

## RESEARCH ARTICLE

Six new species and new distributional records of *Acanthocephala* (Hemiptera: Coreidae) from Central and North AmericaLEONELA OLIVERA<sup>1,2</sup>, PABLO M. DELLAPÉ<sup>1,2</sup> & MARÍA CECILIA MELO<sup>1,2</sup>

## Abstract

Six new species of *Acanthocephala* Laporte, 1833 (Coreidae, Acanthocephalini) are described: *Acanthocephala distanti* **sp. n.** (Panama), *Acanthocephala gamboensis* **sp. n.** (Panama), *Acanthocephala latiantennata* **sp. n.** (Mexico and United States), *Acanthocephala maculata* **sp. n.** (Mexico), *Acanthocephala nigra* **sp. n.** (Costa Rica), and *Acanthocephala rufa* **sp. n.** (Panama). The descriptions include novel characters from the external morphology and from the male and female genitalia. For each species, we provide a habitus photograph of the adult, as well as photographs of diagnostic characters and of the male and female genitalia. Affinities with the other species of the genus are discussed. New distributional records of *Acanthocephala heissi* Brailovsky, 2006 from Guatemala and of *Acanthocephala affinis* (Walker, 1871) and *Acanthocephala angustipes* (Westwood, 1842) from Panama are provided.

Key words: Acanthocephalini, leaf-footed bugs, male and female genitalia, morphology, taxonomy.

## Zusammenfassung

Sechs neue Arten von *Acanthocephala* Laporte (Coreidae, Acanthocephalini) werden beschrieben: *Acanthocephala distanti* **sp. n.** (Panama), *Acanthocephala gamboensis* **sp. n.** (Panama), *Acanthocephala latiantennata* **sp. n.** (Mexiko und USA), *Acanthocephala maculata* **sp. n.** (Mexiko), *Acanthocephala nigra* **sp. n.** (Costa Rica) und *Acanthocephala rufa* **sp. n.** (Panama). Für jede Art stellen wir ein Habitusfoto des erwachsenen Tieres sowie Fotos der diagnostischen Merkmale und der männlichen und weiblichen Genitalien bereit. Ähnlichkeiten zu den anderen Arten der Gattung werden diskutiert. Neue Verbreitungsnachweise von *Acanthocephala heissi* Brailovsky, 2006 aus Guatemala sowie von *Acanthocephala affinis* (Walker, 1871) und *Acanthocephala angustipes* (Westwood, 1842) aus Panama werden vorgelegt.

## Introduction

The species of the genus *Acanthocephala* Laporte, 1833 (Coreidae, Acanthocephalini) are among the largest Coreidae, reaching lengths up to 37 mm (OLIVERA et al. 2024). All members are phytophagous, but little has been published on their life histories. MCPHERSON et al. (2011) provided host plant records only to species of *Acanthocephala* recorded from America north of Mexico, and according to FERNANDES et al. (2015) the vegetative plant parts appear to be the preferred sites for species in this genus. They can be recognized by the compressed tylus projecting between the genae, the spiny and strongly incrassate metafemora (more developed in males), and by the presence of metatibial expansions in both sexes (BRAILOVSKY 2006; MCPHERSON et al. 2011; OLIVERA et al. 2024). It is the most diverse genus of Acanthocephalini, with 32 known species distributed from southern Canada to northern Argentina (PACKAUSKAS 2010; MCPHERSON et al. 2011; OLIVERA et al. 2024; COREOIDEA SPECIES FILE TEAM 2024), which is the broadest distribution within the tribe.

Recently, OLIVERA et al. (2023, 2024) studied the Acanthocephalini from South America, resurrected *Spilopleura* Stål, 1870 from synonymy with *Acanthocephala* to include two species, and described eight new species of *Acanthocephala*, recording 24 species from South America. By contrast, the number of species of *Acanthocephala* from Central and North America is considerably lower. Only five species are recorded from Central America: *A. alata* (Burmeister, 1835), *A. bicoloripes* (Stål, 1855), *A. femorata* (Fabricius, 1775), *A. latipes* (Drury, 1782), and *A. pittieri* Montandon, 1895; and according to BRAILOVSKY (2006) and MCPHERSON et al. (2011), the genus *Acanthocephala* is currently represented in North America by six species: *A. alata*, *A. declivis* (Say, 1832), *A. femorata*, *A. heissi* Brailovsky, 2006, *A. terminalis* (Dallas, 1852), and *A. thomasi* (Uhler, 1872).

The present study aims to describe six new species of *Acanthocephala* from Central and North America and to provide new distributional records of the known species from these regions. For each new species, we provide a habitus photograph of the adult, as well as photographs of diagnostic characters and of the male and female

genitalia. Affinities with the other species of the genus are discussed.

### Material and methods

The material studied in this work belongs to the following entomological collections: (MLP) Museo de La Plata, La Plata, Argentina; (USNM) National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA; (UNAM) Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City.

Specimens were examined under an Olympus SZX7 and a Nikon SMZ1000 stereomicroscope. Digital images were taken with a Micrometrics 391CU, 3.2m, Accu-Scope digital camera attached to the Nikon SMZ1000 stereomicroscope. Images were stacked using HeliconFocus v. 6.7.1, and the plates were created and numbered in Corel Draw 2018. We include 34 measurements as described in OLIVERA et al. (2023), they are given in millimeters (mm) and are presented as follows: minimum – maximum (mean).

Dissections of male and female genitalia were performed according to OLIVERA et al. (2023). For the description of the genitalia, the terminology used is that of SINGH-PRUTHI (1925) for males, and SCUDDER (1959) and PLUOT-SIGWALT & MOULET (2017, 2020) for females.

Type material label data are cited verbatim. Lines on labels are separated with “/”, contents of different labels are separated with “//”, and remarks are given between brackets “[ ]”. Other material label data are adjusted to a standard format using Darwin Core (DWC) terms.

### Results

#### *Acanthocephala distanti* sp. n.

(Figs. 1A, 2A, 3A, 4A, 5B, F, 6A, 7A, 8A, E, 9A, 10C)

*Acanthocephala bicoloripes*: DISTANT (1881: 120) [in part]; DISTANT (1892: 359) [in part]; LETHIERRY & SEVERIN (1894: 30) [in part]; PITTIER & BIOLLEY (1895: 16) [cat. Costa Rica]; TRISTÁN (1897: 15) [cat. Costa Rica]; GIBSON & HOLDRIDGE (1918: 238) [diagnosis]; COREOIDEA SPECIES FILE TEAM (2024; <http://coreoidea.speciesfile.org>) [cat.; in part].

*Acanthocephala (Metapodius) bicoloripes*: BLÖTE (1881: 276).

*Acanthocephala* sp. 1: MAES et al. (2024: 21).

#### Type material

**Holotype** ♂: PANAMA, Chiriquí / Dst. Renacimiento / Santa Clara / 4000', 4–VII–76 Engleman // Doge Engleman / Collection / 1990 [USNM].

**Paratypes**: 2 ♂♂, Collection / Schild-Burgdon / Costa Rica / Turrialba [USNM]; 1 ♂, Turrialba / Costa Rica / 24 May 1951 / O.L. Cartwright // H. Brailovsky A. det. / *Acanthocephala / bicoloripes* (Stål) [MLP]; 1 ♀, S. & C.H. Ballou / Coll VII 21 36 // on *Coix / lacryma jobi* [handwritten label] [USNM]; 1 ♂, PANAMA, Chiriquí / Dst. Renacimiento / Oeste Santa Clara / 5500' / 5–VII–76 Engleman // Doge Engleman / Collection / 1990 [MLP]; 1 ♀, PANAMA, Chiriquí / Dst. Ren. Oest. Clara / 13–22.V.77 5500' / Cl: Engleman & Matos // Dodge Engleman / Collection / 1990 [USNM]; 1 ♂, V. de Chiriquí, / 25–4000 ft. / Champion // *Acanthocephala bicoloripes* (Stål) [handwritten label] [USNM]; 1 ♀, El Valle / Panama. / Alt. 2000 ft / VII. 7 37 / R. Bliss // J.C. Lutz / Collection / 1961 [MLP]; 1 ♀, Santa Fé, Veraguas / Panamá 2900' / 17 Feb 74 / Col: D. Engleman // Dodge Engleman / Collection 1990 / [USNM].

#### Other material

Costa Rica: 2 ♀♀; Alajuela, San Carlos; SCHILD-BURGDOF leg. [USNM]; 1 ♀; San José, San José; M. VALERIO leg. [USNM]; 1 ♀; Cartago, Tuis; alt. 731 m; C.H. LANKASTER leg. [USNM]; 3 ♂♂♂; Cartago, Turrialba; SCHILD-BURGDOF leg. [USNM]; 1 ♀; same collection data as for preceding; 3–11.II–III.1944; Mrs T. GRANT leg. [USNM]; 1 ♂; same collection data as for preceding; 24.IV.1951, O.L. CARTWRIGHT leg. [USNM]; 1 ♂; Heredia, Finca La Selva; 21–30.VII.1976; J.C. SOLOMON leg. [USNM]. Guatemala: 2 ♀♀; Chiquimula; XII.1930; J.J. WHITE leg. [USNM]. Nicaragua: 1 ♀; 8.XI.1955; C. ESPINOZA leg.; light trap [USNM]. Panama: 1 ♂; Chiriquí, Valle de Chiriquí [USNM]; 2 ♂♂ and 2 ♀♀; same collection data as for preceding; alt. 730–762 m; CHAMPION & P.R. UHLER leg. [USNM]; 1 ♀; Chiriquí, Dst. Renacimiento, Santa Clara; alt. 1219 m; 29.V.1976; ENGLEMAN leg. [USNM]; 2 ♂♂ and 1 ♀; same collection data as for preceding; 4.VII.1976; ENGLEMAN leg. [USNM]; 1 ♂; same collection data as for preceding; alt. 1524 m; 5.VII.1976; ENGLEMAN leg. [USNM]; 1 ♂; same collection data as for preceding; 16–20.II.1977; A.E. THURMAN leg. [USNM]; 1 ♂ and 2 ♀♀; Coclé, El Valle; alt. 609 m; 7–14.VII.1937; R. BLISS leg.; J.C. LUTZ coll. [USNM]; 2 ♀♀; Veraguas, Santa Fé; alt. 883 m; 17.II.1974; D. ENGLEMAN leg. [USNM].

#### Etymology

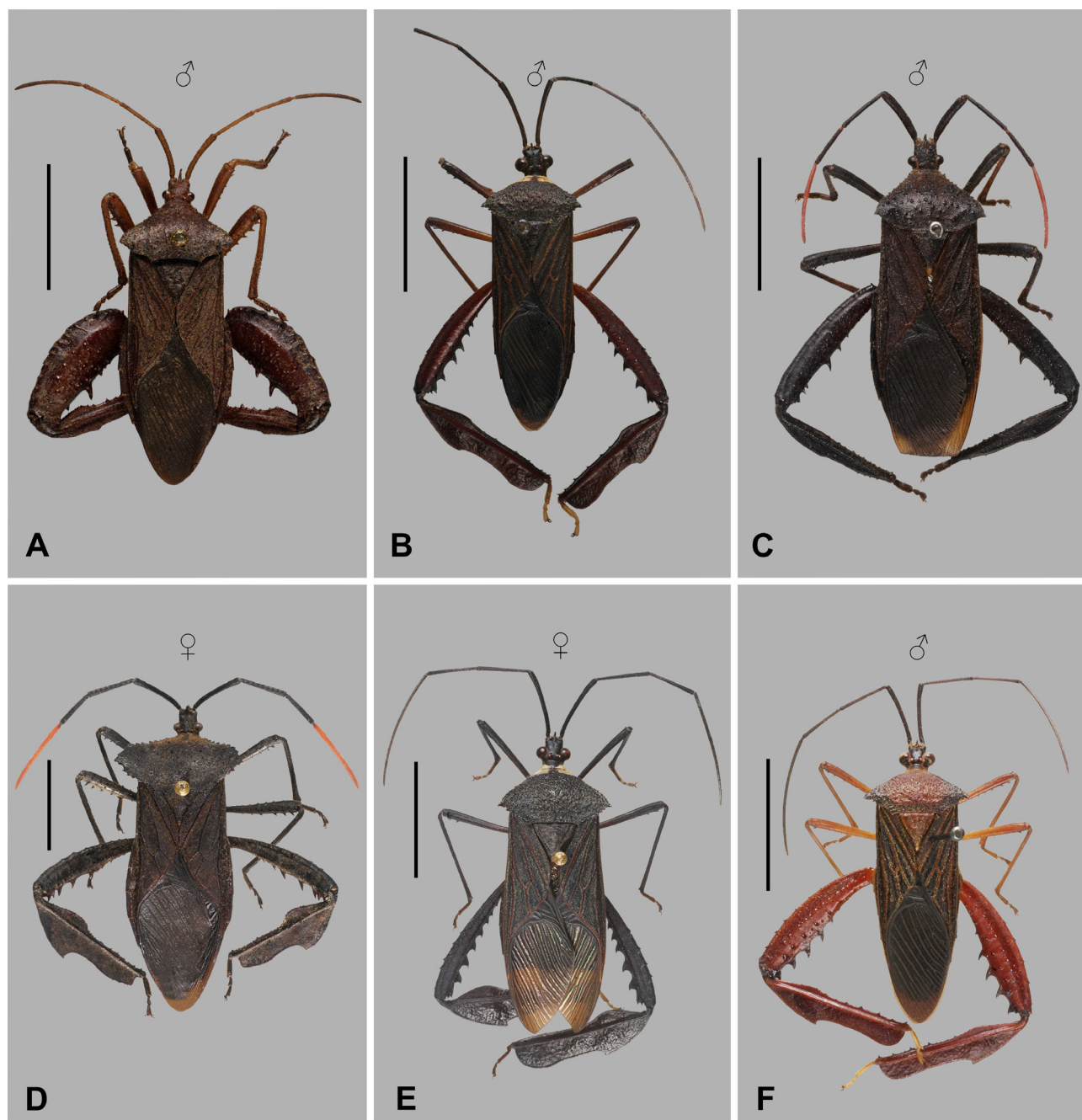
The new species is named after W. L. DISTANT, who was the first to publish illustrations of this new species in the *Biologia Centrali Americana*, although mistakenly identified as *A. bicoloripes* (Stål, 1855).

