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Two new species of *Hygronemobius* Hebard, 1913 (Orthoptera, Grylloidea, Nemobiinae) from Brazilian Amazon

LUCIANO DE P. MARTINS[1,4], MARCELO R. PEREIRA[2], AUGUSTO L. HENRIQUES[1] & EDISON ZEFA[3]

[1]*Instituto Nacional de Pesquisas da Amazônia (INPA), Coordenação de Biodiversidade, Av. André Araújo, 2936, 69060-001, Manaus, Amazonas, Brazil*

[2]*Universidade Federal de Viçosa (UFV), Departamento de Entomologia, Programa de Pós-Graduação em Entomologia, 36570-000, Viçosa, Minas Gerais, Brazil*

[3]*Universidade Federal de Pelotas, Departamento de Zoologia e Genética, Campus Universitário Capão do Leão s/n, 96010-900, Capão do Leão, Rio Grande do Sul, Brazil*

[4]*Corresponding author. E-mail: lucianodpm@gmail.com*

Abstract

Two new Neotropical species of *Hygronemobius* Hebard were described from Brazilian Amazon: *Hygronemobius duckensis* **sp. nov.** and *Hygronemobius dialeucus* **sp. nov.** Photographs of habitus, morphological characteristics and male genitalia were provided. Calling songs and spectrograms of the new species were characterized.

Key words: Crickets, Calling Songs, Nemobiini, Amazon Forest, Brazil

Resumo

Duas espécies novas neotropicais de *Hygronemobius* Hebard foram descritas para a Amazônia brasileira: *Hygronemobius duckensis* **sp. nov.** e *Hygronemobius dialeucus* **sp. nov.** Fotografias do hábito, de caracteres morfológicos e da genitália masculina foram apresentadas. Os sons de chamado e os espectogramas das espécies novas foram caracterizados.

Palavras-chave: Grilos, Sons de Chamado, Nemobiini, Floresta Amazônica, Brasil

Introduction

Hygronemobius Hebard, 1913 comprises 28 valid species distributed in all biogeographic subregions of the Neotropics occurring from latitude 30° N [*H. alleni* (Morse), Florida State, USA] to latitude 27° S [*H. nemoralis* (Saussure), Corrientes province, Argentina] (Eades *et al.* 2013; Pereira *et al.* 2013). Despite the fact that *Hygronemobius* species are non-volant, i. e. they do not fly, the genus can be considered the Neotropical group of Nemobiinae that has the highest known distribution, covering approximately 6500 Km.

There are only eight species of *Hygronemobius* with described calling song in literature (Desutter-Grandcolas 1993; Otte & Peck 1998; Walker & Moore 2011; Pereira *et al.* 2013), three of them for the Amazonian subregion (*H. albolineatus* Desutter-Grandcolas*, H. amoenus* Chopard*, H. tetraplagion* Desutter-Grandcolas), two for the Caribbean subregion (*H. daphne* Otte & Peck and *H. speculi* Mcneill), one for southern Florida, USA [(*H. alleni* (Morse)], and two for Parana subregion (*H. indaia* Pereira, Miyoshi & Martins and *H. iperoigae* Pereira, Miyoshi & Martins).

In this paper, we described two new species of *Hygronemobius* from Brazilian Amazon, providing photographs of the type specimens and of the genitalia, calling song description, as well as spectrograms of *Hygronemobius duckensis* **sp. nov.** and *Hygronemobius dialeucus* **sp. nov.**

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Materials and methods

The crickets were collected from the Reserva Florestal Adolpho Ducke, municipality of Manaus, state of Amazonas, Brazil (02º55'S, 59º58'W). The area covers 100 km^2 of non-inundated Tropical Forest lands. In this region, the climate is characterized as tropical humid with 75-86% relative humidity and 1750-2500 mm of annual rainfall (Baccaro *et al.* 2008).

The figures 1A-D, were taken in a studio lab using Canon EOS 550D T2i digital camera with 100mm Canon macro lens and 430EX II flash. Other photographs were taken with the specimens immersed in ethanol 80% under a Leica® M205 C stereomicroscope equipped with a DFC 295 digital camera and Leica® Application Suite LAS V3.6 digital image processing software.

Male genitalia were treated with an aqueous solution of 10% potassium hydroxide for three hours inside a laboratory oven at 40°C. After membranes removal, the genitalia were washed in water, neutralized with 10% acetic acid and stored in 80% ethyl alcohol. Genitalia terminology was proposed by Desutter (1987) and modified by Desutter-Grandcolas (2003).

Tegmina were removed to analyze the number of teeth in the stridulatory file. Teeth number was counted with a light microscope at a magnification of 200X considering all teeth, including the smaller ones present on the edges of the file.

Nine males of *H. duckensis* **sp. nov.** and four of *H. dialeucus* **sp. nov.** were recorded using a Sony PCM-D50 digital recorder with Sennheiser ME66/K6 microphone placed at 30 cm from the calling male. All songs of *H. duckensis* **sp. nov.** and two of *H. dialeucus* **sp. nov.** were field-recorded, the other two songs of *H. dialeucus* **sp. nov.** were lab-recorded. Temperature was measured at the male calling site.

Temporal parameters of the calling songs were analyzed using the Avisoft SasLab Light software and a fast Fourrier transformation (FFT) was conducted. Spectrograms were made using the following configuration: FFT-length of 256 points, 100% frame size, FlatTop Window and window overlap of 75%. The dominant frequency was obtained using the Cool Edit PRO software.

