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Synopsis of the wasp genus *Clystopsenella* Kieffer (Hymenoptera: Scolebythidae)

ANDERSON LEPECO[1*] & GABRIEL A. R. MELO[1,2]
[1]*Laboratório de Biologia Comparada de Hymenoptera (LBCH), Departamento de Zoologia, Universidade Federal do Paraná, Cx. Postal 19020, 81531-980, Curitiba, PR, Brazil.*
[2] *garmelo@ufpr.br; https://orcid.org/0000-0001-9042-3899*
**Corresponding author. al.lepeco@gmail.com; https://orcid.org/0000-0001-7467-5244*

Abstract

Scolebythidae are ectoparasitoid wasps which develop gregariously as idiobionts on wood-boring beetle larvae. Among them, the genus *Clystopsenella* is restricted to the Neotropical region and the eastern coast of Australia. The genus also includes a fossil species, †*Clystopsenella mirabilis* Engel, 2015, from Miocene Dominican amber. In the present study we review the genus *Clystopsenella* and describe a new species from Costa Rica, *Clystopsenella pacifica* **sp. nov.** A key to the extant and extinct species is provided. The type locality of *Clystopsenella longiventris* Kieffer, 1911 is reinterpreted based on the original labels. The distribution of the genus is mostly confined to woodlands under tropical and subtropical climates. The biology of scolebythids is discussed based on a new host record for *C. longiventris.*

Key words: Chrysidoidea, taxonomy, parasitic wasp

Introduction

The aculeate family Scolebythidae comprises a small group of ectoparasitoid wasps which develop gregariously as idiobionts on wood-boring beetle larvae (Brothers 1981; Melo 2000). These wasps are rarely collected, with a geographic range spanning tropical regions of the world, including warm forests of the Neotropics, southern Africa, Madagascar, southern China, Thailand, Australia, New Zealand, New Caledonia and Fiji (Evans 1963; Azevedo 1999; Beaver 2002; Azevedo *et al.* 2011; Brothers 2011; Lepeco & Melo 2021).

Clystopsenella Kieffer, 1911, comprising three described species—two extant and one extinct, is one of the four extant genera presently included in the family. *Clystopsenella longiventris* Kieffer, 1911 was originally described as a bethylid and later transferred to Scolebythidae with the proposition of the family by Evans (1963). This species occurs throughout rainforests in the Neotropical Region, being recorded in Brazil, Costa Rica, Colombia, Panama and Belize (Kieffer 1911; Gauld 1995; Azevedo 1999; Fernández *et al.* 2002; Cambra & Azevedo 2003; Engel 2005). *Clystopsenella australiana* Lepeco & Melo, 2021 is known from a single specimen collected on Bribie Island, on the eastern coast of Australia (Lepeco & Melo, 2021). The fossil †*Clystopsenella mirabilis* Engel, 2015 was described from an amber inclusion from the Miocene of the Dominican Republic, being more alike the extant Neotropical species (Engel, 2015; Lepeco & Melo, 2021). Gauld (1995) suggested that there would be at least one undescribed species of *Clystopsenella* in Costa Rica, mentioning a peculiar specimen collected in the Santa Rosa National Park, on the western coast of the country. Later, Cambra & Azevedo (2003) attested that the specimens examined by them from Panama and Costa Rica corresponded to *C. longiventris*.

In the present study we review *Clystopsenella* and describe a new species from Costa Rica, collected at the Santa Rosa National Park. We also provide a key to the species.

Material and Methods

We conducted an extensive examination of specimens, collected in various localities, from the following institutions:

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American Museum of Natural History, New York, USA (AMNH); Australian National Insect Collection—CSIRO, Canberra, Australia (ANIC); Natural History Museum, London, UK (NHM); Coleção Entomológica Padre Jesus Santiago Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil (DZUP); Coleção Zoológica do Maranhão, Universidade Estadual do Maranhão, Caxias, Brazil (CZMA) and Snow Entomological Collection, University of Kansas, Lawrence, USA (SEMK). Morphology was observed and measured using a Leica M125 stereomicroscope, with the aid of a 10 × eyepiece and a micrometric scale. Photographs were taken using a Leica DFC295 digital camera coupled to the stereomicroscope and the dome illumination system of Kawada & Buffington (2016). Resulting images were combined in Zerene Stacker 1.4 (Zerene Systems, LLC) and edited in GIMP 2.8.16 (The GIMP Team).

Anatomical terminology follows mainly Huber & Sharkey (1993), complemented by the terminology proposed for the closely related bethylid wasps by Lanes *et al.* (2020). We refer to the lateral portions of meso- and metathorax as "mesepisternum" and "metepisternum", respectively. Apparent abdominal structures are numbered based on metasomal segmentation, i.e., the metasomal segment I used herein corresponds to the abdominal segment II. Sculpturing description follows Harris (1979). Species boundaries were based on evidence brought by distinct distributions of morphological characters, with no overlapping conditions (Cronquist 1978), coupled with distinct geographic distribution. The gaps seen in the external morphology and in distribution can be taken as evidence of independent evolutionary lineages (Willey 1978).

RESULTS

Clystopsenella Kieffer

Clystopsenella Kieffer, 1911: 204. Type species: *Clystopsenella longiventris* Kieffer, 1911, by monotypy.

