

## Two new species of *Metaleptobasis* from Central Ecuador (Odonata: Coenagrionidae)

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Two new species of *Metaleptobasis* from Ecuador are described and illustrated. *Metaleptobasis gibbosa* (holotype ♂, allotype ♀: Ecuador, Pastaza Province, forest wetlands, Los Copales, between Mera and Shell, 01° 29' 30" S, 078° 04' 19" W, elevation 1070 m, 20–22 September 2005, leg. K. J. Tennessen; deposited in Florida State Collection of Arthropods) appears related to *M. mauffrayi* based on large, scythe-shaped posterior hamules; it differs by having cerci about 0.8 times the length of paraprocts, paraprocts wide in proximal half and posterior margin of S10 straight in dorsal view; the female has small denticles on the posteroventral margin of S8 but lacks a distinct vulvar spine. *Metaleptobasis knopfi* (holotype ♂, allotype ♀: Ecuador, Sucumbios Province, swamp-forest and stream, 52 km NE of Chaco, 00° 00' 04" S 077° 24' 07" W, elevation 685 m, 18 August 1980, leg. K. W. Knopf; deposited in Florida State Collection of Arthropods) appears related to *M. minteri* based on color pattern, small posterior hamule and morphology of the genital ligula; it differs by having rear of head completely tan, S10 produced posteromedially and cerci more than half as long as paraprocts; the female of *M. knopfi* has larger, more erect mesepisternal horns than *M. minteri*.

**Keywords:** damselfly; *Metaleptobasis*; new species; taxonomy; Ecuador

### Introduction

*Metaleptobasis* Calvert, 1907, is a group of secretive, mostly orange to brownish colored Neotropical damselflies that inhabit forest pools and slow shaded streamlets. The genus is in need of revision, as many of the 18 described species are poorly known and several species are yet to be named (Garrison et al., 2010). The two new species described here were discovered recently in central Ecuador at low to moderate elevations on the east slopes of the Andes.

### Material and methods

Illustrations were made with aid of a camera lucida on a stereomicroscope; measurements were made with an ocular micrometer. Total length includes cerci; S10 and appendages were measured in lateral view along the midline. Wing nomenclature follows Riek and Kukalová-Peck (1984). Pterostigma length was measured along the costa and includes the widths of the enclosing proximal

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and apical crossveins. Abbreviations: AbL – abdomen length; Fw – forewing; Hw – hind wing; Hf – hind femur; -L (appended to another abbreviation) – length; Pt – pterostigma; TL – total length (with caudal appendages); S – abdominal segment; FSCA – Florida State Collection of Arthropods, Gainesville, Florida, USA.

***Metaleptobasis gibbosa* sp. nov.**  
(Figures 1–13)

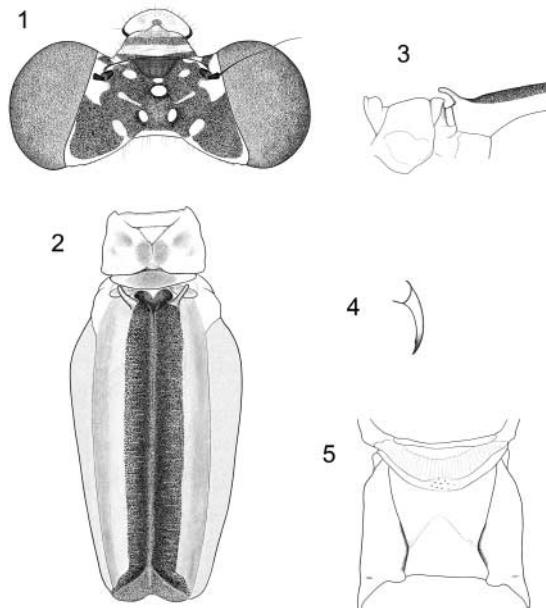
*Specimens examined*

*Holotype* ♂, Ecuador, Pastaza Province, forest wetlands, Los Copales, between Mera and Shell; 01° 29' 30" S, 078° 04' 19" W; elevation 1070 m, 22 September 2005, leg. K. J. Tennessen. Allotype ♀, same except 20 September 2005. Paratypes: 2 ♂♂, same data as holotype, leg. J. J. Daigle (JJD) and W. F. Mauffray (WFM). Deposited in FSCA.

*Etymology.* The name *gibbosa* (L.) refers to the pair of swollen, dorsomedial prominences on abdominal segment 10 of the male.

*Holotype* (Figures 1–8; Figure 9 is from a paratype).

