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A revision of the Neotropical bee genus *Diadasina* Moure (Hymenoptera: Apidae, Emphorini)

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Abstract. A revision of the emphorine bee genus *Diadasina* Moure is presented. These bees are exclusively found in South America, occurring eastward of the Andes mountains from northern Brazil to central Argentina. Four species are recognized as valid. The following synonymies are established: *Melitoma paraensis* Ducke, 1912, and *Diadasia paraensis monticola* Moure, 1944, are new synonyms of *D. distincta* (Holmberg, 1903), *Diadasia parahybensis* Cockerell, 1912 is a new synonym of *D. riparia* (Ducke, 1907), and *Diadasia callura* Cockerell, 1918 is a new synonym of *D. singularis* (Brèthes, 1910). Lectotypes are designated for *Teleutemnesta distincta* Holmberg, *Ptilothrix adolphi* Strand, 1910, and *Diadasia callura* Cockerell. A key to the species, descriptions, and illustrations are provided.

INTRODUCTION

The genus *Diadasina* Moure belongs to the tribe Emphorini, a tribe of solitary bees exclusively found in the New World. The generic classification of the tribe was proposed by Roig-Alsina (1999), who recognized ten genera. Recent studies (Freitas *et al*., 2021) suggest that *Ancyloscelis* Latreille should be excluded from the tribe due to its closer relationship to other bees formerly placed in the Exomalopsini, while the other nine genera form a clade corresponding to the tribe Emphorini (equivalent to the subtribe Emphorina of Roig-Alsina & Michener, 1993, and Michener, 2007). One of these nine genera, *Leptometriella* Roig-Alsina, was included by Michener (2007) as a subgenus of *Diadasina* due to the similarity of the two groups, but studies based on morphology (Sipes & Tepedino, 2005), as well as molecular studies (Freitas *et al*., 2021) support the independence of the two genera as separate lineages, a position followed here. A revision of *Leptometriella* was presented by Roig-Alsina (2008).

The species of *Diadasina* are restricted to South America, occurring eastward of the Andes mountains from northern Brazil to central Argentina. These solitary bees are known to nest in compact soil, frequently forming large, dense aggregations. Their short burrows (2–4 cm long) end in a single cell, less frequently in a short linear series of cells, or in short branches each ending in a single cell. Bees build a turret at the nest entrance using mud pellets made from the softened soil of the excavation. They

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share with species of *Ptilothrix* Smith the capacity of floating on the surface of water bodies to drink the water necessary to dig their burrows in hard soil and construct their thick-walled cells. The nesting biology of *Diadasina distincta* (Holmberg), has been studied in detail across several aspects, including nesting behavior [Frazão *et al.*, 2023, as *D. paraensis* (Ducke); Hazeldine, 1997; Martins & Antonini, 1994], nest architecture (Hazeldine, 1997), pollen affinities (Martins & Borges, 1999), population dynamics (Antonini *et al*., 2000, 2003; Martins & Figueira, 1992; Martins *et al.*, 1999), parasitism (Antonini *et al*., 2003), and fungal associates (Rosa *et al.*, 1999). The nesting biology of *D. riparia* (Ducke) has been studied by Martins *et al*. (2021), and its pollen affinities by Pick & Schlindwein (2011). There is no information on the biology of the other two species of *Diadasina* recognized in this revision, *D. singularis* (Brèthes) and *D. tarijensis* (Brèthes).

Pollen-host selection is well known for *D. distincta*, a species with a strong preference for plants of the genus *Ludwigia* L. (Onagraceae), but with a diet breadth that also includes pollen of other plants (Hazeldine, 1997, Martins & Borges, 1999, Schlindwein, 1998). Records in the literature (Pick & Schlindwein, 2011; Schlindwein, 1998) suggest that at least *D. riparia* is an oligolege on Malvaceae.

A preliminary list of the species of *Diadasina* was presented by Roig-Alsina (1999). Current catalogs (Ascher & Pickering, 2020; Moure *et al.*, 2023) list eight valid species and two synonymous names. A critical revision of available material and of the name-bearing types led to the recognition of only four valid species in the present contribution.

MATERIAL AND METHODS

Specimens studied belong to the following institutions. Acronyms are used in the list of material studied to indicate depositories of the specimens. Names of the personnel who loaned the material are in parentheses. AMNH, American Museum of Natural History, New York (J.G. Rozen, Jr.); DZUP, Department of Zoology, Universidade Federal do Paraná, Curitiba (Pe. J.S. Moure and G.A.R. Melo); IFML, Instituto y Fundación Miguel Lillo, Tucumán (C. Berta and E. Pérez); MACN, Museo Argentino de Ciencias Naturales, Buenos Aires; MLP, Museo de La Plata, La Plata (M. Lucía and L. Álvarez); MNHN, Muséum National d'Histoire Naturelle, Paris (C. Villemant); MZSP, Museu de Zoologia, Universidade de São Paulo (C. R. Brandão); PCYU, Packer collection at York University, Toronto (L. Packer); SEMC, Snow Entomological Collection, University of Kansas, Lawrence (R. Osborn); USNM, United States National Museum, Smithsonian Institution, Washington D.C. (S.G. Brady); ZMB, Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität, Berlin (F. Koch).

The maximum diameter of the median ocellus (MOD) is used as unit of measurement to express the length of the pubescence and other structures. The metasomal terga (T) and sterna (S) are identified with Arabic numerals; in the lists of material studied F stands for female, and M for male.

The male hidden sterna (S7 and S8), and the genital capsule are similar in all the species, and are only figured for *D. tarijensis*.

SYSTEMATICS

Genus *Diadasina* Moure

Diadasina Moure, 1950: 392. Type species: *Melitoma paraensis* Ducke, 1912 by original designation (=*Teleutemnesta distincta* Holmberg, 1903).

Diagnosis: Species of *Diadasina* are characterized by their short mouthparts, the pale pubescence on the head and mesosoma, and the distinct apical bands of yellow hairs on the metasoma (on T2–T4 in the female or T2–T6 in the male). The distinctly yellow-banded metasoma distinguishes *Diadasina* from species of *Alepidosceles* Moure and sympatric species of *Diadasia* Patton, two other emphorine genera with short mouthparts (species of *Diadasia* with banded terga occur in other areas). Besides their smaller size, they are readily separated from *Ptilothrix* by the presence of arolia (absent in *Ptilothrix*), and the short first flagellomere (as long as its apical width, twice as long in *Ptilothrix*). They may be confused with species of *Leptometriella*, which may have similar size and pubescence pattern. Both sexes of *Diadasina* are distinguished by the labrum with a rounded preapical margin, which is not carinate and without denticles (as is the case in *Leptometriella*), by the metapostnotum entirely covered with hairs (in species of *Leptometriella* an upper bare area bordering the metanotum is always present), and by the female hind basitarsus being blunt apically, not with the strong apical projection present in females of *Leptometriella*.