#### Diagnosis

Species brown to dark brown, with light brown antennae and metathoracic gland auricle and basal region of evaporatory area yellowish. Anterior pronotal lobe with four rounded central tubercles next to collar and between the calli; posterior pronotal lobe with well-developed rounded tubercles; humeral angles unarmed, not elevated over the pronotal disc. Propleura tuberculate. Metatibial expansions slightly developed, fusiform in males and triangular in females.

#### Description

**Holotype** (Fig. 1A). Male. General color brown. Total length 25.00; length of head 2.80. Head (Fig. 2A). With sparse dark, erect and semierect setae, and yellowish, decumbent setae ventrally. Vertex brown with two paler areas next to ocelli; posterior margin of eye and ocellar tubercle darker, tylus and post-tylus depression paler. Dorsal margin of tylus straight, apex slightly projected upwards, not surpassing dorsal margin of head. Post-tylus depression short and deep, 2.5 times shorter than inter-ocellar space. Length of tylus 1.50, length of post-tylus depression 0.28. Eyes globose and protuberant, small in relation to head height. Width of eye 0.70, ocular dis-



**Fig. 1.** *Acanthocephala* spp., holotypes, dorsal view. **A.** *A. distanti* sp. n. **B.** *A. gamboensis* sp. n. **C.** *A. latiantennata* sp. n. **D.** *A. maculata* sp. n. **E.** *A. nigra* sp. n. **F.** *A. rufa* sp. n. Scale bar: 10.00 mm.

tance 2.70, interocular space 1.40, ocellar distance 1.30, interocellar space 0.70. Buccula large and semicircular, reaching the anterior third of eye. Antenna light brown, shorter than body length. Scape, pedicel and basiflagellomere with abundant dark, stiff, semierect setae, and sparse yellowish, short, decumbent setae; distiflagellomere with abundant yellowish, decumbent setae, and

sparse darker, semierect setae. Length of antennal articles: scape 4.50, pedicel 4.00, basiflagellomere 3.70, distiflagellomere 6.50; width of antennal articles: scape 0.40, pedicel 0.25, basiflagellomere 0.23, distiflagellomere 0.28. Labium light brown, apex of segment IV black; extending to mesocoxae. Length of labial segments: I 1.80, II 1.85, III 1.20, IV 1.60. Thorax. Pronotum (Fig. 3A) with dark,





**Fig. 2.** *Acanthocephala* spp., holotypes, head, lateral view. **A.** *A. distanti* sp. n. **B.** *A. gamboensis* sp. n. **C.** *A. latiantennata* sp. n. **D.** *A. maculata* sp. n. **E.** *A. nigra* sp. n. **F.** *A. rufa* sp. n. Scale bar: 1.00 mm.

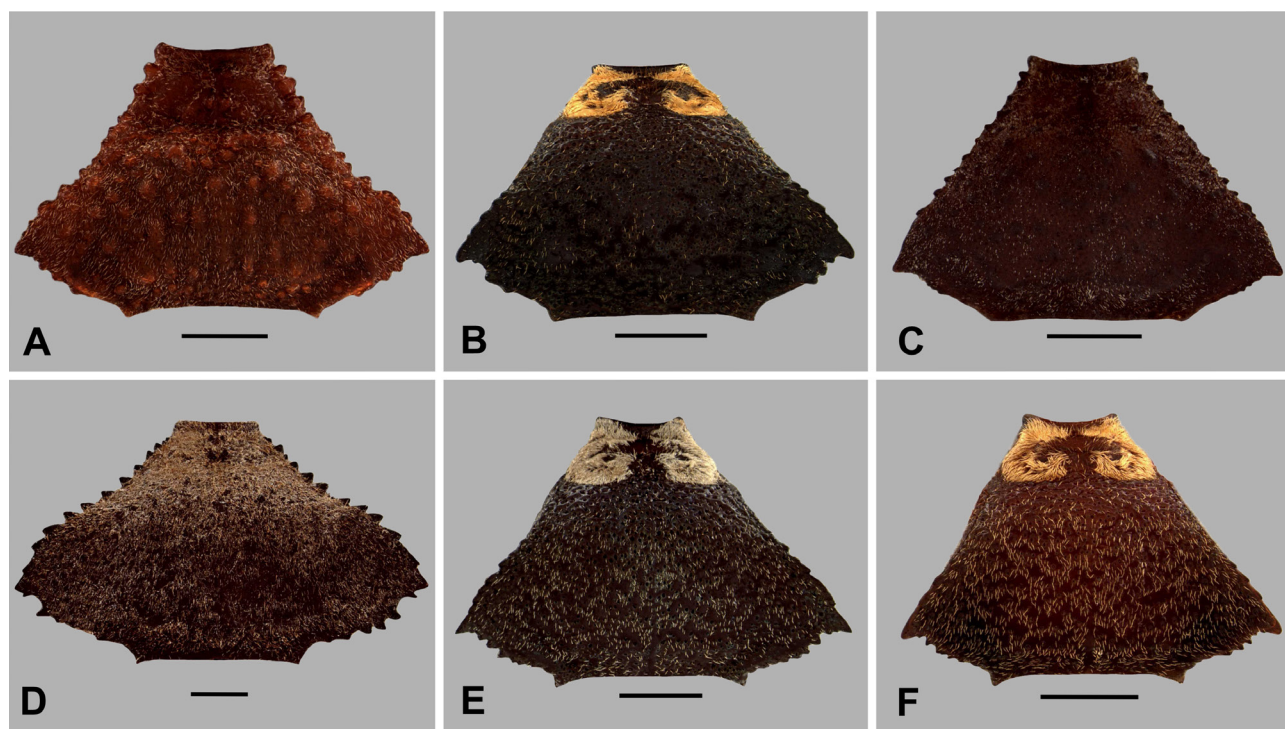
stiff, erect setae, and yellowish, shorter, decumbent setae all over the surface; anterior lobe with two rounded central tubercles next to collar, and calli with two rounded tubercles between them; posterior lobe punctate, with rounded tubercles; anterolateral margins straight, with well-developed conical tubercles; humeral angles unarmed and acute, not elevated over pronotal disc; posterolateral margins weakly tuberculate on anterior half; triangular processes short. Width of humeral angles 9.00, slightly greater than abdomen width. Scutellum longer than wide, punctate, with transversal rugosities, and abundant yellowish, short, decumbent setae and darker, stiff, erect setae all over the surface; apex incrassate and yellowish. Length of scutellum 2.60; width of scutellum 2.55. Hemelytra. Clavus and corium brown, entirely punctate, with abundant yellowish, decumbent setae, costal margin smooth, veins concolorous; membrane dark brown with sparse yellowish, decumbent setae, veins concolorous. Length of hemelytra 18.05. Thoracic pleurae brown, with sparse yellowish, decumbent setae; proepimeron with rounded tubercles; metathoracic gland auricle yellowish (Fig. 4A), anterior lobe rounded, reddish centrally, posterior lobe semicircular; evaporative area with basal rugosities; supracoxal area of metapleura incrassate posteriorly. Thoracic sterna brown, with abundant dark, long, erect setae; mesosternal anterior projection paler. Legs. Protrochanter

unarmed, mesotrochanter with one small, ventral, black setiferous tubercle, metatrochanter with two ventral setiferous tubercles. Femora brown, with yellowish, decumbent setae, and darker, semierect setae that become erect on ventral margin. Pro- and mesofemora sub-equal, ventral margin with two rows of spines. Metafemur (Fig. 5B) at least 3.8 times wider than profemur; dorsal margin with two rows of conical setiferous tubercles with darker apex, and with a conspicuous basal spine; ventral margin with two rows of spines and tubercles: anterior row with conical spines that become larger in the middle and end in a flat bidentate projection, median spine larger; posterior row with well-developed rounded tubercles that end in a flat dentate projection; anterior and posterior margins with irregular rounded tubercles. Pro- and mesotibiae light brown. Metatibia (Fig. 5F) brown, dorsal expansion fusiform, maximum width at basal third, sinuously narrowing towards distal third, distal third armed with well-developed conical setiferous tubercles, apex of dorsal expansion of metatibia end in an acute angle; ventral margin slightly expanded, evident on basal third, bordered with one row of irregular, conical, setiferous tubercles that become larger towards the apex, basally forming two rows of small tubercles; anterior and posterior margins unarmed. Tarsi light brown. Width of profemur 0.80; length of metafemur 10.00, width 3.05; length

of metatibia 10.25, width 1.50. Abdomen. Length of abdomen 11.37, width 7.30. Terga black, with a rounded yellowish macula around the scent gland scars, posterior macula continuing into a longitudinal fringe along tergite VI; lateral margins of segments II to VII yellowish posteriorly. Sterna brown, with two darker areas on segment III under the metacoxae; and with abundant yellowish, decumbent setae and sparse yellowish, semierect setae. Lateral margin of abdominal sternite III expanded like a fold along all segment, but narrowing posteriorly, sternite IV narrowly expanded anteriorly (Fig. 6A). Area of insertion of trichobothria yellowish, surrounding area concolorous with rest of abdomen; lateral areas with rugosities around spiracles. Spiracles black. Genitalia (paratype). Pygophore (Fig. 7A): dorsal aperture elongated, with parandria evident; dorsal margin convex and slightly declivent posteriorly in lateral view. Parameres (Fig. 8A): dorsal region of basal shank rounded, narrowing in distal third at the joint with the arm, inner margin straight and not expanded, outer margin slightly concave; arm broad, shorter than basal shank. Aedeagus as seen in Fig. 8E, conjunctival dorsal appendices I subtriangular, apex of outer margin rounded, with a small membranous depression between each other.