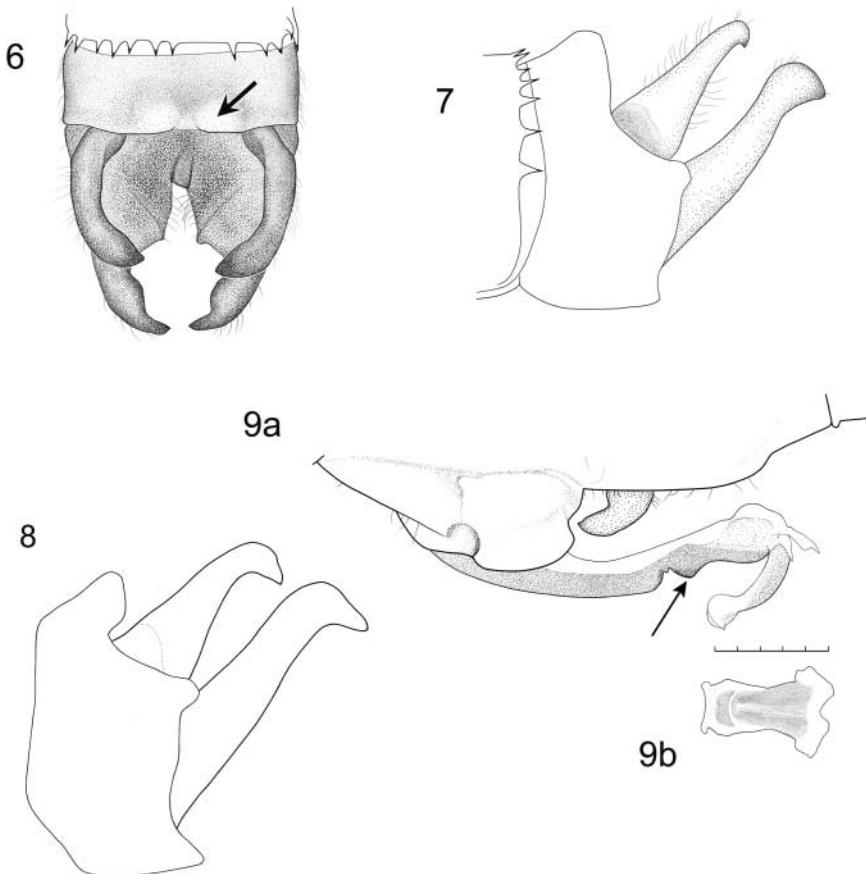
*Head.* Eyes in life red-orange dorsally, green anteriorly and ventrally (Figure 13); labium yellow with gray wash; labrum gray-green with basomedial dark spot, outer margins narrowly black proximally, several stout brown setae on distal margin (Figure 1); base of mandible gray-green with black dorsal spot, gena gray-green; anteclypeus in vertical plane, brown medially, gray-green laterally; postclypeus in horizontal plane, black distally, gray-green proximally; frons ridged, antefrons in vertical plane, mostly gray-green except black at base; postfrons in horizontal plane, black with a depressed trapezoidal area anteriorly and with gray-green spots near antennal bases; vertex black with narrow lateral brown stripe (Figure 1); occiput black with pair of light brown spots, posterior margin light brown with about 12 straight long setae; rear of head mostly yellow tan.



Figures 1–5. *Metaleptobasis gibbosa* sp. nov. holotype male. (1) Head, dorsal view; (2) pronotum and pterothorax, dorsal view; (3) pronotum and anterior third of pterothorax, lateral view; (4) hind tarsal claw; (5) S1, ventral view.

**Thorax.** Pronotum mostly brown-orange, middle and posterior lobes dark brown medially (Figure 2), slightly arched in lateral view; posterior lobe in dorsal view entire medially, lateral corners tapered and rounded, not projecting (Figure 3). Pterothorax with dark metallic green mid-dorsal stripe, about 0.7 mm wide for most of its length, covering mid-dorsal carina, tapered to 0.55 mm wide anterior to antealar crest, with narrow lateral offshoot along crest (Figure 3); mesepisternum brown orange above mesopleural suture, with pair of anterodorsal, orange-brown, slightly curved horns 0.3 mm long (Figures 2, 3); mesepimeron, metepisternum and metepimeron light brown-yellow; venter of pterothorax tan. Legs pale tan, spines on femur, tibia and tarsi black, proximal spines on tibia about 2/3 as long as intervening spaces; pretarsal claws brown with a vestigial preapical tooth (Figure 4). Wings clear, venation black to black brown, typical for genus (Garrison et al., 2010); 14 postnodal crossveins; pterostigma mostly brown but with narrow tan margin inside veins, covering 1 cell.