Diagnosis and comments. The genus can be readily distinguished from other scolebythids by the possession of a modified region on the medial surface of the sternum V of females, consisting of an elevated area with patches of appressed setae on each side. The forewing has a relatively well-developed venation, with medial, marginal and submarginal cells closed by tubular veins. In contrast to *Ycaploca* Nagy, *Clystopsenella* lacks a strong medial elevation on the frons with carinate sides; the vein 2rs-m is inserted anteriorly on the marginal cell, and the vein 2r-rs is shorter than 1m-cu; the posterior surface of the propodeum is not rugulose medially; the first flagellomere is longer than two-thirds of the length of the second one; and the tibial spur formula is 1:2:2. Differently from *Scolebythus* Evans, species of *Clystopsenella* have the occipital carina completely absent or vestigial and restricted to its lateral portions, the malar space longer than one-half of the basal mandibular width, and the posterior ocelli distanced from each other by about 3 × anterior ocellus width or more. In addition, *Clystopsenella* has relatively robust legs in comparison to the other genera.

Key to species of *Clystopsenella* Kieffer

1. Head longer than its maximum width; frontal line indicated as deep sulcus extending from clypeus to anterior ocellus; fore wing membrane with distinct dark spots around apex of radial and marginal cells; distal margin of pterostigma, within marginal cell, straight (early-Miocene Dominican amber) . . . . . †***C. mirabilis*** **Engel**
- Head shorter than its maximum width; frontal line indicated as deep sulcus only near level of antennal foramina; fore wing mostly hyaline, membrane only with yellowish translucent band across region of pterostigma; distal margin of pterostigma, within marginal cell, outcurved (extant fauna) 2
2. Occipital carina weakly indicated laterally; medial portion of clypeus forming short lobe, its anterior margin incurved; sublateral tooth of clypeus small, less prominent than lateral acetabular lobe; medial elevation of sternum V low and lacking bare triangular declivity; coxae, trochanters and femora mostly brown and tibiae and tarsi light reddish brown (Australia) . . . . . ***C. australiana*** **Lepeco & Melo**
- Occipital carina completely absent; clypeus very short, lacking medial lobe (except in males of *C. longiventris*, which have a short lobe); sublateral tooth of clypeus well developed, more prominent than lateral acetabular lobe; medial elevation of sternum V distinctly pronounced and with bare triangular declivity; legs entirely light reddish brown or yellowish (South America and continental Central America) 3
3. Frons sparsely punctate, punctures on surface between eye and median line with interspaces exceeding diameter of anterior

ocellus, becoming denser near antennal foramina; mesoscutum sparsely punctate between notauli, distance between punctures exceeding diameter of anterior ocellus; mesepisternum slightly depressed dorsad of mesepisternal pit; antennae with homogeneous dark brown coloration (South America and continental Central America) . . . . . ***C. longiventris*** **Kieffer**

- Frons densely punctate, punctures on surface between eye and median line with interspaces not exceeding diameter of anterior ocellus; mesoscutum densely punctate between notauli, distance between punctures not exceeding diameter of anterior ocellus; mesepisternum not depressed dorsad of mesepisternal pit, posteriorly with shallow sulcus between pit and posterior edge of sclerite; scape and pedicel yellowish, flagellum light brown (western Costa Rica) . . . . . ***C. pacifica*** **sp. nov.**

Clystopsenella australiana Lepeco & Melo

Clystopsenella australiana Lepeco & Melo, 2021: 456. Holotype female, Australia: Queensland, Bribie Island (ANIC, examined).

This is the single species of the genus found outside the Neotropical region. Together with *Ycaploca evansi* Nagy, 1975, they are the only species of Scolebythidae recorded in Australia. *C. australiana* is known only from the holotype specimen, which was collected over one hundred years ago.

Clystopsenella longiventris Kieffer

(Figs. 1A–D; 2A–D; 4B, D)

Clystopsenella longiventris Kieffer, 1911: 204. Lectotype female, designated by Evans (1963:10), Brazil: Amazonas, Parintins ('Villa Nova') (NHM, examined through photographs).