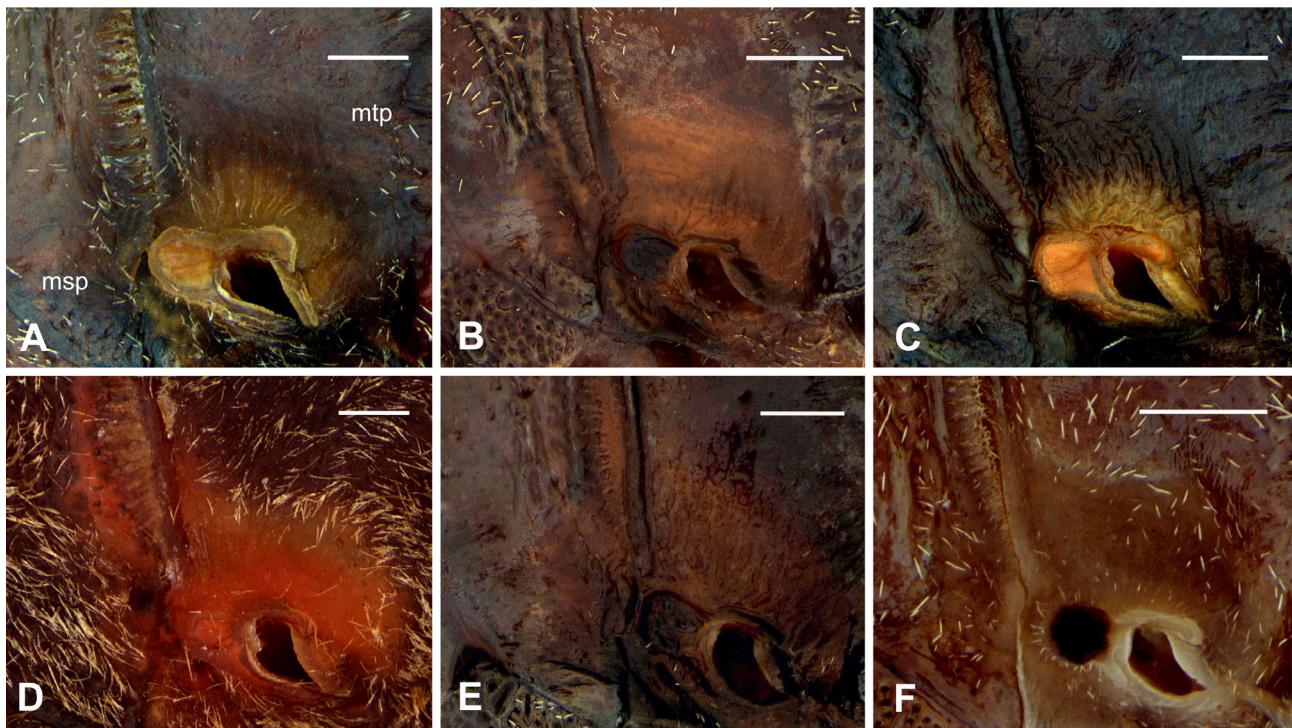
Paratype female. Thorax. Width of humeral angles as long as abdomen width. Base of scutellum with two rounded, central tubercles. Supracoxal area of metapleura

not incrassate posteriorly. Legs. Meso- and metatrochanters unarmed. Metafemur 1.9 times wider than profemur (Fig. 5B); dorsal margin with two rows of conical setiferous tubercles with apex dark; ventral margin with two rows of ventral flat spines that increase in size towards the apex and end in an apical bidentate projection; posterior row less developed; anterior and posterior margins with rounded tubercles. Metatibia (Fig. 5F) with dorsal expansion slightly developed, wider at distal end of basal third, with a conspicuous spine, then narrowing to the apex; distal third armed with small, conical, setiferous tubercles. Ventral expansion triangular, restricted to basal third; margin bordered by a single row of conical setiferous tubercles. Abdomen. Genitalia. Sternite VII (Fig. 9A): fisura median lobes well developed, quadrangular, and overlapping with each other; plica slightly convex, close to anterior margin of sternite, as long as maximum width of first gonocoxae; posterolateral margins extending to distal third of first gonocoxae. Paratergite VIII surpassing the apex of first gonocoxae. Dorsal apodeme of first gonocoxae long, rectangular. Second gonocoxae wide, narrowing in the middle, basal region wider than apical region. Second gonapophysis as long as second gonocoxa. Spermatheca (Fig. 10C): seminal receptacle apically globose and rounded; distal duct as long as flexible zone; dilation of spermathecal duct elongate oval.



**Fig. 3.** *Acanthocephala* spp., holotypes, pronotum, dorsal view. A. *A. distanti* sp. n. B. *A. gamboensis* sp. n. C. *A. latiantennata* sp. n. D. *A. maculata* sp. n. E. *A. nigra* sp. n. F. *A. rufa* sp. n. Scale bar: 2.00 mm.





**Fig. 4.** *Acanthocephala* spp., holotypes, metathoracic scent gland. **A.** *A. distanti* sp. n. **B.** *A. gamboensis* sp. n. **C.** *A. latiantennata* sp. n. **D.** *A. maculata* sp. n. **E.** *A. nigra* sp. n. **F.** *A. rufa* sp. n. Abbreviations: msp, mesopleura; mtp, metapleura. Scale bar: 0.50 mm.

#### Measurements of paratypes

(n= 5♂ | 4♀) Total length: ♂ 19.87–25.05 (22.50) / ♀ 22.62–24.37 (23.50); length of head: ♂ 2.59–3.10 (2.80) / ♀ 2.56–2.68 (2.62); length of tylus: ♂ 1.15–1.44 (1.25) / ♀ 1.18–1.28 (1.23); length of post-tylus depression: ♂ 0.25–0.32 (0.29) / ♀ 0.28–0.32 (0.30); width of eye: ♂ 0.64–0.70 (0.67) / ♀ 0.66–0.99 (0.93); ocular distance: ♂ 2.46–2.68 (2.60) / ♀ 2.24–2.65 (2.44); interocular space: ♂ 1.21–1.44 (1.37) / ♀ 1.15–1.34 (1.24); ocellar distance: ♂ 0.96–1.15 (1.08) / ♀ 0.92–1.05 (0.99); interocellar space: ♂ 0.57–0.80 (0.72) / ♀ 0.56–0.58 (0.57); length of antennal articles: scape, ♂ 3.75–4.87 (4.37) / ♀ 4.12–4.25 (4.18); pedicel, ♂ 3.00–3.75 (3.31) / ♀ 3.37–3.39 (3.38); basiflagellomere, ♂ 3.00–3.75 (3.31) / ♀ 2.78–3.00 (2.89); distiflagellomere, ♂ 5.25–6.12 (5.65) / ♀ 5.12–5.37 (5.25); width of antennal articles: scape, ♂ 0.41–0.64 (0.53) / ♀ 0.38–0.41 (0.40); pedicel, ♂ 0.25–0.32 (0.26) / ♀ 0.24–0.26 (0.25); basiflagellomere, ♂ 0.22–0.28 (0.26) / ♀ 0.22–0.25 (0.24); distiflagellomere, ♂ 0.29–0.32 (0.29) / ♀ 0.26–0.28 (0.27); length of labial segments: I, ♂ 1.83–2.35 (2.12) / ♀ 2.02–2.11 (2.06); II, ♂ 1.73–2.07 (1.94) / ♀ 2.02–2.04 (2.03); III, ♂ 1.17–1.55 (1.39) / ♀ 1.17–1.22 (1.19); IV, ♂ 1.55–1.69 (1.63) / ♀ 1.55–1.59 (1.57); width of humeral angles: ♂ 7.37–9.63 (8.78) / ♀ 9.12–9.25 (9.18); length of scutellum: ♂ 2.63–3.50 (3.15) / ♀ 3.05–3.39 (3.22); width of scutellum: ♂ 2.49–3.38 (3.03) / ♀ 2.82–3.20 (3.01); length of

hemelytra: ♂ 15.50–19.38 (18.06) / ♀ 17.50–18.62 (18.06); width of profemur: ♂ 0.83–1.12 (0.97) / ♀ 0.89–0.96 (0.92); width of metafemur: ♂ 2.72–4.23 (3.75) / ♀ 1.75–1.87 (1.81); length of metafemur: ♂ 9.37–11.75 (11.00) / ♀ 9.00–9.25 (9.12); width of metatibia: ♂ 1.15–2.12 (1.78) / ♀ 2.00–2.75 (2.37); length of metatibia: ♂ 9.25–11.50 (10.66) / ♀ 9.20–10.25 (9.72); length of abdomen: ♂ 11.13–13.13 (12.59) / ♀ 12.25–12.37 (12.31); width of abdomen: ♂ 7.25–9.38 (8.66) / ♀ 8.87–9.25 (9.06).

#### Distribution

Known from Costa Rica, Guatemala, Nicaragua, and Panama (Supplementary File 1).

#### Host plant

*Coix lacryma-jobi* L. (Poaceae).

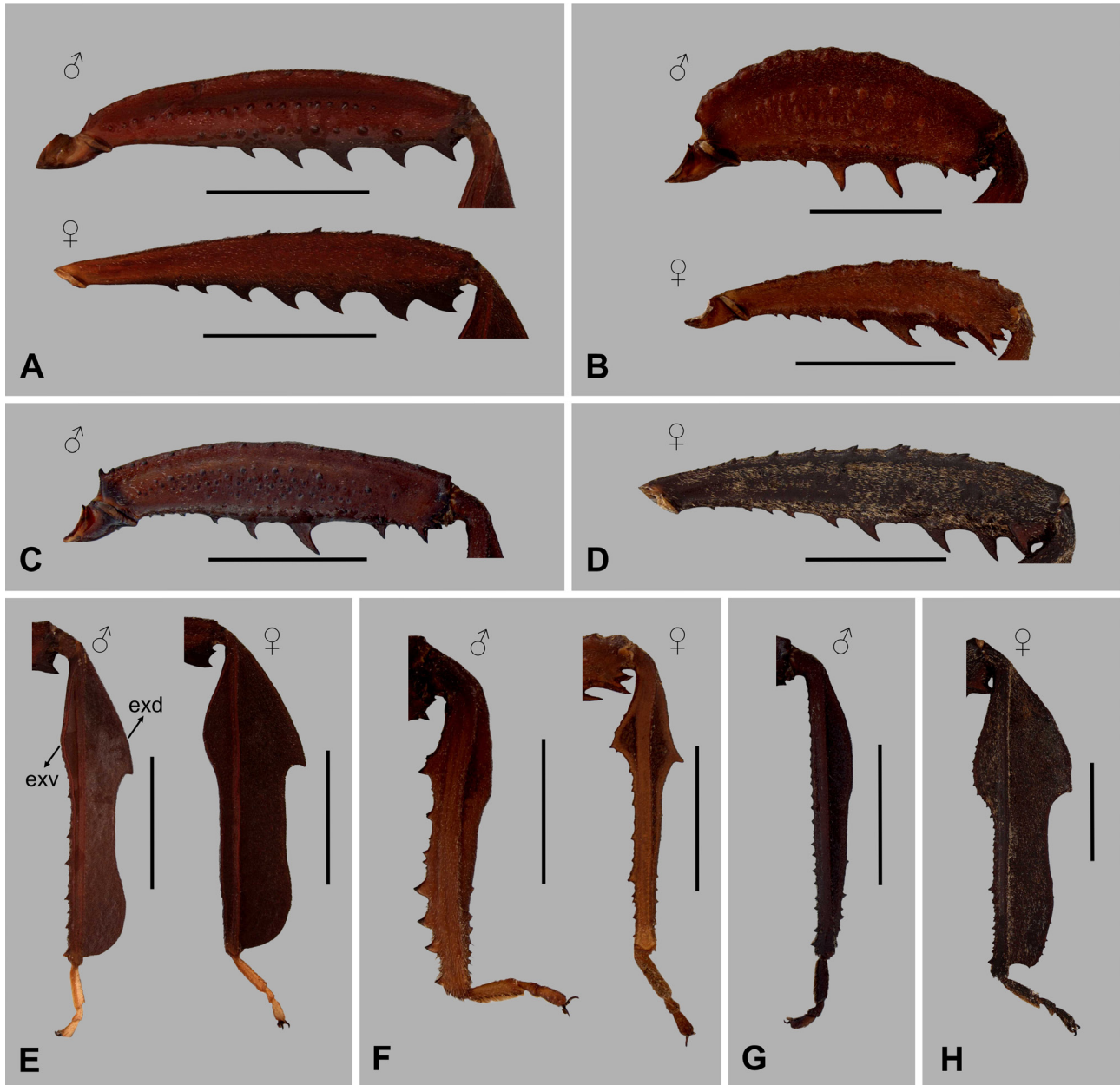
#### Remarks

This species has been confused with *Acanthocephala bicoloripes*, a fact evidenced by the several examined specimens labeled as *A. bicoloripes* in the collections studied. The origin of the confusion can be traced back to DISTANT (1881), who published figures and distributional records for *A. bicoloripes*, but after comparing his illustrations with the holotype of this species, it is evident that they are not conspecific and that they actually correspond

to *A. distanti* **sp. n.** Therefore, the distributional references given by DISTANT for *A. bicoloripes* from Costa Rica and Panama must be assigned to *A. distanti* **sp. n.**

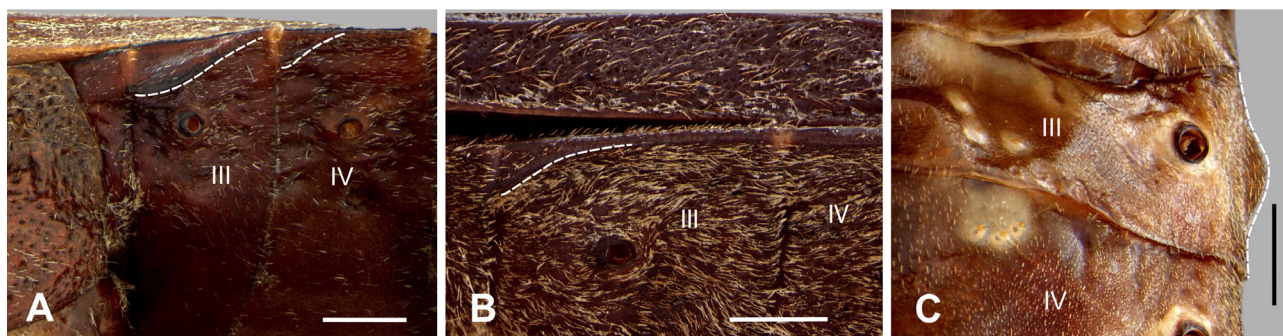
The type material of *A. bicoloripes* it is currently on loan, but should be deposited in the Natural History Museum, Stockholm, Sweden. We studied photographs of the holotype provided by R. J. PACKAUSKAS. This species

can be distinguished by the dark brown general coloration, with antennae, pro-, meso- and apex of metatibia yellowish, and abdominal terga black with a contrasting triangular yellowish macula on segment VI; and by the sinuous and broadly dilated basal third of the metatibial dorsal expansions of females, that gradually narrow beyond the middle towards the apex.