Characterization of *Diadasina*: 5.5–9.0 mm long, with distinct apical bands of hairs on T2–T4 (female) or T2–T6 (male). First flagellomere short, as long as its apical width. Labrum of both sexes with the preapical margin rounded, not carinate and without denticles. Mandible of female with small preapical tooth. Proboscis short, at rest barely reaching anterior coxae; second segment of labial palp at most 0.8 times as long as first, much shorter than eye length (0.30–0.35×). Metapostnotum entirely covered with hairs, at most with a very narrow longitudinal bare band. Hind tibia of female with distinct basitibial plate. Hind basitarsus of female with the apical projection blunt and weak. Arolia present; all claws with pointed apices in both sexes. Gradulus of S2 gently curved. Gradulus of T6 of female incomplete, absent at sides of pygidial plate, present as short lateral apical portion. Pygidial plate funnel-shaped, with basal sides straight, and apical portion narrow, parallel-sided. S6 of male with hairs longer along midline, frequently forming a tuft. S7 with simple, hairy apical lobes; S8 with apical portion profoundly divided by longitudinal slit; gonostylus shorter than gonocoxite (0.75×); dorsoapical lobe of gonocoxite shorter than gonostylus (0.4×), hairy.

Key to Species of *Diadasina*

Females

1. Scopa loose (Fig. 1), scopal hairs on outer surface of hind tibia and basitarsus with few, long branches (up to 0.6 × MOD) (Fig. 3a); dorsal and ventral margins of hind tibia and basitarsus with stiff, simple hairs surpassing in length branched hairs (Fig. 3b). Fourth segment of labial palpus truncate, with bifid apex (Fig. 5), last segment of maxillary palpus truncate. Vertex and dorsum of thorax with fulvous hairs. Erect hairs of T3–T4 usually black; prepygidial fimbria on T5 with black hairs (Fig. 7)…… *D. distincta* (Holmberg)

—. Scopa dense (Fig. 2), scopal hairs on outer surface of hind tibia and basitarsus with numerous, shorter branches (up to 0.3× MOD) (Fig.4a); dorsal and ventral margins of hind tibia and basitarsus only with branched hairs (Fig. 4b). Fourth segment of labial palpus with rounded apex (Fig. 6); last segment of maxillary palpus with rounded apex. Vertex and dorsum of thorax with yellowish to grey hairs. Erect hairs of T3–T4 yellowish; prepygidial fimbria on T5 with yellowish, reddish or brown hairs (Figs. 8–10)..... **2**

2(1). Apical bands of T3–T4 broad, that of T3 along midline 3× MOD (Fig. 8). Vertex of head much elevated behind ocelli (Fig. 11), distance from median ocellus to vertex in frontal view as long as 1.30–1.35× MOD.....*D. singularis* (Brèthes)

—. Apical bands of T3–T4 narrower, that of T3 along midline not over 2× MOD (Figs. 9–10). Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 0.65–0.80× MOD (Fig. 12)..... **3**

3(2). Hairs on disc of scutum 0.7–1.1× MOD, on anterior surface of T1 1.0–1.2× MOD (Fig. 9). Pubescence of disc of T3–T4 very dense, hiding integument and obscuring basal limit of apical band (Fig. 9). Hind leg with yellowish brown tarsus and yellowish scopal hairs (Fig. 9)..... *D. riparia* (Ducke)

—. Hairs on disc of scutum 1.2–1.5× MOD, on anterior surface of T1 1.5–2.2× MOD (Fig. 10). Pubescence of disc of T3–T4 allowing to see dark integument below, so basal limit of apical band distinct (Fig. 10). Hind leg with black tarsus and brown scopal hairs (Fig. 10)..... *D. tarijensis* (Brèthes)

Males

1. S6 with hairs loose along median longitudinal elevation and on apical third, not forming dense tuft; hairs shorter at sides of median elevation (Fig. 13). Flagellomeres 2–7 or 2–8 with raised, longitudinal ridges on plical surface, giving the antenna a weakly crenulate aspect (Fig. 15)..... .....*D. distincta* (Holmberg)

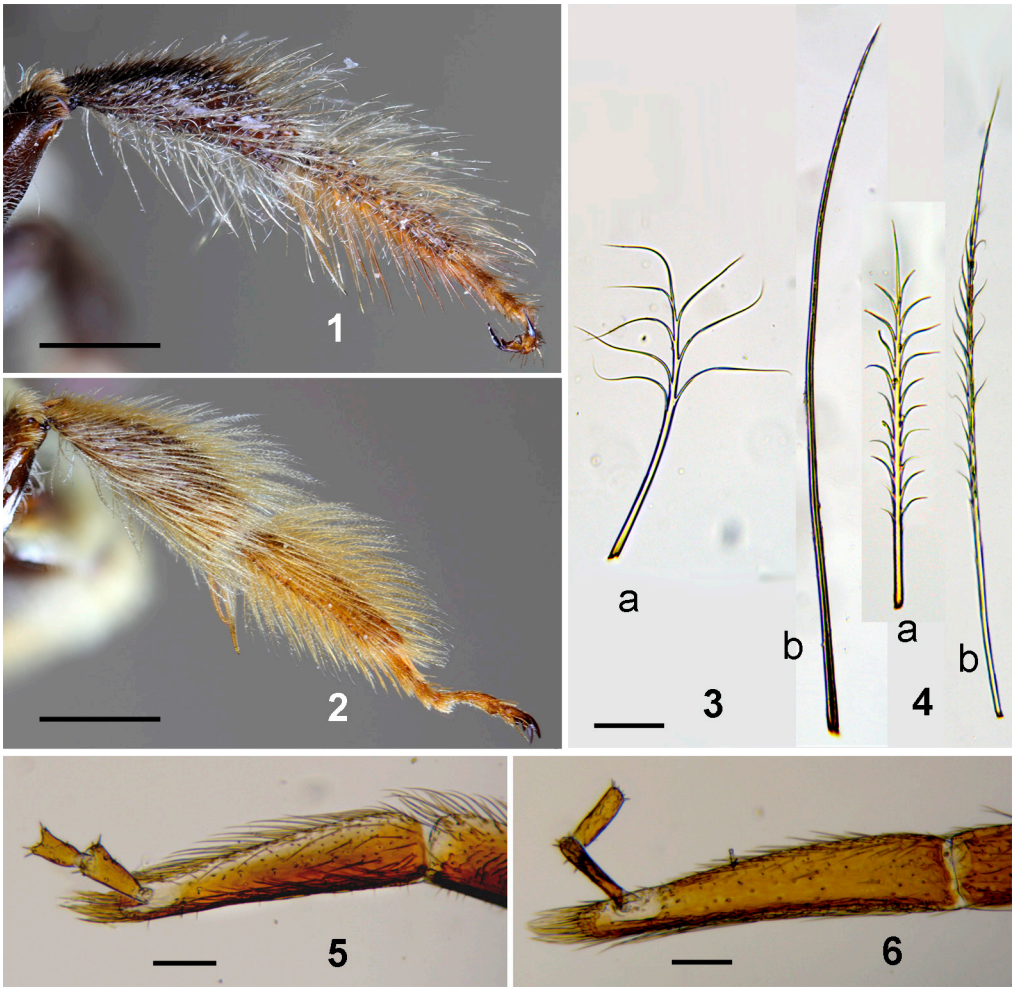
—. S6 with dense tuft of hairs on median longitudinal elevation, and bare at sides of it (Fig. 14). Flagellomeres cylindrical (Figs. 16–17)..... **2**