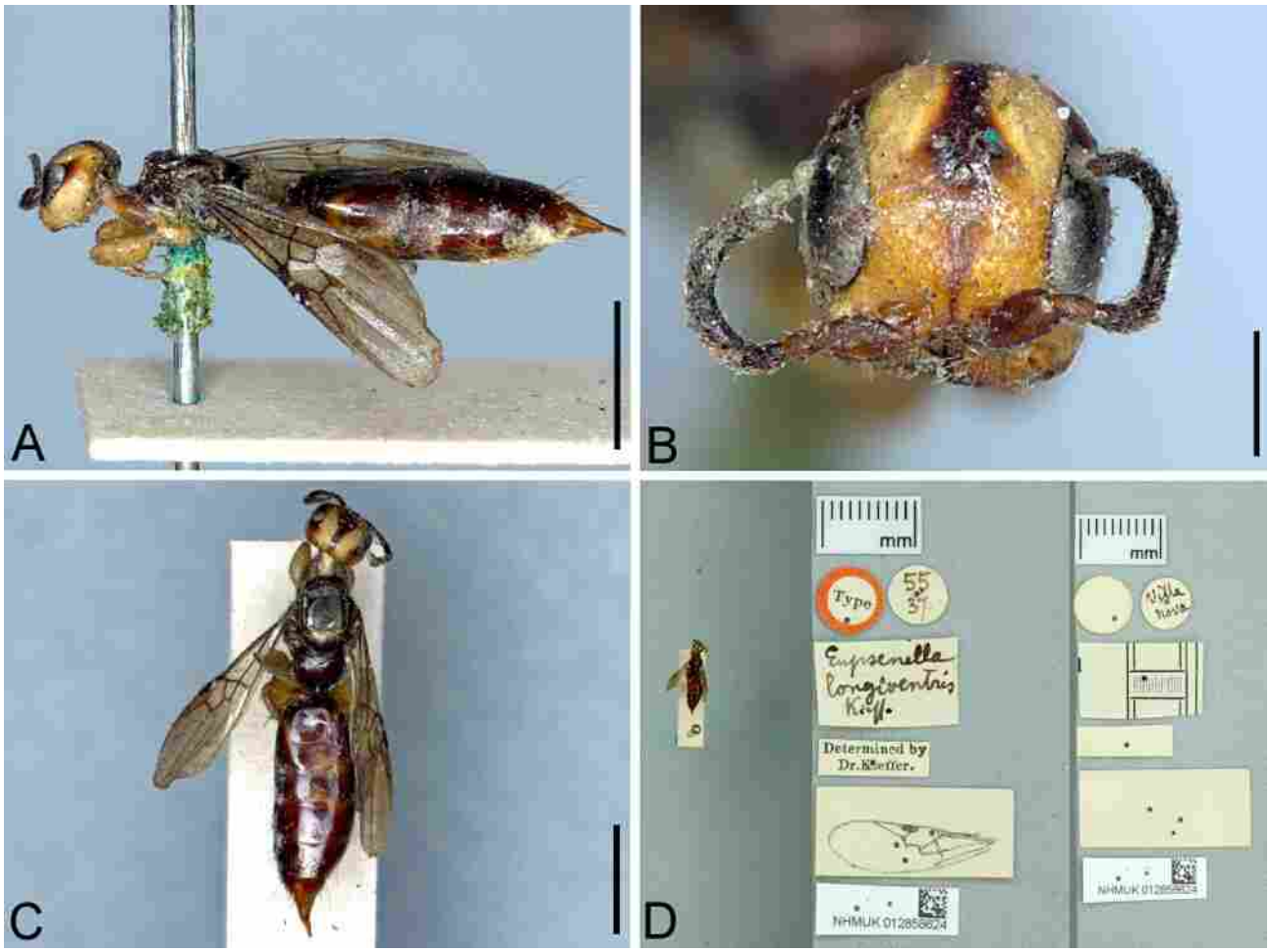

FIGURE 1. *Clystopsenella longiventris* lectotype female. A) habitus, lateral view, scale bar: 2 mm; B) head, frontal view, scale bar: 0.5 mm; C) habitus, dorsal view, scale bar: 2 mm; D) specimen and labels (both surfaces).

The species was described by Kieffer (1911) based on two specimens (Figs. 1 and 2) which, judging by the features of the locality labels, were collected by Henry W. Bates. These specimens were obtained during his trip through the Amazon Forest, but the precise indication of the type localities was never mentioned by subsequent authors. 'St. Paul' refers to the municipality of São Paulo de Olivença, in the Brazilian state of Amazonas, while 'Villa Nova' refers to Parintins in the same state (Papavero 1973). The lectotype and paralectotype are the only specimens known from the Brazilian Amazon. Considering that Bates was an avid collector of beetles, including cerambycids (O'Hara 1995), it is possible that he reared the *Clystopsenella* wasps from parasitized beetle larvae. Additionally, the specimens exhibit a pattern of coloration of their integument with lighter areas. Although Evans (1963) attributed lighter coloration in scolebythids to fading with time in collections, this condition is more likely indicative that the specimens were killed before reaching full sclerotization. The same color pattern is exhibited by the two females from Bahia reared from a cerambycid larva.