**Fig. 5.** *Acanthocephala* spp., legs. **A.** *A. rufa* **sp. n.**, male (holotype) and female (paratype) metafemur. **B.** *A. distanti* **sp. n.**, male (holotype) and female (paratype) metafemur. **C.** *A. latiantennata* **sp. n.**, male (holotype) metafemur. **D.** *A. maculata* **sp. n.**, female (holotype) metafemur. **E.** *Acanthocephala rufa* **sp. n.**, male (holotype) and female (paratype) metatibia. **F.** *A. distanti* **sp. n.**, male (holotype) and female (paratype) metatibia. **G.** *A. latiantennata* **sp. n.**, male (holotype) metatibia. **H.** *A. maculata* **sp. n.**, female (holotype) metatibia. Abbreviations. exd: expansion of dorsal margin of metatibia; exv: expansion of ventral margin of metatibia. Scale bar: 5.00 mm.





**Fig. 6.** *Acanthocephala* spp., holotypes, abdominal expansions. **A.** *A. distanti* **sp. n.**, lateral view, margin of abdominal sternite III and IV expanded like a fold. **B.** *A. maculata* **sp. n.**, lateral view, margin of abdominal sternite III expanded like a fold. **C.** *A. rufa* **sp. n.**, ventral view, lateral margin of abdominal sternite III expanded like subtriangular projection. Abbreviations: III: abdominal sternite III; IV: abdominal sternite IV. Scale bar: 1.00 mm.

***Acanthocephala gamboensis* sp. n.**

(Figs. 1B, 2B, 3B, 4B, 7B, 8B, F, 9B, 10D)

**Type material**

**Holotype** ♂: PANAMA / Gamboa / 7 VII 1999 / S. Wellso [UNAM].

**Paratypes**: 1 ♂, Barro Colorado / CZ I-6-37 // S.W. Frost / colr // H.G. Barber / Colln 1950 [MLP]; 1 ♀, Barro Colorado / CZ VIII-1939 // Jas Zetel / N° 4539 // lot. N° / 39- 5936 [USNM]; 1 ♀, Panamá, C.Z. / Ft. Kobbe / 20 Mar. '70 / H.P. Stockwell // Dodge Engleman / Collection / 1990 [USNM]; 1 ♀, Chiriqui / Panamá [MLP].

**Etymology**

The specific epithet, *gamboensis*, refers to the locality in Panama where the holotype was collected.

**Diagnosis**

Dark brown, with apex of scutellum and tarsi yellowish, and veins of clavus and corium a contrasting reddish. Anterior pronotal lobe with abundant yellowish, decumbent setae forming one thick patch; humeral angles slightly elevated over pronotal disc, ending in a small spine. Thoracic pleurae unarmed. Metatibial expansions well developed in both sexes, dorsal expansion enlarged basally, with a notch from where it narrows towards the middle region and then widens again towards the apex; apex of dorsal expansion of metatibia rounded.

**Description**

**Holotype** (Fig. 1B). Male. General color dark brown. Total length 21.87; length of head 2.12. Head (Fig. 2B). With sparse yellowish, semierect setae; vertex dark brown with two paler areas next to ocelli, posterior margin of eye with a yellowish fringe, inner region of antennal tubercles, neck laterally and gula light brown, gular suture yellowish. Dorsal margin of tylus straight, apex slightly projected upwards, surpassing dorsal margin of head. Post-tylus depression long and deep, 1.7 times shorter than interocular space. Length of tylus 0.75, length of post-

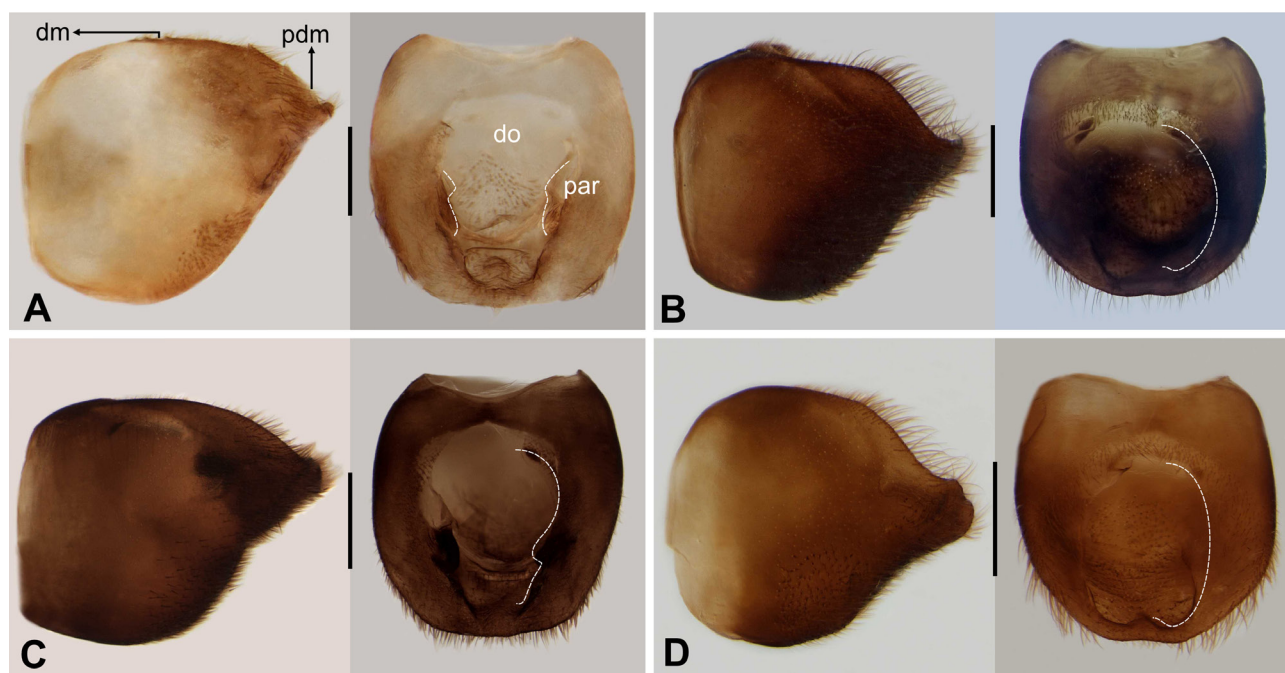
tylus depression 0.33. Eyes globose and protuberant, large in relation to head height, in lateral view surpassing dorsal margin of head. Width of eye 0.84, ocular distance 2.81, interocular space 1.09, ocellar distance 0.97, interocular space 0.58. Buccula semicircular, reaching the anterior third of eye. Antenna dark brown, longer than body length. Scape, pedicel and basiflagellomere with abundant dark, long, stiff, semierect setae; distiflagellomere with abundant yellowish, long, decumbent setae, and sparse yellowish, semierect setae. Scape with inner surface longitudinally ridged. Length of antennal articles: scape 5.00, pedicel 4.12, basiflagellomere 3.62, distiflagellomere 10.06; width of antennal articles: scape 0.33, pedicel 0.23, basiflagellomere 0.23, distiflagellomere 0.26. Labium brown, extending beyond mesocoxae. Length of labial segments: I 2.02, II 1.87, III 1.80, IV 1.72. Thorax. Pronotum (Fig. 3B) dark brown, anterior lobe with abundant yellowish, decumbent setae forming two patch, and with scattered yellowish, semierect setae; posterior lobe punctate, with scattered yellowish, short, decumbent setae, and small rounded tubercles on humeral angles; anterolateral margins straight; humeral angles expanded and slightly elevated over pronotal surface, ending in a subacute small spine slightly directed backwards; posterolateral margins slightly tuberculate, triangular processes short. Width of humeral angles 7.98, 1.1 times longer than width of abdomen. Scutellum dark brown with its apex yellowish; longer than wide; punctate and with transversal rugosities, basal region raised; with abundant yellowish, decumbent setae on lateral margins and across the medial line, and with sparse dark, erect setae all over the surface. Length of scutellum 3.04, width 3.00. Hemelytra. Clavus and corium dark brown, veins reddish-brown, punctures with yellowish, short, decumbent setae; costal margin smooth; membrane dark brown with veins paler, glabrous. Length of hemelytra 16.87. Thoracic pleurae brown, with scattered yellowish, decumbent and semierect setae; methathoracic



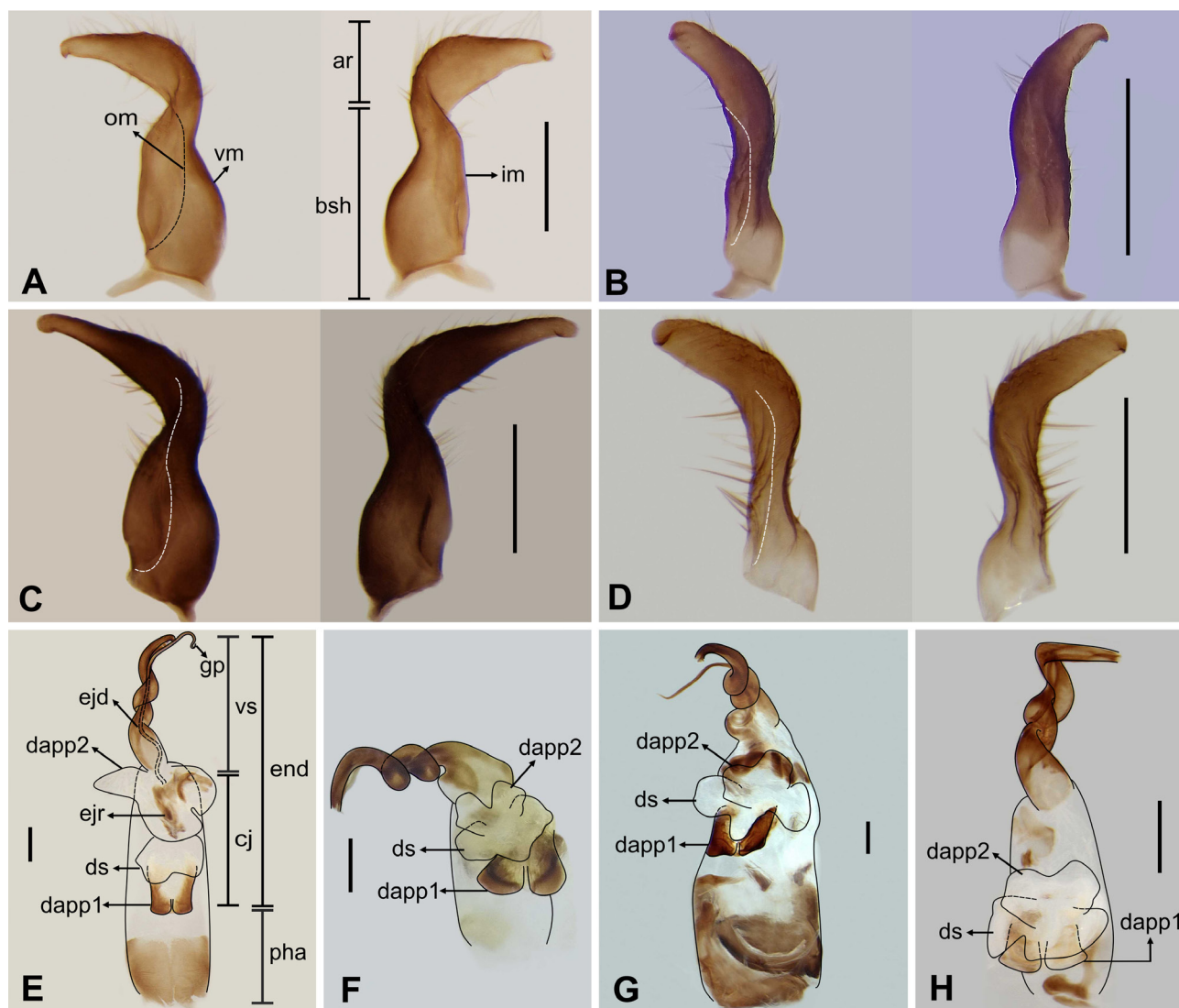
scent gland auricle dark brown, and evaporatorium paler (Fig. 4B); anterior and posterior lobes of auricle elongate, anterior lobe dark brown, posterior lobe paler. Thoracic sterna brown, with abundant dark yellowish, erect setae; mesosternal anterior projection yellowish. Legs. Pro-, meso- and metatrochanters unarmed. Femora brown, with the basal third paler, with dark, stiff, semierect setae all over the surface that become erect on ventral margin. Pro- and mesofemora sub-equal, ventral margin with two rows of spines. Metafemur brown, 2.7 times wider than profemur; dorsal margin with two rows of conical setiferous tubercles with their apex darker; ventral margin with two rows of dark brown spines and tubercles: anterior row with flat spines that increase in size towards the apex and end in a flat dentate projection; posterior row with conical tubercles that become larger towards the apex and end in a smaller flat dentate projection; anterior margin unarmed; posterior margin with one row of conical setiferous tubercles with their apex darker. Pro-, meso- and metatibiae brown. Dorsal expansion of metatibia developed, enlarged basally, with a notch from where it narrows towards the middle region and widens again towards the apex; apex of dorsal expansion of metatibia rounded; ventral margin black, slightly expanded on basal third; bordered with one row of conical irregular setiferous tubercles that become larger towards the apex, basally forming two rows of small tubercles; anterior and posterior margins unarmed. Pro- and mesotarsi brown, metatarsi yellowish. Width of pro-