**Abdomen.** S1 and S2 mostly gray-brown dorsally, S1 with apical third black, S2 with apical sixth black; S1 gray-green laterally, venter with medial cluster of 8 very small dark setae on anterior margin just posterior to metaposternum (Figure 5); S2 yellow-brown laterally; S3–S7 black dorsally, yellow-brown ventrolaterally with small (about 0.3 mm wide) basal light-brown



Figures 6–9. *Metaleptobasis gibbosa* sp. nov. holotype male. (6) S10 and anal appendages, dorsal view – arrow indicates mid-dorsal prominence; (7) S10, left cercus & paraproct, outline in left lateral view; (8) anal appendages, ventrolateral view; (9a) genital ligula, left lateral view (arrow indicates obtuse angular projection, Scale = 0.5 mm); (9b) genital ligula, ventral view of terminal segment (Scale = 0.5 mm).

arm extending dorsally almost to mid-dorsal line of each segment; dorsum of S8 and S9 mostly dark brown, orange-brown distally, yellow-brown laterally, posterior margin with conspicuous sharp black denticles; S10 red-orange dorsally, orange-brown laterally, apical third produced dorsally with a round low prominence on each side of midline (Figure 6), posterior margin entire, without denticles, in lateral view elevated (Figure 7). Anteroventral margin of S3 with a very small rounded, lateral protuberance. Anal appendages oriented dorsoapically; cercus red-orange, in dorsal view slender, curved inward, apex dark and slightly bulbous proximal to tapered point (Figure 5), in lateral view evenly tapering to apical hook (Figure 7), about 0.8 length of paraproct; paraproct orange-red, longer than cercus, in dorsal view medial margin straight proximal to angular, mid-length corner, concave distal to angle, apex bulbous proximal to elongate inwardly curved point (Figure 6), in lateral view straight, apex rounded and curved downward (Figure 7); downwardly curved tips of cercus and paraproct nearly identical in shape in ventrolateral view, though apex of paraproct slightly larger (Figure 8). Posterior hamule large (exposed portion about 0.3 mm long), scythe-shaped (Figure 9a); genital ligula with an obtuse-angular projection on ventral margin of first segment near indentation (indicated by arrow in Figure 9a), second segment without inner fold but with a terminal fold plus a smaller inner flap, apex of second segment expanded in lateral view (Figure 9a) with distal margin curved inward slightly in ectal (ventral) view (Figure 9b).

*Measurements* (mm). Holotype. TL 46.5, AL 40.0 mm, FwL 25.2, HwL 24.4, Fw PtL 0.63, Hw PtL 0.55, HfL 2.7, cercus L 0.65.

*Allotype female* (Figures 10–12).

*Head.* Eye color in life unknown; head color pattern similar to holotype.

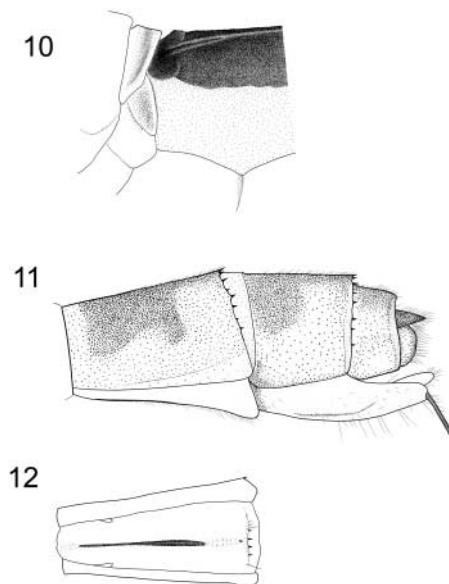
*Thorax.* Color pattern similar to holotype. Pronotum mostly gray-brown, posterior lobe in dorsal view entire medially, lateral corners tapered and rounded, not projecting. Mesostigmal lamina basically flat with slight depression medially, tapered laterally, with small setae (0.02–0.03 mm long) on anterior margin (Figure 10); mesepisternum with slightly raised areas in place of male horns (Figure 10); dark mesepisternal dorsal stripe 0.8 mm wide at widest point anteriorly. Legs and wings as in holotype, except 13 postnodal crossveins in hind wing.

*Abdomen.* S1–S6 mostly black dorsally, green-gray laterally, S2 with brown ring at 0.75 length, remaining segments with slight dorsal extension at same position; dorsum of S7 black in basal 0.25; dorsum of S8–S10 dark brown in basal half, lighter brown posteriorly, S7–S10 tan ventrolaterally, posterior margins of S7–S9 with conspicuous sharp black denticles (Figure 11); posterior margin of S10 slightly indented and emarginate, without denticles (Figure 11). Venter of S8 with 4 small, posterior denticles (Figure 12). Ovipositor stout, ventral margin of each outer valve with about 8 long setae, apices of inner valves slightly beyond tip of cercus (Figure 11); stylus black, 0.56 mm long, nearly twice as long as cercus.