Song characters measured were chirp rate, pulses per chirp, pulse duration, chirp duration, inter-chirp interval and dominant frequency. Each song was analyzed for a period of 10 s being selected ten consecutive chirps to calculate chirp duration (elapsed time from the first to the last pulse of a chirp), number of pulses per chirp, and chirp rate (number of chirps per minute). Pulse duration was measured using three chirps per song. Pulse is a train of sound cycles produced during inward movement of the forewings. Chirp is a train of pulses.

Body and right tegmen morphometry were made in a stereomicroscope with graduated ocular. Morphometric and acoustic results were presented as follows: mean ± standard deviation (range of variation).

Label data were cited in full, with the original spellings, punctuations, and dates. Information presented within square brackets is complementary data not included on the original labels. Data for the same specimen but from different labels were separated by slashes (/). The acronyms within parenthesis indicate the depository collection.

Four paratypes, two males and two females, of *H. duckensis* **sp. nov.** and *H. dialeucus* **sp. nov.** were sent to the Museu de Zoologia da Universidade de São Paulo (MZUSP). Holotype and remaining paratypes were deposited in the Invertebrates Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA). The calling song sequences were deposited at the "Orthoptera Species File Online" (http://Orthoptera.SpeciesFile.org) with the code formed by the specimen number followed by PROSET.

Results

Hygronemobius duckensis Martins & Pereira, sp. nov.

(Figs. 1A–B, 2, 3A–C, 4A)

Etymology. The specific name refers to type locality, the Reserva Florestal Adolpho Ducke. This place is a conservation area located in the municipality of Manaus.

Diagnosis. (i) Pronotum and legs light with darker spots (Figs. 1A–B; 2A–C); (ii) female tergites with many apparent blackish dots and tergite 4 darker than the others (Fig. 1B); (iii) male right tegmen with a yellow spot at the apex (Figs. 1A, 2D); (iv) pseudepiphallic apical lobe reduced, not visible in lateral view (Fig. 3C); (v) apex of

pseudepiphallic sclerite well developed, totally covering the ectophallic parameres in dorsal view (Fig. 3B); (vi) apex of pseudepiphallus curved ventrally, sub-triangular shaped (Fig. 3C).

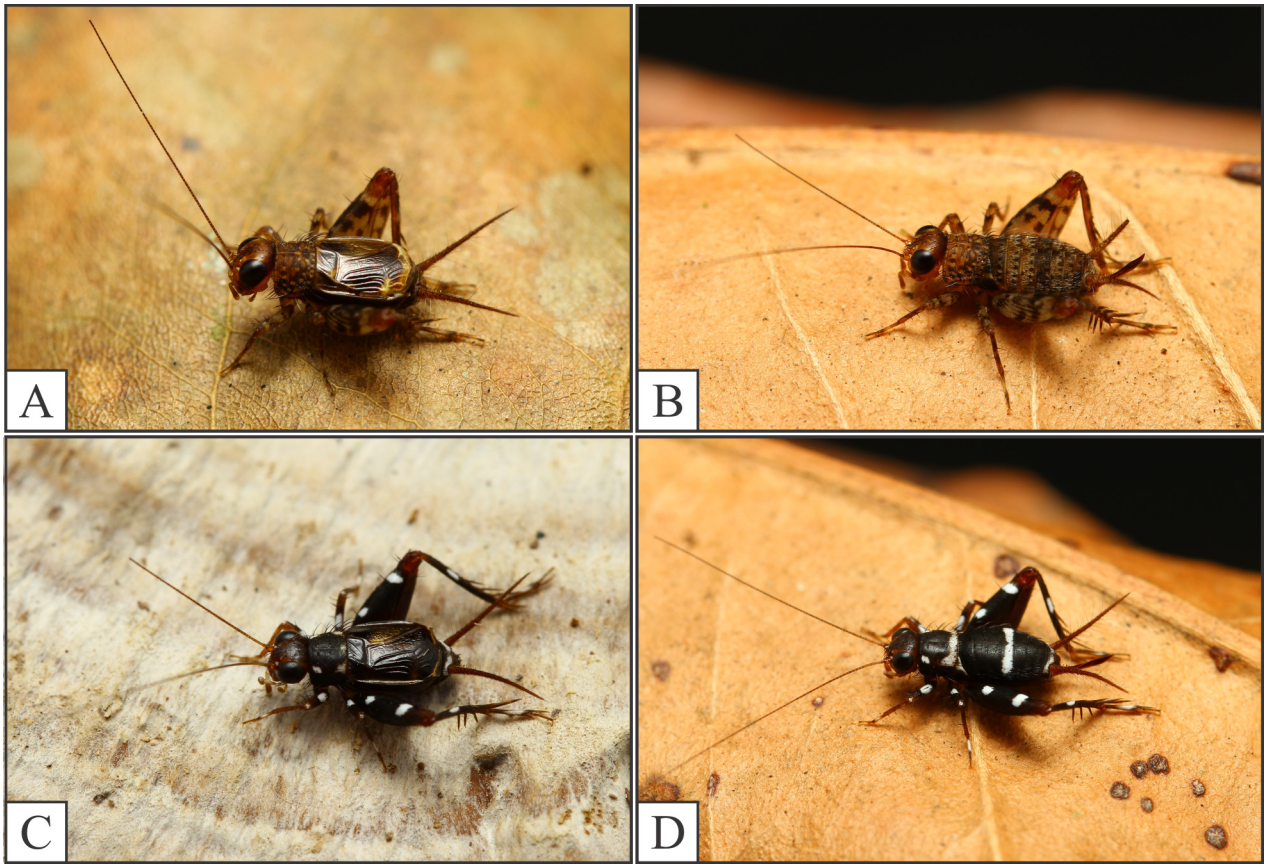

FIGURE 1. Paratypes habitus. A–B—*Hygronemobius duckensis* **sp. nov.**: A—male; B—female. C–D—*Hygronemobius dialeucus* **sp. nov.**: C—male; D—female.