femur 0.75; length of metafemur 12.37, width 2.08; length of metatibia 12.50, width 2.49. Abdomen. Length of abdomen 11.87, width 6.84. Terga entirely black. Sterna light brown, with the posterior region of segment V, VI, VII and pygophore darker; with abundant yellowish, decumbent setae and sparse yellowish, semierect setae. Lateral margin of abdominal sternite III expanded to form a small subtriangular projection. Area of insertion of trichobothria and surrounding area yellowish, detached on sternite III and forming one macula on the other segments; lateral areas with rugosities around spiracles. Spiracles dark brown, surrounding area yellowish. Genitalia. Pygophore (Fig. 7B): dorsal aperture broadly rounded, without paranthia; dorsal margin obliquely and abruptly declivent in the middle third in lateral view. Parameres (Fig. 8B): dorsal region of basal shank rounded, narrowing in the middle, inner margin straight and not expanded, outer margin slightly concave; arm elongate and narrow, slightly curved. Aedeagus as seen in Fig. 8F, conjunctival dorsal appendices I lobed, apex of outer margin rounded, with a small membranous depression between each other.

Paratype female. Thorax. Width of humeral angles equal to width of the abdomen. Legs. Metafemur 2.4 times wider than profemur; dorsal margin with two rows of black, conical setiferous tubercles; ventral margin with posterior row only developed on distal third; anterior and posterior margins unarmed. Dorsal expansion of metatibia wide, enlarged basally, with a notch from where it nar-



**Fig. 7.** *Acanthocephala* spp., male genitalia, pygophore lateral and dorsal view. **A.** *A. distanti* sp. n., paratype. **B.** *A. gamboensis* sp. n., holotype. **C.** *A. latiantennata* sp. n., holotype. **D.** *A. rufa* sp. n., holotype. Abbreviations. dm: dorsal margin of pygophore; do: dorsal opening of pygophore; par: parandria; pdm: postero-dorsal margin of pygophore. Scale bar: 1.00 mm.



**Fig. 8.** *Acanthocephala* spp., male genitalia. **A.** *A. distanti* **sp. n.**, paratype, right paramere, lateral views. **B.** *A. gamboensis* **sp. n.**, holotype, right paramere, lateral views. **C.** *A. latiantennata* **sp. n.**, holotype, right paramere, lateral views. **D.** *A. rufa* **sp. n.**, right paramere, holotype, lateral views. **E.** *A. distanti* **sp. n.**, paratype, aedeagus. **F.** *A. gamboensis* **sp. n.**, holotype, aedeagus. **G.** *A. latiantennata* **sp. n.**, holotype, aedeagus. **H.** *A. rufa* **sp. n.**, holotype, aedeagus. Abbreviations. ar: paramere arm; bsh: basal shank of paramere; cj: conjunctiva; dapp1: conjunctival dorsal appendix I; dapp2: conjunctival dorsal appendix II; ds: dorsal sac of conjunctiva; ejd: ejaculatory duct; ejr: ejaculatory reservoir; end: endosoma; gp: gonoporal process; im: inner margin of basal shank of paramere; om: outer margin of basal shank of paramere; pha: phallobase; vm: ventral margin of paramere; vs: vesica. Scale bar: 0.50 mm.

rows parallel to the distal region of the tibia from where it widens to the apex. Ventral margin of metatibia unarmed, expanded and well developed, rounded on basal third and then narrowing parallel to the apex. Abdomen. Lateral margin of abdominal sternite III not expanded. Genitalia. Sternite VII (Fig. 9B): fisura median lobes small, rounded, and overlapping with each other; plica nearly straight, close to posterior margin of sternite, as long as maximum width of first gonocoxae; posterolateral mar-

gins extending to medial third of first gonocoxae. Paratergite VIII surpassing the apex of first gonocoxae. Dorsal apodem of first gonocoxae wide, and slightly curved, with apex rounded. Second gonocoxae wide, it slightly narrows at the middle third, basal region as wide as apical region. Second gonapophysis shorter than second gonocoxa. Spermatheca (Fig. 10D): seminal receptacle apically globose and oval; distal duct shorter than flexible zone; dilation of spermathecal duct broadly oval.



## Measurements of paratypes

(n= 1♂ | 3♀) Total length: ♂ 20.37 / ♀ 22.25–23.37 (22.70); length of head: ♂ 2.16 / ♀ 2.30–2.44 (2.38); length of tylus: ♂ 0.70 / ♀ 0.75–1.89 (0.83); length of post- tylus depression: ♂ 0.33 / ♀ 0.32–0.37 (0.35); width of eye: ♂ 0.94 / ♀ 0.89–0.99 (0.93); ocular distance: ♂ 2.72 / ♀ 2.81–2.96 (2.86); interocular space: ♂ 0.98 / ♀ 1.08–1.12 (1.10); ocellar distance: ♂ 0.89 / ♀ 0.56–0.58 (0.57); interocellar space: ♂ 0.51 / ♀ 0.56–0.58 (0.57); length of antennal articles: scape, ♂ 5.00 / ♀ 5.00–5.37 (5.16); pedicel, ♂ 4.00 / ♀ 4.00–4.25 (4.16); basiflagellomere, ♂ 3.50 / ♀ 3.50–3.75 (3.66); distiflagellomere, ♂ (absent) / ♀ 10.25–10.37; width of antennal articles: scape, ♂ 0.35 / ♀ 0.32–0.33; pedicel, ♂ 0.22 / ♀ 0.23–0.54 (0.33); basiflagellomere, ♂ 0.22 / ♀ 0.22–0.24 (0.23); distiflagellomere, ♂ (absent) / ♀ 0.23; length of labial segments: I, ♂ 2.02 / ♀ 2.11–2.20 (2.15); II, ♂ 1.83 / ♀ 1.88–2.06 (1.94); III, ♂ 1.64 / ♀ 1.75–1.83 (1.79); IV, ♂ 1.60 / ♀ 1.59–1.69 (1.65); width of humeral angles: ♂ 8.62 / ♀ 8.25–9.25 (8.83); length of scutellum: ♂ 2.87 / ♀ 3.29–3.62 (3.37); width of scutellum: ♂ 2.75 / ♀ 3.25–3.50 (3.33); length of hemelytra: ♂ 16.25 / ♀ 18.12–19.00 (18.42); width of profemur: ♂ 0.70 / ♀ 0.65–0.76 (0.69); width of metafemur:

♂ 1.73 / ♀ 1.50–1.87 (1.70); length of metafemur: ♂ 11.37 / ♀ 11.87–12.25 (12.04); width of metatibia: ♂ 2.72 / ♀ 3.25–3.75 (3.54); length of metatibia: ♂ 12.50 / ♀ 12.50–12.87 (12.75); length of abdomen: ♂ 10.87 / ♀ 12.37–13.00 (12.62); width of abdomen: ♂ 5.87 / ♀ 8.00–8.50.

## Distribution

Only known from Panama (Supplementary File 1).

## Host plant

Unknown.

*Acanthocephala latiantennata* sp. n.

(Figs. 1C, 2C, 3C, 4C, 5C, G, 7C, 8C, G)