*Measurements* (mm). Allotype. TL 47.5, AL 40.0 mm, FwL 26.3, HwL 25.6, PtL 0.63, HfL 2.85, cercus L 0.30.

*Variation in paratype males.* Pale areas on head slightly more extensive in male leg. WFM, mostly obscured in male leg. JJD except light brown bar along occipital ridge and postocular lobe are evident. Pterothorax appears to have a shade of gray in older specimens (Figure 13). Ratio of cercus L to paraproct L = 0.75–0.80. TL 42.0–48.7, AL 37.0–41.2, HwL 22.4.

***Metaleptobasis knopfi*** sp. nov.  
(Figures 14–23)



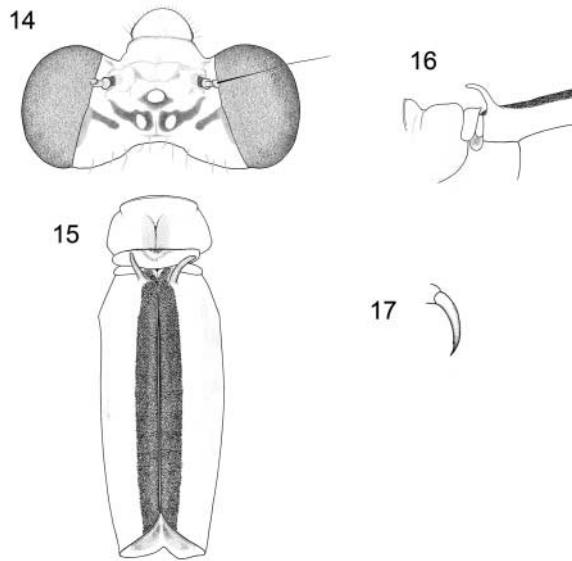
Figures 10–12. *Metaleptobasis gibbosa* sp. nov., allotype female. (10) Hind lobe of pronotum and anterior third of pterothorax, dorsolateral view; (11) S8–S10 + ovipositor, lateral view; (12) S8, ventral view.

### *Specimens examined*

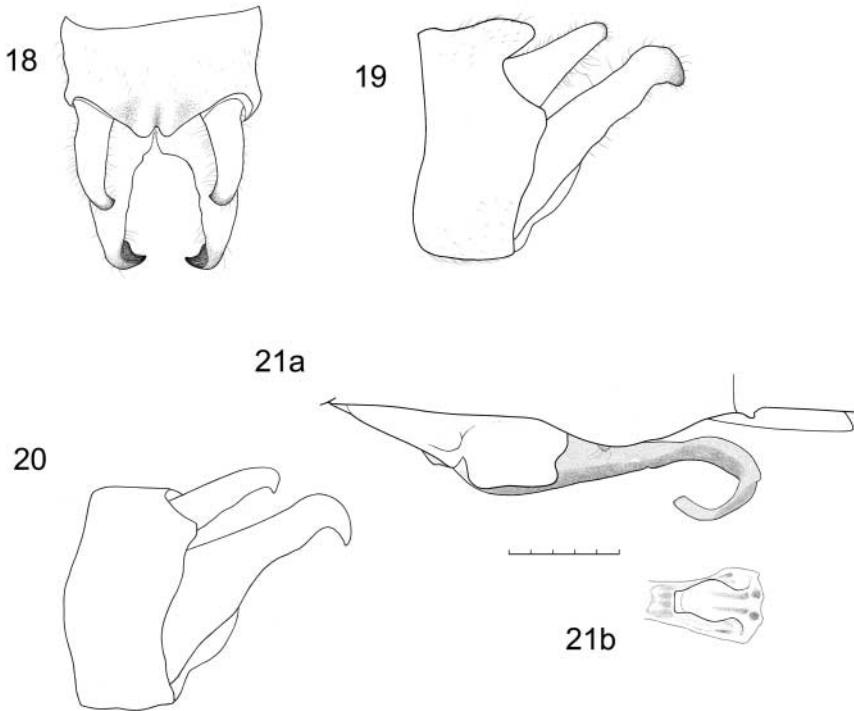
*Holotype* ♂, Ecuador, Sucumbios Province, swamp-forest pond near stream, Hwy. E45 ca. 52 km NE of Chaco, 00° 00' 04" S 77° 24' 07" W, elevation 685 m, 18 August 1980, leg. K. W. Knopf; Allotype ♀, same. Paratypes: 7 ♂♂, same, leg. K. W. Knopf; 3 ♂♂, same, leg. S. W. Dunkle. Paratype ♀: ECUADOR, Sucumbios Province, forest S of Limoncocha, 00° 25' 13" S, 76° 36' 39" W, elevation 250 m, 11 May 2009, leg. K. J. Tennessen. Paratype ♂: Ecuador, Napo Province,