2(1). Flagellomeres 2–4 shorter than their apical width (Fig. 16) (proportion 0.8–0.9:1). Vertex much elevated behind ocelli, distance from median ocellus to vertex in frontal view 1.5–1.7× MOD (more elevated than in female, Fig. 11).... .....*D. singularis* (Brèthes)

—. Flagellomeres 2–4 longer than their apical width (Fig. 17) (proportion 1.15–1.20:1). Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 0.8–0.9× MOD (similar to that of female, Fig. 12)..... **3**

3(2). Hairs on disc of scutum 0.8–1.1× MOD. Flagellum reddish on underside. Pubescence of disc of T3–T4 dense, obscuring basal limit of apical band (as in female, Fig. 9)..... *D. riparia* (Ducke)

—. Hairs on disc of scutum up to 1.6× MOD. Flagellum black. Pubescence of disc of T3–T4 allowing to see dark integument below, so basal limit of apical band distinct (as in female, Fig. 10).....*D. tarijensis* (Brèthes)



Figures 1–6. Hind tibia and tarsus showing scopa (1, 2), scopal hairs (3, 4) of outer surface (a) and dorsal margin (b) of hind tibia, and distal segments of female labial palpus (5, 6). **1, 3, 5** = *Diadasina distincta* (Holmberg); **2** = *D. riparia* (Ducke); **4, 6** = *D. singularis* (Brèthes). Scale lines: 1, 2 = 1.0 mm; 3, 4 = 0.1 mm; 5, 6 = 0.2 mm.

Collecting structures and pollen affinities: The pollen-collecting structures of *Diadasina distincta* are strikingly different from those of the other species of the genus. Females have a unique scopa on the hind tibia and basitarsus, suited for the collection of the adhesive pollen of *Ludwigia* (Onagraceae). The scopa has sparse hairs with few branches (Fig. 3a), and simple, rigid hairs that surpass in length all other hairs (Fig. 3b). The anterior tarsus, the tool for actively collecting pollen, bears exclusively stiff, simple hairs. The literature describing a loose scopa clothed with simple, stiff hairs as an adaptation to the collection of pollen from Onagraceae has been reviewed by Thorp (1979). This type of adaptation has been described by Gimenes (1991) for several bees collecting pollen particularly on *Ludwigia*, although she did not study *Diadasina*.

The pollen affinities of *D. distincta* were studied in great detail by Martins & Borges (1999) in southeastern Brazil. They documented the strong preference of *D. distincta* for

Figures 7–10. Dorsal view of metasoma and hind leg of females of *Diadasina* species. **7.** *D. distincta* (Holmberg). **8.** *D. singularis* (Brèthes). **9.** *D. riparia* (Ducke). **10.** *D. tarijensis* (Brèthes).

pollen of *Ludwigia*. Hazeldine (1997) and Schlindwein (1998) also indicated *D. distincta* as a specialist on *Ludwigia.* Most museum specimens with pollen loads examined in the present study bore the typical onagraceous tetrads. Despite this strong preference and its morphological adaptations, Martins & Borges (1999) demonstrated, by study of nest pollen masses, that this bee switches to other host plants when *Ludwigia* is not at full bloom. They found nests with pure pollen provisions of *Pavonia* sp. (Malvaceae) and *Cosmos sulphureus* Cav. (Asteraceae), as well as significant amounts of pollen of *Combretum* sp. (Combretaceae), *Miconia fallax* DC. (Melastomataceae), and *Antigona* sp. (Polygonaceae). Besides this diet versatility, *D. distincta* is a eurytopic species occurring in some disparate places, such as Manaos in the Amazonia and the valley of the Río Negro in northern Patagonia.

Figures 11–12. Face of females of *Diadasina* species. **11.** *D. singularis* (Brèthes). **12.** *D. riparia* (Ducke). Scale lines = 1.0 mm.

The scopa on the hind tibia and basitarsus of the other three species of *Diadasina* is formed by dense hairs with short, numerous branches (Fig. 4); simple hairs are not present. The anterior basitarsus is clothed with plumose hairs. The density of hairs and the pattern of branching of the hairs of these pollen-collecting and transporting structures is similar in the three species, suggesting that they share similar pollen-collecting habits. Pick & Schlindwein (2011) studied nest provisions of *D. riparia* in northern Brazil, and they only found pure pollen masses of *Sida* sp. (Malvaceae). Schlindwein (1998) had already recorded *D. riparia* as an oligolege on *Sida rubifolia* A.St.-Hil. in southern Brazil. Museum specimens with pollen loads of *D. singularis* examined in the present study bear medium-sized, spherical, spiny pollen grains similar to those present in the scopae of specimens of *D. riparia*. Studied specimens of *D. tarijensis* bore no pollen loads.

Diadasina distincta (Holmberg)
(Figs. 1, 3, 5, 7, 13, 15, 23)

Teleutemnesta distincta Holmberg, 1903: 404–405. Lectotype female, Argentina, Buenos Aires, Las Conchas [nowadays Tigre], MACN, examined, present designation.

Ancyloscelis analis Vachal, 1904: 19. Two female syntypes, République Argentine, MNHN, examined.

Ptilothrix adolphi Strand, 1910: 510. Lectotype male, Paraguay, Asunción, Sapucay, 12.I.05, J.D. Anisits, ZMB, examined, present designation.

Ancyloscelis duckei Friese, 1910: 708. Type Brazil, Pará, A. Ducke col., not located (preoc., not *Ancyloscelis duckei* Friese, 1904).

Melitoma paraensis Ducke, 1912: 96 (nom. nov. for *Ancyloscelis duckei* Friese, 1910). **New synonym.**

Diadasia paraensis monticola Moure, 1944: 115. Holotype male, Brazil, São Paulo, Monte Alegre, Faz. Experimental, 750 m, 14/27.X.1942, L. Travassos & R.F. d'Almeida, MZSP, examined. **New synonym.**

Diagnosis: This widespread species is readily distinguished by the fulvous color of the pile on the vertex and the dorsum of the thorax, more conspicuous in females than in males. Both sexes have a distinctive distal segment on the labial and maxillary

palpi, with a broadened, bifid apex (Fig. 5). The scutum has sparser punctures than in the other species of the genus. Males are readily distinguished by the loose pilosity of S6, not forming a dense tuft as in the other species, and by the crenulate antenna.