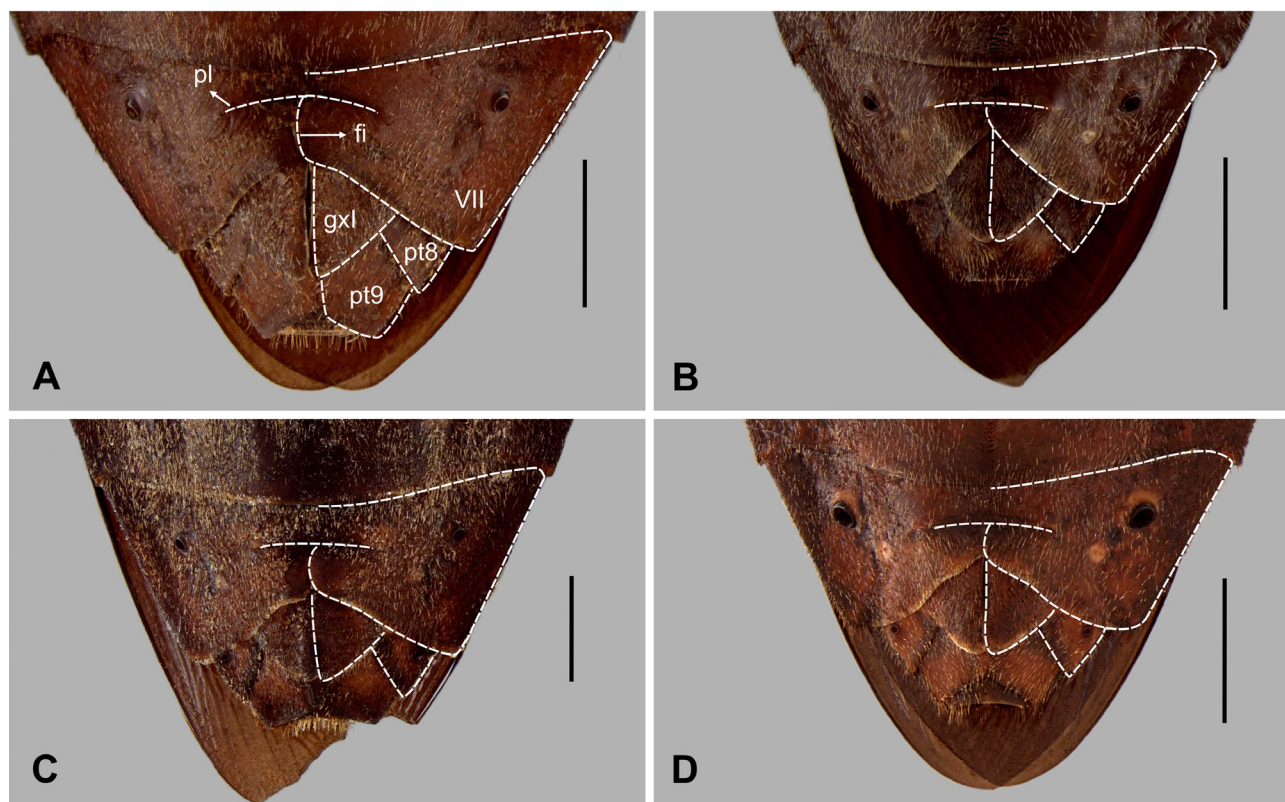
## Type material

**Holotype** ♂: Douglas. / 8/II/42 [handwritten] Ar. / W. W. Jones [USNM].

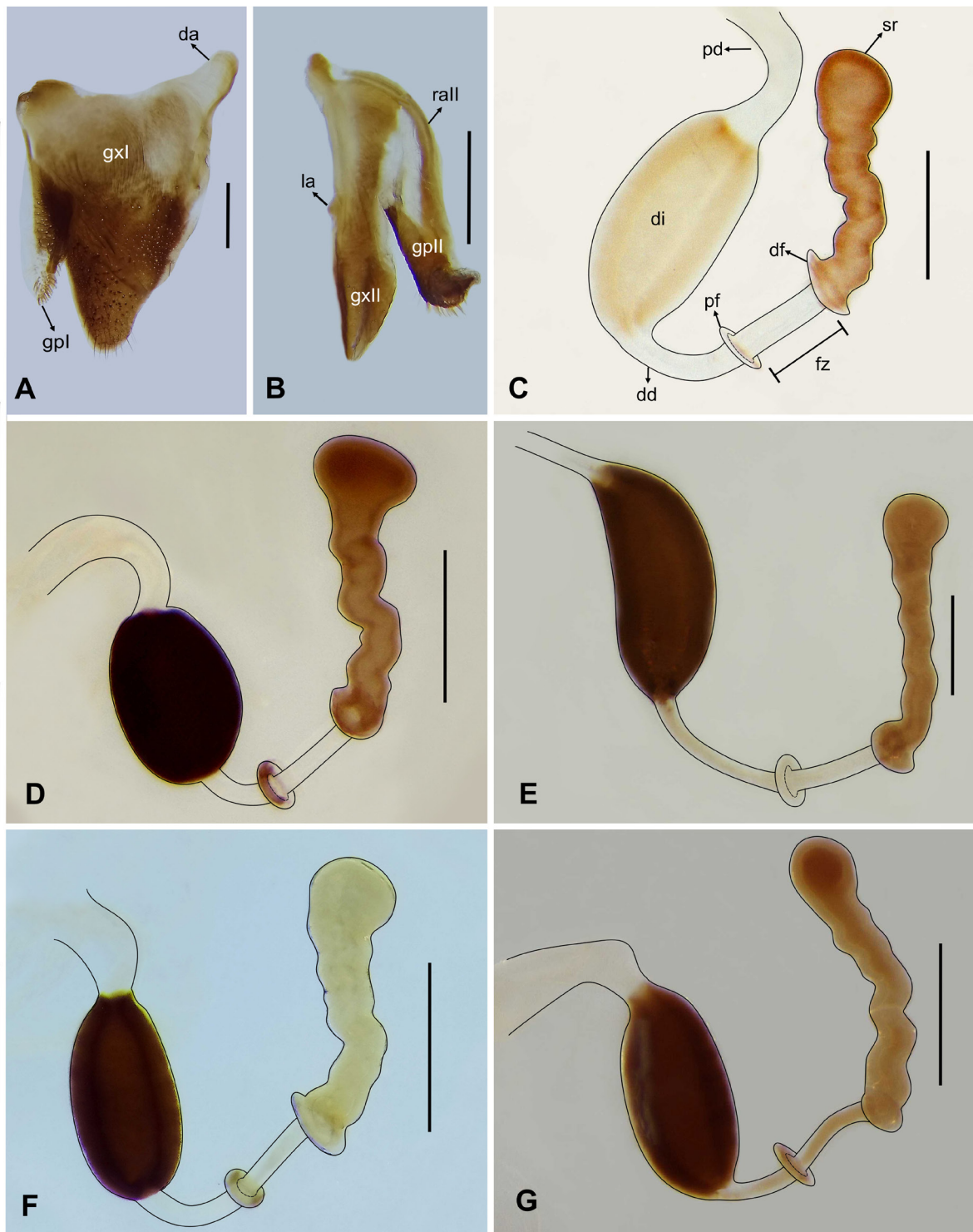
**Paratype**: 1 ♂, Mexico: Zacatecas / Apulco Tenayuca / 24–XI–1995 / H. Brailovsky / E. Barrera [UNAM].

## Etymology

From the Latin *latus*, meaning broad, with reference to the wide scape of this species.



**Fig. 9.** *Acanthocephala* spp., female genitalia, pregenital and genital segments. **A.** *A. distanti* sp. n., paratype. **B.** *A. gamboensis* sp. n., paratype. **C.** *A. maculata* sp. n., holotype. **D.** *A. rufa* sp. n., paratype. Abbreviations. fi: fisura; lt: latero-tergite; pl: plica; pt8: paratergite VIII; pt9: paratergite IX; VII: abdominal sternite VII. Scale bar: 2.00 mm.



**Fig. 10.** *Acanthocephala* spp., female genitalia. **A.** *Acanthocephala nigra* sp. n., holotype, first gonocoxa and gonapophysis; **B.** *A. nigra* sp. n., holotype, second gonocoxa and gonapophysis. **C.** *A. distanti* sp. n., paratype, spermatheca. **D.** *A. gamboensis* sp. n., paratype, spermatheca. **E.** *A. maculata* sp. n., holotype, spermatheca. **F.** *A. nigra* sp. n., holotype, spermatheca. **G.** *A. rufa* sp. n., paratype, spermatheca. Abbreviations. da: dorsal apodeme of first gonocoxa; dd: distal duct of spermatheca; df: distal flange; di: dilation of spermathecal duct; fz: flexible zone; gpl: first gonapophysis; gpII: second gonapophysis; gxl: first gonocoxa; gxII: second gonocoxa; rall: second ramus; la: lateral apodeme; pd: proximal duct of spermatheca; pf: proximal flange; sr: seminal receptacle. Scale bar: 0.50 mm.



### Diagnosis

Dark brown to black, with contrasting orange distiflagellomere, and with apex of scutellum, metathoracic gland auricle, and evaporatory area yellowish. Scape wide. Anterior pronotal lobe with four small rounded central tubercles next to collar and between the calli; posterior pronotal lobe with small sparse rounded tubercles; humeral angles acute but not spinose, slightly expanded and not elevated over the pronotal disc; triangular processes absent. Male metatibial expansions fusiform and slightly developed.

### Description

Holotype (Fig. 1C). Male. General color dark brown to black. Total length 23.75, length of head 2.90. Head (Fig. 2C). With sparse yellowish, semierect setae. Paler areas next to ocelli, posterior margin of eye and ocellar tubercle black, gular suture paler. Dorsal margin of tylus straight, apex not projected upwards, not surpassing dorsal margin of head. Post-tylus depression short and shallow, 3.4 times shorter than interocellar space. Length of tylus 1.28, length of post-tylus depression 0.25. Eyes globose and small in relation to head height. Width of eye 0.70, ocular distance 2.80, interocular space 1.40, ocellar distance 1.15, interocellar space 0.86. Buccula large, subrectangular, reaching the anterior third of eye. Antenna shorter than the body. Scape wide, dark brown, with yellowish, decumbent setae and darker, stiff, semierect setae; pedicel and basiflagellomere dark brown, only with dark, stiff, semierect setae; distiflagellomere orange with abundant yellowish, decumbent setae and sparse darker, stiff, semierect setae. Length of antennal articles: scape 4.50, pedicel 3.87, basiflagellomere 3.37, distiflagellomere 6.50; width of antennal articles: scape 0.64, pedicel 0.33, basiflagellomere 0.33, distiflagellomere 0.37. Labium brown, apex of segment IV darker; extending to mesocoxae. Length of labial segments: I 2.11, II 2.11, III 1.27, IV 1.64. Thorax. Pronotum (Fig. 3C) with dark, short, stiff, erect setae all over the surface, and sparse, short, decumbent setae on posterior lobe; anterior lobe with two rounded central tubercles next to collar, and calli with two rounded tubercles between them; posterior lobe punctate with rounded tubercles irregularly arranged; anterolateral margins straight with well-developed conical tubercles; humeral angles spineless, slightly expanded and not elevated over the pronotal disc; posterolateral margins weakly tuberculate; triangular processes absent. Width of humeral angles 8.25, slightly shorter than width of abdomen. Scutellum dark brown with its apex yellowish and incrassate; as long as wide; with conspicuous transversal rugosities and with yellowish, decumbent setae and sparse darker, erect setae all over the surface. Length of scutellum 3.12, width 3.30. Hemelytra. Clavus and corium dark reddish-brown, veins concolorous, with punctures on all surface and yellowish, short, decumbent

setae on punctures; costal margin smooth; membrane dark brown and glabrous, veins concolorous. Length of hemelytra 19.00. Thoracic pleurae dark brown, with sparse yellowish, short, decumbent and semierect setae; propleura with sparse, rounded tubercles on all surface, more abundant near humeral angles; metathoracic gland auricle and ventral zone of evaporatory area yellowish, evaporatory area with conspicuous rugosities (Fig. 4C), anterior lobe of auricle rounded, posterior lobe elongate; supracoxal area of metapleura slightly incrassate posteriorly. Thoracic sterna dark brown, with abundant yellowish, long, erect setae; mesosternal anterior projection concolorous. Legs. Protrochanter unarmed; mesotrochanter with one small, ventral, dark setiferous tubercle; metatrochanter with three small, ventral, dark setiferous tubercles. Pro-, meso- and metafemora dark brown, with yellowish, decumbent setae and dark, stiff, semierect setae all over the surface that become erect on ventral margin. Pro- and mesofemora sub-equal, ventral margin with two rows of spines. Metafemur 2.4 times wider than profemur (Fig. 5C); dorsal margin with two rows of concolorous conical setiferous tubercles; posterior row with a basal large tubercle; ventral margin with two rows of concolorous spines; anterior row with conical spines that become larger in the middle and end on a flat bidentate apical projection; posterior row with conical tubercles that become larger towards the apex and end on an apical flat bidentate projection; anterior and posterior margins with concolorous rounded tubercles. Pro-, meso- and metatibiae dark brown. Metatibia (Fig. 5G) with dorsal expansion fusiform, maximum width at basal third, sinuously narrowing to apex, apex of dorsal expansion of metatibia end in an acute angle; distal third armed with small setiferous tubercles; ventral margin slightly expanded, evident on basal third; bordered with one row of irregular, conical setiferous tubercles that become larger towards the apex, basally forming two rows of small tubercles; anterior and posterior margins unarmed. Tarsi dark brown. Width of profemur 1.00; length of metafemur 11.37, width 2.44; length of metatibia 11.87, width 1.62. Abdomen. Length of abdomen 12.87, width 8.70. Terga black, with a “Y” shape yellowish central macula on the VI and VII tergites. Sterna dark brown, with abundant yellowish, short, decumbent setae and sparse yellowish, semierect setae. Lateral margin of abdominal sternite III expanded like a fold along all segment, narrowing posteriorly, sternite IV narrowly expanded anteriorly. Area of insertion of trichobothria and surrounding area yellowish, detached on sternites III and IV, and forming one macula on the rest of segments. Lateral areas with rugosities around spiracles. Spiracles black, surrounding area concolorous with rest of abdomen. Genitalia. Pygophore (Fig. 7C): anterior opening elongated, parandria well developed; dorsal margin convex, declivent and rounded posteriorly. Parameres

(Fig. 8C): dorsal region of basal shank rounded, narrowing in the distal third, inner margin straight and slightly expanded on apical region, outer margin sinuous; arm narrow, longer than basal shank. Aedeagus as seen in fig. 8G, conjunctival dorsal appendices I sub-triangular, slightly lobate apically, without a small membranous depression between each other.

Female. Unknown.

### Distribution

Known from Mexico and the United States (Supplementary File 1).

### Host plant

Unknown.

### *Acanthocephala maculata* sp. n.

(Figs. 1D, 2D, 3D, 4D, 5D, H, 6B, 9C, 10E)

### Type material

**Holotype** ♀: México / Veracruz / Los Tuxtlas / 10-VI-85, L. Cervantes [handwritten label] [UNAM].

### Etymology

The name of this new species refers to the two rounded yellowish maculae around the scent gland scar openings on the abdominal terga.

### Diagnosis

Robust species, dark brown to black, with distiflagellomere, metathoracic gland auricle, and evaporatory area a contrasting orange; abdominal tergites black, with a rounded yellowish macula around the scent gland scars. Anterior pronotal lobe with four rounded central tubercles next to collar and between the calli; posterior pronotal lobe with abundant rounded tubercles; humeral angles wide, slightly elevated over the pronotal disc. Costal margin of hemelytra tuberculate at base. Mesofemur tuberculate dorsally. Metatibial expansions in female well developed, dorsal expansion wide basally, with a notch from where it narrows towards the apex, apex of dorsal expansion of metatibia end in a right angle.

