Journal of Natural History
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tnah20

Review of Loxopus Townes (Hymenoptera, Ichneumonidae, Cryptinae), with descriptions of six new species

Bernardo F. Santos[a] & Alexandre P. Aguiar[a]
[a] Departamento de Ciências Biológicas, Universidade Federal do Espírito Santo, Goiabeiras, Vitória, ES, Brazil
Published online: 25 Nov 2014.

To cite this article: Bernardo F. Santos & Alexandre P. Aguiar (2014): Review of Loxopus Townes (Hymenoptera, Ichneumonidae, Cryptinae), with descriptions of six new species, Journal of Natural History, DOI: 10.1080/00222933.2014.976669

To link to this article: http://dx.doi.org/10.1080/00222933.2014.976669

Journal of Natural History, 2014
http://dx.doi.org/10.1080/00222933.2014.976669

Review of *Loxopus* Townes (Hymenoptera, Ichneumonidae, Cryptinae), with descriptions of six new species

Bernardo F. Santos* and Alexandre P. Aguiar

Departamento de Ciências Biológicas, Universidade Federal do Espírito Santo, Goiabeiras, Vitória, ES, Brazil

(*Received 31 January 2014; accepted 7 October 2014*)

The taxonomic limits of *Loxopus* Townes are reviewed. The genus is characterized by the lateral margin of the clypeus projecting as subtriangular lobe; lateral lobes of fourth tarsomeres distinctly longer than mesal lobes; forewing vein 3r-m absent; hind wing vein 2-1A absent or vestigial; and first metasomal tergite with a basolateral tooth. It occurs from Mexico to southern Brazil. Nine species are recognized, of which six are described as new: *L. dodecius* Santos et Aguiar, *L. duckei* Santos et Aguiar, *L. exius* Santos et Aguiar, *L. ichilus* Santos et Aguiar, *L. tenuis* Santos et Aguiar, and *L. venezuelanus* Santos et Aguiar. The type species, *L. australis* Townes, and *L. multicolor* Kasparyan et Ruíz-Cancino are redescribed, and a diagnosis is provided for *L. unicolor* Kasparyan et Ruíz-Cancino, not examined. All studied species are illustrated and distribution records are mapped. An identification key for the species of *Loxopus* is presented.

http://zoobank.org/urn:lsid:zoobank.org:pub:5B73E8B4-1288-4FD9-AABD-845B5085FFE3

Keywords: Goryphina; Cryptini; Phygadeuontinae; parasitoid; taxonomy

Introduction

Loxopus Townes was described in 1970 as a new Neotropical genus characterized mainly by the hind wing vein 2-1A absent or vestigial, apicolateral margin of clypeus projecting as a subtriangular lobe and lateral lobes of fourth tarsomeres at least 1.5 × as long as mesal lobes (Townes 1970). Only one species was described, *L. australis*, although Townes stated that he had examined six species. Kasparyan and Ruíz-Cancino (2005) described two additional species from Mexico, *L. unicolor* and *L. multicolor*, essentially corresponding to the original generic definition. Subsequently, Kasparyan and Wharton (2007) proposed a new subspecies for *L. multicolor*, *L. m. honduras*. In a faunistic inventory in southern Brazil, Kumagai and Graf (2000) reported 97 specimens and six species of *Loxopus*, but did not describe any new species.

The phylogenetic relationships of the genus remain essentially unknown. It was placed by Townes in the Cryptini, a large group currently with over 240 genera. Within Cryptini, *Loxopus* was classified as part of subtribe Goryphina, but the subtribal arrangement of cryptine genera is known to be highly artificial (Laurenne et al. 2006). Therefore, the monophyly and relationships of Goryphina, and of most of its taxa, are uncertain. *Loxopus australis* was coded in the matrices of Santos et al. (2009),

*Corresponding author. Email: bsantos@amnh.org

Santos and Aguiar (2012, 2013) and Tedesco and Aguiar (2013), but those works were focused in particular genera and did not discuss the results for the Goryphina.

This work aims to review the generic delimitation of *Loxopus*, to describe new species, and provide new distribution records.

Material and methods

This work is based on 218 specimens of *Loxopus*, sorted from over 60,000 examined specimens of Neotropical Cryptinae from several collections worldwide. The studied specimens belong to the following institutions (curators in parenthesis): AEIC: American Entomological Institute, Gainesville, FL, USA (D. Wahl); AMNH: American Museum of Natural History, New York, NY, USA (J. Carpenter); BMNH: The Natural History Museum, London, UK (G. Broad); CNCI: Canadian National Collection of Insects, Ottawa, ON, Canada (A. Bennett); DZUP: Universidade Federal do Paraná, Curitiba, Brazil (G.A.R. Melo); INPA: Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (A.L. Henriques and J.A. Rafael); MPEG: Museu Paraense Emílio Goeldi, Belém, Brazil (O. Silveira); UFES: Universidade Federal do Espírito Santo, Vitória, Brazil (C.O. Azevedo). Specimens from MPEG are part of a long-term loan to UFES.

All methods and conventions, including morphological terminology and biometric ratios, follow Santos and Aguiar (2013), except that the 'second trochanter' is referred to herein as trochantellus. The first and subsequent tarsomeres are referred to as t1, t2, t3, etc, while first and subsequent metasomal tergites are referred to as T1, T2, T3, etc. Biometric ratios used in descriptions are as follows: MLW, mandible maximum length/maximum width; MWW, mandible minimum width/maximum width; CWH, clypeus maximum width/maximum height; CWW, clypeus maximum width/minimum width; MSM, malar space maximum width/basal width of mandible; SWL, propodeal spiracle maximum width/maximum length; APH, forewing cell 1 + 2Rs (areolet) height/pterostigma maximum width; AWH, 1 + 2Rs maximum width/maximum height; HW1C, hind wing vein Cua/cu-a length; T1LW, first metasomal tergite maximum length/maximum width (dorsal view); T1WW, first metasomal tergite maximum width/minimum width (dorsal view); T2LW, second metasomal tergite maximum length/maximum width (dorsal view); T2WW, second metasomal tergite maximum width/minimum width (dorsal view); OST, ovipositor sheath length/hind tibia length. Ratios expressed to the nearest tenth reflect estimated proportions; ratios expressed to the nearest hundredth were obtained through direct measurements.

In the sections 'Distribution' and 'Material examined', countries are listed from north to south, as standardized by Zanella et al. (2000). When potentially ambiguous, colour names are followed by their respective RGB formula, as determined from digital pictures of the studied specimens, according to procedures described by Aguiar (2005).

Results

Loxopus Townes, 1970
(Figures 1–8)

Loxopus Townes, 1970, 238, 255–256, 470. Description, figure, keyed. Type species: *Loxopus australis* Townes, by monotypy and original designation.

Figure 1. *Loxopus australis*, habitus.

Diagnosis

Apical margin of clypeus laterally projecting as delicate to distinct triangular lobes (Figure 2A,B); mesosoma matt and densely covered with short pilosity; epomia short and delicate; lateral lobe of t4 much longer (at least 1.5×) than mesal lobe (Figure 2D); posterior transverse carina of propodeum forming weak but distinct sublateral crests; forewing cell 1 + 2Rs (areolet) small, open, vein 3r-m absent; hind wing vein *M* + Cu subapically strongly arched; vein 2-1A almost always absent or vestigial (Figure 2C).

Female

Forewing 3.38–6.45 mm long. *Head*. Mandible of moderate length, MLW 1.33–2.02, its apex distinctly narrower than base, MWW 0.47–0.59, dorsal tooth slightly longer and more robust than ventral one. Malar space from narrow to wide, MSM 0.47–0.65. Clypeus moderately wide, CWH 1.58–1.81, trapezoidal, CWW 1.42–2.09; in profile, distinctly convex; apical margin convex, without median teeth, laterally

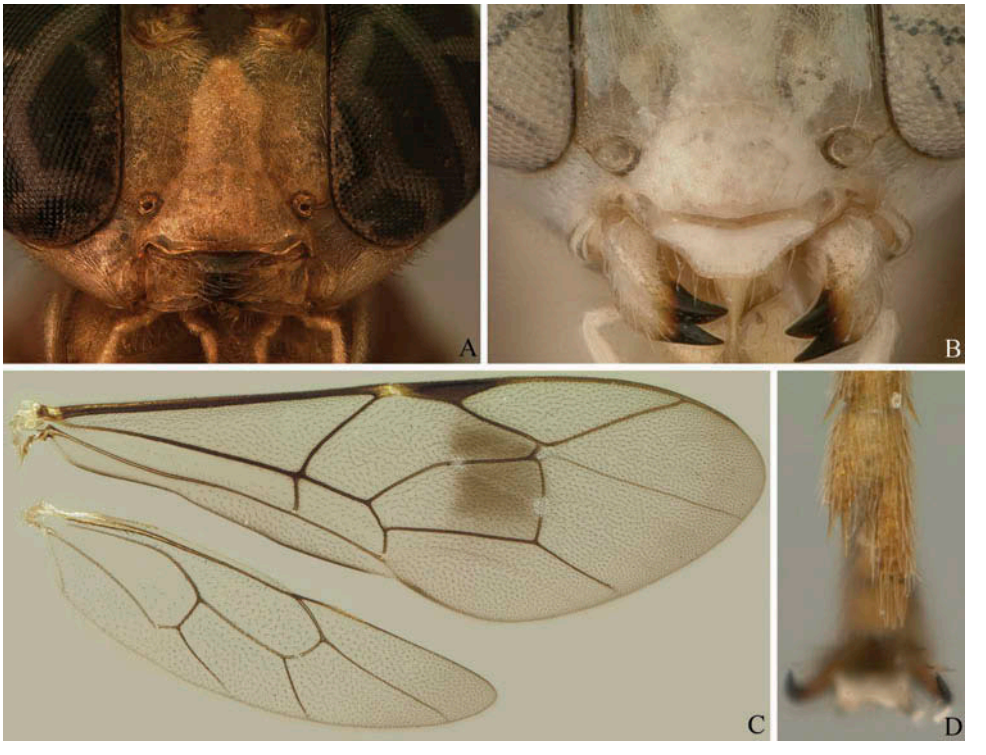


Figure 2. Diagnostic features for the genus. (A,B) clypeus; (A) *L. multicolor*; (B) *L. dodecius*. (C,D) *L. australis*; (C) wings; (D) hind t4.

projected sublaterally into delicate triangular lobes (Figure 3B); clypeal fovea large, rounded, connected to compound eye by delicate sulcus. Antenna with 20–27 flagellomeres; just beyond middle with a distinct, wide white band; subapical flagellomeres slightly thicker than basal ones, never flattened. Supra-antennal area near ocelli slightly convex, ventrally concave, densely punctulate; medially with delicate median longitudinal line. Occipital carina sharp, complete, meeting hypostomal carina above base of mandible.