Description. Holotype, male, measurements (mm): body length, 6.50; pronotum length, 1.30; pronotum width, 1.80; head width, 1.90; length of femur III, 3.90; length of tibia III, 3.10; right tegmen length, 3.40; right tegmen width (dorsal field), 2.40. **Head**, light yellow with some darker portions: a large dark brown stripe behind the eyes; some dark brown markings on median-apical vertex, fastigium, frons and clypeus; occiput and vertex covered by pubescence and with some long black bristles; black eyes; three ocelli present, central ocellus surrounded by dark brown spot, lateral ocelli partially surrounded by one dark brown spot each; scape light yellow; pedicel light brown; flagellum light brown becoming darker to the apex; anteclypeus whitish; dark brown spot under the eye; gena whitish; mandible dark brown on proximal portion to light yellow on distal; labrum light yellow to light brown; Maxilla whitish, lacinia light brown with whitish apex; maxillary palp: first two palpomere dark brown; third palpomere, proximal portion dark brown, and distal portion whitish; fourth palpomere whitish; fifth palpomere dark brown, whitish on proximal portion and white on apex; labial palp: first palpomere dark brown; second palpomere with dark brown proximal half and whitish distal half; third palpomere dark brown, proximal portion whitish and white on apex. **Thorax**, pronotum light yellow adorned with diffuse brown spots (Fig. 1A), presence of fine pubescence and long black bristles covering all its extension; lateral lobe with a large light yellow spot on inferior margin and five light yellow spots aligned in a semi-parabola shaped (Fig. 2D). Prosternum light brown. Mesosternum dark brown with a yellowish triangle shaped spot in posterior margin (Fig. 1B). Metasternum yellowish and light brown. Right tegmen, dorsal field dark brown with light yellow spots (Fig. 1D) situated: 1) proximal portion of basal and harp areas; 2) distal portion of basal area and along of stridulatory file; 3) close proximal portion of cordal area; 4) distal portion of cordal area; 5) covering apical area; 6) large spot between longitudinal vein in harp and Cu_1. Lateral field with five veins, the color pattern varying from whitish to dark brown: supero-proximal portion dark brown, supero-distal light brown and inferior portion whitish; three rectangular light yellow spots between M vein and superior vein of lateral field. Hindwings absent. Legs I and II

FIGURE 2. *Hygronemobius duckensis* **sp. nov.** A–C—male holotype: A—dorsal view; B—ventral view; C—lateral view of pronotum; D—right tegmina dorsal field, paratype; E—supranal plate of holotype; F—subgenital plate of holotype; G-I—female paratype: G—supranal plate; H—subgenital plate; I—lateral view of ovipositor.

