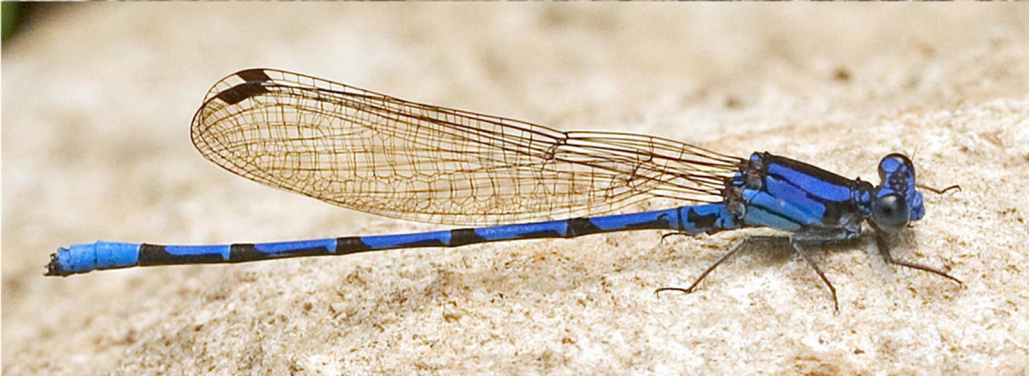
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180



**FIGURES 177–180.** Field photographs of extranea-group species. (177) *A. elongata*, female from El Limón de Metapán, Santa Ana Dept., El Salvador, 28 viii 2011; (178) *A. elongata*, male at La Lindora, Monteverde Prov., Costa Rica, 27 xii 2007; (179) male of *A. extranea* from Quebrada Camastro, 6 km SW of Monteverde, Puntarenas Prov., Costa Rica, 13 xi 2007; (180) teneral male of *A. extranea* from Quebrada San Francisco, 6 km SSW of Monteverde, Puntarenas Prov., Costa Rica, 5 xi 2005. Photograph (177) by D. Danforth; (178–180) by WAH.



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183



**FIGURES 181–183.** Field photographs of extranea-group species. (181) *A. anceps*, male from Upper Aravaipa Canyon, Arizona State, USA, 1 x 2015; (182) *A. anceps*, teneral female at Village of Campo de Oro, 4.5 km SW of El Dos, Guanacaste Prov., Costa Rica, 31 iii 2007; (183) pair in copula of *A. fissa* from E of Cuesta de Piedras, Chiriquí Prov., Panama, 22 viii 2012. Photograph (181) by D. Danforth; (182) by WAH; (183) by N. Smith.



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185



186



**FIGURES 184–186.** Field photographs of other species. (184) *A. carolus*, male from Quebrada La Guaria, 10 km SSW of Monteverde, Puntarenas Prov., Costa Rica, 4 viii 2006; (185) *A. carolus*, female from Surubres river, Higuito village, 3.5 km NE of San Mateo, Alajuela Prov., Costa Rica, 7 ix 2008; (186) male of *A. rhoadsi* from Coy River headwaters, 27 km S of Ciudad Valles, San Luis Potosí State, Mexico, 18 viii 1999. Photograph (184, 185) by WAH; (186) by RWG.



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188



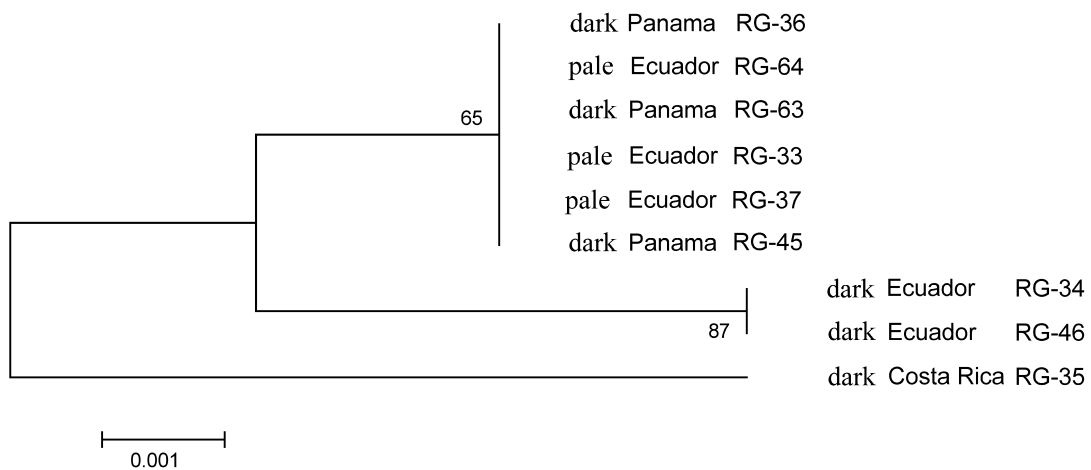
189



190



**FIGURES 187–190.** Field photographs of other species. (187) *A. rhoadsi*, pair in copula from forest stream at McAllen Nature Center, Texas State, USA, 12 xi 2005; (188) *A. popoluca*, male at road into Arenal Observatory Lodge, Alajuela prov., Costa Rica, 4 vi 2015; (189) male of *A. popoluca* from El Remanso, NW of Cabo Matapalo and 22 km by road S of Puerto Jimenez, Puntarenas Prov., Costa Rica, 23 i 2005; (190) female of *A. schorri* at La Gamba Biological Station, 8 km NW of Golfito, Puntarenas Prov., Costa Rica, 11 ix 2011. Photograph (187, 189) by DRP; (188) by N. Smith; (190) by WAH.



**FIGURE 191.** Bootstrapped Maximum-Likelihood tree of dark and pale morphs of *Argia fulgida* based on mt16S sequences of nine specimens. The tree is drawn to scale, with branch lengths measured in the number of substitutions per site.