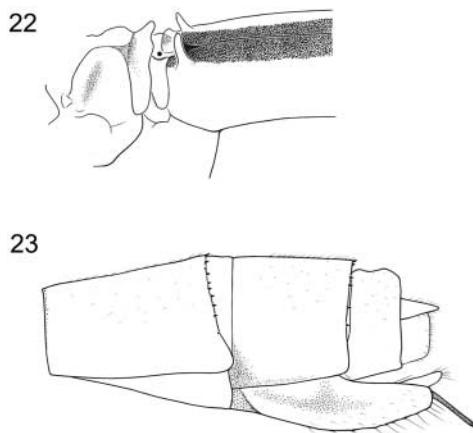
Figure 13. Photograph of *Metaleptobasis gibbosa* sp. nov. male, Ecuador, Pastaza Province, forest seep, Los Copales, between Mera and Shell, 7 October 2009, K. J. Tennessen.



Figures 14–17. *Metaleptobasis knopfi* sp. nov. holotype male. (14) Head, dorsal view; (15) pronotum and pterothorax, dorsal view; (16) pronotum and anterior third of pterothorax, lateral view; (17) hind tarsal claw.



Figures 18–21. *Metaleptobasis knopfi* sp. nov. holotype male. (18) S10 and anal appendages, dorsal view; (19) S10, left cercus & paraproct, outline in left lateral view; (20) ventrolateral view of cercus and paraproct; (21a) genital ligula, left lateral view (Scale = 0.5 mm); (21b) genital ligula, ventral view of terminal segment. (Scale = 0.5 mm).



Figures 22–23. *Metaleptobasis knopfi* sp. nov., allotype female. (22) Hind lobe of pronotum and anterior third of pterothorax, dorsolateral view; (23) S8–S10 + ovipositor, lateral view.

pond along Río Sinde, ca. 5 km E of Puerto Napo bridge, 01° 03' 00" S, 77° 44' 32" W, elevation 430 m, 12 November 1997, leg. K. J. Tennessen. All specimens deposited in FSCA.

*Etymology.* I am naming this species for Dr. Kenneth W. Knopf in recognition of the valuable contributions he has made to the FSCA.

#### *Holotype* (Figures 14–21)

*Head.* Eye color not recorded in life, but based on preserved specimens probably mostly orange dorsally, paler ventrally. Labium tan with gray wash medially; labrum gray-blue (some uneven darkening evident due undoubtedly to postmortem change), outer margins narrowly black proximally, numerous stout brown setae on distal margin (Figure 14); base of mandible gray-green, gena gray-blue; anteclypeus in vertical plane, gray-blue; postclypeus in horizontal plane, gray-blue except black at anterolateral corners; frons ridged, antefrons in vertical plane, gray-blue; postfrons gray-blue; first segment (scape) of antenna black, second segment pale in basal 2/3, black apically, flagellum black; vertex gray to brownish gray, black around median ocellus, narrow black bar extending from each lateral ocellus anterolaterally toward antennal bases, plus a separate posterior narrow black bar extending to margin of compound eye (Figure 14); occiput gray-green with about 12 pale, straight long setae pointing rearward; rear of head tan.

*Thorax.* Pronotum orange, middle and posterior lobes gray-orange medially; posterior lobe in dorsal view entire medially, lateral corners tapered and rounded, not projecting (Figure 15). Pterothorax with dark metallic green mid-dorsal stripe, about 0.45 mm wide for most of its length, covering mid-dorsal carina, narrowing to 0.30 mm wide anterior at antecular crest, without lateral offshoot along crest (Figure 15); mesepisternum orange above mesopleural suture, with pair of anterodorsal, brown, slightly curved horns 0.43 mm long (Figures 15, 16); mesepimeron, metepisternum, metepimeron and venter of pterothorax yellow-tan. Legs pale tan, spines on femur, tibia and tarsi black, proximal spines on tibia approximately as long as intervening spaces; pretarsal claws light brown with vestigial preapical tooth (Figure 17). Wings clear, venation brown; 12 postnodal crossveins; pterostigma light brown with narrow light tan margin inside veins, covering nearly 1 cell.