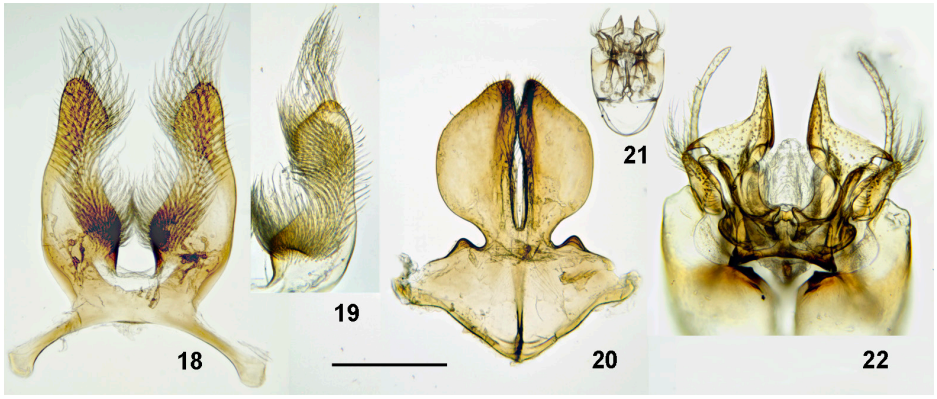
REDESCRIPTION: Female. Length, 7.0–8.5 mm; length of forewing 5.8–7.0 mm. Black, with yellowish brown distitarsi and tegula, and yellowish tibial spurs; but some specimens with all tarsi yellowish brown to yellowish, and antenna with reddish last flagellomeres. Pubescence rufous on vertex and dorsum of mesosoma; greyish on rest of head and mesosoma, on proximal part of legs, and base of T1; brown to dark brown on dorsal surface of fore and mid tibiae; black along upper margin of hind tibia apical of basitibial plate; yellowish brown to bright orange brown on hind tibia, tarsi, and metasomal sterna. Pubescence brown to yellowish brown on basal part of T2, black on basal part of T3–T4; prepygidial and pygidial fimbriae black; basal part of T5 with appressed white hairs; apical bands on T1–T4 yellow. Hairs on scutum 0.8–1.4× MOD; on mesopleuron 1.7–2.2× MOD. Hairs on outer side of forebasitarsus simple. Scopa on hind tibia and basitarsus sparse, with long, stiff, simple hairs and shorter plumose hairs with few, long branches. T1–T4 with sharply defined apical bands, that on T3 along midline 1.3–1.8× MOD. Scutum with sparse punctures, separated by polished interspaces 1–3× puncture diameter. Eyes weakly convergent below, proportion of upper to lower interocular distance, 1:1.05–1.10. Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 1.07–1.10× MOD. Last segment of labial and maxillary palpi with truncate, bifid apex.

Male. Length, 6.5–8.5 mm; length of forewing 5.7–6.8 mm. Color of integument similar to that of female, but hind and mid tibiae sometimes with apical yellowish brown spot on outer surface; in some specimens nearly whole hind tibia and S6 yellowish brown, and flagellum entirely reddish. Pubescence yellowish brown to greyish, in some specimens paler on venter of body. With well-defined apical bands on T1–T6. S6 with sparse hairs, longer on apical third and on median longitudinal elevation, shorter at sides of longitudinal elevation. Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 1.0–1.2× MOD. Flagellum crenulate, proportion of four proximal flagellomeres 1:1:1.2:1.2; first and second flagellomeres as long as their apical width, following two flagellomeres longer than their apical width (1.2×).

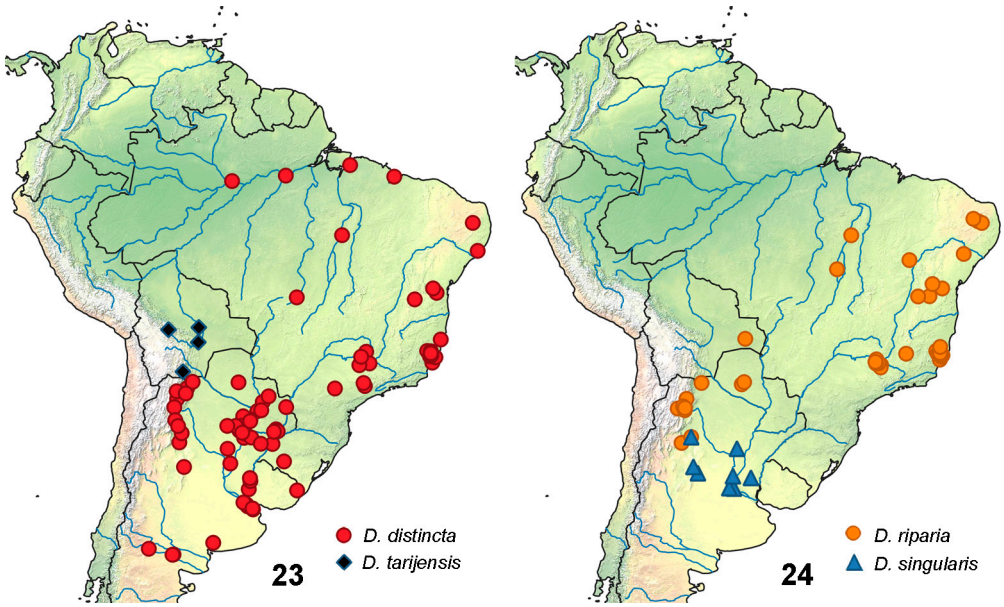
COMMENTS ON TYPE MATERIAL: A single syntype specimen of *Teleutemnesta distincta* from the Holmberg collection is preserved in Buenos Aires at MACN. It is a female lacking the head and part of the metasoma beyond T2. It bears the following labels: a white minute triangle with a date "II/26", a rectangular label with the number "29." and a label in Holmberg's handwriting "distincta/Holmberg." The date coincides with the date indicated for the specimen mentioned in the original description as collected in Buenos Aires, Las Conchas (nowadays locality of Tigre). The number 29 coincides with the number of the microscopic slide of the mouthparts indicated by Holmberg in the original description. The specimen is here designated as the lectotype and labeled accordingly. The syntype specimens from Córdoba and Paraguay can be considered lost. The lectotype agrees in every detail with the current concept of the species.

The syntypes of *Ancyloscelis analis* Vachal preserved in Paris are two females mounted together on a single pin. The locality label, a white rectangle written with red ink, only reads "Argentin." Both specimens are conspecific and agree with *D. distincta* (Holmberg).