Thorax. Generally matt and densely covered with dense and short pilosity. Dorsal margin of pronotum regular, not swollen; epomia short and delicate, divergent from pronotal collar. Mesoscutum subcircular, finely punctate; notaulus weakly impressed, in dorsal view distinct approximately on anterior 0.4 of mesoscutum; mesoscutum surface over notaulus with weak transverse wrinkles. Epicnemial carina restricted to ventral 0.5–0.8 of mesopleuron; sternaulus complete, weakly sinuous, striate, moderately impressed, weaker at posterior 0.35; median portion of posterior transverse carina of the mesothoracic venter short, straight. Hind margin of metanotum with small tooth-like projection; transverse furrow at base of propodeum narrow and moderately deep, with faint to distinct transverse striae. Pleural carina absent, or sometimes vestigial, often apparently present because of sculpture

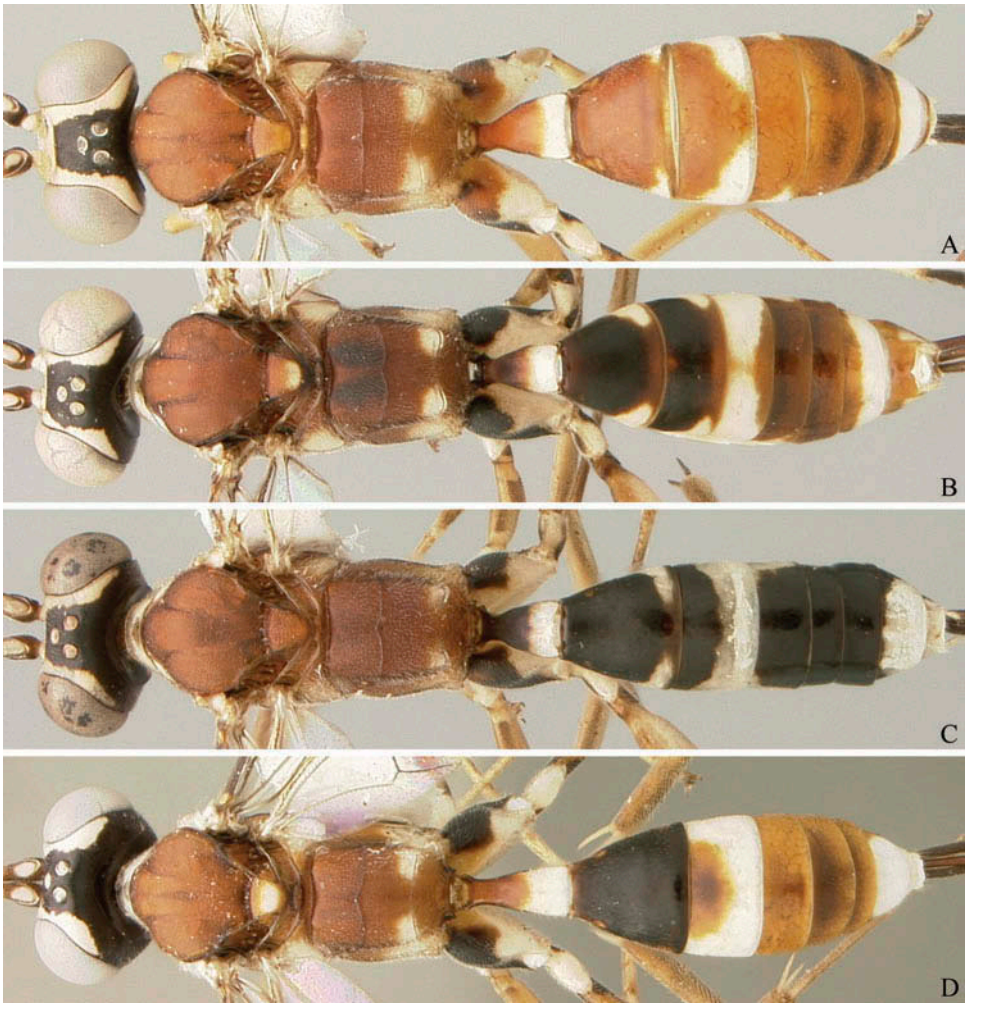


Figure 3. (A) *L. australis*; (B) *L. dodecius*; (C) *L. duckei*; (D) *L. exius*.

patterns of propodeum and metapleuron; juxtacoxal carina absent. Foretibia of female regular, not swollen; all t4 bilobed, lateral lobe at least 1.5 × as long as mesal lobe (Figure 2D).

Propodeum. Moderately short, 1.11–1.36 × as long as wide, matt, uniformly punctate, moderately pilose, pilosity denser laterally. Anterior margin medially straight or slightly concave. Spiracle elliptic, SWL 1.33–1.64, Anterior transverse carina complete, sharp, medially slightly to distinctly curved forward; distance from anterior transverse carina to anterior margin as long as that to posterior transverse carina. Posterior transverse carina usually complete, its median portion arched forward and usually weaker or sometimes obsolescent, sublaterally forming distinct but weak crests or flanges.

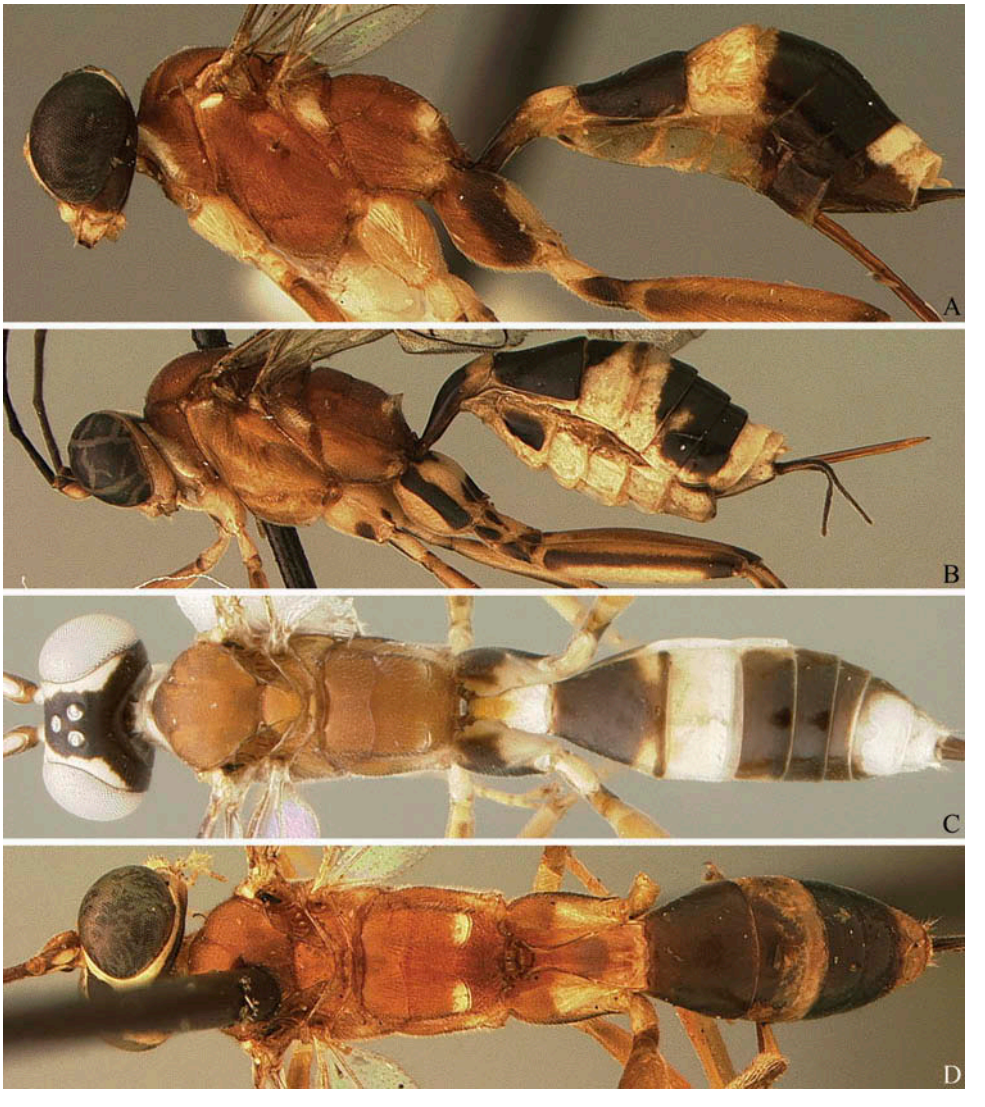


Figure 4. (A) *L. ichilus*; (B) *L. multicolor*; (C) *L. tenuis*; (D) *L. venezuelanus*.

Wings (Figure 2C). Hyaline, forewing length 4.20–5.20 mm, usually with brownish spot covering apical part of cells 2 + 3M (Townes' second discoidal) and 1 + 2R (Townes' discocubital). Forewing vein 1-Rs + M with bulla placed basally; ramellus absent; crossvein 1cu-a forming distinct obtuse angle with *M* + Cu, arising basad or opposite of base of 1M + Rs; crossvein 2cu-a nearly as long as vein 2-Cu; vein 4-Rs approximately straight; cell 1 + 2Rs (areolet) small, APH 0.47–0.68, pentagonal, approximately as wide as high, AWH 0.94–1.13, open (3r-m not differentiated); veins 3-M and 4-M nebulous or spectral, 4-M distinctly longer than 4-Rs. Hind wing vein *M* + Cu subapically strongly convex; vein 1-Cu slightly to distinctly longer than crossvein 1cu-a, HW1C 1.18–2.00; crossvein 1r-m with bulla on posterior portion;

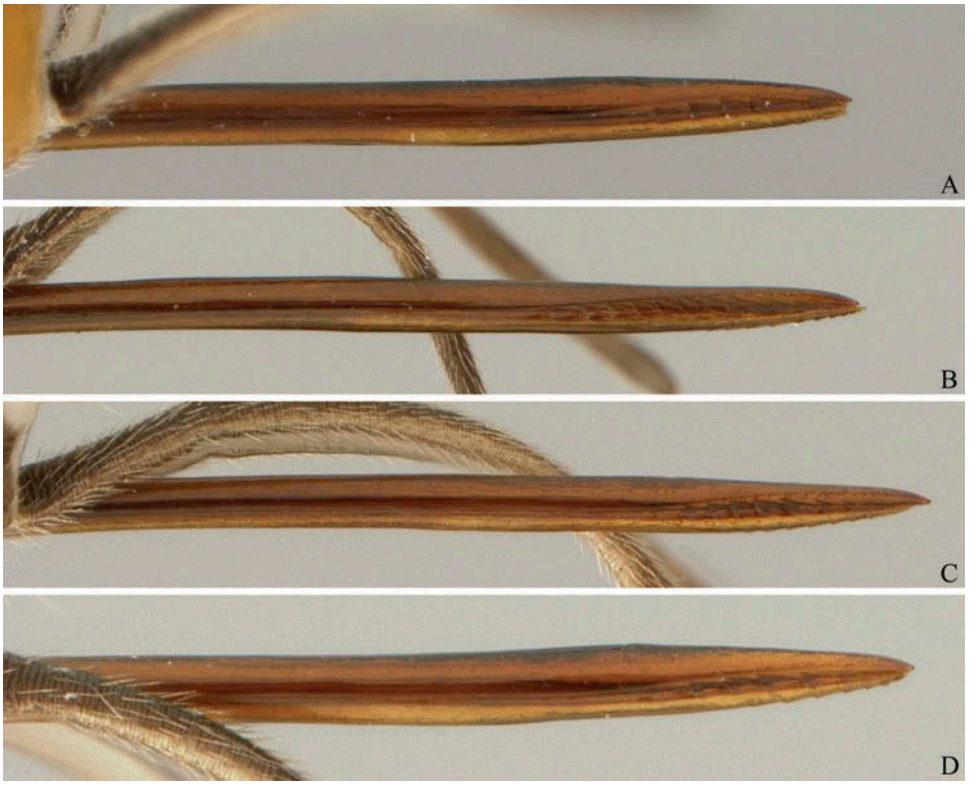


Figure 5. Ovipositor apex. (A) *L. australis*; (B) *L. dodecius*; (C) *L. duckei*; (D) *L. exius.*

vein 2-1A usually absent or vestigial, in one species sometimes distinct and reaching as much as 0.7 of distance to posterior margin.

Metasoma. T1 of moderate length, 0.35–0.40 × as long as combined length of T2–8, slender, T1LW 2.00–2.40, moderately triangular, T1WW 2.04–2.67, matt, with distinct basolateral tooth; spiracle on apical 0.4, not prominent; dorsolateral carina complete but usually delicate; median dorsal carina absent, ventrolateral carina distinct. Thyridium subcircular. T7–8 about as long as T5–6. OST 0.57–0.75; ovipositor thick, stout, slightly downcurved or approximately straight; basal half almost cylindrical, apical half laterally weakly compressed, progressively tapered; dorsal valve with nodus absent or very weak; ventral valve tip with distinct, though sometimes weak, teeth.