*Abdomen.* S1 orange dorsally, green laterally, venter pale tan with about 15 long pale setae; S2 mostly brown-orange dorsally, apical fifth black-brown; S3–S6 black dorsally, yellow-brown

ventrolaterally with small (about 0.3 mm wide) basal light brown arm extending dorsally almost to mid-dorsal line of each segment; dorsum of S7 black basally, fading slightly to dark brown apically; dorsum of S8–S10 orange, lighter laterally, posterior margin with conspicuous sharp black denticles; apical 0.3 of S10 not elevated but produced straight rearward (Figure 19) as a blunt process of which the posterior margin is indented with a rounded projection on each side of midline, without denticles (Figure 18). Anal appendages oriented dorsoapically; cercus orange, in dorsal view slender, slightly curved inward, tapered to blunt, slightly hooked, darkened apex (Figure 18), in lateral view tapering gradually to apex (Figure 19), about 0.6 length of paraproct; paraproct dark orange, projecting beyond cercus, in dorsal view wide in basal 0.25, posterior 0.75 with medial margin quite straight to curved apex (Figure 18), in lateral view straight, apex rounded, curved downward with blunt ventroapical point (Figure 19); in ventrolateral view tips of cercus and paraproct curved downward, ventral tips more pointed, that of paraproct much larger than that of cercus (Figure 20). Posterior hamule small, mostly hidden by lateral wall of S3, only apical setae visible (Figure 21a); genital ligula smoothly recurved, second segment without an inner fold or a terminal fold, in lateral view apex of second segment not expanded (Figure 21a), in ventral view, shield-shaped, tapering to transverse apex (Figure 21b).

*Measurements* (mm). Holotype. TL 42.0, AL 35.7 mm, FwL 21.0, HwL 20.5, Fw PtL 0.67, thoracic horn L 0.43, Hw PtL 0.65, HfL 2.5, cercus L 0.49, paraproct L 0.83.

*Allotype female* (Figures 22–23)

*Head.* Eye color in life unknown; color pattern of head similar to holotype.

*Thorax.* Color pattern as in holotype. Posterior margin of pronotum weakly trifold, corners tapered and rounded, not projecting (Figure 22). Mesostigmal lamina flat, tapered laterally, small setae (0.02 mm long) on anterior margin; mesepisternum with horns similar to male although shorter (0.27 mm long), paler and oriented vertically (Figure 22); dark mesepisternal mid-dorsal stripe 0.48 mm wide at widest point. Legs and wings as in holotype, except 12 postnodal crossveins in forewing, 11 in hind wing; pterostigma L 0.63 in both wings.

*Abdomen.* S1–S6 patterned as in male; dorsum of S7 orange-brown; dorsum of S8–S10 dark orange; S7–S9 tan ventrolaterally, posterior margins with conspicuous sharp black denticles (Figure 23); posterior margin of S10 slightly indented and emarginate dorsomedially, without denticles (Figure 23). Venter of S8 with numerous inconspicuous pale setae, posterior margin lacking a ventral spine or stout black denticles. Ovipositor stout, ventral margin of each outer valve with about 10 long pale setae, apices of inner valves with apical setae and extending slightly beyond tip of cercus (Figure 23); stylus dark brown, 0.47 mm long, about 1.6 times as long as cercus.

*Measurements* (mm). Allotype. TL 38.2, AL 32.0 mm, HwL 21.2, PtL 0.63, HfL 2.4, cercus L 0.30, ovipositor L 1.70, stylus L 0.47.

*Variation in paratypes.* In the paratype from Río Sinde, the rear of the head was slightly darker on the upper portion than the ventral portion, and in 5 of the paratypes from the type locality the upper portion was more orange, a slight contrast compared to the uniform tan in the holotype. Dorsal head pattern is remarkably similar in the series. The width of the dark green mid-dorsal thoracic stripe (at mid-length) varied from 0.42 to 0.48 mm. The number of postnodal crossveins varied slightly, 11 or 12 in forewings (usually 12), 10 to 12 in hind wings (usually 11). Cercus: paraproct length ratio varied from 0.53 to 0.62. Male measurements varied as follows: TL 38.3–43.5, AL 32.5–37.5, thoracic horn L 0.30–0.45, cercus L 0.43–0.49, paraproct L 0.73–0.84. The paratype

female from Limoncocha had shorter thoracic horns (0.16 mm) than the allotype; TL 38.5, AL 32.5, Fw pterostigma 0.7, Hw 0.67, ovipositor L 1.75.