### Description

**Holotype** (Fig. 1D). Female. General color dark brown to black. Total length 33.12, length of head 3.04. Head (Fig. 2D). Dark brown, with abundant yellowish, decumbent and semierect setae; ocellar tubercle black. Dorsal margin of tylus straight at base and projected upwards at apex, surpassing dorsal margin of head. Post-tylus depression short and deep, 3.1 times shorter than interocular space. Length of tylus 1.14, length of post-tylus depression 0.32. Eyes globose and protuberant, small in relation to head height. Width of eye 0.80, ocular distance 3.29, interocular space 1.66, ocellar distance 1.44, interocular space 1.02. Buccula large, oval and elongate, reaching the

anterior third of eye. Antenna shorter than body length. Scape, pedicel, and basiflagellomere black, with abundant dark, stiff, semierect setae; distiflagellomere orange with abundant yellowish, decumbent setae and sparse yellowish, semierect setae. Length of antennal articles: scape 6.87, pedicel 5.12, basiflagellomere 4.37, distiflagellomere 10.00; width of antennal articles: scape 0.60, pedicel 0.41, basiflagellomere 0.38, distiflagellomere 0.41. Labial segments I to III dark brown, segment IV paler with apex segment black; extending to mesocoxae. Length of labial segments: I 2.82, II 2.63, III 1.50, IV 2.25. Thorax. Pronotum (Fig. 3D) with yellowish, short, decumbent setae more abundant on anterior lobe, and sparse yellowish, long, semierect setae only on anterior lobe; anterior lobe with two rounded central tubercles next to collar, and calli with two rounded tubercles between them; posterior lobe punctate, with abundant, rounded, smooth and shiny tubercles irregularly arranged; anterolateral margins straight, with well-developed conical tubercles; humeral angles tuberculate, expanded and slightly elevated, widely acute; posterolateral margins with conical tubercles, triangular processes short. Width of humeral angles 14.50, 1.2 times larger than width of abdomen. Scutellum dark brown with its apex yellowish; longer than wide; punctate and with transversal rugosities; raised basal region with two medial rounded tubercles; with yellowish, decumbent setae and darker, erect setae all over the surface. Length of scutellum 4.50, width 3.99. Hemelytra. Clavus and corium dark brown, veins concolorous, entirely punctate, with sparse yellowish, short, decumbent setae, basal region of costal margin armed with one small setiferous tubercle; membrane dark brown, veins concolorous, with sparse, decumbent setae. Length of hemelytra 26.12. Thoracic pleurae dark brown, with long, yellowish decumbent setae; propleura with sparse small tubercles; metathoracic gland auricle and evaporatory area orange (Fig. 4D), anterior lobe of auricle digitiform, posterior lobe elongate and semicircular, evaporatory area finely punctate and weakly striated. Thoracic sterna black, metasternum paler; with abundant yellowish, long, erect and decumbent setae; mesosternal anterior projection concolorous. Legs. Pro- and mesotrochanters unarmed, metatrochanter with two small, ventral, setiferous tubercles. Pro-, meso and metafemora dark brown, with yellowish, short, decumbent setae and darker, longer, semierect setae all over the surface. Pro- and mesofemora sub-equal, ventral margin with two rows of spines. Dorsal margin of mesofemur with one row of conical setiferous tubercles. Metafemur 2.5 times wider than profemur (Fig. 5D); dorsal margin with two rows of conical setiferous tubercles; anterior margin with one row of small setiferous tubercles on distal half; posterior margin with sparse, irregular tubercles; ventral margin with one row of flat ventral spines that increase in size towards the apex and end in an apical bidentate projec-



tion. Pro- and mesotibiae entirely dark brown. Metatibia (Fig. 5H) dark brown with lateral margins paler; dorsal expansion developed, enlarged basally, with a notch from where it narrows parallel to the tibia towards the apex, apex of dorsal expansion of metatibia end in a right angle; distal margin with sparse, small setiferous tubercles; ventral margin expanded on basal third, bordered with one row of conical, irregular setiferous tubercles that become larger towards the apex, basally forming two rows of small tubercles. Tarsi dark brown. Width of profemur 1.08; length of metafemur 15.00, width 2.75; length of metatibia 16.25, width 5.00. Abdomen. Length of abdomen 17.50, width 12.12. Terga black, with a rounded yellowish macula around the scent gland scars. Sterna dark brown, with abundant yellowish, decumbent and semierect setae all over the surface. Lateral margin of sternite III expanded like a fold on the anterior half of the segment, narrowing posteriorly (Fig. 6B). Area of insertion of trichobothria and surrounding area yellowish. Lateral areas with rugosities around spiracles. Spiracles black, surrounding area concolorous with rest of abdomen. Genitalia. Sternite VII (Fig. 9C): fisura median lobes well developed, rounded, and overlapping with each other; plica straight, close to the anterior margin of sternite, as long as maximum width of first gonocoxae; posterolateral margins extending to apical third of first gonocoxae. Paratergite VIII overpass first gonocoxae. Dorsal apodem of first gonocoxae rectangular. Second gonocoxae slightly curved, narrowing to the apex. Second gonapophysis shorter than second gonocoxa. Spermatheca (Fig. 10E): seminal receptacle apically globose and rounded; distal duct longer than flexible zone; dilation of spermathecal duct elongate oval.

Male. Unknown.

#### Distribution

Only known from Mexico (Supplementary File 1).

#### Host plant

Unknown.

### *Acanthocephala nigra* sp. n. (Figs. 1E, 2E, 3E, 4E, 10A–B, F)

#### Type material

**Holotype** ♀: Send Guanacaste, Pto Jimenez, Prov. / Punta, COSTA RICA. 0m. 23 MAR / 1995. L. Angulo, L\_N\_270900\_508100 / #4687 // COSTA RICA INBIO / [barcode] GRI002 / 141689 [UNAM].

#### Etymology

From the Latin *niger*, to denote the black coloration of the species.

#### Diagnosis

Dark brown to black, apex of scutellum and tarsi yellowish, veins of clavus and corium reddish-brown. Ante-

rior pronotal lobe with abundant yellowish, decumbent setae forming one dense patch; humeral angles slightly elevated over pronotal surface, ending in a small spine. Metatibial expansions well developed in females, dorsal expansion wide, enlarged basally, with a notch where it narrows towards the apex; apex of dorsal expansion of metatibia rounded.

#### Description

**Holotype** (Fig. 1E). Female. General color dark brown to black. Total length 23.75, length of head 2.52. Head (Fig. 2E). With sparse yellowish, decumbent setae. Vertex black with paler areas next to ocelli, posterior margin of eye with a yellowish fringe; inner region of antennal tubercles, sides of the neck, and gula paler than dorsal region of head. Tylus black, dorsal margin of tylus straight at base, apex strongly projected upwards, surpassing dorsal margin of head. Post-tylus depression deep, 1.8 times shorter than interocellar space. Length of tylus 0.89, length of post-tylus depression 0.32. Eyes globose and protuberant, large in relation to head height. Width of eye 0.86, ocular distance 2.91, interocular space 1.15, ocellar distance 1.02, interocellar space 0.57. Buccula oval, reaching anterior third of eye. Antenna black, as long as the body. Scape with inner side longitudinally ridged. Scape, pedicel, and basiflagellomere, with abundant dark, stiff, semierect setae; distiflagellomere with abundant yellowish decumbent setae, and sparse darker, shorter, semierect setae. Length of antennal articles: scape 4.6, pedicel 4.5, basiflagellomere 4.12, distiflagellomere 10.12; width of antennal articles: scape 0.38, pedicel 0.28, basiflagellomere 0.25, distiflagellomere 0.25. Labium dark brown, extending beyond mesocoxae. Length of labial segments: I 2.25, II 2.06, III 1.88, IV 2.69. Thorax. Pronotum (Fig. 3E) dark brown, anterior lobe with abundant yellowish, decumbent setae forming a patch, and with scattered yellowish, semierect setae; posterior lobe punctate, with scattered yellowish, short, decumbent setae, and small, rounded tubercles on humeral angles; anterolateral margins straight and unarmed; humeral angles expanded and elevated over pronotal surface, ending in a subacute spine slightly directed backwards; posterolateral margins tuberculate, triangular processes short. Width of humeral angles 9.62, slightly longer than width of abdomen. Scutellum dark brown with its apex yellowish; wider than long; with transversal rugosities and basal region raised; with abundant yellowish, decumbent setae on lateral margins and across the medial line, and with sparse darker, erect setae all over the surface. Length of scutellum 3.37, width 3.75. Hemelytra. Clavus and corium black, veins reddish-brown, punctures with yellowish, short, decumbent setae; costal margin smooth; membrane dark brown, glabrous, with veins paler. Length of hemelytra 18.75. Thoracic pleurae dark brown, with sparse yellowish, decumbent setae; methathoracic scent gland auricle dark brown, evaporatorium paler,

anterior and posterior lobes of auricle elongate (Fig. 4E). Thoracic sterna dark brown, with abundant dark, erect setae; mesosternal anterior projection yellowish. Legs. Pro-, meso- and metatrochanters unarmed. Femora black, with dark, stiff, semierect setae all over the surface that become erect on ventral margin. Pro- and mesofemora sub-equal. Ventral margin of profemur with one row of spines on apical half. Ventral margin of mesofemur only with three apical spines. Metafemur 2.3 times wider than profemur; dorsal margin with two rows of conical setiferous tubercles; ventral margin with one row of spines, becoming larger to the apex and ending in an apical bidentate projection; anterior and posterior margins unarmed. Pro-, meso- and metatibiae black. Dorsal expansion of metatibia developed, enlarged basally, with a notch from where it narrows parallel to the tibia till the apex, apex of dorsal expansion of metatibia rounded; ventral margin unarmed, well developed and rounded on basal third, then narrowing parallel to the apex. Pro- and mesotarsi dark brown, metatarsi yellowish. Width of profemur 0.75; length of metafemur 12.75, width 1.75; length of metatibia 13.12, width 3.75. Abdomen. Length of abdomen 13.12, width 8.87. Terga entirely black. Sterna dark brown, with scattered yellowish, short, decumbent setae and longer, semierect setae. Lateral margin of abdominal sternites not expanded. Area of insertion of trichobothria and surrounding area yellowish, detached on sternite III, and forming one macula on the other segments; lateral areas with rugosities around spiracles. Spiracles black, surrounding area paler. Genitalia (sternite VII, and paratergites destroyed during dissection). Dorsal apodeme of first gonocoxae longer than wide, apex rounded (Fig. 10A). Second gonocoxae wide, narrower apically, with a well-developed lateral apodeme at middle (Fig. 10B). Second gonapophysis shorter than second gonocoxa. Spermatheca (Fig. 10F): seminal receptacle apically globose and rounded; distal duct slightly longer than flexible zone; dilation the spermathecal duct elongated oval.

Male. Unknown.

#### Distribution

Only known from Costa Rica (Supplementary File 1).

#### Host plant

Unknown.

#### *Acanthocephala rufa* sp. n.

(Figs. 1F, 2F, 3F, 4F, 5A, E, 6C, 7D, 8D, H, 9D, 10G)

#### Type material

**Holotype** ♂: Trinidad Río / Pan 23–3–12 // A. Busck / coll [USNM].

**Paratypes**: 1 ♂, Barro Colorado / CZ Jan–Mar–44 / Zetek, 5122 [MLP]; 1 ♀, Barro Colorado / ado, C.Z. Pan / Mar. 13. 1935 // CR 73706 / C. H. Ballou [handwritten label] [USNM].

#### Etymology

From the Latin *rufus*, reddish, to denote the contrasting reddish-brown coloration of the species.

#### Diagnosis

Brown to dark brown, tinged with red, apex of scutellum and tarsi yellowish, veins of clavus and corium reddish; anterior lobe of metathoracic gland auricle dark brown to black. Anterior pronotal lobe with abundant yellowish, decumbent setae forming one dense patch; humeral angles not elevated over pronotal surface, ending in a small spine. Metatibial expansions well developed in both sexes, dorsal expansion wide, enlarged basally, with a notch from where it narrows towards the apex; apex of dorsal expansion of metatibia rounded.

#### Description

**Holotype** (Fig. 1F). Male. General color brown to dark brown, tinged with red. Total length 19.87, length of head 2.17. Head (Fig. 2F). With sparse yellowish, semierect setae; posterior margin of eye with a yellowish fringe, vertex dark brown with two paler areas next to ocelli extending posteriorly and ventrally to gula, inner region of antennal tubercles and buccula paler than dorsal region of head. Dorsal margin of tylus straight, apex projected upwards, not surpassing dorsal margin of head. Post-tylus depression deep, 1.5 times shorter than interocular space. Length of tylus 0.77, length of post-tylus depression 0.32. Eyes globose and protuberant, large in relation to head height. Width of eye 0.96, ocular distance 2.62, interocular space 0.99, ocellar distance 0.93, interocular space 0.48. Buccula small and subtriangular, reaching the anterior third of eye. Antenna dark brown, longer than the body. Scape with inner side longitudinally ridged. Scape, pedicel, and basiflagellomere, with abundant dark, long, stiff, semierect setae; distiflagellomere, with abundant yellowish, decumbent setae and sparse darker, shorter, semierect setae. Length of antennal articles: scape 5.00, pedicel 4.00, basiflagellomere 3.62, distiflagellomere 9.75; width of antennal articles: scape 0.33, pedicel 0.23, basiflagellomere 0.23, distiflagellomere 0.28. Labium brown, slightly surpassing mesocoxae. Length of labial segments: I 2.02, II 1.78, III 1.69, IV 1.60. Thorax. Pronotum reddish-brown, with posterolateral margins dark brown (Fig. 3F); anterior lobe with abundant yellowish, decumbent setae forming one patch, and with scattered yellowish, semierect setae; posterior lobe punctate, with scattered yellowish, short, decumbent setae and with small rounded tubercles on humeral angles; anterolateral margins straight and unarmed; humeral angles expanded and not elevated over pronotal surface, ending in a subacute small spine slightly directed backwards; posterolateral margins weakly tuberculate on anterior half; triangular processes short. Width of humeral angles 7.87, 1.2 times longer than width of abdomen. Scutellum reddish-brown with its apex yellow-