Males

Generally similar to the respective females. Morphological secondary sexual differences are usually more or less uniform within Cryptini, as noted by Santos and Aguiar (2013), and apply to the males of *Loxopus* as follows. General body size usually smaller than respective females. Antenna with 24–26 flagellomeres (body-size related), each flagellomere usually shorter and wider than in females; white band of

Figure 6. Ovipositor apex. (A) *L. ichilus*. (B) *L. multicolor*; (C) *L. tenuis*; (D) *L. venezuelanus.*

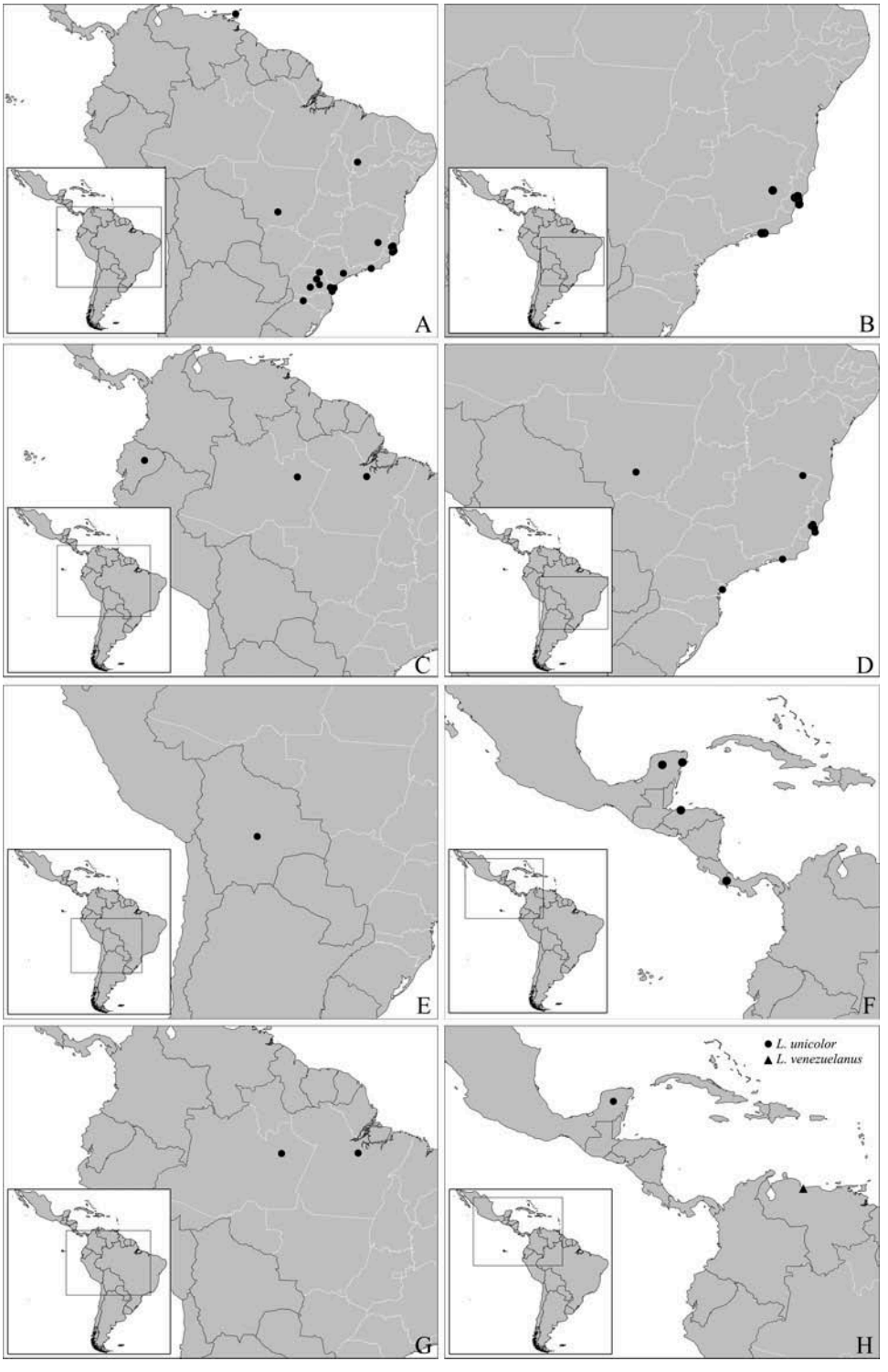
flagellum starting more apically and usually covering more articles than in females of the same species. Transverse furrow usually slightly longer than in female. Propodeum smaller, less strongly convex, sublateral crests usually less distinct than in female (Figure 7F). Spiracle of propodeum usually circular or weakly elongate, SWL 1.00–1.50. Brownish spot on forewing absent. First metasomal segment more slender, with T1LW around 2.6 (2.10–3.11), and less widened apically, with T1WW around 1.6 (1.41–1.79). T2–7 much more slender than in females.

Comments

All species of *Loxopus* are very similar in sculpturing, biometric ratios and colour pattern, usually being recognized by slight but distinctive features, particularly in the colour pattern. All of them agree well with the original definition of the genus. The unequal lobes of t4, hind wing vein 2-1A indistinct and the triangular projections at the margin of the clypeus suffice to distinguish *Loxopus* from all other Neotropical genera of Cryptinae. The projections on the clypeal margin, though, are usually quite inconspicuous and need to be examined under high magnification and proper

Figure 7. (A,B) Head, frontal view. (A) *L. dodecius*; (B) *L. ichilus* (C-E, G) Mesosoma, lateral view. (C) *L. duckei*; (D) *L. australis*; (E) *L. ichilus*; (F) *L. docedius* male, propodeum; (G) *L. exius*; (H) *L. multicolor*, metasoma.

lighting. The taxa described herein should run properly in the key provided by Townes (1970) for the world genera of Goryphina, except for the specimens of *L. duckei* sp. nov. that have a developed vein 2-1A ('brachiella' of Townes). In the ninth couplet of the key, the character 'brachiella absent, or present and short, not reaching more than half the distance to wing margin' could lead the user to the Afrotropical genus *Bozakites* Seyrig, though that is not the only character of the couplet. The



available description and illustrations of *Bozakites*, however, should suffice to distinguish any species of *Loxopus* from it.

Sampling and biodiversity

The vast majority of the specimens examined in this work were collected with Moericke (yellow pan) traps, mostly as part of an extensive program of field trips that also used several Malaise traps, in the same sites and during the same period. This is in agreement with the findings by Aguiar and Santos (2010), suggesting that Moericke traps outperform Malaise traps in collecting many cryptine taxa, including *Loxopus*. The strong sex bias towards females observed herein is also in agreement with the results yielded by Moericke traps in Aguiar and Santos (2010). The collection of 41 specimens of *L. australis* in two days in Anchieta, Brazil, with a total effort of 720 trap-days (unpublished data) is particularly remarkable. This sampling success (one specimen for every 17.6 trap-days) contrasts with the few specimens reported in the literature so far, and may support the idea that *Loxopus* is a rather abundant group.

Biology

Unknown.

Distribution

Mexico, Costa Rica, Trinidad, Venezuela, Ecuador, Brazil (AM, PA, PI, MT, MG, ES, RJ, SP, PR, SC) and Bolivia (Figure 8).

***Key to the females of species of* Loxopus**

The following key can be tentatively used to determine males, but as male specimens are unknown for half of the species, its efficiency cannot be thoroughly assessed.

1 T3 mostly ferruginous or dark brown, sometimes with whitish lateral marks 2
– T3 mostly white, sometimes with anterior brown or blackish semicircular mark 4

2(1) T4 mostly white; postscutellum ferruginous (Figure 3B); antenna with 26–27 flagellomeres; forewing length 5.1–6.4 mm ..... *Loxopus dodecius* sp. nov.
– T4 entirely ferruginous or almost so; postscutellum whitish; antenna with 23–25 flagellomeres; forewing length 3.8–5.3 mm 3

3(2) Mesoscutum entirely ferruginous (Figure 3A); anterior margin of mesopleuron ferruginous (Figures 1, 7D); T2–3 usually with lateral whitish marks (Figures 1, 3A) ..... *Loxopus australis* Townes
– Mesoscutum black with central whitish mark; anterior margin of mesopleuron blackish; T2–3 entirely ferruginous .... *Loxopus unicolor* Kasparyan et Ruíz-Cancino

Figure 8. Distribution maps for species of *Loxopus*. (A) *L. australis*; (B) *L. dodecius*; (C) *L. duckei*; (D) *L. exius*; (E) *L. ichilus*; (F) *L. multicolor*; (G) *L. tenuis*; (H) *L. unicolor* and *L. venezuelanus*.

4(1) Orbital band complete, gena light yellow or whitish along posterior margin of eye 5
– Orbital band widely interrupted, gena mostly blackish or brown along posterior margin of eye 6

5(4) Posterior transverse carina of propodeum represented only by distinct, conical crests, elsewhere indistinct; T1 black with posterior whitish stripe; S4–6 whitish; all coxae with blackish marks, hind trochanter and femur laterally marked with black (Figure 4B) ..... *Loxopus multicolor* Kasparyan et Ruíz-Cancino
– Posterior transverse carina of propodeum complete, medially arched forwards, sublaterally forming distinct but delicate crests; T1 ferruginous with posterior whitish stripe (Figure 4D); S4–6 brown; all coxae and hind trochanters and femur without blackish marks ..... *Loxopus venezuelanus* sp. nov.

6(5) Mesopleuron ventrally with distinct whitish mark; mesosternum with blackish marks (Figure 7G); T4–6 ferruginous (Figure 3D); dorsal margin of pronotum with whitish stripe ..... *Loxopus exius* sp. nov.
– Mesopleuron and mesosternum entirely ferruginous, without whitish or blackish marks; T4–6 dark brown or blackish; dorsal margin of pronotum without whitish stripe 7

7(6) Ovipositor with weak nodus (Figure 6C); supra-clypeal area whitish, without dark marks; T1 mostly ferruginous, without blackish portions (Figure 4C) ..... *Loxopus tenuis* sp. nov.
– Ovipositor without a distinct nodus; supra-clypeal area with brownish or blackish marks; T1 at least partially blackish 8

8(7) Forewing with distinct brownish mark covering apical part of cells 2 + 3M and 1 + 2R; subalar ridge moderately wide, elliptic, light yellow (Figure 7E); T4–6 without lateral whitish marks (Figure 4A); hind wing vein 2-1A absent ..... *Loxopus ichilus* sp. nov.
– Forewing without distinct brownish mark; subalar ridge very narrow, dash-like, ferruginous or whitish (Figure 7C); T4–6 with lateral whitish marks; hind wing vein 2-1A sometimes present ..... *Loxopus duckei* sp. nov.

Loxopus australis Townes (Figures 1, 2C–D, 3A, 5A, 7D, 8A)

Loxopus australis Townes, 1970: 255–256, 470. Description, figure. Holotype ♀ (AEIC, not examined). Type data: BRAZIL: *Santa Catarina*, Nova Teutonia, 30 June 1946, F. Plaumann
Loxopus australis: Yu and Horstmann, 1997: 266. Listed.
Loxopus australis: Yu et al. 2005. Listed.