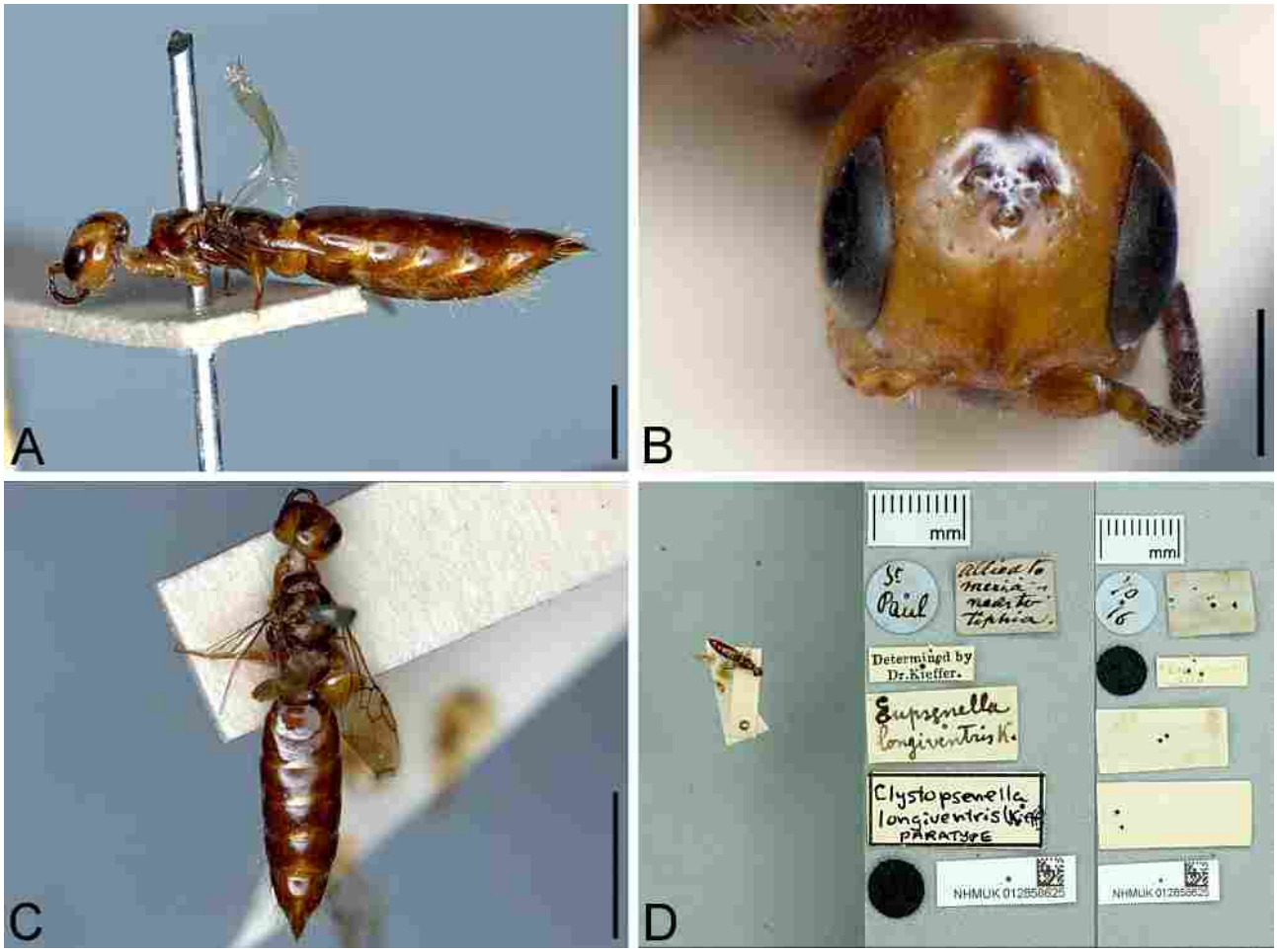

FIGURE 2. *Clystopsenella longiventris* paralectotype female. A) habitus, lateral view, scale bar: 1 mm; B) head, frontal view, scale bar: 0.5 mm; C) habitus, dorsal view, scale bar: 2 mm; D) specimen and labels (both surfaces).

Type material. Lectotype ♀ from Brazil, Amazonas, Parintins, bearing the locality label 'Villa\Nova\\55\37' (NHM), designated by Evans (1963: 10). Paralectotype female from Brazil, Amazonas, São Paulo de Olivença, bearing the locality label 'St.\Paul\\70\16' (NHM). The two specimens, and their respective labels, are shown in Figs. 1 and 2. **Additional examined material. BRAZIL:** 1 ♀ Bahia, Ilhéus: "Brasil, BA, região de\Ilhéus, K. Nakayama,\Malaise em cabruca" (DZUP); two females from Bahia, Inhambupe: "COPENER\INHAMBUPE\BAHIA BA.\X-1996" "EM LARVA DE\CERAMBYCIDAE\BERTI. EF." (DZUP); 1 ♀ Maranhão, Barreirinhas: "BR, Maranhão, Barreirinhas,\PNLM, 02°39'49"S42°49'54"W\Altitude 16m; Arm. Suspensa,\01-15.ix.2016; F. Limeira-de-\Oliveira, A.A.T. Sousa &\D.M. Limeira, Cols." (CZMA); 1 ♀ Maranhão, Carolina: "Brasil (MA), Carolina, PARNÁ Chapada das Mesas,\Riacho Sucuruiu, 240m,\07°07'05.6"S\47°18'31.6"W" "Armadilha de Malaise\10-20.vi.2014; J.A. Rafael\F. Limeira-de-Oliveira, T.L.\Rocha & G. A. Reis, cols." (CZMA); 1 ♀ Maranhão, Carolina: "Brasil (MA), Carolina, PARNÁ Chapada das Mesas,\Riacho Sucuruiu, 240m,\07°07'05.6"S\47°18'31.6"W" "Ar-

madilha de Malaise\20-30.vi.2014; J.A. Rafael\F. Limeira-de-Oliveira, T.L.\Rocha & G. A. Reis, cols." (CZMA); 2 ♀ Mato Grosso: "Rio Caraguata\Matto Grosso\Brazil III-1953\F. Plaumann" (SEMK); one female from Rio de Janeiro, Rio de Janeiro: "Brasil Rio de Janeiro\D. F. CORCOVADO\X.1959\Seabra e Alvarenga" (DZUP); 2 ♀ São Paulo, Cajuru: "Brasil, São Paulo, Cajuru,\Faz.Rio Grande, 21°12'S,\47°09'W, 17.xi-02.xii.\1999, Melo & Nascimento,\Malaise preta" (DZUP); 1 ♀ São Paulo, Cajuru: "Brasil, São Paulo, Cajuru,\Faz.Rio Grande, 21°12'S,\47°09'W, 02 -18.xii.\1999, Melo & Nascimento,\Malaise preta". **BOLIVIA:** 1 ♂ Beni, San Borja: "BOLIVIA: El Beni\Beni Stn., Palm\Camp, Savannah\NE of San Borja\29 July 1988\ex., malaise trap" "Robert W. Brooks\BIO-LAT-SI/MAB" (SEMK). **COSTA RICA:** 1 ♀ Heredia, Puerto Viejo de Sarapiqui: "Costa Rica, Heredia,\Pto. Viejo Sarapiqui,\Est. Biol. La Selva,\2.v-18.v.1993,\M/07/101" (DZUP).

Host record. The two females from Inhambupe, in Bahia, are labeled as reared from a larva of Cerambycidae.

†*Clystopsenella mirabilis* Engel

†*Clystopsenella mirabilis* Engel, 2015: 4. Holotype female, Early Miocene Dominican amber (AMNH, not examined).

This is the single fossil species described for the genus *Clystopsenella*. Together with †*Pristapenesia inopinata* (Prentice & Poinar in Prentice *et al.*, 1996), they represent the two species of Scolebythidae known from the Miocene amber of the Dominican Republic.

Clystopsenella pacifica sp. nov.