## Diagnosis

Only two species of *Metaleptobasis* have been recorded previously in Ecuador, i.e. *M. mauffrayi* Daigle, 2000 and *M. minteri* Daigle, 2003. Discovery of the two new species reported here indicates that there are two pairs of sibling species in Ecuador, namely *M. mauffrayi*/*M. gibbosa* and *M. minteri*/*M. knopfi*. The large size and scythe-like shape of the posterior hamule of *M. gibbosa* and *M. mauffrayi* indicate that these two species are closely related. They also share a wide mid-dorsal thoracic dark stripe and large, anteriorly directed mesepisternal horns. In contrast, the posterior hamule of *M. minteri* and *M. knopfi* is small, as only 0.06 mm or less of the tip (plus numerous apical setae) is visible in lateral view. In addition, the mid-dorsal dark stripe is narrow; however, the thoracic horns vary between these two species. Further evidence of a relationship between *M. gibbosa* and *M. mauffrayi* is indicated by an obtuse-angular projection on the basal segment of the genital ligula (Figure 9a); the genital ligula of both *M. minteri* and *M. knopfi* lacks an angular projection. The apex of the distal segment of the genital ligula is wide and entire in *M. gibbosa* and *M. mauffrayi*.

Male *Metaleptobasis gibbosa* are distinguished from *M. mauffrayi* by relatively shorter cerci (0.8 length of the paraprocts versus approximately the same length as the paraprocts in *M. mauffrayi*), posterior margin of S10 in lateral view straight (a triangular projection in *M. mauffrayi*), and paraprocts in dorsal view wide basally for about half their length and angular at midpoint (widened only in the extreme base in *M. mauffrayi*). The lateral corners of the prothoracic hind lobe are flat in female *M. gibbosa* versus upturned in female *M. mauffrayi*. Female *M. gibbosa* lack “ear-like” projections on the anterior portion of the middle lobe prothorax, a pair of which are present dorsolaterally in the two *M. mauffrayi* females I examined, varying in length and width from  $0.24 \times 0.16$  mm to  $0.45 \times 0.20$  mm. The upturned corners of the prothoracic hind lobe and the ear-like projections on the prothoracic middle lobe were not mentioned by Daigle (2000). Also, female *M. gibbosa* have several very small denticles on the ventral, posterior margin of S8 (Figure 12) versus a ventral spine which varies from single to bifid or trifid in *M. mauffrayi* (Daigle, 2000). *Metaleptobasis gibbosa* is similar in size and color pattern to *M. amazonica* (Sjöstedt, 1918) known solely from near Manaus, Amazonas, Brazil. I have not examined specimens of *M. amazonica*, but based on Sjöstedt’s illustrations of S10 and the anal appendages, the two species differ as follows: (1) *M. gibbosa* S10 elevated dorsally and posterior margin without a distal projection versus *M. amazonica* S10 flat dorsally and posterior margin with distal projection; (2) *M. gibbosa* paraprocts wide in basal half and slender apically versus *M. amazonica* paraproct wide only in basal fifth and apex truncate. Although Daigle (2000) did not illustrate a terminal fold on the genital ligula of *M. mauffrayi*, a terminal fold similar to that of *M. gibbosa* was present in the three specimens I examined.

*Metaleptobasis knopfi* is most similar to *M. minteri* based on color pattern, small posterior hamule, genital ligula lacking a terminal fold, and shape of male anal appendages. The color patterns of the head and thorax of *M. knopfi* are similar also to those of *M. manicaria* Williamson (see Garrison et al., 2010); however, the cerci of *M. manicaria*, and also the similarly patterned *M. mauritia* Williamson, are greatly arched in dorsal view (Williamson, 1915). The rear of the head is tan in both sexes of *M. knopfi* (half brown in *M. minteri*) and the thoracic horns are large and project dorsoanteriorly (small and directed laterally in *M. minteri*). In males of *M. knopfi*, the apical segment of the genital ligula is about 0.04 mm long (0.06 mm long in *M. minteri*), the cerci are about 0.6 length of paraprocts (0.5 in *M. minteri*), the paraprocts are cylindrical (blade-shaped

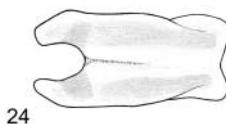


Figure 24. *Metaleptobasis minteri* genital ligula, ventral view of terminal segment.

in *M. minteri*), and the tips of the paraprocts are downturned (directed straight rearward in *M. minteri*). In *M. minteri*, the apex of the distal segment of the genital ligula is deeply incised (Figure 24) whereas it is entire in *M. knopfi* (Figure 21b); the genital ligula of *M. minteri* was not illustrated by Daigle (2003). Females of the two species differ as follows: rear of head entirely tan in *M. knopfi* (dorsal half brown in *M. minteri*); dark metallic green mid-dorsal thoracic stripe >0.4 mm wide in *M. knopfi* (<0.3 mm in *M. minteri*); mesepisternal horns erect and directed anteriorly in *M. knopfi* (directed laterally in *M. minteri*).