Female

Forewing 5.20 mm long. *Head.* Antenna with 25 flagellomeres. CWH 1.81, CWW 1.52. MLW 1.67, MWW 0.53. MSM 0.62. Median line on supra-antennal area distinct. *Mesosoma*. Pronotum with weak, short transverse striae along posterior

margin of collar, from laterocentral area to ventral corner. Scutellar carina in dorsolateral view distinct on the anterior 0.4–0.5 of scutellum. Subalar ridge moderately wide, elliptic; epicnemial carina restricted to ventral 0.8 of mesopleuron, its ventral 0.3 arched forwards, upwards almost straight. Transverse furrow at base of propodeum with distinct striae. Metapleuron finely punctate; juxtacoxal and pleural carinae absent. Fourth tarsomeres lateral lobe 2.8 × as long as mesal lobe. Anterior margin of propodeum medially approximately straight; SWL 1.46; posterior transverse carina complete, medially weaker and moderately arched forward, sublaterally forming distinct but weak crests. Forewing vein 1-Rs + M straight, continuous with crossvein 1m-cu, crossvein 1m-cu uniformly curved; crossvein 1cu-a arising close, a little basad, to base of 1M + Rs; crossvein 2cu-a and 2-Cu angled; bulla of crossvein 2m-cu placed on ventral 0.5; APH 0.56; AWH 1.05. Hind wing vein 2-1A absent; HW1C 1.44. *Metasoma*. T1LW 2.00; T1WW 2.50; T1 approximately rounded ventrolaterally; dorsolateral carina complete but weak; ventrolateral carina absent. T2LW 0.86; T2WW 1.8; T2–8 sparsely pilose, finely punctate. OST 0.6; ovipositor slightly downcurved; dorsal valve without nodus, with distinct preapical notch; ventral valve with six oblique ridges (Figure 5A).

Colour. Head black and whitish; mesosoma, legs and metasoma ferruginous. Head: black; scape dorsally dark brown (105,079,055), ventrally ferruginous; pedicel with elongate white spot, remainder of pedicel and first flagellomeres brown, getting darker toward apex, apical segments black; dorsal portion of f6–9 white; supraclypeal area, clypeus, mouth parts, base of mandible and malar space, lower 0.5 of gena and orbital band on supra-antennal area and vertex, whitish (230,215,188); apex of mandible blackish. Mesosoma: ferruginous (137,116,079); propleuron, collar, short dash on dorsal margin of pronotum, tegula and subalar ridge, dorsal division of metapleuron, usually apical 0.4 of metapleuron, transverse marks over propodeal crests, whitish; postscutellum lighter than body. Legs: ferruginous, generally slightly darker towards apex; fore and mid coxae and trochanter white, mid trochanter with fore and hind black spots on base and white spot on apex; mid trochantellus and hind trochanter and trochantellus marked whitish and dark brown; apical tarsi dark brown; hind coxa with fore and hind portions white, lateral part with broad stripe which is ferruginous on base and darker towards apex and hind part. Wings hyaline, forewing with dark spot covering apical part of cells 2 + 3M and 1 + 2R1. Metasoma: ferruginous; apical 0.2 of T1, buff lateral areas on T2–4 (larger in T3) and median dorsal areas on T7–8 white; T2–3 sometimes fuscous (221,157,113) apically; ovipositor reddish orange (110,061,031); sheaths dark brown.

Male

Similar to female, except for the following: forewing 4.40–5.10 mm; mandible more strongly triangular; antenna with 24–25 flagellomeres; apical transverse carina of propodeum placed more apically than in female, not forming sublateral crest; flagellum without white band, apical white stripe at T1 weak or absent, and T7–8 not white dorsally. SWL 1.00–1.33; T1LW 2.78–3.11; T1WW 1.41–1.57. Variation in pattern of white marks apply as in females.

Variation

Forewing 3.92–5.32 mm long. Antenna with 23–25 flagellomeres; pedicel sometimes without dorsal white spot; f10–11 and apical half of f5 and f12 sometimes white; first flagellomere ranging from light to dark brown; pronotum posteriorly sometimes with sparse blackish areas; scutellum whitish on some specimens; propodeum sometimes with sparse blackish marks. Tones of ferruginous of the body vary from very light, yellowish, to dark, brownish; this might be at least partially related to specimen conservation and age. Mesopleuron sometimes with pale to distinct whitish mark; whitish mark on metapleuron varying from white and distinct to almost indistinct, sometimes represented by a buff, slightly paler area (Figure 7D). Postscutellum sometimes completely white. Specimens from southern Brazil usually with more evident whitish spots on mesopleuron and metapleuron. Darker specimens with more extensive dark spots on hind coxa and sometimes with sparse blackish spots on mesoscutum and T2.

Comments

Readily recognizable by having all tergites of the metasoma mostly ferruginous, with lateral whitish marks, and sometimes with sparse blackish areas. Further isolated from all other species of the genus by the following combination of characters: supraclypeal area whitish, without blackish spots; lower 0.5 of gena whitish; postscutellum whitish; fourth tarsomeres lateral lobe 2.8 × as long as mesal lobe; dorsal valve of ovipositor without distinct nodus; ventral valve with six distinct teeth. *Loxopus australis* seems to be by far the commonest species of the genus, and possibly for that reason also the most variable in colour pattern.

Material examined

116 ♀♀, 14 ♂♂. Paratype: 1 ♂ from BRAZIL, Santa Catarina, Nova Teutônia, 5 December 1948, F. Plaumann (AEIC). Other specimens: TRINIDAD: 1 ♀ from 8 km Arima Simla Reserve Station, 260 m, lower montane rainforest, 24 June–8 July 1993, Malaise trap, S. Peck & J. Peck, 93–56 (CNCI). BRAZIL: *Piauí*: 2 ♀♀ from Ribeirão Gonçalves, Estação Ecológica Uruçuí Una, 17–23 June 1984, V. Graf (DZUP). *Mato Grosso*: 1 ♀ from Chapada dos Guimarães, 18–20 November 1983, Polonoroeste, Malaise trasp, Departamento de Zoologia UFPR (DZUP). *Minas Gerais*: 1 ♂ Minas Gerais, Parque Estadual do Rio Doce, Trilha do Vinhático 2, Mata secundária alta, 24 October 2002, Malaise, J.C.R. Fontenelle leg. (UFES). *Espírito Santo*: 4 ♀♀ from Anchieta, Eucalipto-Macega [*Eucalyptus* and pasture], Pt. 1, 28–29 July 2008, yellow pan traps, A.P. Aguiar et al.; 1 ♀, same data except Pt. 2; 3 ♀♀, same data except Mata: afloramento rochoso [forest in rocky outcrop], Pt. 2, 28–29 July 2008; 2 ♀♀, same data except Pt. 3; 2 ♀♀, same data except Pt. 2, 29–30 July 2008; 1 ♀, same data except Pt. 4; 5 ♀♀, same data except Pt. 5; 6 ♀♀ 1 ♂, same data except Mata Estágio Avançado de regenetação [forest in advanced state regeneration], Pt. 01, 28–29 July 2008; 10 ♀♀, same data except Pt. 02; 2 ♀♀, same data except Pt. 3; 3 ♀♀, same data except Pt. 4; 4 ♀♀, same data except Pt. 5. 1 ♀ from Cariacica, Reserva Biológica de Duas Bocas, 26–27 April 2005, Pt. 1, yellow pan

traps, A.P. Aguiar et al.; 1 ♀, same data except 27–28 April 2005; 1 ♀, same data except Pt. 5, 29–30 April 2005; 1 ♀, same data except Pt. 10, 30 April–1 April 2005; 1 ♀, Pt. 1, same data except 2–3 May 2005; 2 ♀♀, same data except 16–17 September 2006, Malaise trap, R. Kawada; 1 ♀, same data except Pau Amarelo, 22–24 October 2005, yellow pan traps, Pt. 11. 1 ♀ from Guarapari, Parque Estadual Paulo César Vinha, 20°36′ S, 40°25′ W, 4 m, Pt. 14, 8–15 May 2006, yellow pan traps, R. Kawada et al.; 1 ♀, same data except Pt. 16; 1 ♀, same data except Pt. 21; 1 ♀, same data except Pt. 95; 1 ♀, same data except Pt. 96; 1 ♀, same data except Pt. 8, 2–9 November 2006, Malaise trap, B. Araújo & M. Santos; 1 ♀, same data except Pt. 2, 9–16 November 2006; 1 ♀, same data except Pt. 5, 2–10 December 2006. 1 ♀ from Santa Maria Jetibá, Fazenda Clarindo Kruger, 20°04′27.9″ S 40°44′51.3″ W, 29 November–6 December 2002, Malaise T6, M. Tavares et al. 2 ♀♀ from Santa Teresa, Estação Biológica Santa Lúcia, 9 May 2006 YPT, MTavares, C. Azevedo et al.; 3 ♀♀, same data except 9–13 May 2006 (UFES). *Rio de Janeiro*: 1 ♀ from Guanabara [currently state of Rio da Janeiro], Represa do Rio Grande, June 1966, M. Alvarenga (AEIC). *São Paulo*: 1 ♀ from São Roque, Alto da Serra, 12 February 1991, yellow pan traps, M.T. Tavares (UFES). *Paraná*: 1 ♀ from Antonina, 20 July 2987, Malaise trap, Profaupar. 1 ♀ from Guarapuava, Estação de Águas Santa Clara, 11 August 1986; 1 ♂, same data except 8 September 1986; 1 ♂, same data except 15 September 1986; 2 ♂♂, same data except 6 October 1986; 1 ♀, same data except 13 October 1986; 1 ♀, same data except 20 October 1986; 1 ♂, same data except 5 January 1987; 1 ♀, same data except 6 April 1987; 1 ♀ from Guaratuba, 23–30 October 1976, [trap unknown] Bernadete. 1 ♂ from Ilha do Mel, Praia Grande, 15 January 1989, R. Dutra. 2 ♀♀ from Jundiaí do Sul, Fazenda Monte Verde, 11 August 1986, Malaise trap, Profaupar; 1 ♀, same data except 22 September 1986; 3 ♀♀, same data except 13 October 1986; 1 ♀ same data except 20 October 1986; 1 ♂, same data except 3 November 1986; 1 ♀, same data except 24 November 1986. 1 ♀ from Ponta Grossa (Vila Velha), Reserva IAPAR Br376, 4 October 1986, lamp; 1 ♀, same data except 6 October 1986, Malaise trap; 1 ♀, same data except 2 March 1987. 1 ♀ from Telêmaco Borba, Reserva Samuel Klabin, 11 August 1986 (DZUP). *Santa Catarina*: 1 ♂ from Nova Teutônia, 300–500 m, 4 October 1938, F. Plaumann, B. M.1938-682; 1 ♀, same data except 9 December 1938, B.M.1938-312 (BMNH); 1 ♀, same data except 15 July 1948; 1 ♀, same data except 6 August 1948; 1 ♀, same data except 30 August 1948; 1 ♂, same data except 1 September 1948; 1 ♀, same data except 5 November 1958; 1 ♀, same data except February 1966; 2 ♀♀, same data except July 1967 (CNCI); 1 ♀, same data except September 1967; 3 ♀♀, same data except October 1967; 2 ♀♀, same data except December 1967 (DZUP); 1 ♀, same data except February 1968; 2 ♀♀, same data except November 1968; 3 ♀♀ 2 ♂♂, same data except December 1968; 2 ♀♀, same data except March 1969; 1 ♀, same data except April 1969; 1 ♀, same data except November 1958–February 1966 (CNCI).

Distribution

Trinidad and Brazil (PI, MT, ES, SP, PR, SC) (Figure 8A). The vast majority of the records are from the rainforests of southern and south-eastern Brazil, but this might be merely a consequence of more intense sampling effort in those areas.