Figures 13–17. Sixth sternum (13, 14), crenulate antenna (15), and proximal flagellomeres (16, 17) of *Diadasina* males. **13, 15** = *Diadasina distincta* (Holmberg); **14, 17** = *D. riparia* (Ducke); **16** = *D. singularis* (Brèthes).



Figures 18–22. *Diadasina tarijensis* (Brèthes), male. **18.** S7, ventral view. **19.** Variation in shape of apical lobe of S7. **20.** S8, ventral view. **21.** Genital capsule, dorsal view. **22.** Detail of apical portion of genital capsule, dorsal view. Scale lines: all 0.5 mm, except for figure 21.



Figures 23-24. Distribution maps of species of *Diadasina*. **23.** *D. distincta* (Holmberg) (red dots), *D. tarijensis* (Brèthes) (black diamonds). **24.** *D. riparia* (Ducke) (orange dots), *D. singularis* (Brèthes) (blue triangles).

Strand (1910) based his species *Ptilothrix adolphi* on several specimens, all of which agree with *D. distincta*. A male with the following labels is designated here as the lectotype: "Asuncion/ Paraguay/ Sapucay/ 12.I.05/ J.D.Anisits," "Ptilothrix/ adolphi/ [male symbol] m./ Strand det.," "Co-/ Type," and a lectotype label of mine. A female with similar labels is designated as paralectotype.

When I requested type material of *Ancyloscelis duckei* Friese, 1910 from Berlin (ZMB), it was not located. I have studied several specimens that may represent syntypes, since Friese may have sent them back to A. Ducke: two specimens identified by Friese himself as *Ptilothrix duckei* (at SEMC), specimens identified by Ducke as *Ancyloscelis duckei* (Museu Paraense Emilio Goeldi and SEMC), and the specimen invalidly designated as lectotype of *Melitoma paraensis* Ducke by Nascimento (1979) at the Museu Goeldi. All these specimens are from Pará and were collected by Ducke before 1910. It is not clear whether Friese actually based his species on any of these specimens, and their type status is not certain. However, the pattern of pubescence of the female and the crenulate antenna of the male, both described by Friese (1910), leave no doubts about the identity of the species.

The male holotype of *Diadasia paraensis monticola* Moure corresponds to a male of *D. distincta* (Holmberg). The color differences mentioned by Moure (1944), *i.e.*, the black antennae and legs, fall within the limits of variability of the species. Males with reddish flagellum and extensively reddish legs as well as males with dark antennae and legs occur frequently in the same populations, without a geographic correlation.

DISTRIBUTION: Argentina, provinces of Buenos Aires, Chaco, Córdoba, Corrientes, Entre Ríos, Formosa, Jujuy, Misiones, Río Negro, Salta, Santa Fe, Santiago del Estero, and Tucumán. Brazil, states of Alagoas, Amazonas, Bahia, Espírito Santo, Maranhão, Mato Grosso, Minas Gerais, Pará, Paraíba, Paraná, Rio Grande do Sul, and São Paulo. Paraguay, departments of Alto Paraná, Asunción, Concepción, Cordillera, Itapuá,

Presidente Hayes, and San Pedro. Uruguay, department of Treinta y Tres.

Material studied: Argentina. Buenos Aires: 2 F, Otamendi, ii.1993, P. Hazeldine (MACN); 12 F, Otamendi, 1.ii.1990, L. Moffatt (MACN); 1 F, Sierra de la Ventana, 1.ii.1989 (MACN); 20 F, 5 M, Buenos Aires, ii.1898, xii.1903, xii.1907, ii.1908, 10.xii.1915, J. Brèthes (MACN); 10 F, 9 M, La Plata (MACN); 5 M, Capital Federal, Reserva Costanera Sur, 6.xi.2015, 1.xii.2015, 25.i.2016, Compagnucci, Galvani, González Vaquero (MACN); 2 M, Canal San Fernando, xi.1945, A.O. (MLP); 10 F, 1 M, Dique Luján, 21.i.1945, A. Martínez (MLP); 3 F, Tigre, 21.ii.1945 (MLP); 1 F, Punta Lara, 20.i.1946, A. Martínez (MLP). Chaco: 24 F, 5 M, Fontana, 10/19.iv.2016, A. Schaller (MACN); 1 M, Colonia Benítez, 12.xii.1948, R. Golbach (IFML); 5 M, Colonia Benítez, 20.xi.2018, A. Schaller (MACN); 1 F, Barranqueras, 23.iv.1916, A. Schaller (MACN); 1F, 1 M, Colonia Elisa, 15.xi.2017, A. Schaller (MACN); 3 F, 4 M, Resistencia, Parque Caraguatá, 19.xi.2018, A. Schaller (MACN); 1 M, Colonia Mixta, 4.i.1917, A. Schaller (MACN); 12 F, 1 M, Dpto. San Marín, La Eduvigis, 5/12.i.2018, A. Schaller (MACN); 2 F, Parque Nacional Chaco, Laguna Carpincho, 27.ii.2004, L. Compagnucci (MACN);7 M, Parque Nacional Chaco, 12/13.xi.2007, L. Compagnucci (MACN); 4 M, Roque Sáenz Peña, 1930, Ohnmeiser (MACN). Córdoba: 1 F, San Marcos Sierras, 7.i.2005, L. Compagnucci (MACN). Corrientes: 1 F, Manantiales, i.1960, Apóstol (MACN); 1 F, Estación Biológica EBCO, 26.x.2016, ex Convolvulaceae, A. Schaller (MACN); 2 F, Empedrado, Derqui, 17.i.2018, A. Ávalos (MACN); 1 F, Corrientes, ciudad, Camping El 15, 18.xii.2016, A. Ávalos (MACN); 1 F, 1 M, Pellegrini, xii.1974, Fritz (MACN). Entre Ríos: 5 F, 2 M, Liebig, 17/20.xii.2004, A. Roig A. (MACN); 4 F, 1 M, Tuyuparé, 26.ii.1911, J. Brèthes (MACN); 2 F, Palmar de Colón, i.1974, iii.1978, Fritz (DZUP); 1 F, Parque Nacional El Palmar, 11.iii.1994, Hazeldine (MACN); 2 M, Gualeguaychú, Haedo Rossi (IFML); 1 F, Pronunciamiento, ii.1962, F.H. Walz (DZUP) ; 4 F, 1 M, Pronunciamiento, i.1961, J. Foerster (DZUP). Formosa: 1 F, 11 M, C. Aquino, 26.x.2011, Galvani (MACN); 3 F, Tres Marías, Galvani (MACN); 2 M, ciudad Formosa, Reserva Laguna Oca, 26.ix.2008, G. Galvani (MACN); 1 F, 1 M, Gran Guardia, J. Foerster (MLP); 1 M, Gran Guardia, xi.1952, J. Foerster (DZUP). Jujuy: 1 M, Yuto, 12.ii.1945, J.F. (MLP); 7 F, 2 M, Jujuy (MACN). Misiones: 1 F, Misión San Ignacio, xi.1953, Viana & De Carlo (MACN); 1 M, Posadas, 17.xi.1945, A. Martínez (MLP). Río Negro: 4 F, 1 M, Lago Pellegrini, 22.i.1975, Willink, Claps (IFML); 7 F, 2 M, Luis Beltrán, xii.1991, Fritx (MACN); 7 F, Choele Choel, i.1991, U. Fritz (MACN). Salta: 1 M, Orán, ii.1945, A. Martínez (MLP); 1 F, Saucelito, 1.xii.1952, A. Ogloblin (MLP); 2 M, Tartagal, ii.1957, Willink (IFML); 3 F, 1 M, Rosario de Lerma, xii.1992, A. Roig A. & L. Horovitz (MACN). Santa Fe: 1 F, Vera, 25.iii.1942 (MLP); 1 M, Fontana, 28.iii.1942 (MLP); 3 M, San Javier, La Brava, 26.x.2010, J.P. Torretta & C. Cerino (MACN). Santiago del Estero: 1 M, Tapso, 22. iv.1951, A. Ogloblin (MLP); 1 M, Termas de Río Hondo, Dique Frontal, 16.x.1971, C. Porter (IFML). Tucumán: 1 M, Tucumán, 9.xii.1952 (MLP); 1 F, Trancas, Tacanas, 21.xi.1957, Golbach (DZUP). Brazil. Alagoas: 2 F, São Miguel, xi.1952, Camargo (MZSP). Amazonas: 1 F, Manaus, x.1959, C. Elias (DZUP). Bahia: 3 F, 1 M, Jequié, 10.viii.1964, C. Elias (DZUP); 1 F, Maracás, ix.1965, F. oliveira (DZUP); 1 F, Cacule, vii.1961, S. Laroca (DZUP). Espírito Santo: 1 M, Santa Maria, 21.i.1967, C. & C.T. Elias (DZUP); 5 F, Santa Teresa, 19.iii.1966, 4.iv.1966, C.T. & C.Elias (DZUP); 1 F, 1 M, Conc. da Barra, 26.iv.1968, C. Elias (DZUP); 1 F, Baixo Guandú, 7.vi.1971, C. Elias (DZUP); 1 F, Colatina, 28.vii.1964, C. Elias (DZUP); 1 M, São Roque, 5.v.1966, C. Elias (DZUP); 1 F, Jacaraipe, 18.ii.1967, C. & C.T. Elias (DZUP); 2 F, Guarapari, ix.1960, M. Alvarenga (DZUP). Maranhão: 1 F, São Luis, 11.viii.1953 (DZUP). Mato Grosso: 1 F, Chavantina, vii.1962, Alvarenga- Oliveira (DZUP). Minas Gerais: 6 F, Passos, 3.xi.1962, 1/7.v.1963, 9/14.xii.1963, C. Elias (DZUP); 2 F, Araxá,