The lack of a terminal fold on the genital ligula of *M. minteri* and *M. knopfi* does not fit the third character in the key to Coenagrionidae genera in Garrison et al. (2010) which characterizes *Metaleptobasis* males with a well-developed terminal fold (p. 156, couplet 60'). The *Metaleptobasis* fauna of Ecuador is still incompletely known, as I have examined three females from Yasuni National Park that do not belong to any of the species discussed above. The specimens have a pair of long sharp spines projecting rearward from the posteroventral margin of S8; the spines lie alongside the ovipositor, their tips reaching beyond mid-length of S9. No males that can be associated with these females were available for study.

### Habitat notes

*Metaleptobasis gibbosa* was found near a small, partially shaded seepage pool at the edge of the forest at Los Copales; the area contained very little water. The few individuals detected were perched low on stems but when disturbed flew high toward and into overhanging bushes. Other species of Zygoptera observed near this seepage area were *Teinopodagrion curtum* (Selys) and *Argia infrequentula* Fraser. I photographed a male of *M. gibbosa* at the type locality on 7 October 2009 that I was unable to collect but it appears to have more gray than orange-brown on the pterothorax (Figure 13). The only known locality for *Metaleptobasis gibbosa* is at an elevation over 1000 m, whereas *M. mauffrayi* occurs at elevations between 120 and 435 m and *M. minteri* at 240–300 m. *Metaleptobasis knopfi* was collected near ponds in a shady swamp forest and in a mesic forest at similar elevation (250–700 m). Other species of Zygoptera found at the Chaco site were *Acanthagrion cuyabae* Calvert, *A. floridense* Fraser, *A. obsoletum* (Förster), *Argia pulla* Hagen in Selys and *Telebasis griffinii* (Martin) (K. Knopf, personal communication). At the Río Sinde pond, I collected *Acanthagrion floridense* Fraser, *A. obsoletum* (Förster), *Aeolagrion axine* Dunkle, *Calvertagrion* sp., *Telebasis flammeola* Kennedy, *T. griffinii* (Martin), and *T. livida* Kennedy.

### Remarks

Males of most *Metaleptobasis* species have mesepisternal horns immediately posterior to the mesostigmal laminae (Garrison et al., 2010). Another sylvan genus in which coloration of the sexes does not differ and in which males have mesepisternal horns is *Denticulobasis* Machado (Machado, 2009). The function of such horns is unknown. Female *Metaleptobasis* usually lack

horns, instead having slightly raised areas where the bases of the male horns are; furthermore, female prothoracic lobes and mesostigmal laminae are remarkably uniform in shape. Unlike most other coenagrionid genera, the sexes of *Metaleptobasis* are not obviously dichromatypic. It is probable that males in search of a mate could visually mistake another male for a female and attempt to achieve tandem linkage, especially in the shaded habitats where these damselflies live. The horns of a male taken into tandem might serve as a signal to the male attempting tandem that he has acquired the wrong sex. Such a system would prevent wasted energy expenditure. However, exceptions are *M. minteri* and *M. knopfi*, females of which have mesepisternal horns (the latter with horns nearly as large as in males). Such species may have other sex recognition signals, allowing males to more easily recognize other males. Clarification of the function of these thoracic structures in cryptic, sylvan damselflies awaits more detailed observations and experimentation.

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## References

- Daigle, J.J. (2000). *Metaleptobasis mauffrayi* spec. nov. from Ecuador and Peru (Zygoptera: Coenagrionidae). *Odonatologica*, 29, 325–328.
- Daigle, J.J. (2003). *Metaleptobasis minteri* spec. nov. from Ecuador (Zygoptera: Coenagrionidae). *Odonatologica*, 32, 371–374.
- Garrison, R.W., von Ellenrieder, N., & Louton, J. (2010). *Damselfly genera of the New World. An illustrated and annotated key to the Zygoptera*. Baltimore: The Johns Hopkins University Press.
- Machado, A.B.M. (2009). *Denticulobasis* and *Tuberculobasis*, new genera close to *Leptobasis*, with description of ten new species (Odonata: Coenagrionidae). *Zootaxa*, 2108, 1–36.
- Riek, E.F., & Kukulová-Peck, J. (1984). A new interpretation of dragonfly wing venation based upon Early Upper Carboniferous fossils from Argentina (Insecta: Odonatoidea) and basic character states in pterygote wings. *Canadian Journal of Zoology*, 62(6), 1150–1166.
- Sjöstedt, Y. (1918). Wissenschaftliche Ergebnisse der Swedischen Entomologischen Reise des Herrn Dr. A. Roman in Amazonas 1914–1915. 1. Odonata. *Arkiv vor Zoologi*, 11(15), 1–54.
- Williamson, E.B. (1915). Notes on Neotropical dragonflies, or Odonata. *Proceedings of the United States National Museum*, 48, 601–638.