Loxopus dodecius Santos et Aguiar, sp. nov. (Figures 2B, 3B, 5B, 7A, 7F, 8B)

Female

Forewing 5.88 mm long. *Head* (Figure 7A). Antenna with 26 flagellomeres. CWH 1.71; CWW 1.67. MLW 2.02; MWW 0.50. MSM 0.64. Median line on supra-antennal area faint, almost indistinct. *Mesosoma*. Pronotum with distinct, short striae along posterior margin of collar, from laterocentral area to ventral corner. Scutellar carina in lateral view distinct on the anterior 0.3–0.4 of scutellum. Subalar ridge very narrow, dash-like; epicnemial carina restricted to ventral 0.70 of mesopleuron, irregular. Transverse furrow at base of propodeum with distinct striae. Metapleuron finely punctate; juxtacoxal and pleural carinae absent. Fourth tarsomeres lateral lobe 2.8 × as long as mesal lobe. Anterior margin of propodeum medially weakly concave; SWL 1.64; posterior transverse carina complete, medially moderately arched forward, sublaterally forming weak but distinct crests. Forewing vein 1-Rs + M approximately straight, crossvein 1m-cu uniformly and slightly curved, shorter than 1-Rs + M, limit between veins almost indistinct; crossvein 1cu-a arising basad of base of 1M + Rs by about 0.3 of its own length; veins 2cu-a and 2-Cu aligned; bulla of crossvein 2m-cu placed on ventral 0.5; APH 0.51; AWH 1.09. Hind wing vein 2-1A absent; HW1C 1.18. *Metasoma*. T1LW 2.38; T1WW 2.29; T1 approximately rounded ventrolaterally; dorsolateral carina complete, moderately strong, weaker anteriorly; ventrolateral carina absent. T2LW 0.82; T2WW 2.26; T2–8 sparsely pilose, finely punctate. OST 0.6; ovipositor slightly downcurved; dorsal valve without nodus, preapical notch present but very weak; ventral valve tip with 12 oblique ridges (Figure 5B).

Colour. Head black and whitish, mesosoma and legs ferruginous, metasoma dark brown and white. Head: black; scape dorsally dark brown (102,067,048), ventrally ferruginous; pedicel with elongate white spot, remainder of pedicel and first flagellomeres brown, getting darker toward apex; dorsal portion of f5–11 and apex of f12 white; supra-clypeal area, clypeus, mouth parts, base of mandible and malar space, gena and orbital band on supra-antennal area and vertex, whitish (238,224,200); apex of mandible blackish. Mesosoma: ferruginous (125,073,047); propleuron, collar, short dash on dorsal margin of pronotum, tegula and subalar ridge, ventral 0.5 of mesopleuron, apical 0.4 of scutellum, dorsal division of metapleuron, apical 0.4 of metapleuron, transverse marks over propodeal crests whitish. Legs: ferruginous, generally darker towards apex; fore and mid coxae and trochanter white, mid trochanter with fore and hind black spots; apical tarsomeres brown; hind coxa with fore and hind portions white, lateral part with broad, dark brown mark; hind femur ferruginous, ventrally whitish; tarsomeres 2–4 white, apical one dark brown. Wings hyaline, forewing with dark spot covering apical part of cells 2 + 3M and 1 + 2R. Metasoma: T1 ferruginous, apical 0.3 white; T2–3 dark brown, lighter apically, with buff whitish areas laterally; T4 whitish; T5–8 ferruginous, T7 with white apical stripe; ovipositor reddish orange (116,069,034); sheaths dark brown.

Male

Similar to female, except for the following: antenna with 25 flagellomeres, with or without white band (n = 2); forewing 4.12–5.26 mm; 1cu-a ending closer to base of

1M + Rs; posterior transverse carina of propodeum almost straight and not forming sublateral crests; spiracle on T1 slightly prominent; SWL 1.33–1.50; T1LW 3.68–3.11; T1WW 1.41–1.50.

Variation

Forewing 5.10–6.35 mm long. Antenna with 26–27 flagellomeres; gena sometimes dorsally blackish, but never reaching anterior margin of eye; area in front of anterior transverse carina of propodeum sometimes dark, blackish; brown areas of metasoma sometimes darker, blackish, always darker basally.

Comments

Very similar to *L. exius* sp. nov., from which it can be differentiated mainly by having 12 teeth on the ventral valve of the ovipositor (versus six), and by the colour pattern of the mesosoma, with T2 having white areas laterally (versus entirely dark brown), T3 dark brown (*vs.* white), and T4 white (versus dark ferruginous). Additionally distinguished from *L. exius* by the gena mostly white (versus completely black), scutellar carina distinct only on anterior 0.3–0.4 of scutellum (versus 0.5–1.0), and dorsolateral carina of T1 moderately strong (versus weak).

Etymology

Latinized form of the Greek *dodeka*, meaning twelve; in reference to the 12 teeth in the lower valve of the ovipositor.

Material examined

24 ♀♀, 2 ♂♂. Holotype ♀ from BRAZIL, Espírito Santo, Cariacica, Reserva Biológica de Duas Bocas, Pau Amarelo, Pt. 14, 25–27 October 2005, yellow pan traps, A.P. Aguiar et al. (UFES). Mounted on triangle point. In good shape.

Paratypes: BRAZIL: *Minas Gerais*: 1 ♂ from Parque Estadual do Rio Doce, Trilha do Vinhático, mata secundária alta [high secondary forest] Pt. 2, 24 October 2002, Malaise trap, J.C.R. Fontenelle. *Espírito Santo*: 1 ♀ from Cariacica, Reserva Biológica de Duas Bocas, Pt. 1, 25–26 April 2005, yellow pan traps, A.P. Aguiar et al; 1 ♀, same data except Pt. 5, 29–30 April 2005, 1 ♀, same data except Pau Amarelo, Pt. 12, 23–25 October 2005; 2 ♀♀, same data except Pt. 13; 3 ♀♀, same data except Pt. 17; 1 ♀, same data except Pt. 3, 26–28 October 2005; 1 ♀, same data except Pt. 21, 27–29 October 2005. 1 ♀ from Guarapari, Parque Estadual Paulo César Vinha, 20°36′ S, 40°25′ W, 4 m, Pt. 5, 8–15 May 2006, R. Kawada; 1 ♀, same data except Pt. 35; 1 ♂, same data except Pt. *Clusia* 40; 2 ♀♀, same data except Pt. 66; 1 ♂, same data except Pt. 2, 9–16 November 2006, Malaise trap, B. Araújo and M. Santos; 1 ♀, same data except Pt. 8; 1 ♀ from Santa Maria de Jetibá, Fazenda Clarindo Kruger, Pt. T6, 29 November–6 December 2002, Malaise trap, M.T. Tavares. 2 ♀♀ Santa Teresa, Estação Biológica de Santa Lúcia, 9 May 2008, yellow pan traps, M. Tavares, C. Azevedo et al; 3 ♀♀, same data except 9–13 May 2006. *Rio de Janeiro*: 1 ♀ from Guanabara [currently state of Rio da Janeiro], Represa do Rio Grande, VI.1966, Alvarenga (AEIC).

Distribution

Brazil (MG, ES, RJ) (Figure 8B).

Loxopus duckei Santos et Aguiar, sp. nov. (Figures 3C, 4C, 7C, 8C)

Female

Forewing 5.19 mm long. *Head*. Antenna with 26 flagellomeres. CWH 1.68; CWW 1.42. MLW 1.67; MWW 0.57; MSM 0.57. Median line on supra-antennal area distinct. *Mesosoma*. Pronotum with strong, short striae along posterior margin of collar, from laterocentral area to ventral corner. Scutellar carina in lateral view distinct on about 0.8 of scutellum, though much weaker at posterior 0.3. Subalar ridge very narrow, dash-like (Figure 7C); epicnemial carina restricted to ventral 0.8 of mesopleuron, irregular. Transverse furrow at base of propodeum with almost indistinct striae. Metapleuron reticulate; juxtacoxal carina absent; pleural carina vestigial. Fourth tarsomeres lateral lobe 4.0 × as long as mesal lobe, mesal lobe almost indistinct. Anterior margin of propodeum medially approximately straight; SWL 1.57; posterior transverse carina complete, sublaterally forming distinct crests. Forewing vein 1-Rs + M approximately straight; crossvein 1m-cu uniformly curved or irregular, slightly shorter than 1-Rs + M; crossvein 1cu-a arising basad to base of 1M + Rs by about 0.1 of its own length; veins 2cu-a and 2-Cu slightly angled; bulla of crossvein 2m-cu placed ventrally; APH 0.68; AWH 1.13. Hind wing vein 2-1A absent; HW1C 1.31. *Metasoma.* T1LW 2.23; T1WW 2.24; T1 angled ventrolaterally; laterally before spiracle and dorsally coriaceus, elsewhere smooth; dorsolateral carina complete but weak, more distinct apically; ventrolateral carina distinct. T2LW 0.88; T2WW 2.09; T2 sparsely pilose, with moderately coarse punctation, gradually changing to alutaceous at T3–8, those sparsely pilose. OST 0.6; ovipositor basally distinctly downcurved, apically straight; dorsal valve without nodus, preapical notch present but very weak, ventral valve tip with eight oblique ridges (Figure 5B).

Colour. Head black and whitish, mesosoma and legs ferruginous, metasoma dark brown and white. Head: black; scape dark ferruginous (117,072,041); pedicel with elongate white spot, remainder of pedicel and base of first flagellomere ferruginous; remainder of flagellum light brown to dark brown, toward apex except for apical one lighter; dorsal portion of apex of f4, f5–9 and base of f10 white; clypeus, ventral portion of supraclypeal area, mouth parts, base of mandible and malar space, frontal and vertical orbit whitish (234,219,186); ventral portion of gena dark brown; apex of mandible and transverse mark on supraclypeal area dark brown to blackish. Mesosoma: ferruginous (142,091,067); propleuron, collar, short dash on dorsal pronotum, subalar ridge, dorsal division of metapleuron, lateral division near hind coxa, small transverse marks over propodeal crests whitish. Legs: fore and mid coxa, fore trochanter and hind tarsi except for apical one brownish, white; hind coxa with fore portion ferruginous, hind portion white, lateral part with a broad brown mark, darker towards apex; mid and hind trochanter marked with white and dark brown; fore and mid trochantelli, femur, tibiae and tarsi ferruginous; hind trochantellus marked with ferruginous and dark brown; hind femur yellowish (211,060,129), with a darker median longitudinal line; hind tibia greyish-brown. Wings hyaline, forewing with

small, pale darker spot covering apical part of cells 2 + 3M and 1 + 2R. Metasoma: Dark brown, apical 0.2 of T1, T2 laterally, most of T3, T4–6 laterally and T7–8 dorsally, white; ovipositor reddish orange (119,074,046); sheath dark brown.

Male

The single available male is very similar to the female, except T4–6 entirely blackish, without lateral whitish marks, and T7 anteriorly blackish; forewing 4.60 mm; SWL 1.40; T1LW 2.74; T1WW 1.79.

Variation

Forewing 4.39–5.29 mm long. Antenna with 21–26 flagellomeres; gena sometimes partially black; mid coxa sometimes with dark brown spot; T1 sometimes smooth on lateral anterior portion. Two of six studied specimens with hind wing vein 2-1A distinct, reaching 0.5–0.7 of the distance to wing margin.

Comments

This is the only species of *Loxopus* without a distinct brownish mark on the forewing. Very similar to *L. tenuis*, from which it can be differentiated by having the supra-clypeal area with distinct brownish marks (versus entirely whitish, rarely with fuscous lateral marks); posterior transverse carina of propodeum complete (versus usually incomplete); anterior portion of T1 blackish (versus orange), T3 anteriorly blackish (versus entirely white); dorsal valve of ovipositor without nodus (versus with weak nodus); and ventral valve with eight teeth (versus five). In addition, some specimens of *L. duckei* are the only members of *Loxopus* with a developed hind wing vein 2-1A.

Etymology

The specific name is after the type locality, the reserve in Manaus named in honour of the notable Italian-Brazilian naturalist Adolpho Ducke.