(Fig. 3A–D; 4A, C)

Diagnosis. Head shorter than maximum width; frontal line indicated as deep sulcus only near level of antennal foramina (Fig. 4A); fore wing membrane with light yellowish translucent band across region of pterostigma, lacking distinct dark spots around apex of radial and marginal cells; margin of pterostigma within marginal cell outcurved (Fig. 3B); occipital carina completely absent; medial lobe of clypeus absent (Fig. 4A); sublateral tooth of clypeus more prominent in relation to lateral acetabular lobe; medial elevation of the sternum V distinctly pronounced, forming bare triangular declivity (Fig. 3D); antenna with scape and pedicel yellowish and flagellum light brown; punctation on frons homogeneously dense between eye and frontal line, with interspaces not exceeding diameter of anterior ocellus (Fig. 4A); mesepisternum not depressed dorsad mesepisternal pit, posteriorly with slight sulcus coming from pit to posterior edge of sclerite (Fig. 3C); and mesoscutum densely punctate between notauli, with interspaces not exceeding diameter of anterior ocellus (Fig. 4C).

Description. Female. Measurements. Approximate body length, 7.00 mm. Fore wing length, 3.99 mm. Maximum head width, 1.04 mm. Maximum head length, 0.99 mm. Basal mandibular width, 0.23 mm.

Color. Head mostly dark brown, lighter near mandibles and hypostoma. Mesosoma dark brown. Metasomal segments mostly reddish brown, becoming lighter towards posterior margin of sclerites. Mandible light reddish brown. Antenna with scape and pedicel yellowish, flagellum light brown. Palpomeres and legs yellowish. Wing membranes mostly hyaline, with light yellowish translucent band across region of pterostigma; wing veins mostly light brown, pterostigma brown. Body pubescence entirely pale yellow to white; setae on wing membranes pale yellowish.

Pubescence. Sparse overall. Apical margin of clypeus and frons with short and dense setae. Scape and pedicel with tiny erect setae, denser on flagellum, with slightly longer erect setae intermixed. Compound eye almost glabrous, except for tiny scattered setae. Pronotum, mesoscutum and scutellum with dense coverage of setae. Propleura, mesepisternum and tibiae with distinctly long setae, longest setae on tibiae longer than twice tibial diameter. Dorsal portion of terga with sparse shorter setae, lateral portions with distinctly longer setae; setae becoming longer toward apex of metasoma. Sterna I-IV with sparse, long setae on disc. Sternum V with erect long setae on disc and pre-marginal line of shorter setae laterally which merges with medial tuft of appressed setae situated before posterior margin. Pubescence of fore wing formed by regularly spaced short setae, their length subequal to width of vein Rs on marginal cell.

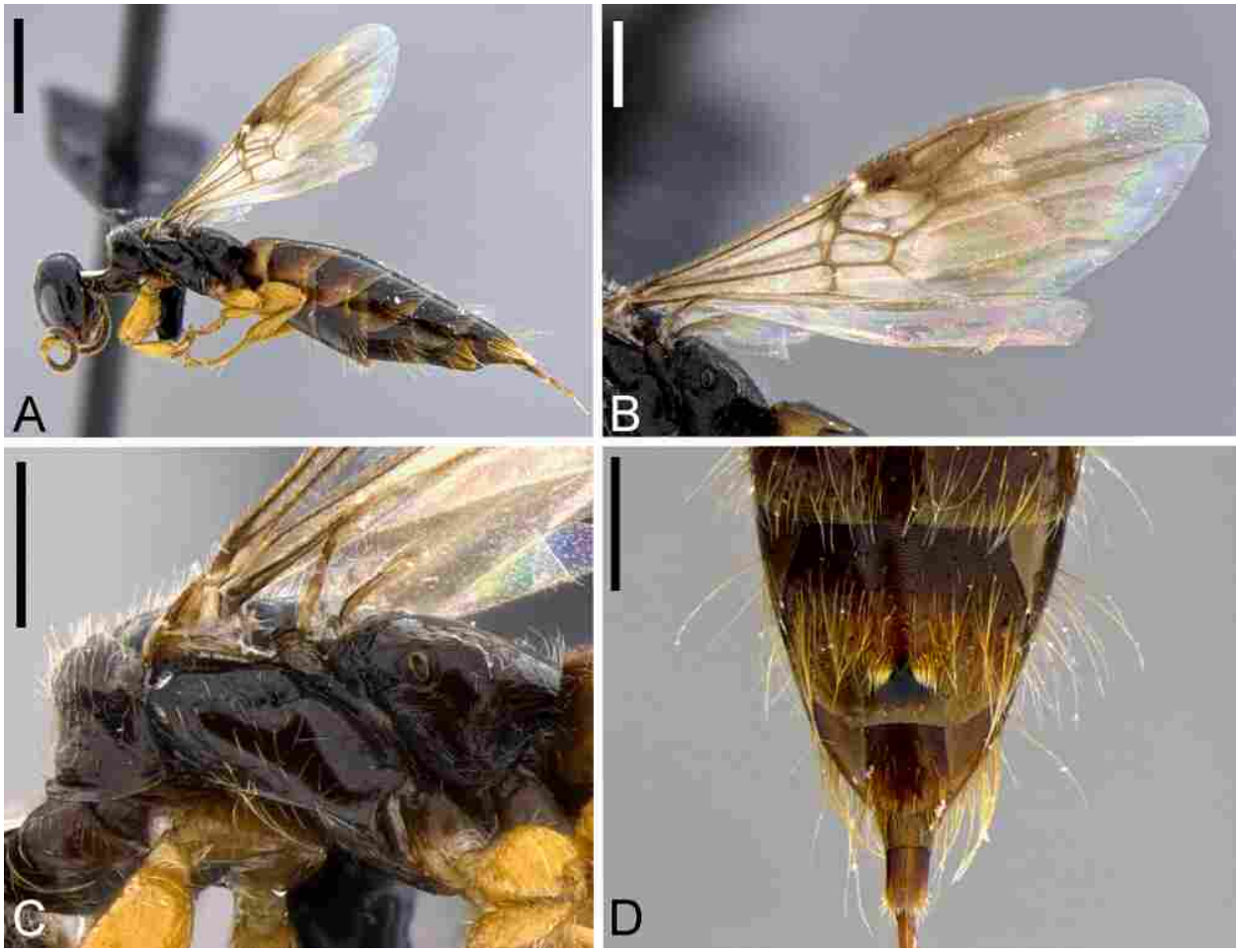

FIGURE 3. *Clystopsenella pacifica* **sp. nov.** holotype female: A) habitus, lateral view, scale bar: 1 mm; B) fore wing, scale bar: 0.5 mm; C) mesosoma, lateral view, scale bar: 0.5 mm; D) metasoma, ventral view of terminal sclerites, scale bar: 0.5 mm.