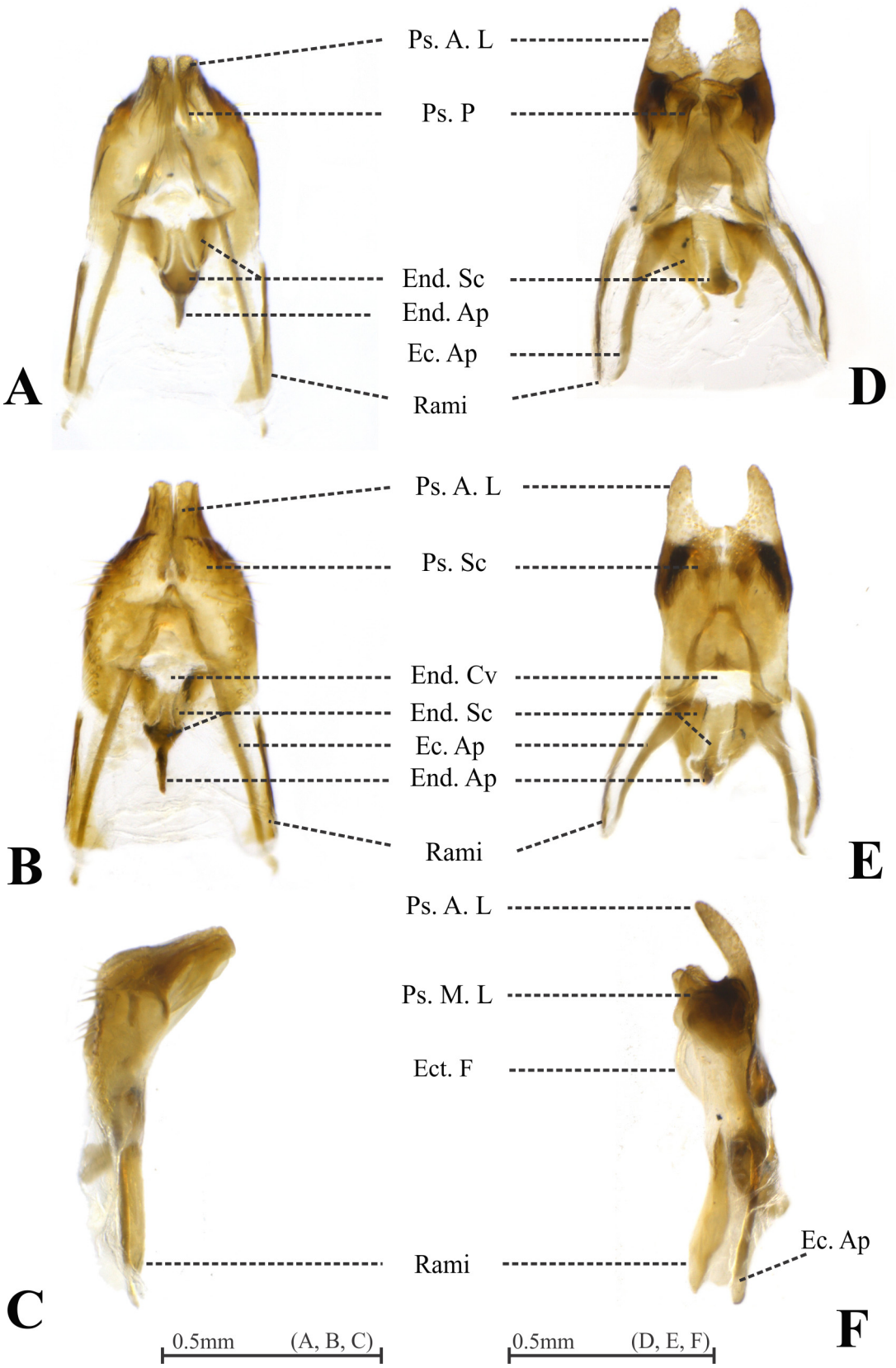

FIGURE 3. Male genitalia of holotypes. A–C—*Hygronemobius duckensis* **sp. nov.:** A—ventral view; B—dorsal view; C—lateral view. D–F—*Hygronemobius dialeucus* **sp. nov.:** D—ventral view; E—dorsal view; F—lateral view. Abbreviations: Ps. A. L—pseudepiphallic apical lobe; Ps. M. L—pseudepiphallic median lobe; Ps. P—pseudepiphallic parameres; Ps. Sc—pseudepiphallic sclerite; End. Cv—endophallic cavity; Ect. F—ectophallic fold; Ect. Ap—ectophallic apodeme; End. Sc—endophallic sclerite; End. Ap—endophallic apodeme.

with similar pattern: coxa, trochanter and femur whitish with dark brown diffuse markings; tibia light brown with an oval tympanum on outer face; tarsus light brown, first tarsomere with a central elongated whitish spot. Leg III, femur whitish with four dark brown stripes on external face: three diagonally aligned stripes on superior portion and another one longitudinally arranged on inferior portion; tibia light brown, external face with five whitish marks, three of them surrounded the dorsal spurs; apical and dorsal spurs dark brown with whitish base and apex; tarsus whitish: first tarsomere with two brownish rings, one closed to proximal portion and another on distal portion; third tarsomere with a light brown ring on proximal portion and another on distal one. **Abdomen** with tergites dark brown, tergites I–IV light brownish on central portion corresponding to area covered by tegmina, tergites VII–IX with diffuse light brown marks (Fig. 2A). Supranal plate whitish to light brown, apex rounded (Fig. 2E). Cerci light brown. Sternites I–II dark brown with posterior margin whitish, sternites III–VIII dark brown with two whitish triangular spots near median portion. Subgenital plate dark brown with two light brown spots close to distal margin, sub-trapezoidal shaped (Fig. 2F). **Male genitalia** (Fig. 3A–C)**:** triangular; pseudepiphallic sclerite well sclerotized: proximal two-thirds inflated, distal third narrow, curved ventrally and invaginated in central portion; pseudepiphallic parameres as long as the apex of pseudepiphallic sclerite, visible in ventral view; apex of pseudepiphallic sclerite well developed, totally covering the ectophallic parameres in dorsal view; apex of pseudepiphallus curved ventrally, sub-triangular; ectophallic fold small, visible only in ventral view; ectophallic apodemes surpassing, but not crossing the rami; endophallus shell shaped divided in three sclerites, the lateral sclerites being larger than the central one; end of lateral sclerites of endophallus laterally projected.

Observations in paratypes. Stridulatory file of right tegmen with 85–93 teeth (n=4). Female, body shape and color pattern similar to Holotype, except: tegmina reduced to dark brown lateral scales; abdomen, tergites I–VII with several rounded dark brown spots; tergite IV darker than the other ones; sternites varying from same pattern described for holotype to sternites largely whitish with central and lateral portion dark brown; supranal plate rectangular shaped with distal margin rounded, color dark brown to whitish (Fig. 2G); subgenital plate whitish, rectangular shaped with rounded distal corners and invaginated on apex (Fig. 2H); ovipositor (Fig. 2I), valves light brown on proximal portion to dark brown on median and distal portions, apex of the dorsal valve slightly denticulate on their margins.