Material examined

6 ♀♀, 1 ♂. Holotype ♀ from BRAZIL, Amazonas, Reserva Adolpho Ducke, Pt. 5, 1–3 October 2005, yellow pan traps, A.P. Aguiar et al. (INPA). Mounted on triangle point. In good shape.

Paratypes: ECUADOR: 1 ♂ from Manabi, Palmar, 200m, 27 April 1942 (AMNH); 1 ♀ from Napo, Puerto Misahuelli, 18 February 1983, L. Huggert (AIEC). BRAZIL: *Amazonas*: 1 ♀ from Reserva Adolpho Ducke, Pt. 5, 1–3 October 2005, yellow pan traps, A.P. Aguiar et al. (INPA). *Pará*: 1 ♀ from Melgaço, Floresta Nacional de Caxiuanã, Estação Científica Ferreira Pena, P05012, 13–16 November 2003, yellow pan traps, A.P. Aguiar and J. Dias; 1 ♀, same data except Igarapé Ararua, P05027, 15–18 November 2003; 1 ♀, same data except Igarapé Tijucaquara, P05192, 24–27 November 2003 (MPEG).

Distribution

Ecuador and Brazil (AM, PA) (Figure 8C).

Loxopus exius Santos et Aguiar, sp. nov. (Figures 3D, 5D, 7G, 8D)

Female

Forewing 3.44 mm long. *Head*. Antenna with 21 flagellomeres. CWH 1.60; CWW 1.54. MLW 1.92; MWW 0.59. MSM 0.64. Median line on supra-antennal area distinct. *Mesosoma* (Figure 7G). Pronotum with distinct, short striae along posterior margin of collar, from laterocentral area to ventral corner. Scutellar carina in lateral view distinct on about 0.3–0.4 of scutellum. Subalar ridge very narrow, dash-like; epicnemial carina restricted to ventral 0.8 of mesopleuron, its ventral 0.3 arched forward, dorsally almost straight. Transverse furrow at base of propodeum with distinct striae. Metapleuron finely punctate; juxtacoxal and pleural carinae absent. Fourth tarsomeres lateral lobe 3.0 × as long as mesal lobe. Anterior margin of propodeum medially weakly concave; SWL 1.57; posterior transverse carina complete, medially weaker and moderately arched forwards, sublaterally forming weak but distinct crests. Forewing vein 1-Rs + M approximately straight; crossvein 1m-cu uniformly and slightly curved, as long as 1-Rs + M crossvein 1cu-a arising opposite base of 1M + Rs; veins 2cu-a and 2-Cu angled; bulla of crossvein 2m-cu placed centrally; APH 0.62; AWH 1.07. Hind wing vein 2-1A absent or vestigial; HW1C 1.27. *Metasoma*. T1LW 2.21; T1WW 2.19; T1 approximately rounded ventrolaterally; dorsolateral carina complete but very weak, stronger posteriorly; ventrolateral carina absent. T2LW 0.87; T2WW 2.17; T2–8 very sparsely pilose, finely punctate. OST 0.6; ovipositor approximately straight; dorsal valve with very weak nodus and distinct preapical notch; ventral valve tip with six oblique ridges (Figure 5D).

Colour. Head black and whitish, mesosoma ferruginous, metasoma dark brown and white. Head: black; scape ferruginous (111,074,045); pedicel with elongate white spot, remainder of pedicel and first flagellomere ferruginous, remainder of flagellum dark brown, getting darker toward apex; dorsal portion of apex of f4, f5–9 and base of f10 white; supra-clypeal area, clypeus, mouth parts, base of mandible, frontal and vertical orbit whitish (240,230,217); apex of mandible reddish to blackish; supra-antennal area, temple, gena until anterior margin of eye, and occiput black. Mesosoma: ferruginous (160,097,057); propleuron, collar, short dash on dorsal margin of pronotum, tegula and subalar ridge, ventral 0.5 of mesopleuron, apical 0.4 of scutellum, dorsal division of metapleuron, apical 0.4–8 of metapleuron, transverse marks over propodeal crests, whitish; mesosternum at least partially blackish, usually at postpectum and near base of mid coxae. Legs: ferruginous, generally slightly darker towards; fore and mid coxae and all trochanters white, mid trochantellus with fore and hind black spots; tibiae whitish, tarsi light brown; hind coxa with fore and hind portions whitish, lateral part with a broad, dark brown (073,059,040) mark; hind trochantellus marked with dark brown. Wings hyaline, the fore ones with a buff dark spot covering the apical part of cells 2 + 3M and 1 + 2R1. Metasoma: T1 ferruginous, apical 0.40 white; T2 dark brown; T3 white, basally with semicircular dark brown mark; T4–6 dorsally light brown, laterally

ferruginous; T7–8 dorsally white, laterally ferruginous; ovipositor reddish orange (115,074,032); sheaths dark brown.

Male

General morphology similar to female, except for forewing 4.12–5.26 mm; antenna with 24–26 flagellomeres, with or without white band (n = 2); posterior transverse carina of propodeum almost straight and not forming sublateral crests; spiracle of first metasomal tergite distinctly prominent; SWL 1.14–1.45; T1LW 2.10–2.59; T1WW 1.64–1.77.

Variation

Forewing 3.67–4.83 mm long. General tone of ferruginous ranging from bright, almost orange (212,157,093), to almost fuscous (152,102,050); antenna with 21–27 flagellomeres; white band at flagellum sometimes starting only on f5; mesosternum sometimes entirely blackish; scutellum in some specimens the same colour as mesosoma; postscutellum whitish in specimens with general lighter colour; pro- and mesosternum sometimes with black marks; T1 white on posterior 0.25–0.40 T2 sometimes basally ferruginous; basal dark mark at T3 sometimes indicated only by a buff, ferruginous area; T3 sometimes with semicircular dark spot at apical 0.6; T4 white in one specimen.

Comments

Very similar to *L. dodecius* sp. nov., from which it can be differentiated mainly by having six teeth on the ventral valve of the ovipositor (versus 12) and by the colour pattern of the metasoma, with apex of T2 dark brown (versus lighter, whitish laterally), T3 white (versus dark brown with apex whitish), and T4 ferruginous (versus white). Additionally distinguished from *L. dodecius* by the gena black until anterior margin of eye (versus partially to completely white), scutellar carina distinct on 0.5–1.0 of scutellum (versus 0.3–0.4) and dorsolateral carina of T1 weak (versus moderately strong).

Etymology

Latinized form of the Greek *exi*, meaning six; in reference to the six teeth on the lower valve of the ovipositor.

Material examined

28 ♀♀, 2 ♂♂. Holotype ♀ from BRAZIL, Espírito Santo, Cariacica, Reserva Biológica de Duas Bocas, Pt. 11, 25–27 April 2005, yellow pan traps, A.P. Aguiar (UFES). Mounted on triangle point. In good shape.

Paratypes: BRAZIL: *Mato Grosso*: 1 ♂ from Chapada dos Guimarães, 800 m, July 1983, M. Alvarenga (AEIC). *Minas Gerais*: 1 ♀ from Águas Vermelhas, 15°45′ S, 11°28′ W, 800 m, December 1983, Alvarenga. *Espírito Santo*: 1 ♀ from Cariacica, Reserva Biológica de Duas Bocas, Pt. 10, 29–30 April 2005, yellow pan traps, A.P.

Aguiar; 1 ♀, same data except Pt. 2, 30 April–1 May 2005; 1 ♀, same data except 26 July 1996, sweeping, C.O. Azevedo; 1 ♀, same data except 27 July 1996, H.S. Sá; 1 ♀, same data except Pau Amarelo, Pt. 1, 20–28 October 2005, Malaise trap, A.P. Aguiar et al.; 1 ♀, same data except Pt. 9; 4 ♀♀, same data except Pt. 3, 22–24 October 2005, yellow pan traps; 1 ♀, same data except Pt. 8; 1 ♀, same data except Pt. 11; 2 ♀♀, same data except Pt. 21, 23–25 October 2005; 1 ♀, same data except Pt. 5, 24–26 October 2005; 1 ♀, same data except Pt. 12, 25–27 October 2005; 1 ♀, same data except Pt. 13; 2 ♀♀, same data except Pt. 18, 27–29 October 2005. 1 ♂ from Guarapari, Parque Estadual Paulo César Vinha, 20°36′ S, 40°25′ W, 4 m, Pt. 63, 8–15 May 2006, yellow pan traps, R. Kawada. 1 ♀ from Santa Maria de Jetibá, Fazenda Clarindo Kruger, Pt. T8, 29 November–6 December 2002, Malaise trap, M. Tavares, C. Azevedo et al.; 1 ♀, same data except Fazenda Paulo Seick, Pt. B4. 1 ♀ from Santa Teresa, propriedade rural, Pt. 4, 19–26 August 2007, Malaise trap, F.G. Rampinelli et al.; 3 ♀♀, same data except Estação Biológica de Santa Lúcia, 9–13 May 2006, yellow pan traps, M.T. Tavares, C.O. Azevedo et al. (UFES). *Rio de Janeiro*: 1 ♀ from Rio de Janeiro, Floresta da Tijuca, July 1966, Alvarenga and Seabra (AEIC). *Paraná*: 1 ♀ from Ilha do Mel, Fortaleza, 26 February 1989, R. Dutra (DZUP).

Distribution

Brazil (MT, MG, ES, RJ, PR) (Figure 8C).

Loxopus ichilus Santos et Aguiar, sp. nov. (Figures 4A, 6A, 7B, 7E, 8E)

Female

Forewing 4.30 mm long. *Head* (Figure 7B). Antenna with 22 flagellomeres. CWH 1.71; CWW 1.92; MLW 1.33; MWW 0.56; MSM 0.63. Median line on supra-antennal area faint. *Mesosoma*. Pronotum ventrally with distinct, short transverse striae. Scutellar carina in lateral view distinct on about 0.4 of scutellum. Subalar ridge moderately wide, elliptic (Figure 7E); epicnemial carina restricted to ventral 0.7 of mesopleuron, dorsally very weak, its shape irregular. Transverse furrow at base of propodeum with weak striae. Metapleuron coriarious; juxtacoxal carina absent; pleural carina absent. Fourth tarsomeres lateral lobe 4.0 × as long as mesal lobe. Anterior margin of propodeum medially slightly concave; SWL 1.51; posterior transverse carina complete, medially distinctly arched, sublaterally forming distinct crests. Forewing vein 1-Rs + M uniformly curved; crossvein 1m-cu uniformly curved, slightly shorter than 1-Rs + M; crossvein 1cu-a arising opposite to base of 1M + Rs; veins 2cu-a and 2-Cu slightly angled; bulla of crossvein 2m-cu placed centrally; APH 0.47; AWH 1.11. Hind wing vein 2-1A absent; HW1C 2.00. *Metasoma.* T1LW 2.25; T1WW 2.17; T1 entirely coriarious, approximately cylindrical ventrolaterally; dorsolateral carina complete, moderately strong; ventrolateral carina interrupted on its midlength. T2LW 0.83; T2WW 2.38; T2–8 coriarious, mostly sparsely pilose, T3–8 with distinct pilosity laterally. OST 0.59; ovipositor basally distinctly downcurved, apically straight; dorsal valve without nodus, preapical notch distinct, ventral valve tip with nine oblique ridges (Figure 6A).