Structure. Head. Mandible with four apical teeth, ventral tooth larger, remaining teeth progressively smaller. Clypeus transverse, strongly emarginated by antennal foramina; apical margin with incurved apex, without medial lobe; sublateral tooth well developed, more prominent than lateral acetabular lobe. Malar space about two-thirds of basal width of mandible. Tentorial pits distanced from antennal foramina by about 0.5× foramen width. Frons gently convex, densely punctate below level of ocelli, spaces between punctures not exceeding 2× puncture diameters; frontal line clearly indicated near anterior ocellus, very faint at mid length, portion near antennal foramina and below eye level, indicated as narrow sulcus. Compound eyes parallel, oval, inner margin outcurved. Anterior ocellus positioned anteriorly to posterior tangent of compound eyes. Posterior ocelli separated from each other by about 1.5× distance from anterior ocellus. Vertex gently arched, extending beyond posterior ocelli, in lateral view, by almost maximum width of eye. Distance between hypostomal cavity and occiput, along medial line, about basal width of mandible. Hypostomal cavity forming wide arch ending at mandibular bases. Occipital carina completely absent. Antennal foramina separated from each other by about their diameter; dorsal portion of antennal rim slightly projected; lateral surface adjacent to foramen gently depressed, without strong adjacent carinae. **Antennae.** Scape flat, about 2.5× as long as its maximum width. Flagellomeres slightly longer than wide; flagellomere I slightly shorter than flagellomere II. **Mesosoma.** Pronotum with transverse rugosity anteriorly, pronotal collar short. Propleuron dorsally exposed, strongly produced forward. Prosternum large, diamond-shaped, with faintly impressed longitudinal sulcus. Mesoscutum with well-impressed and complete notauli; densely punctate medially, spaces between punctures not exceeding 4× puncture diameters; parapsidal lines well-marked and reaching transscutal suture posteriorly. Mesoscutellum anteriorly with deeply impressed sulcus; strongly declivitous posteriorly. Mesepisternum without depressed area above level of mesepisternal pit, posteriorly with slight sulcus coming from pit to posterior edge of sclerite. Metanotum distinctly shorter medially, uniformly rugose due to short longitudinal carinae; metanotal troughs well-developed, micro-reticulate. Ventral portion of metepisternum narrow, but separating meta-

coxae; sulcate medio-posteriorly. Metapostnotum well-defined, forming short triangle, medial portion distinctly longer than lateral portions; finely reticulate rugose and separated from propodeum by slight step medially which becomes narrow foveate sulcus laterally. Propodeum strongly declivitous; posterior surface with gently impressed medial longitudinal sulcus; spiracle distanced from metapleural line by about 2× its width, entirely on lateral surface of propodeum. Protrochanter inserted baso-laterally on procoxa. Profemur progressively wider apicad, somewhat swollen, ventrally with broad sulcus to receive protibia. First tarsomere of metatarsus about 5× as long as its maximum width. Tibial spur formula: 1:2:2. Tarsal claws simple. **Fore wing.** Margin of pterostigma within marginal cell strongly outcurved. Submarginal cell relatively short, about 2× as long as maximum width. 2rs-m inserted near base of marginal cell. Marginal cell closed, about 2.5× longer than maximum width; apex away from costal margin of wing. Medial cell rectangular, about 2× longer than maximum width. Vein Cu nebulous distad of m-cu; vein M, distad of submarginal cell, and Cu1 spectral; vein A nebulous distad of cu-a. Distal part of wing membrane with fine microreticulation. **Hind wing.** Vein A short, about 0.5× length of vannal lobe. Costal margin with four basal and three distal hamuli. **Metasoma.** Longer than head and mesosoma combined. Tergum I with wide longitudinal sulcus on anterior vertical surface, transition between anterior and dorsal surfaces angled; dorsal surface about 3× as wide as long, its posterior margin arched. Sternum I medially elevated; posterior margin strongly arched. Medial elevation of sternum V distinctly pronounced and with bare triangular declivity.

Type material: Holotype ♀ Costa Rica, Guanacaste, Santa Rosa: "COSTA RICA: Guan[a]c[a]ste\ Sta. Rosa P[ar]k H[a]c[ie]nda\ 2-23.iii.86\ I.D. Gauld SE.6.C" (AMNH). Paratypes: 4 ♀ Costa Rica, Guanacaste, Santa Rosa: same data (2 AMNH, 2 DZUP).