Calling song (26.5–27.4°C, Tab. 01, Fig. 4A): 15 to 30 pulses per chirp (n=90); gradual increase in amplitude and duration from the first to the third/sixth pulse of each chirp; duration of the first pulse of 7.79 ± 1.21 ms (5–10, n=24), duration of the third/sixth pulse of 10.5 ± 0.59 ms (9–11, n=24), and the other pulses with duration of 11.92 ± 0.65 ms (11–13, n=48); chirp duration ranged from 320 to 660 ms (n=90) according to number of pulses per chirp (see Tab. 01); inter-chirp interval ranged from 1300 to 1700 ms (n=90); chirp rate of 39.1 ± 4.01 chirps/min (34–48, n=9); dominant frequency of 6.16 ± 0.11 kHz (6.0–6.3, n=9).

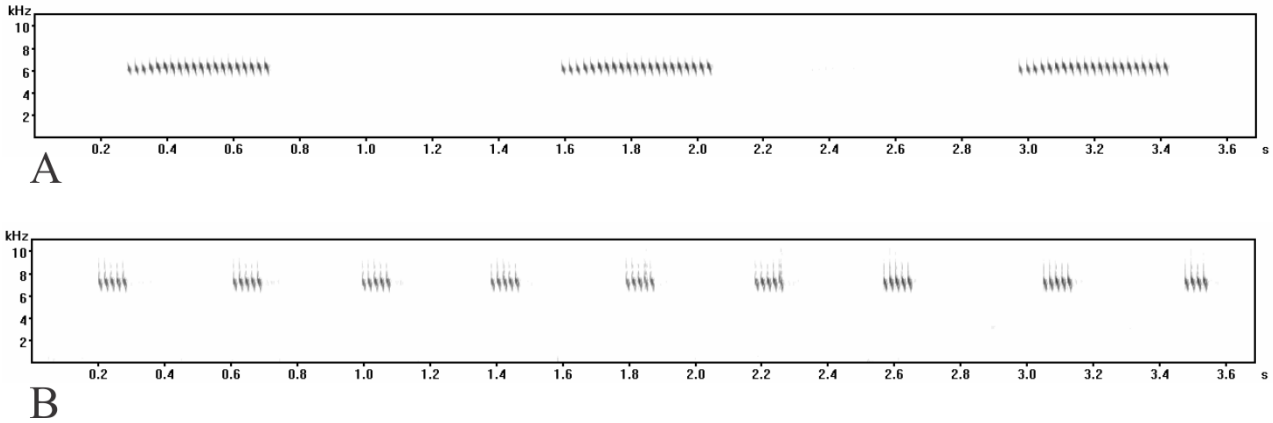

FIGURE 4. Calling song spectrograms. A—three chirps of *Hygronemobius duckensis* **sp. nov.**, the first with 20 pulses and the other ones with 21 pulses; B—nine chirps of *Hygronemobius dialeucus* **sp. nov.**, first eight with five pulses and the last one with four pulses.

TABLE 1. Calling song parameters of *H. duckensis* **sp. nov.** and *H. dialeucus* **sp. nov.** CR = chirp rate; P/C = pulses per chirp; CD = chirp duration; IC = interval between chirps; DF = dominant frequency; TEMP. = temperature measured at the male calling site.

	CR	P/C	**CD** (ms)	**IC** (ms)	DF (kHz)	TEMP. (°C)
H. duckensis						
05PROSET	36	19.9±1.6 (18–22)	427±40.6 (380–480)	1248±150 (1012–1560)	6.3	27.4
21PROSET	40	22±1.16 (21–24)	451±24.2 (420–500)	1037±49 (933–1108)	6.1	27.3
22PROSET	38	20.3±1.16 (19–22)	427±21.1 (400–470)	1218±103 (1071–1371)	6.2	26.5
69PROSET	48	20.9±0.87 (20–22)	436±25 (400–480)	818±38 (764–881)	6.3	27.4
70PROSET	38	21.2±1.87 (19–25)	490±44.2 (420–560)	1114±158 (917–1457)	6.1	26.5
71PROSET	34	16.5±1.27 (15–18)	374±24.6 (320–400)	1238±116 (1036–1387)	6.0	27.0
72PROSET	42	28±1.49 (26–30)	613±28.8 (570–660)	814±54 (737–889)	6.1	27.3
79PROSET	38	21.6±1.95 (19–24)	521±40.7 (440–560)	988±133 (758–1227)	6.1	27.0
80PROSET	38	20.1±1.66 (18–23)	449±38.4 (410–520)	1069±87 (914–1128)	6.3	27.0
H. dialeucus						
127PROSET	140	5	87	307±14.9 (280–330)	7.5	28.0
144PROSET	176	5	83	240±11.55 (220–260)	7.7	28.5
152PROSET	168	5	96	271±23.31 (240–330)	7.3	26.0
153PROSET	156	5	99	273±14.94 (240–290)	6.8	25.8

Habitat and male calling site. Males and females live in litter and were quite abundant in forest at border areas. Males often stridulated on soil in sheltered places as under dry leaves. Few specimens were found stridulating between roots or in litter on dry leaves. All males were recorded during daytime.