Colour. Head black and light yellow, mesosoma mostly ferruginous, metasoma dark brown and white. Head: black; mandible except apex, palpi, clypeus, malar space, ventral 0.05 of gena, most of supra-clypeal area and orbital band in supra-antennal area, light yellow (227,212,140); scape ventrally orange (180, 100, 040); supra-clypeal area with brownish marks; scape dorsally, pedicel and f1 light brown; remainder of flagellum dark brown, f5–9 dorsally white; apex of mandible reddish. Mesosoma: ferruginous (181,085,032); collar, tegula, subalar ridge, dorsal division of metapleuron, metapleuron near hind coxa and small transverse marks over propodeal crests, whitish (232,215,150). Legs mostly fuscous (174,108,053); fore and mid coxae and all trochanters, whitish; hind coxa laterally with broad brown mark, anteriorly to the mark ferruginous, posteriorly whitish; hind trochantellus, base and apex of femur and base of tibia with brownish marks; all t5 blackish. Wings hyaline, forewing with brownish spot covering apical portions of cells 2 + 3M and 1 + 2R1. Metasoma: T1 dark brown and whitish, brown area dorsally covering anterior 0.6, laterally covering anterior 0.3; S1 dark brown; T2 and T4–6 dark brown; T3 whitish, anteriorly with small brownish spot; T7–8 dorsally whitish, laterally dark brown; S2–4 whitish, S2 with lateral brown mark; S5–6 brown. Ovipositor reddish orange, its sheaths brown.

Male

Unknown.

Variation

Forewing length 4.20–4.50 mm; one paratype with ventral 0.1 of gena yellow; one paratype with ovipositor apex with eight oblique ridges.

Comments

Generally similar to *L. duckei* and *L. tenuis*, from which it can be differentiated by having the gena almost entirely black (versus ventrally orange); subalar ridge moderately wide, elliptic (versus narrow, dash-like), and bright yellow (versus ferruginous or whitish). Further differentiated from *L. tenuis* by having the anterior portion of T1 blackish (versus orange), and from *L. duckei* by having the forewing with distinct brownish spot (versus forewing without spot).

Etymology

Latinized form of the type locality name, *Rio Ichilo*.

Material examined

3 ♀♀. Holotype ♀ from BOLIVIA, Santa Cruz, Rio Ichilo (Locality B), 24 July 1965, 'See Bouseman field notes in Mammology Department' (AMNH). Mounted on triangle point; quite dirty, otherwise in good shape.

Paratypes: BOLIVIA: 2 ♀♀, same data as holotype except with additional label 'J. K. Bouseman L. Lussenhop Collectors' (AMNH).

Distribution

Bolivia (Figure 8E).

Loxopus multicolor Kasparyan et Ruíz-Cancino 2005 (Figures 4B, 6B, 7H, 8F)

Loxopus multicolor Kasparyan et Ruíz-Cancino, 2005: 248–249 Description, figure, keyed. Holotype ♀ (Universidad Autónoma Tamaulipas, not examined). Type data: MEXICO: Yucatán, Sudzal Chico, SMSP, VI-1999, H. Delfín G.

Loxopus multicolor honduras Kasparyan et Wharton, 2007: 59–60 Description, figure, keyed. Holotype ♀ (Texas A&M University, not examined). Type data: HONDURAS: Atlanida Tela, trop. Forest, Lancetilla Botanical Garden, 26 December 1986 (R. Jones).

Female

Forewing 6.56 mm long. *Head*. Antenna with 27 flagellomeres. CWH 1.71; CWW 2.09; MLW 1.78; MWW 0.56; MSM 0.65. Median line on supra-antennal area distinct. *Mesosoma*. Pronotum with delicate striae along posterior margin of collar, elsewhere coriarious–rugulose. Scutellar carina in lateral view distinct on about 0.7 of scutellum. Subalar ridge very narrow, dash-like; epicnemial carina restricted to ventral 0.5 of mesopleuron, somewhat uniformly arched. Transverse furrow at base of propodeum with delicate striae. Metapleuron minutely rugulose; juxtacoxal carina absent; pleural carina vestigial. Fourth tarsomeres lateral lobe 3.3 × as long as mesal lobe. Anterior margin of propodeum laterally slightly projecting, medially approximately straight; SWL 1.33; posterior transverse carina represented only by distinct, conical crests, elsewhere indistinct. Forewing vein 1-Rs + M approximately straight; crossvein 1m-cu uniformly curved, slightly shorter than 1-Rs + M; crossvein 1cu-a arising basad to base of 1M + Rs by about 0.2 of its own length; veins 2cu-a and 2-Cu aligned, continuous; APH 0.58; AWH 1.00. Hind wing vein 2-1A reaching about 0.5 of distance to wing margin; entirely absent; HW1C 1.60. *Metasoma*. T1LW 2.00; T1WW 2.21; T1 ventrolaterally angled; coarsely coriarious; dorsolateral and ventrolateral carinae distinct. T2LW 0.86; T2WW 1.75; T2–8 coriarious, glabrate. OST 0.57; ovipositor straight, slender (Figure 7H); dorsal valve without nodus, preapical notch very delicate, ventral valve tip with 13 oblique ridges, basal ones very shallow, apical ones minute (Figure 6B).

Colour. Head blackish and whitish, mesosoma mostly ferruginous, metasoma black and whitish. Head: blackish; mandible except apex, palpi, clypeus, malar space, supra-clypeal area and complete orbital band, whitish to pale yellow (208,143,083); scape light orange (176,105,048); pedicel and flagellum dark brown, pedicel with dorsal whitish spot; f5–11 dorsally white; area between ocelli ferruginous. Mesosoma: ferruginous (117,065,026), mesopleuron distinctly lighter (147,083,035) than elsewhere; propleuron, collar, posterior portion of tegula, small mark on dorsal division of metapleuron and small transverse marks over propodeal crests, whitish (205,152,095). Legs mostly fuscous (134,081,041); all coxae and trochanters whitish; fore and mid coxae with apical brown spots, hind coxa with wide blackish stripe on

lateral face, mesal face with basal and apical blackish spots; mid and hind trochanters and all trochantelli with blackish marks; fore and mid femora and all tibiae with sparse brownish marks; hind femur with brown stripe along anterior face; basal 0.8 of mid t1 and 0.25 of hind t1 brownish; apex of t1 and t2–4 white, t5 blackish. Wings hyaline, forewing with brownish spot covering apical portions of cells 2 + 3M and 1 + 2R1. Metasoma: T1 dorsally black, laterally dark brown, with posterior whitish mark; S1 dark brown; T2 black, T3 whitish, anteriorly with semicircular blackish spot; T4 anterior half whitish, posterior half black; T5–6 black with lateral whitish marks; T7–8 whitish; S2–6 whitish, S2 with lateral blackish mark. Ovipositor reddish orange, its sheaths brown.

Male

Similar to the female, except for the following: posterior portion of vertex and occiput orange; antenna with 25 flagellomeres; f7–14 lighter than remaining flagellum but not quite white; fore and mid coxae without brown marks; hind femur without distinct brown stripe; hind tibia and basal 0.5 of T1 blackish; S1 ferruginous; anterior blackish mark on T3 covering 0.6 of its area, anterior whitish area of T4 covering 0.8 of its area; SWL 1.46; T1LW 2.62; T1WW 1.50.

Variation

Holotype and paratypes described by Kasparyan and Ruíz-Cancino (2005) with the following variation: antenna with 25 flagellomeres; scutellar carina distinct on about 0.4 of scutellum; white band on flagellum starting on f4. The illustration provided by those authors does not show the conical shape of the sublateral crests, but they are described as being 'rather strong'. The female described as *L. m. honduras* has T3 completely whitish; T4 predominantly black, laterally and on basal 0.2 whitish; T5–6 entirely blackish; hind tarsus white with t5 brownish dorsally; and forewing vein 2-M distinctly shorter than 3-M.

Comments

Quite distinctive among other species of the genus by its generally stout body structure (see Figure 4B), posterior transverse carina of propodeum represented only by conical apophyses (versus well developed, complete or almost so in all other species), and ovipositor quite slender (versus moderately stout in other species – see Figure 7H). It is also one of the two species with a complete orbital band, along with *L. venezuelanus*, from which it can be readily distinguished by the shape of the posterior transverse carina of the propodeum and by the hind femur with a brown stripe along the anterior face (versus fuscous with brownish marks on base and apex); T1 anteriorly black (versus orange); and T4 anteriorly whitish (versus entirely blackish).

Material examined

1 ♀, 1 ♂. COSTA RICA: 1 ♀ from San Vito de C.B., Las Cruces, 1200 m, 7–14 August 1982, B. Gill. Labelled 'Loxopus sp. 3/Tow. 1967'. MEXICO: 1 ♂ from Quintana Roo, Xel-Há resort, 7 December 1993, L. Masner, coastal forest (AEIC).

Distribution

Mexico, Honduras, Costa Rica (Figure 8F)

Loxopus tenuis Santos et Aguiar, sp. nov. (Figures 4C, 6C, 8G)

Female

Forewing 3.97 mm long. *Head*. Antenna with 22 flagellomeres. CWH 1.58; CWW 1.48. MLW 1.53; MWW 0.54. MSM 0.47. Median line on supra-antennal area faint, almost indistinct. *Mesosoma*. Pronotum with weak, short striae along posterior margin of collar, from laterocentral area to ventral corner. Scutellar carina in lateral view distinct over full length of scutellum, though much weaker at posterior 0.5. Subalar ridge very narrow, dash-like; epicnemial carina restricted to ventral 0.7 of mesopleuron, its ventral 0.3 arched forward, dorsally almost straight. Transverse furrow at base of propodeum with distinct striae. Metapleuron finely punctate; juxtacoxal and pleural carinae absent. Fourth tarsomeres lateral lobe 5.0 × as long as mesal lobe, mesal lobe almost indistinct. Anterior margin of propodeum medially weakly concave; SWL 1.63; posterior transverse carina medially interrupted, sublaterally forming delicate crests. Forewing vein 1-Rs + M and crossvein 1m-cu approximately straight and with same length; crossvein 1cu-a arising opposite to base of 1M + Rs; veins 2cu-a and 2-Cu aligned; bulla of crossvein 2m-cu placed centrally; APH 0.49; AWH 0.94. Hind wing vein 2-1A absent or vestigial; HW1C 1.49. *Metasoma*. T1LW 2.40; T1WW 2.04; T1 angled ventrolaterally; dorsolateral carina complete but weak, stronger posteriorly; ventrolateral carina absent. T2LW 0.95; T2WW 2.20; T2–8 sparsely pilose, finely punctate. OST 0.75; ovipositor approximately straight; dorsal valve with delicate nodus, preapical notch present but very weak, ventral valve tip with five very weak, oblique ridges (Figure 6C).

Colour. Head black, mesosoma and legs ferruginous, metasoma dark brown and white. Head: black; scape ferruginous (173,122,068); pedicel with elongate white spot, remainder of pedicel and first flagellomere ferruginous to light brown, darker toward apex; dorsal portion of apex of 4, 5–9 and base of 10 white; clypeus and ventral portion of supra-clypeal area light ferruginous; dorsal portion of supra-clypeal area, mouthparts, base of mandible and malar space, orbital band on supra-antennal area and vertex, whitish (225,207,164); apex of mandible blackish; gena dark ferruginous. Mesosoma: ferruginous (164,100,046); propleuron, collar, metapleuron near hind coxa, small transverse marks over propodeal crests whitish. Legs: ferruginous, generally darker towards apex; fore and mid coxae and trochanter white; hind coxa with fore portion ferruginous, hind portion white, lateral part with a broad brown mark, darker towards apex; hind trochanter whitish, hind trochantellus brownish. Wings hyaline, forewings with buff, pale darker spot covering the apical part of cells 2 + 3M and 1 + 2R. Metasoma: T1 light ferruginous, apical 0.5 white; T2 dark brown, apical 0.3 pale or whitish; T3 whitish, T4–6 dorsally dark brown, laterally ferruginous; T7–8 dorsally whitish, laterally ferruginous; ovipositor reddish orange (166,106,059); sheath dark brown.

Male

Unknown.

Variation

Forewing 3.38–397 mm long. Antenna with 20–23 flagellomeres; posterior transverse carina of propodeum sometimes traceable medially, but usually interrupted; general tone of ferruginous can vary from bright, almost orange, to very pale, straw-coloured; supra-clypeal area rarely with faint fuscous lateral marks; T2 sometimes medially brown, only laterally whitish; T3 sometimes with basal subcircular dark spot; T3–6 sometimes laterally white.