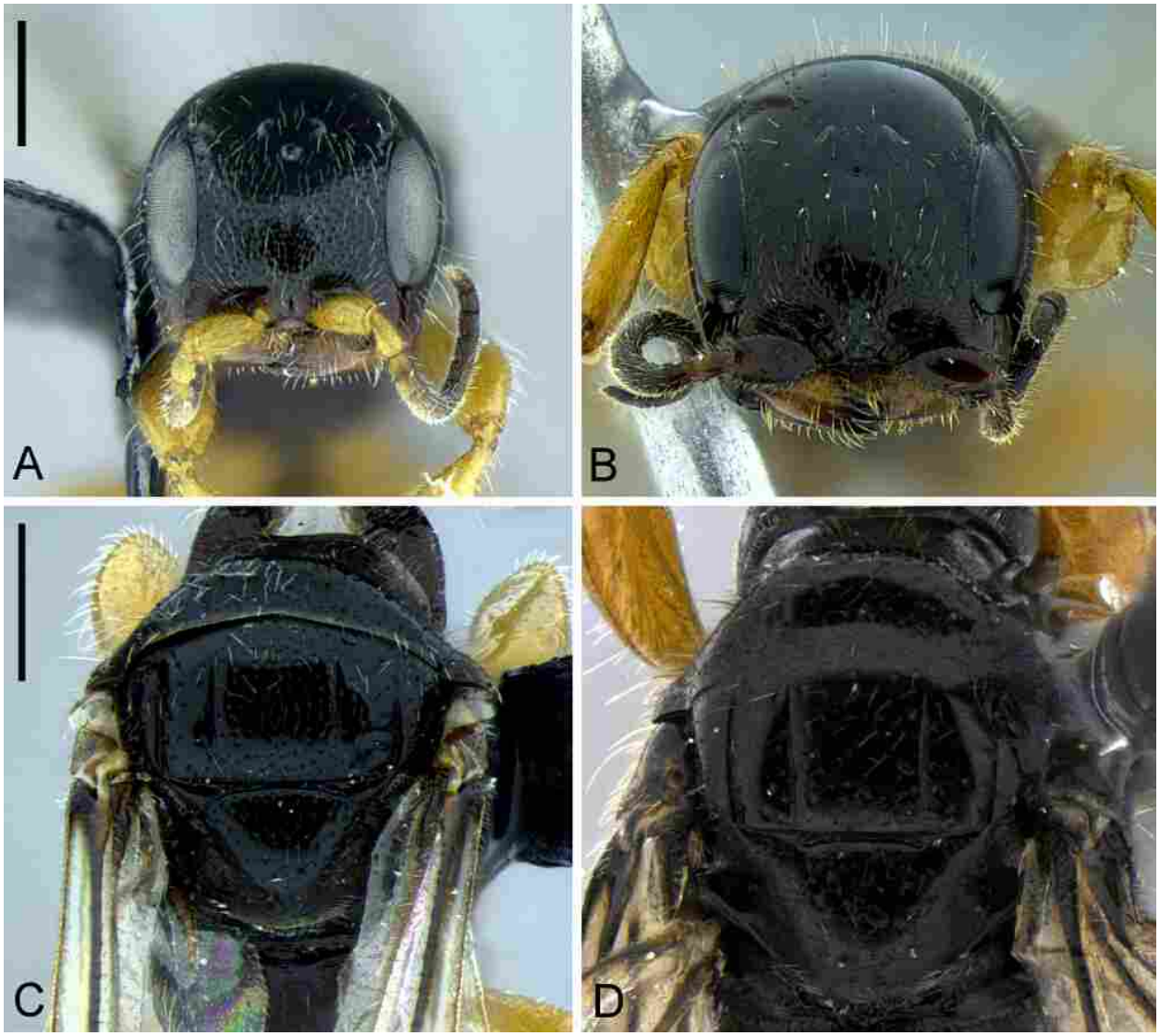

FIGURE 4. *Clystopsenella pacifica* **sp. nov.** holotype female (A, C) and *C. longiventris* female from São Paulo, Brazil (B, D). A, B) head, frontal view, scale bar: 0.5 mm; C, D) mesosoma, dorsal view, scale bar: 0.5 mm. A–B and C–D at same scale.

Etymology. The name is a reference to the locality where the type series was collected, near the Pacific coast of Costa Rica.

Comments. Specimens examined from Santa Rosa National Park consistently exhibit a denser punctation, lighter coloration of antennae and legs, conspicuously dense setation, and a sulcus coming from the mesepisternal pit to the posterior edge of the mesepisternum when compared to *C. longiventris*. We examined a series of specimens of the latter coming from various localities across the Neotropical region and concluded that, even though *C. longiventris* may exhibit variations in size and coloration, the characters used to differentiate it from *C. pacifica* **sp. nov.** do not overlap. Differences in setation among species of *Clystopsenella* were already noted by Gauld (1995), which mentions that a female from Santa Rosa National Park exhibited a distinctive pattern of setae on the metasoma. In comparison to *C. longiventris*, the new species has a slightly denser pubescence on the laterals of the metasomal sclerites, and the specimens mentioned by Gauld (1995) probably correspond to *C. pacifica* **sp. nov.**, although reexamination of the material is needed to confirm its identity.