ish; as wide as long; with transversal rugosities, raised on basal region; with abundant yellowish, decumbent setae on lateral margins and across the medial line, and with sparse darker, erect setae all over the surface. Length of scutellum 2.87, width 2.87. Hemelytra. Clavus and corium dark brown, with punctures along and next to veins and in the center of the cells, with yellowish, short, decumbent setae on punctures, veins reddish-brown; costal margin smooth; membrane dark brown and glabrous, veins paler. Length of hemelytra 16.87. Thoracic pleurae light brown, with sparse yellowish, semierect setae; anterior lobe of auricle black and rounded, posterior lobe yellowish and elongate; evaporatory area light brown to yellowish, punctate and with inconspicuous rugosities (Fig. 4F). Thoracic sterna light brown, with abundant dark, long, erect setae; mesosternal anterior projection yellowish. Legs. Pro-, meso- and metatrochanters unarmed. Femora with dark, stiff, semierect setae all over the surface that become erect on ventral margin. Pro- and mesofemora sub-equal, light reddish-brown, ventral margin with two rows of spines. Metafemur reddish-brown, at least 3.8 times wider than profemur (Fig. 5A); dorsal margin with two rows of conical setiferous tubercles with their apex darker; ventral margin with two rows of dark brown spines and tubercles: anterior row with flat dark brown spines that increase in size towards the apex and end in a flat dentate projection; posterior row with conical tubercles that become larger towards the apex and end in a smaller flat dentate projection; anterior margin unarmed; posterior margin with one row of conical setiferous tubercles with the apex darker. Pro- and mesotibiae light brown. Metatibia reddish-brown; dorsal expansion (Fig. 5E) developed, enlarged basally, with a notch from where it narrows towards the middle and widens again towards the apex, apex of dorsal expansion of metatibia rounded; ventral margin slightly expanded on basal third; bordered with one row of irregular, conical setiferous tubercles that become larger towards the apex, basally forming two rows of small tubercles. Pro- and mesotarsi light brown, metatarsi yellowish. Width of profemur 0.66; length of metafemur 11.75, width 2.50; length of metatibia 12.12, width 2.50. Abdomen. Length of abdomen 10.62, width 6.50. Terga black. Sterna light brown, with the distal region of segment VII and pygophore dark brown; with abundant yellowish, decumbent setae and sparse, semierect setae. Lateral margins of abdominal sternite III expanded into a small subtriangular projection (Fig. 6C). Insertion of trichobothria and surrounding area yellowish, forming one macula; lateral areas punctate around spiracles. Spiracles black, surrounding area yellowish. Genitalia. Pygophore (Fig. 7D): dorsal aperture broadly oval, without parandria; dorsal margin convex and abruptly declivent in the posterior third in lateral view. Parameres (Fig. 8D): dorsal region of basal shank rounded, narrowing in the middle third, inner

margin straight and not expanded, outer margin straight; arm wide, longer than basal shank. Aedeagus as seen in fig. 8H, conjunctival dorsal appendices I lobed, apex of outer margin rounded, with a small membranous depression between each other.

Paratype female. Thorax. Humeral distance as large as the width of the abdomen. Legs. Spines on the dorsal margin of pro- and mesofemur reduced, with only one or three apical spines. Metafemur 2.5 times wider than profemur (Fig. 5A); dorsal margin with two rows of black conical setiferous tubercles; ventral margin with posterior row only developed on distal third; anterior margin unarmed; posterior margin with a single small setiferous tubercle on the distal third. Dorsal expansion of metatibia (Fig. 5E) wide, enlarged basally, with a notch from where it narrows parallel to the distal region from where it widens to the apex. Ventral margin of metatibia unarmed, well developed and rounded on basal third, then narrowing parallel to the apex. Abdomen. Lateral margin of abdominal sternite III not expanded. Genitalia. Sternite VII (Fig. 9D): furca median lobes rounded, and overlapping with each other; plica straight, equidistant to posterior and anterior margins of sternite, longer than maximum width of first gonocoxae; posterolateral margins extending to apical third of first gonocoxae. Paratergite VIII surpassing the apex of first gonocoxae. Dorsal apodeme of first gonocoxae long and narrow. Second gonocoxae wide, it slightly narrows at the middle region, and with a well-developed lateral apodeme, apical region wider than basal region. Second gonapophysis shorter than second gonocoxa. Spermatheca (Fig. 10G): seminal receptacle apically globose and rounded; distal duct as long as flexible zone; dilation of spermathecal duct elongated oval.

#### Measurements of paratypes

(n= 1♂ | 1♀) Total length: ♂ 20.00 / ♀ 22.62; length of head: ♂ 2.16 / ♀ 2.56; length of tylus: ♂ 0.75 / ♀ 0.96; length of post- tylus depression: ♂ 0.37 / ♀ 0.32; width of eye: ♂ 0.84 / ♀ 0.96; ocular distance: ♂ 2.58 / ♀ 2.97; interocular space: ♂ 0.94 / ♀ 1.08; ocellar distance: ♂ 0.84 / ♀ 1.02; interocellar space: ♂ 0.47 / ♀ 0.57; length of antennal articles: scape, ♂ 5.12 / ♀ 5.12; pedicel, ♂ 4.12 / ♀ 4.37; basiflagellomere, ♂ 3.62 / ♀ 3.87; distiflagellomere, ♂ 10.00 / ♀ 9.62; width of antennal articles: scape, ♂ 0.51 / ♀ 0.32; pedicel, ♂ 0.23 / ♀ 0.25; basiflagellomere, ♂ 0.23 / ♀ 0.22; distiflagellomere, ♂ 0.25 / ♀ 0.25; length of labial segments: I, ♂ 1.88 / ♀ 2.06; II, ♂ 1.78 / ♀ 1.97; III, ♂ 1.64 / ♀ 1.83; IV, ♂ 1.59 / ♀ 1.73; width of humeral angles: ♂ 7.87 / ♀ 8.87; length of scutellum: ♂ 3.12 / ♀ 3.50; width of scutellum: ♂ 3.12 / ♀ 3.50; length of hemelytra: ♂ 16.87 / ♀ 18.50; width of profemur: ♂ 0.62 / ♀ 0.65; width of metafemur: ♂ 2.37 / ♀ 1.62; length of metafemur: ♂ 11.87 / ♀ 12.37; width of metatibia: ♂ 2.87 / ♀ 3.75; length of metatibia: ♂ 12.37 / ♀ 12.50;



length of abdomen: ♂ 10.05 / ♀ 12.00; width of abdomen: ♂ 6.00 / ♀ 8.00.

#### Distribution

Only known from Panama (Supplementary File 1).

#### Host plant

Unknown.

### New distributional records

#### *Acanthocephala affinis* (Walker, 1871)

#### Distribution

Colombia and Venezuela (WALKER 1871); first record from Panama.

#### Material examined

New record. Panama, 1 ♂: Panamá Oeste, C.A. Cerro de la Campana; 11.VI.1967, ALBERTO ORTIZ B. leg. [UNAM] (Supplementary File 1).

#### *Acanthocephala angustipes* (Westwood, 1842)

#### Distribution

Antilles (BERGROTH 1913), Barbados (WALKER 1871), Brazil (PACKAUSKAS 2010), Colombia, French Guiana (WALKER 1871); first record from Panama.

#### Material examined

New record. Panama, 1 ♂ and 1 ♀: C.Z., Albrook Field; 19.VII.1937; J.C. Lutz leg. [USNM] (Supplementary File 1).

#### *Acanthocephala heissi* Brailovsky, 2006

#### Distribution

Belize (MAES et al. 2024), Mexico (BRAILOVSKY 2006), Nicaragua (MAES et al. 2024); first record from Guatemala.

#### Material examined

New records. Guatemala, 1 ♂: Alta Verapaz, Trece Aguas; Schwarz & Barber leg.; on cacao [USNM]; 1 ♀: Izabal, Morales; XII.1929; J.J. Withe leg. [USNM] (Supplementary File 1).

#### Host plant

*Theobroma cacao* L. (Malvaceae).

### Discussion

In the present work, we describe two new species from North America, *A. maculata* **sp. n.** and *A. latiantennata* **sp. n.** According to BRAILOVSKY's (2006) key to Mexican *Acanthocephala*, *A. maculata* **sp. n.** keys out to *A. alata* (Burmeister, 1835) due to the pronotal humeral lobes greatly expanded beyond the margins of the abdomen and the hemelytra; and to the dorsal surface of mid-

dle femur with one row of short, stout spines in both sexes. In McPHERSON et al.'s (2011) key to the *Acanthocephala* from America north of Mexico, it runs to *A. declivis* by the metatibiae broadly dilated for almost their entire length, ending abruptly near the apex; and by the humeral angles broadly rounded, strongly extended laterally, and elevated in posterior view. However, *A. maculata* **sp. n.** can be differentiated from these species by the basally tuberculate costal margin of the hemelytra, and by the black coloration of abdominal terga with two contrasting rounded yellowish maculae around the scent gland scar openings.

In the same way, *A. latiantennata* **sp. n.** runs to *A. femorata* in BRAILOVSKY's (2006) key by the obtuse and weakly expanded humeral angles, only slightly broader than the basal width of the hemelytra; the pronotal disc and the propleura densely tuberculate; the intercallar space with four tubercles at each side of midline, two above and two below the calli; the concolorous tarsi; and the abdominal tergites without a yellow stripe running from segment III to VII. In McPHERSON et al.'s (2011) key, it runs to couple 3, with *A. terminalis* and *A. femorata* by the metatibiae broadly dilated in its basal middle, that gradually narrow towards the apex. Nevertheless, *A. latiantennata* **sp. n.** can be distinguished from these species by the conspicuously wide scape (Fig. 1C), and the absence of triangular processes on the pronotum (Fig. 3C).

The new species *Acanthocephala gamboensis* **sp. n.**, *A. nigra* **sp. n.**, and *A. rufa* **sp. n.** show similarities with *A. carioca* Olivera, Dellapé & Melo, 2024, *A. flaviantennata* Olivera, Dellapé & Melo, 2024, *A. harryi* Olivera, Dellapé & Melo, 2024, and *A. spinosa* Olivera, Dellapé & Melo, 2024, and with *A. latipes*, *A. equalis* (Westwood, 1842), *A. pleuritica* (Costa, 1863), and *A. scutellata* (Signoret, 1862). As discussed in OLIVERA et al. (2024), these species share globose and protuberant eyes, a longitudinally carinate scape, and a rounded apex of the dorsal expansion of the metatibia. Nevertheless, *Acanthocephala gamboensis* **sp. n.** can be distinguished by the absence of a conspicuous lateral spine at the base of the metafemur in males, and by characters from the female internal genitalia, particularly by the oval dilation of spermathecal duct (Fig. 10D). *Acanthocephala nigra* **sp. n.** can be easily distinguished by the dark brown to black coloration, with the metathoracic scent gland auricle and evaporatorium slightly paler and not contrasting with the rest of the pleurae; and finally, *Acanthocephala rufa* **sp. n.** is easily distinguished by the brown to dark brown with reddish tones coloration, with a contrasting posterior metathoracic scent gland lobe and evaporatorium yellowish.

*Acanthocephala distanti* **sp. n.**, described from Costa Rica, Guatemala, Nicaragua, and Panama, is similar to *A. affinis*, *A. angusta* Olivera, Dellapé & Melo, 2024, *A. angustipes*, *A. bicoloripes*, *A. femorata*, *A. concolor* (Herrich-Schäffer, 1841), *A. surata* (Burmeister, 1835),

and *A. terminalis* by the small globose eyes, the straight anterolateral pronotal margins with well-developed conical tubercles, the punctate posterior pronotal lobe with irregularly rounded tubercles, the slightly expanded humeral angles that are not elevated over the pronotal disc, and the fusiform or slightly sinuate metatibial expansions. But *A. distanti* sp. n. can be distinguished by the presence of two rounded central tubercles in the base of the scutellum, the tuberculate thoracic pleurae, and by the shape of the metatibial expansions (Fig. 5F) that are slightly developed and fusiform in males, and triangular in females.

With the addition of the six new species described herein and the new distributional records, the genus increased its diversity to 38 species, with eight species recorded from North America and 12 from Central America.

In the revisional work of the genus *Acanthocephala* from North America north of Mexico, MCPHERSON et al. (2011) mentioned two of the three subgeneric names proposed by STÅL (1870) [*A. (Acanthocephala)*, *A. (Metapodiessa)* and *A. (Spilopleura)*]. These subgeneric names were synonymized by PACKAUSKAS (2010) in the New World Coreidae Catalogue, probably because most authors omitted the subgenera when dealing with *Acanthocephala* species. Recently, OLIVERA et al. (2023) removed *Spilopleura* from synonymy and elevated it to generic rank. We believe that a comprehensive study in a phylogenetic framework, to test the monophyly of *Acanthocephala* and relatives and therefore the subgenera created by STÅL, is necessary to shed light on this situation.

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**Supplementary material:**

[Available from: <https://doi.org/10.6084/m9.figshare.28046435.v1>]

**Supplementary File 1:** Data occurrences of the *Acanthocephala* Laporte material examined for this study.