Comments

Very similar to *L. duckei*, from which it can be differentiated by having the supra-clypeal area entirely whitish, rarely with fuscous lateral marks (versus with distinct brownish marks); posterior transverse carina of propodeum usually incomplete (versus complete) anterior portion of T1 orange (versus blackish); T3 anteriorly entirely white (versus blackish); dorsal valve of ovipositor with a delicate nodus (versus without nodus); and ventral valve with five teeth (versus eight). In addition, some specimens of *L. duckei* have a hind wing vein 2-1A.

Etymology

From the Latin *tenuis*, meaning thin, slender; in reference to its generally small and delicate structure.

Material examined

19 ♀♀. Holotype ♀ from BRAZIL, Pará, Melgaço, Floresta Nacional de Caxiuanã, Igarapé Curua, P05020, 14–17 November 2003, yellow pan traps, APAguiar and JDias (MPEG). Mounted on triangle point. In good shape.

Paratypes: BRAZIL: *Amazonas*: 1 ♀ from Manaus, Reserva Adolpho Ducke, Pt. 16, 2–4 October 2005, yellow pan traps, A.P. Aguiar et al. (INPA). *Pará*: 1 ♀ from Melgaço, Floresta Nacional de Caxiuanã, Estação Científica Ferreira Pena, P05014, 13–16 November 2003, yellow pan traps, A.P. Aguiar & J. Dias; 1 ♀♀, same data except P05024, Igarapé Ararua, 15–18 November 2003; 1 ♀, same data except P05025; 1 ♀, same data except P05071, 18–21 November 2003; 1 ♀, same data except P05184, 24–27 November 2003; 1 ♀, same data except Igarapé Curua, P05020, 14–17 November 2003; 2 ♀♀, same data except P05021; 1 ♀, same data except P05065, 17–20 November 2003; 1 ♀, same data except P05111, 20–23 November 2003; 1 ♀, same data except P05114; 1 ♀, same data except P-5174, 23–26 November 2003; 1 ♀, same data except Igarapé Tijucaquara, P05081, 18–21 November 2003; 1 ♀, same data except P05086; 1 ♀, same data except P05087; 1 ♀, same data except P05088; 1 ♀, same data except P05137, 21–24 November 2003 (MPEG).

Distribution

Brazil (AM, PA) (Figure 8G).

Loxopus unicolor Kasparyan et Ruíz-Cancino 2005 (Figure 8H)

Loxopus unicolor Kasparyan et Ruíz-Cancino, 2005: 249–250. Description, figure, keyed. Holotype ♀ (Universidad Autónoma Tamaulipas, not examined). Type data: MEXICO: Yucatán, Corral, SMSC, December 1998, H. Delfín G.

Comments

Not examined. From the description available (Kasparyan and Ruíz-Cancino 2005), it is very similar to *L. multicolor* in structure. It can readily be distinguished from all other *Loxopus* by the black mesoscutum with a central white spot. All other species of the genus have a completely ferruginous mesoscutum. Other noteworthy features are the metasoma almost completely ferruginous, with whitish marks on T1 and T7–8; with the exception of some *L. australis*, all other species have brown or blackish marks on the metasoma.

Distribution

Mexico (Figure 8H).

Loxopus venezuelanus Santos et Aguiar, sp. nov. (Figures 4D, 6D, 8H)

Female

Forewing 4.70 mm. *Head*. CWH 1.79; CWW 1.79. MLW 1.53; MWW 0.53; MSM 0.58. Median line on supra-antennal area faint. *Mesosoma*. Pronotum distinctly striate on ventral 0.5 and posterior margin of collar, elsewhere coriarious. Scutellar carina in lateral view distinct on about 0.3 of scutellum. Subalar ridge moderately wide, elliptic; epicnemial carina restricted to ventral 0.7 of mesopleuron, somewhat uniformly arched. Transverse furrow at base of propodeum with distinct striae. Metapleuron coriarious; juxtacoxal carina present, short and delicate; pleural carina distinct, delicate, covered by wrinkles. Fourth tarsomeres lateral lobe 3.3 × as long as mesal lobe. Anterior margin of propodeum medially approximately straight; SWL 1.63; posterior transverse carina complete, medially distinctly arched, sublaterally forming distinct crests. Forewing vein 1-Rs + M approximately straight; crossvein 1m-cu uniformly curved, slightly shorter than 1-Rs + M; crossvein 1cu-a arising opposite base of 1M + 13Rs; veins 2cu-a and 2-Cu aligned, continuous; bulla of crossvein 2m-cu placed ventrally; APH 0.48; AWH 1.05. Hind wing vein 2-1A entirely absent; HW1C 1.50. *Metasoma*. T1LW 2.00; T1WW 2.21; T1 ventrolaterally approximately cylindrical; laterally before spiracle and dorsally coriarious, elsewhere smooth; dorsolateral carina complete but delicate; ventrolateral carina distinct, stronger apically. T2LW 0.81; T2WW 2.14; T2–8 coriarious, mostly sparsely pilose, T3–8 with distinct pilosity laterally, pilosity on T6–8 also distinct dorsally. OST 0.62;

ovipositor straight; dorsal valve without nodus, preapical notch indistinct, ventral valve tip with 10 oblique ridges (Figure 6D).

Colour. Head brown and light yellow, mesosoma mostly ferruginous, metasoma dark brown and whitish. Head: brown; mandible except apex, palpi, clypeus, malar space, supra-clypeal area and complete orbital band, light yellow (228,209,117); scape light orange (207,129,052); supra-clypeal area with lateral brownish marks; pedicel and flagellum light brown, pedicel with dorsal light yellow spot [antenna broken at basal third, white band not visible]. Mesosoma: ferruginous (148,073,025); propleuron, collar, tegula, subalar ridge, small mark on dorsal division of metapleuron, metapleuron near hind coxa and small transverse marks over propodeal crests, light yellow (225,212,122). Legs mostly fuscous (175,113,050); fore and mid coxae and all trochanters, whitish; hind coxa whitish laterally with broad brown mark, anteriorly to the mark ferruginous, posteriorly whitish; hind trochantellus, base and apex of femur with brownish marks; all t5 blackish. Wings hyaline, forewing with brownish spot covering apical portions of cells 2 + 3M and 1 + 2R. Metasoma: T1 mostly ferruginous, dorsally brownish at subapical portion, apically light yellow; S1 ferruginous; T2 brown, T3 whitish, anteriorly with large brown spot; T4–6 blackish, T7–8 dorsally whitish, laterally dark brown; S2–4 whitish, S2 with lateral brown mark; S5–6 brown. Ovipositor reddish orange, its sheaths brown.

Male

Unknown.

Comments

Similar to *L. duckei*, from which it can be differentiated by the orbital band complete (versus widely interrupted and dorsal portion of gena); subalar ridge moderately wide, elliptic (versus narrow, dash-like), and bright yellow (versus ferruginous or whitish); transverse furrow at base of propodeum with distinct striae (versus almost indistinct); juxtacoxal carina present (versus absent); and T1 anteriorly orange (versus blackish).

Etymology

Latinized form of 'of Venezuela'; in reference to its type locality in Venezuela.

Material examined

Holotype ♀ from VENEZUELA, San Esteban, nr. Puerto Cabello, 20 January 1940, P.J. Anduze (AEIC). Apical two thirds of both antennae and right hind leg apicad of trochanter missing; otherwise in good shape.

Distribution

Venezuela (Figure 8H).

Acknowledgements

All of the curators mentioned in Material and Methods provided invaluable loans of Cryptinae specimens. Andrew Bennett (CNCI), Rogério P. Martins (Universidade Federal de Minas Gerais, Brazil) and David Wahl (AEIC) also received one or both authors for scientific visits, and loaned all the relevant specimens. Enrique Ruíz-Cancino (Universidad Autónoma Tamaulipas, Mexico) kindly helped with literature. Berthil B. Longo prepared Figures 1, 2B, 3D, 4C, 5A, 5D and 6C. Yuri L.R. Leite and Celso O. Azevedo (UFES) provided useful comments and suggestions at an early stage of the manuscript.

Funding

This work was supported by FAPES/PPP under Grant 36263290/07; FACITEC under Grant 027/2007; and CNPq under Grant 926.656.810. It also benefited from PNOPG/CNPq under Grant 550885013; further support was provided by PIBIC/Petrobras (UFES) and The Ernst Mayr Grant (MCZ, Harvard University).

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Aguiar AP. 2005. An accurate procedure to describe colors in taxonomic works, with an example from Ichneumonidae (Hymenoptera). Zootaxa. 1008:31–38.

Aguiar AP, Santos BF. 2010. Discovery of potent, unsuspected sampling disparities for Malaise and Möricke traps, as shown for Neotropical Cryptini (Hymenoptera, Ichneumonidae). J Insect Conserv. 14:199–206. doi:10.1007/s10841-009-9246-x

Kasparyan DR, Ruíz-Cancino EC. 2005. Cryptini de México (Hymenoptera: Ichneumonidae: Cryptinae) Parte I. Serie Avispas parasíticas de plagas de plagas y otros insectos. Victoria: Universidad Autónoma de Tamaulipas; 287 pp. Printed in Mexico.

Kasparyan DR, Wharton RA. 2007. A new subspecies of *Loxopus multicolor* Kasp. & Ruíz-Cancino from Honduras (Hymenoptera: Ichneumonidae: Cryptini). Zoosystematica Rossica. 16:59–60.

Kumagai AF, Graf V. 2000. Ichneumonidae (Hymenoptera) de áreas urbana e rural de Curitiba, Paraná, Brasil. Acta Biológica Paranaense. 29:153–168.

Laurenne NM, Broad GR, Quicke DLJ. 2006. Direct optimization and multiple alignment of 28S D2–D3 rDNA sequences: problems with indels on the way to a molecular phylogeny of the cryptine ichneumon wasps (Insecta: Hymenoptera). Cladistics. 22:442–473. doi:10.1111/j.1096-0031.2006.00112.x

Santos BF, Aguiar AP. 2012. Phylogeny and description of *Eknomia*, a morphologically unusual new genus of Neotropical Cryptinae (Hymenoptera, Ichneumonidae), with three new species. Zootaxa. 3237:35–52.

Santos BF, Aguiar AP. 2013. Phylogeny and revision of *Messatoporus* Cushman (Hymenoptera, Ichneumonidae, Cryptinae), with descriptions of sixty five new species. Zootaxa. 3634:1–284. doi:10.11646/zootaxa.3634.1.1

Santos BF, Aguiar AP, Tedesco AM. 2009. Phylogenetic revision and the origin of *Polyphrix* Townes (Hymenoptera, Ichneumonidae, Cryptinae), with description of a new species. Zootaxa. 2214:29–44.

Tedesco AM, Aguiar AP. 2013. Phylogeny and revision of Toechorychus Townes (Hymenoptera, Ichneumonidae, Cryptinae), with description of thirty-five new species. Zootaxa. 3633:1–138. doi:10.11646/zootaxa.3633.1.1

Townes HK. 1970. The genera of Ichneumonidae, Part 2. Memoirs of the American Entomological Institute. 12:1–537.

Yu DS, Achterberg C, Horstmann K. 2005. Interactive Catalogue of World Ichneumonoidea Taxonomy, biology, morphology and distribution. Taxapad (Master version). Compact Disc.

Yu DS, Horstmann K. 1997. A catalogue of world Ichneumonidae (Hymenoptera). Memoirs of the American Entomological Institute. 58:1–1558.

Zanella FCV, Oliveira ML, Gaglianone MC. 2000. Standardizing lists of locality data for examined specimens in systematic and biogeography studies of new world taxa. Biogeographica. 76:145–160.