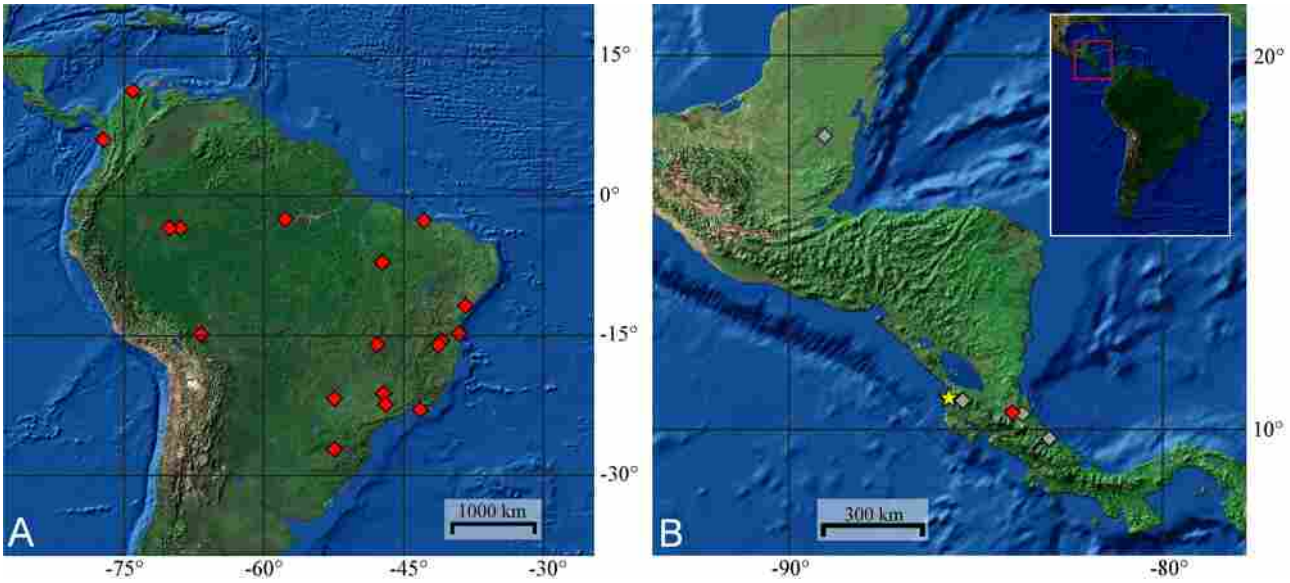

FIGURE 5. Distribution maps of Neotropical *Clystopsenella*: A) South America; B) Central America. Red diamonds represent *C. longiventris*, the yellow star represents the type locality of *C. pacifica* **sp. nov.,** and grey diamonds represent specimens originally identified as *C. longiventris* that should be checked.

Discussion

With the present contribution, the extant diversity of the genus *Clystopsenella* now comprises three species distributed in warm regions of the Neotropics and Australia. As in other species of the genus, *C. pacifica* **sp. nov.** has a modified area on the medial surface of the sternum V, tibial spur formula 1:2:2, a relatively well-developed wing venation and robust legs. The new species is distinguished from *C. longiventris* by characteristics of the integumental sculpture, pubescence and color, suggesting that they are closely related and diverged recently. Within the Scolebythidae, *C. pacifica* **sp. nov.** is the eighth extant species described so far, adding to the relict diversity of this family. Although scolebythids exhibit a distinctive morphological monotony, extant genera are easily distinguished by many characters, and morphological similarity among congeners may indicate a scenario of extensive extinction within the family. This trend is reinforced by the astonishing extinct diversity of the family during the Cretaceous (Lepeco & Melo, 2022; see also Prentice *et al.* 1996; Engel & Grimaldi 2007).

As in other scolebythids, the distribution of *Clystopsenella* is mostly confined to woodlands under tropical and subtropical climates (Fig. 5). *Clystopsenella longiventris* was recorded in localities characterized by forested formations within the Amazon and Atlantic biomes in South America (Kieffer 1911; Azevedo 1999; Fernández *et al.* 2002); in the Chocó and Magdalena departments in northern Colombia (Fernández *et al.* 2002); and in Central America (Gauld 1995; Cambra & Azevedo 2003; Engel 2005). Interestingly, the species was also recorded at the IBGE Ecological Reserve, in the municipality of Brasilia, central Brazil (Azevedo 1999), a region characterized

by the Cerrado biome, which is part of the South American diagonal of open formations. Although the locality is mostly covered by the savannas typical of the Cerrado, there are wetter areas along watercourses, with vegetation resembling that found in tropical forests (IBGE 2004). These gallery forests have long been suggested as bridges connecting the biotas of South American rainforests (e.g., Oliveira-Filho & Ratter 1995; Aguiar & Melo, 2007), and may explain in part the wide distribution of *C. longiventris*. Another factor influencing the range of this species is the habit of chasing hosts within logs (Melo 2000), which may facilitate transport through water bodies.

It is worth mentioning that *C. longiventris* was already recorded from the Rincon de la Vieja National Park, in the Guanacaste province, Costa Rica (Cambra & Azevedo 2003), very close to the type locality of *C. pacifica* **sp. nov.** on the western slope of the country (Fig. 5B). Although the authors mention that all specimens examined by them had no morphological differences from *C. longiventris* from Brazil, it would be important to reexamine these specimens in light of the new information. Nevertheless, *C. longiventris* occurs in Costa Rica and a specimen examined by us from Puerto Viejo de Sarapiqui, in the Heredia Province, cannot be distinguished from the South American specimens. This may be an indication that *C. pacifica* **sp. nov.** is associated to the drier western coast of Central America, differently from *C. longiventris*, which is associated to the wetter Atlantic slope, ranging through the rainforests in South America. This view is supported by the fact that the Pacific and Atlantic slopes of Costa Rica represent distinct biogeographic provinces with particular physiognomies (Morrone 2014).

The association reported here between females of *C. longiventris* with larvae of Cerambycidae is the first host record for the genus and corroborates the view that species of Scolebythidae are parasitoids of wood-boring larvae. This judgement was first made by Evans (1963), based on morphological peculiarities of the head, prothoracic sclerites and legs. Subsequently, data on specimen labels of *Ycaploca evansi* Nagy, 1975 suggested that larvae of that species developed gregariously on cerambycid larvae (Nagy 1975; Brothers 1981), while adults of *Scolebythus madecassus* Evans, 1963 found together within a hollow wood stick reinforced this view (Evans *et al.* 1979). A definitive host association and detailed biological account is available for a single species, the Neotropical *Pristapenesia stricta* (Azevedo, 1999), which develops gregariously on larvae of Ptinidae (Melo 2000). It is possible that larger species of Scolebythidae, comprising the genera with more complex venation in the fore wing, are adapted to parasitize the larger cerambycid larvae in comparison to the minute *Pristapenesia*, which may rely on larvae of smaller beetles such as ptinids.

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