Comments. *Hygronemobius duckensis* **sp. nov.** belongs to the *benoisti* group proposed by Desutter-Grandcolas (1993). Among species of this group *H. duckensis* **sp. nov.** has the external and the male genitalia morphology very similar to *H. tetraplagion.* These two species differ from *H. elegans* by the body pattern coloration to be light yellow with dark spots and by male genitalia, as follow: i) pseudepiphallic sclerite with many long bristles (Fig. 3B–C); ii) pseudepiphallic apical lobe surpassing pseudepiphallic apex (lateral view, Fig. 3C); iii) ectophallic fold greatly reduced, badly or not visible in lateral view (Fig. 3C). *Hygronemobius duckensis* **sp. nov** and *H. tetraplagion* differ from *H. diplagion* by the light pronotal lateral lobe with small dark spots, tergites II, III, V and VI lighter than other tergites, pseudepiphallic sclerite bristly and longer than rami, ectophallic apodemes and rami parallel, and distinct separation between pseudepiphallic sclerite and rami by membranous area. *Hygronemobius duckensis* **sp. nov** and *H. tetraplagion* differ from *H. benoisti* by the light spot without a well-defined dark outline in the postero-inferior portion of pronotal lateral lobe, male tegmina with a light spot at the apex, and pseudepiphallic apical lobe reduced, covering only the apex of pseudepiphallic sclerite (in dorsal view, Fig. 3B). *Hygronemobius duckensis* **sp. nov.** differs from *H. tetraplagion* only by male genitalia, as follow:

pseudepiphallus expanded apically surrounded completely the pseudepiphallic apical lobe in dorsal and posterior views (Fig. 3B); This expansion is curved ventrally with a sub-triangular shape, so it is not possible to see the ectophallic parameres in lateral view (Fig. 3C); pseudepiphallic apical lobe is reduced not surpassing the apex of pseudepiphallus, when in lateral view (Fig. 3C). Regarding calling song of *H. tetraplagion*, there is discordance between description of song and spectrogram presented by Desutter-Grandcolas (1993, pags. 24 and 25), in spectrogram the song consists in many pulses forming long chirps and in description it is characterized as chirps with three pulses. The calling song of *Hygronemobius duckensis* **sp. nov.** (Fig. 4A) presents a similar pattern presented by Desutter-Grandcolas (1993) in the spectrogram, however with fewer pulses and greater interval between pulses.

Measurements (mm). Female (n=7): body length, 7.06 ± 0.27 (6.70–7.50); pronotum length, 1.57 ± 0.05 (1.50–1.60); pronotum width, 1.91 ± 0.13 (1.80–2.20); head width, 2.06 ± 0.05 (2.00–2.10); length of femur III, 4.27 ± 0.20 (3.90–4.40); length of tibia III, 3,26 ± 0.18 (3.00–3.50); ovipositor length, 2.64 ± 0.26 (2.10–2.90). Male (n=5): body length, 6.42 ± 0.54 (5.90–7.30); pronotum length, 1.20 ± 0.07 (1.10–1.30); pronotum width, 1.84 ± 0.05 (1.80–1.90); head width, 1.94 ± 0.05 (1.90–2.00); length of femur III, 3.96 ± 0.24 (3.70–4.30); length of tibia III, 3.08 ± 0.11 (2.90–3.20); right tegmen length, 3.30 ± 0.16 (3.10–3.50); right tegmen width (dorsal field), 2.50 ± 0.16 (2.30–2.70).

Type material. Holotype ♂: BRASIL, AM[azonas], Manaus, R.[eserva] F.[lorestal] Adolpho Ducke, AM-010, 21-24.iv.2011, 02º55'49"S, 59°58'31"W. Coleta ativa. L. P. Martins / 69PROSET (INPA). Holotype condition: genitalia placed in microvial with glycerin. Paratypes: same data of Holotype (4♂, 5♀, INPA). *idem* / 70PROSET (1♂, INPA). *idem* / 72PROSET (1♂, INPA). *idem* / 80PROSET (1♂, INPA). *idem* 01-03.xi.2010. L. P. Martins & D. Mendes (1♀, MZUSP). *idem* 15-19.xii.2010 / 21PROSET (1♂, INPA). *idem* / 22PROSET (1♂, INPA). *idem* / 23PROSET (1♂, MZUSP). *idem* 26-28.ii.2011. L. P. Martins (1♂, MZUSP). *idem* 14-19.x.2011. L. P. Martins & A. Souza (8♂, INPA). *idem* L-08, 500. 02º55', 03º01'S, 59°53', 59º59'W. 15.ix a 20.x.2006. Pitfall 03. J. L. P. Souza col (1♀, MZUSP). *idem* L-04, 4500. Pitfall 10 (2♀, INPA). *idem* L-06, 500. Pitfall 01 (1♀, INPA). *idem* L-03, 4500. Pitfall 06 (1♀, INPA).

Hygronemobius dialeucus Martins & Pereira, sp. nov.

(Figs. 1C–D; 3D–F; 4B; 5)

Etymology. The specific name refers to the white markings on the pronotum, abdomen and legs (from Greek *dialeukos* = marked with white).

Diagnosis. (i) Head brown without white marks (Figs. 1C–D, 5A); (ii) pronotum black with white marks on the dorsal disc: anterior margin, a pair of dots; posterior margin, in female, a stripe slightly incurved on the lateral lobes (Fig. 1D), in male, three dots, the lateral ones bigger (Figs. 1C, 5A); (iii) femora I and II with an elongated white dot dorsally (Figs. 1C–D, 5A); (iv) tibia III with an elongated white dot above the last inner dorsal spur (Fig. 1C–D); (v) femur III with two white dots on the inner face, the distal bigger than the proximal (Figs. 1C–D, 5A); (vi) first tarsomeres of legs I, II and III with a dorsal elongated white spot (Fig. 1C–D); (vii) tergite IV of females with a transversal white band (Fig. 1D); (viii) terminal tergites with a white band or two spots, comprising latero-distal portion of tegite IX, basal portion of supranal plate and cerci adjacent area (Figs. 1C–D, 5A, E, G); (ix) pseudepiphallic sclerite sub-trapezoidal, posterior margin twice wider than the anterior margin (Fig. 3E); (x) pseudepiphallic apical lobes longer than half length of pseudepiphallic sclerite (Fig. 3E); (xi) infero-posterior angle of pseudepiphallic sclerite rounded, in lateral view (Fig. 3F); (xii) setae present only on pseudepiphallic apical lobes.