5.iv.1965, C. Elias (DZUP). Pará: 1 M, Santarém, Fazenda Taperinha, ii.1968 (MZSP); 12 F, 3 M, Belem, 28.v.1956, E. Lobato (DZUP); 2 F, 2 M, Conceição Araguaia, vii.1959, M. Alvarenga (DZUP). Paraíba: 3 F, Juazeirinho, 3.xi.1955, A. Silva (DZUP). Paraná: 2 F, Jacarezinho, 13.ii.1961, Marston - Laroca (DZUP). Rio Grande do Sul: 2 F, Rosario do Sul, 30.xi.1985, R. Radtke (DZUP). São Paulo: 1 M, Batatais, 1.i.1972, J.S. Moure (DZUP); 1 F, Campinas, i.1962, J.S. Moure (DZUP); 1 F, Cosmopolis, Usina Ester, 9/13.ii.1960, Moure-Hurd-Nogueira (DZUP); 1 F, Rifaina, 20.ix.1965, C. Elias (DZUP). Paraguay. Alto Paraná: 1M, Puerto Gral Díaz, iii.1944 (DZUP). Asunción: 1 M, San Lorenzo, i.1962, Sakagami & Laroca (DZUP); 2 M, Assunção, 13.i.1962, Sakagami & Laroca (DZUP). Concepción: 1 M, 12 km S Vallemi, 3.ii.2007, E. Willis (PCYU). Cordillera: 1 M, 2 km NE Atyra, 18.i.2007, E. Willis (PCYU). Itapuá: 3 M, Primavera, xii.1954, W. Brown (DZUP). Presidente Hayes: 1 M, 12 km NW Campo María, 5.ii.2007, E. Willis (PCYU). San Pedro: 1 F, Carumbe, 28.i/10.iii.1965, Golbach (IFML). Uruguay. Treinta y Tres: 6 M, Arroyo Ayala, 18.xi.1942, C. Carbonell (MLP).

Diadasina riparia (Ducke)
(Figs. 2, 9, 12, 14, 17, 24)

Ptilothrix riparia Ducke, 1907: 82. Lectotype male, Brazil, Maranhão, Codó 17.vi.1907, Museu Paraense Emilio Goeldi, examined. Designated by Nascimento, 1979: 9.
Ancyloscelis riparia: Ducke, 1908: 33 (amendment of original description).
Diadasia parahybensis Cockerell, 1912: 58. Holotype male, Brazil, Paraíba, Independencia [nowadays Guarabira], Mann & Heath, AMNH, examined. **New Synonym.**

DIAGNOSIS: Both sexes of this species are characterized by the short and dense pile that covers the scutum and the metasomal terga, and by the scarcely elevated vertex. The females are further characterized by the bright ferruginous prepygidial and pygidial fimbriae. The males are distinguished by the simple flagellum, not crenulate, reddish on the underside, and with long flagellomeres.

REDESCRIPTION: Female. Length, 7.0–9.0 mm; length of forewing 6.3–7.2 mm. Black, except yellowish brown tarsi, yellowish tibial spurs, and reddish underside of flagellum; tegula varies from yellowish to dark brown in some specimens. Pubescence greyish on head, mesosoma, proximal part of legs, and base of T1, in some specimens yellowish brown on vertex and dorsum of thorax, yellowish brown to bright orange brown on tibiae, tarsi, metasomal sterna, prepygidial fimbria, and pygidial fimbria, yellowish on basal part of T2–T5; apical bands on T1–T4, yellow. Hairs on scutum dense and short, 0.7–1.1× MOD; on mesopleuron 1.3–1.8× MOD. Hairs on outer side of forebasitarsus bearing numerous short branches; hairs on outer side of hind tibia and basitarsus plumose. Apical band of T1 laterally formed by long appressed hairs, but medially formed by erect, short and dense hairs; band on T2 with a similar pattern, but lateral hairs shorter; band on T3–T4 with short and appressed hairs, as most of basal part of these terga, so the basal limit of the band is not apparent in certain views of the metasoma; band on T3 along midline 1.2–1.7× MOD. Scutum with dense punctures, on disc separated at most by 0.5× puncture diameter. Eyes convergent below, proportion of upper to lower interocular distance, 1:1.08–1.15. Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 0.7–0.8× MOD. Last segment of labial and maxillary palpi with rounded apex.