Description. Holotype, male, measurements (mm): body length, 6.0; pronotum length, 1.3; pronotum width, 2.0; head width, 2.0; length of femur III, 4.1; length of tibia III, 3.2; right tegmen length, 2.8; right tegmen width (dorsal field), 3.2. General color of the body black with some white markings. **Head** brown, except: vertex dark brown but the adjacent area to eyes light brown; occiput light brown; gena light brown; black eyes; scape e pedicel light brown; flagellum with the firsts antennomeres light brown becoming darker towards the apex; frons with an inverted dark brown T-shaped spot; clypeus, lateral portion of the postclypeus dark brown and center-basal portion of the anteclypeus whitish; labrum light brown, basal portion dark brown with a whitish stripe at the apex; Maxilla light brown, lacinia with whitish apex; maxillary palp: first two palpomere dark brown; third palpomere whitish

FIGURE 5. *Hygronemobius dialeucus* **sp. nov.** A—male holotype, in dorsal view; B—male holotype, in ventral view; C—lateral view of pronotum, paratype; D—right tegmina dorsal field, paratype; E—supranal plate of holotype; F—subgenital plate of holotype; G–I—female paratype: G—supranal plate; H—subgenital plate; I—lateral view of ovipositor.

with proximal portion dark brown; fourth palpomere whitish; fifth palpomere dark brown with whitish apex and third proximal portion light yellow; labial palp: first palpomere dark brown; second palpomere dark brown on proximal half and whitish on distal half; third palpomere from whitish to dark brown with apex whitish. **Thorax**, pronotum black with five white marks on the dorsal disc (Fig. 5A): anterior margin, a pair of dots; posterior margin, three dots, the lateral ones bigger; lateral lobe evenly black (Fig. 5C); pronotum with black fine pubescence and strong bristles covering all its extension. Dorsal field of right tegmen dark brown with light yellow spots (Fig. 5D) situated: 1) close to insertion of tegmen on metanotum; 2) on junction of anal veins; 3) distal portion of cordal area; 4) continuous band between Cu_1 and M veins until external portion of apical area; 5) large spot between longitudinal vein in harp and Cu_1. Lateral field of right tegmen with five veins; color pattern: a long dark yellow band between R vein and superior vein of lateral field; proximal and supero-distal portions dark brown, remaining areas lighter. Hindwings absent. Prosternum dark brown. Mesosternum dark brown with posterior third light brown. Metasternum dark brown. Legs I and II with similar pattern: coxae and trochanteres dark brown; femora dark brown to black with an elongated white dot on dorsal face (Fig. 5A); tibiae dark brown, tibia I with an oval tympanum on outer face; tarsi dark brown, first tarsomere with a dorsal elongated white spot. Leg III: coxa and trochanter dark brown; femur III black, knee and proximal area of lighter color, two white dots on the inner face, the distal bigger than the proximal (Fig. 5A); tibia III black with an elongated white spot close the last inner dorsal spur (Fig. 5A); tarsus III dark brown, first tarsomere with a dorsal elongated white spot. **Abdomen,** tergites black; a continuous band comprising latero-distal portion of tegite IX, proximal half of supranal plate and cerci adjacent area (Fig. 5A); supranal plate with apex rounded (Fig. 5E); sternites I–IV dark brown, sternites V–VII dark brown in central portion and black in laterals, sternite VIII evenly black (Fig. 5B); subgenital plate black with distal and lateral margins rounded; cerci light brown. **Male genitalia** (Fig. 3D–F): pseudepiphallic sclerite sub-trapezoidal, distal margin twice wider than the proximal margin; pseudepiphallic apical lobes well developed, longer than half length of pseudepiphallic sclerite; numerous smalls setae presents only on pseudepiphallic apical lobes; pseudepiphallic median lobes with distal margin rounded, visible in lateral view; ectophallic fold large, as long as pseudepiphallic sclerite, and as high as pseudepiphallic median lobes (in lateral view, Fig. 3F); ectophallic apodeme crossing and surpassing rami (Fig. 3E); endophallus divided in three sclerites, the lateral sclerites triangular and larger than the central one (Fig. 3D–E).

Observations in paratypes. Stridulatory file of right tegmen with 80–95 teeth (n=5). White band on terminal tergites not continuous forming two spots separated by a narrow black stripe (Fig. 1C). Female, body shape and color pattern similar to Holotype, except: tegmina reduced to black lateral scales (Fig. 1D); posterior margin of pronotum with a wide white stripe slightly incurved on lateral lobes (Fig. 1D); tergite IV with a wide transversal white band (Fig. 1D); supranal plate dark brown (Fig. 5G); subgenital plate from dark to light brown, sub-rounded with a central invagination on apex (Fig. 5H); all sternites dark brown; prosternum dark brown; mesosternum dark brown with posterior half light brown; metasternum dark brown; ovipositor, valves dark brown, proximal two-thirds of ventral valves light brown (Fig. 5I); apex of the dorsal valves slightly denticulate on their margins (Fig. 5I).