Male. Length, 5.5–7.8 mm; length of forewing 5.0–6.5 mm. Color and vestiture similar to that of female; hairs on scutum 0.8–1.1× MOD. Apical bands present on T1–T6, that on T3 along midline 1.2–1.4× MOD. S6 with dense tuft of hairs on median longitudinal elevation, and bare at sides of it. Vertex of head moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view as long as 0.9× MOD. Flagellum not crenulate, proportion of four proximal flagellomeres 1:1.35:1.35:1.35; first flagellomere as long as its apical width, following three flagellomeres longer than their apical width (1.15×).

Comments on type material: Nascimento (1979) failed to indicate the sex of any of the lectotypes designated by him. In the case of *Ptilothrix riparia* Ducke, the lectotype is a male. The original description of *P. riparia* was amended by Ducke one year later (Ducke, 1908). He indicated that the prepygidial fimbria of the female was ferruginous and the scopa on the hind tibia and basitarsus of moderate length.

The holotype of *Diadasia parahybensis* Cockerell agrees in all features with the lectotype of *D. riparia*. The metasoma of the holotype is glued to the locality label.

Distribution: Argentina, provinces of Catamarca, Jujuy, Salta, and Santiago del Estero. Bolivia, department of Santa Cruz. Brazil, states of Bahia, Espírito Santo, Minas Gerais, Pará, Paraíba, Rio Grande do Norte, and Tocantins. Paraguay, departments of Boquerón and Presidente Hayes.

Material studied: Argentina. Catamarca: 1 F, i.1929, Bocchio (MACN). Jujuy: 1 F, Jujuy (MACN). Salta: 8 F, 2 M, Sumalao, i.1993, M. Fritz (MACN); 2 F, 2 M, Coronel Moldes, i.1989, i.1993, M. Fritz (MACN); 1 F, Coronel Moldes, 27.i.1994, F. Trucco Alemán (MACN); 1 F, 3 M, Coronel Moldes, i.1945, F. Monrós (MLP); 1 M, Coronel Moldes, i.1945, F. Monrós (IFML); 1 F, Cachi, 21.viii.1968, Golbach, Terán, Willink (IFML); 1 M, Quijarro, 25.xi.1951 (MLP); 3 F, 10 M, Tablillas, 15.ii.1945, A. Martínez (MLP). Santiago del Estero: 1 M, Puerta del Jardín, 20.xi.1951 (MLP). Bolivia. Santa Cruz: 3 M, Santiago, xi.1959 (SEMC). Brazil. Bahia: 1 F, Buritirama, Barra, iv.1959, E. Dente (MZSP); 1 F, Mucuge, 3 km S Igeraes, 7.xii.1990, S. Amarante (MZSP); 1 M, Maracás, 19.xi.1965, F.M. Oliveira (DZUP); 1 M, Maracás, 18.viii.1964, C. Elias (DZUP); 3 F, 5 M, Brumado, 6.v.1975, C. Elias (DZUP); 1 F, Jeremoabo, 30.i.2010, F.F. de Oliveira (MACN); 1 F, 2 M, Guanambi, 20/23.ii.2010, F.F. Oliveira (MACN). Espírito Santo: 1 F, 1 M, Santo Antônio, 22.iv.1966, C. Elias (DZUP); 1 F, 1 M, Santa Leopoldina, Jetibá, 11.iii.1966, C. Elias (DZUP); 1 F, Dom. Martins, 16/28.ii.1966, C. Elias (DZUP); 1 M, São Domingos, 27.iii.1966, C. Elias (DZUP); 1 M, Itaguassu, 25.iv.1970, C. & C.T. Elias (DZUP); 3 F, 3 M, Santa Teresa, 4.iv.1966, C.T. & C.Elias (DZUP); 3 F, S.J. Petrópolis, 12.ii.1964, C.Elias (DZUP); 1 F, Baixo Guandú, 25.iv.1970, C.& C.T. Elias (DZUP); 1 F, Fundão, 20.iv.1964, C. Elias (DZUP). Minas Gerais: 1 F, 2 M, S.R.Cassia, 11.V.1961, C.Elias (DZUP); 1 F, Passos, x.1963, C.T. Elias (MZSP); 6 F, 5 M, Passos, iii.1961, 15.iii.1962, 20/26.iii.1963, C. Elias (DZUP); 2 F, 3 M, Delfinópolis, 6.iv.1963, C.Elias (DZUP); 2 M, Nova Resende, viii.1961, C. Elias (DZUP); 1 F, Pratápolis, 5.ii.1963, C. Elias (DZUP); 1 F, Alpinopolis, iii.1961, C. Elias (DZUP). Pará: 3 F, 12 M, Conceição Araguaia, vii.1959, M. Alvarenga (SEMC) 1 F, 1 M, Conceição Araguaia, vii.1959, M. Alvarenga (DZUP). Paraíba: 1 F, 1 M, Santa Luzia, 18.xi.1955, R. Lima (DZUP); 2 M, Juazeirinho, viii.1955, A. Silva (DZUP); 2 M, Brandão dos Chandoca, Serra do Brandão, 8.ix.1955, A. Silva (SEMC). Rio Grande do Norte: 1 M, Serra Negra do Norte, 17.vi.1995, F. Zanella (SEMC). Tocantins: 1 F, 1 M, Ilha do Bananal, Santa Isabel do Morro, vi.1961, M. Alvarenga (SEMC). Paraguay. Boquerón: 1 F, 2 M, Fn. Boquerón, 6.ii.2007, E. Willis (PCYU). Presidente Hayes: 2 F, 1 M, 5 km SW Lag. Capitán, 5/6.ii.2007, E. Willis (PCYU).

Diadasina singularis (Brèthes)
(Figs. 4, 6, 8, 11, 16, 24)

Leptometria singularis Brèthes, 1910: 297. Holotype male, República Argentina? MACN, examined.

Diadasia callura Cockerell, 1918: 36. Lectotype female, Argentina, Santa Fé, Carcarañá, Bruner 53, USNM 22926, examined, present designation. **New synonym.**

DIAGNOSIS. This species is readily distinguished by the strongly elevated vertex in both sexes, and the broad apical yellow bands on T3 and T4 of the female. The antenna of the male is not crenulate and has short flagellomeres.

REDESCRIPTION: Female. Length, 7.5–8.5 mm; length of forewing 6.8–7.2 mm. Black, except reddish distitarsi (entire hind tarsus in some specimens), and yellowish tibial spurs. Pubescence greyish on head, mesosoma, proximal part of legs, and base of T1–T2, yellowish brown to bright orange brown on tibiae, tarsi, metasomal sterna, prepygidial fimbria, and pygidial fimbria, yellowish on basal part of T3–T5; apical bands on sides of T1 and on T2–T4, yellow. Hairs on scutum 0.8–1.3× MOD; on mesopleuron 2.2–2.7× MOD. Hairs on outer side of forebasitarsus bearing numerous short branches; hairs on outer side of hind tibia and basitarsus plumose. T1 at sides and T2–T4 with sharply defined apical band of dense, appressed hairs; bands on T3–T4 very broad, that on T3 along midline 3× MOD. Margins of scutum with punctures dense, but median part of posterior half with punctures irregularly distributed, separated by 1–5 times their diameter. Eyes weakly convergent below, proportion of upper to lower interocular distance, 1:1.05–1.10. Vertex strongly elevated behind ocelli, distance from median ocellus to vertex in frontal view 1.30–1.35× MOD. Last segment of labial and maxillary palpi with rounded apex.

Male. Length, 7.7–8.5 mm; length of forewing 5.8–6.8 mm. Color and vestiture similar to that of female, although hairs longer, those on scutum 1.3–1.9× MOD. With well-defined apical bands on T1–T6; bands shorter than those of female, that on T3 along midline 2× MOD. S6 with dense tuft of hairs on median longitudinal elevation, and bare at sides of it. Vertex strongly elevated behind ocelli, distance from median ocellus to vertex in frontal view 1.5–1.7× MOD. Flagellum not crenulate, proportion of four proximal flagellomeres 1:0.9:0.9:1; first flagellomere as long as its apical width, following three flagellomeres shorter than their apical width (0.8, 0.8, and 0.9 respectively).

COMMENTS ON TYPE MATERIAL: The male holotype of *Leptometria singularis* Brèthes bears three labels: "212." "Leptometria/ singularis Br." and "HOLOTYPE." The small number label with a red contour corresponds to the old Burmeister collection. Although Burmeister pinned locality labels on some specimens, many others only have small number labels. Regrettably no record has survived the meaning of these numbers. The metasoma of the holotype is missing, but the non-crenulate antenna with short flagellomeres and the much elevated vertex behind the ocelli readily allows the identification of the species.

Cockerell (1918) based his species *Diadasia callura* on two female specimens from the Bruner collection with the numbers 53 and 51, both with the label "Carcarana/ Argentina" The female with the number "53" which bears the labels "Diadasia/ callura/ Ckll TYPE" and "TypeNo./ 22926/ U.S.N.M." is here designated as the lectotype. This specimen is conspecific and agrees in every detail with *D. singularis* (Brèthes).

Distribution: Argentina, provinces of Córdoba, Entre Ríos, Santa Fe, and Santiago del Estero.

Material studied: Argentina. 1 F, Burmeister collection "172." (MACN). Córdoba: 1 F, San Marcos Sierras, 24.xii.2006, A. Roig A. (MACN); 1 F, Capital, 25.xi.1948, P. López (IFML). Entre Ríos: 1 F, Villaguay, 15.xi (MACN). Santa Fe: 1 F lectotype of *Diadasia callura*, Carcarañá, "53" (USNM); 1 M, Carcarañá (SEMC); 1 M, Santo Tomé, November, Stevenin (MACN); 1 M, Alberdi, 24.ii.1911, J. Hubrich (MACN); 2 F, Vera, 2.xi.1940, A. Ogloblin (MLP). Santiago del Estero: 2 M, Puerta del Jardín, 29.xi.1951 (MLP).

Diadasina tarijensis (Brèthes)
(Figs. 10, 18–22, 23)

Leptometria tarijensis Brèthes, 1910: 298. Holotype male, Bolivia, Tarija, MACN, examined.

Diagnosis: This species is morphologically similar to *D. riparia*, from which it is distinguished by the longer pile on the mesosoma and the base of T1. Furthermore, unlike *D. riparia*, the short hairs on the terga do not conceal the integumental surface, so there is a sharp contrast between the preapical part of the terga and the dense apical yellow bands. The scopal hairs on the tibia and basitarsus, as well as the prepygidial and pygidial fimbriae of the female, are dark brown. The male antenna is entirely black.

Redescription: Female. Length, 8.5 mm; length of forewing 7.0 mm. Black, except reddish distitarsi; tegula dark brown. Pubescence greyish on head, mesosoma, most of legs, and base of T1, although somewhat tawny on vertex of head and dorsum of thorax. Scopal hairs on hind tibia and basitarsus, minute hairs on basal part of T2–T5, and hairs of prepygidial and pygidial fimbriae, brown. Apical bands on sides of T1 and on T2–T4, yellow. Hairs on scutum 1.2–1.5× MOD; on mesopleuron 2.2–2.8× MOD. Hairs on outer side of forebasitarsus bearing numerous short branches; hairs on outer side of hind tibia and basitarsus plumose. T1 at sides and T2–T4 with sharply defined apical band of dense, appressed hairs; bands on T3–T4 narrow, that on T3 along midline 1.5× MOD. Scutum with punctures dense, on disc separated by 0.5–1× puncture diameter. Eyes weakly convergent below, proportion of upper to lower interocular distance, 1:1.09. Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 0.7× MOD. Last segment of labial and maxillary palpi parallel-sided, with narrowly truncate apex.

Male. Length, 7.0–7.5 mm; length of forewing 6.0–6.5 mm. Color and vestiture similar to that of female, although hairs longer, those on scutum 1.6–2.0× MOD. With well-defined apical bands on T2–T6, that on T3 along midline 1.5× MOD. S6 with dense tuft of hairs on median longitudinal elevation, and bare at sides of it. Vertex moderately elevated behind ocelli, distance from median ocellus to vertex in frontal view 0.9× MOD. Flagellum not crenulate, proportion of four proximal flagellomeres 1:1.4:1.4:1.4; first flagellomere 0.9× as long as its apical width, following three flagellomeres longer than their apical width (1.17×).

Comments on type material: The male holotype is in good condition, although somewhat discolored . It bears the labels: "Tarija" "Leptometria/ tarijensis Br." and "Holotypus."

DISTRIBUTION: Bolivia, departments of Cochabamba, Santa Cruz and Tarija.

MATERIAL STUDIED: Bolivia. Cochabamba: 1 F, 19 M, Cochabamba, R. Zischka (MLP); 1 M, Cochabamba, 15.iv.1951, Zischka (SEMC). Santa Cruz: 1 M, Estación Experimental General Saavedra, 9.vii.1972, C. Porter & L. Stange (IFML); 1 M, P. Cordillera, Río Seco, ii.1959, A. Martínez (DZUP). Tarija: 1 M, Tarija, holotype of *Leptometria tarijensis* Brèthes (MACN); 2 M, Tarija, 20.iii.1968, J. Ballard (SEMC).

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