Calling song (25.5–28°C, Tab. 01, Fig. 4B): 5 pulses per chirp, rarely chirps with 4 pulses; chirp duration with 5 pulses of 91 ± 7 ms (83–99, n=40); inter-chirp interval of 272 ± 29 ms (220–330, n=40); chirp rate of 160 ± 15,67 chirps/min (140–176, n=4); pulse duration of 8.13 ± 0.43 ms (7–9, n=30); dominant frequency of 7.3 ± 0.39 kHz (6.8–7.7, n=4).

Habitat and male calling site. Males and females live in litter and were collected only inside the forest. Males were seen stridulating on soil under dry leaves during daytime.

Comments. *Hygronemobius dialeucus* **sp. nov.** belongs to the *amoenus* group proposed by Desutter-Grandcolas (1993). The male genitalia of *Hygronemobius dialeucus* **sp. nov.** is more similar to that of *H. amoenus* differing by: pseudepiphallic apical lobes apex longer and thinner (Fig. 3D–E); infero-posterior angle of pseudepiphallic sclerite rounded (Fig. 3F). Among species of *amoenus* group, position and shape of white spots are very important to determining the species, wherefore *H. torquatus* differs from *H. dialeucus* **sp. nov.** by having: dorsal disc of pronotum with a large transversal white stripe near its anterior margin and posterior margin without white markings; only a white dot on femur III; in females, tergites II–III with two pairs of lateral white dots and tergite IV black; *H. albolineatus* differs from *H. dialeucus* **sp. nov.** by having: two longitudinal white stripes running dorsally from fastigium to the posterior margin of pronotum, and in females reaching the tergite IX; a whitish dot behind the eyes; palpi without white markings; tibiae and tarsi without white dots; central portion of posterior margin of pronotum black; tegmina apex whitish. *H. boreus* differs from *H. dialeucus* **sp. nov.** by having:

two longitudinal white stripes running dorsally from fastigium to the posterior margin of pronotum; central portion of posterior margin of pronotum black; in females, tergite II with a transversal white stripe, tergite III with white spots on lateral margins and tergite IV with central portion black; tibiae and tarsi without white dots. *H. amoenus* differs from *H. dialeucus* **sp. nov.** by having: head with two longitudinal thin white stripes, from fastigium to occiput; and two longitudinal white stripes along lateral margins of dorsal disc of pronotum. Calling song of *H. amoenus*, *H. albolineatus* and *H. dialeucus* **sp. nov.** are characterized by brief chirps with 3 pulses in *H. amoenus*, usually 4 pulses in *H. albolineatus* (Desutter-Grandcolas 1993) and usually 5 pulses in *H. dialeucus* **sp. nov.** (Fig. 4B).

Measurements (mm). Male (n=10, excluding holotype). body length, 6.18 ± 0.43 (5.50–6.80); pronotum length, 1.28 ± 0.11 (1.20–1.50); pronotum width, 1.91 ± 0.06 (1.80–2.00); head width, 1.93 ± 0.05 (1.90–2.00); length of femur III, 3.78 ± 0.20 (3.50–4.10); length of tibia III, 3.12 ± 0.14 (2.90–3.30); right tegmen length, 2.95 ± 0.16 (2.70–3.20); right tegmen width (dorsal field), 2.42 ± 0.04 (2.40–2.50). Female (n=5): body length, 5.98 ± 0.41 (5.40–6.30); pronotum length, 1.42 ± 0.08 (1.30–1.50); pronotum width, 1.86 ± 0.05 (1.80–1.90); head width, 2.00 ± 0.10 (1.90–2.10); length of femur III, 4.08 ± 0.18 (3.90–4.30); length of tibia III, 3.36 ± 0.18 (3.10–3.60); ovipositor length, 2.60 ± 0.07 (2.50–2.70).

Type material. Holotype ♂: BRASIL, AM[azonas], Manaus, R.[eserva] F.[lorestal] Adolpho Ducke, AM-010, 26-31.viii.2011, 02º55'49"S, 59°58'31"W. Coleta ativa. L. P. Martins & V. Linard / 127PROSET (INPA). Holotype condition: detached left leg III; genitalia placed in microvial with glycerin; all parts are maintained in holotype's tube. Paratypes: same data of Holotype (1♂, 1♀, INPA). *idem* 23-28.ix.2011 / 144PROSET (1♂, INPA). *idem* 26-31.i.2012. L. P. Martins & K. Soares (2♂, MZUSP). *idem* 14-19.x.2011. L. P. Martins & A. Souza / 152PROSET (1♂, INPA). *idem* / 153PROSET (1♂, INPA). *idem* / 154PROSET (1♂, INPA). *idem* (3♂, 3♀, INPA). *idem* 21-24.iv.2011. L. P. Martins (1♀, INPA). *idem* 01-15.vii.2011 (2♂, 1♀, INPA). *idem* 23-28.ix.2011. L. P. Martins & V. Linard (2♀, MZUSP). *idem* 01-03.xi.2010. L. P. Martins & D. Mendes (1♂, INPA). *idem* / 05PROSET (1♂, INPA). *idem* 26-28.ii.2011 / 49PROSET (1♂, INPA). *idem* (1♀, INPA). *idem* 15-19.xi.2013. L. P. Martins & L. G. Da Silva (3♂, INPA).

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