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## TWO NEW NEOTROPICAL SPECIES OF THE *DASYHELEA MUTABILIS* GROUP (CULICOMORPHA: CERATOPOGONIDAE)

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### ABSTRACT

*Two new species of Dasyhelea Kieffer, Dasyhelea jorgei Diaz, Felipe-Bauer & Spinelli sp. nov. and Dasyhelea mineira Diaz, Felipe-Bauer & Spinelli sp. nov. are described, illustrated and photographed from Peru and Brazil respectively, based on male and female adults. These species are typical members of mutabilis species group and are compared with similar species within the group.*

KEY-WORDS: Ceratopogonidae; Systematic; *Dasyhelea*; Peru; Brazil.

### INTRODUCTION

*Dasyhelea* Kieffer is a large and complex genus of Ceratopogonidae with diverse morphology and biology which occurs worldwide in a variety of small aquatic habitats (Waugh & Wirth, 1976). Taxonomically, the recognition of subgenera and/or species groups is still incipient and generally has been applied intermittently only to various regional faunas (Díaz *et al.*, 2014). Borkent (2016) listed 77 species for the Neotropics and of these number, 25 belong to the *Dasyhelea mutabilis* species group as defined by Waugh & Wirth (1976).

The purpose of this paper is to describe two new species of the *mutabilis* group from Peru and Brazil, from specimens collected during the last decade in the

vicinities of Cuzco, Peru, and in the Parque Nacional da Serra do Cipó, Minas Gerais State, Brazil.

### MATERIAL AND METHODS

The specimens from Peru were collected at light and those from Brazil with a manual aspirator from flowers of *Leiothrix spiralis* (Bong.) Ruhland ("madre-selva"). The holotype of *D. jorgei* Díaz sp. nov. was mounted in slide with Canada balsam following the technique described by Borkent & Spinelli (2007), while the holotype of *D. mineira* Díaz sp. nov. following Wirth & Marston (1968). Ink illustrations were made with a camera lucida. Photomicrographs were taken with a digital camera Micrometrics SE Premi-

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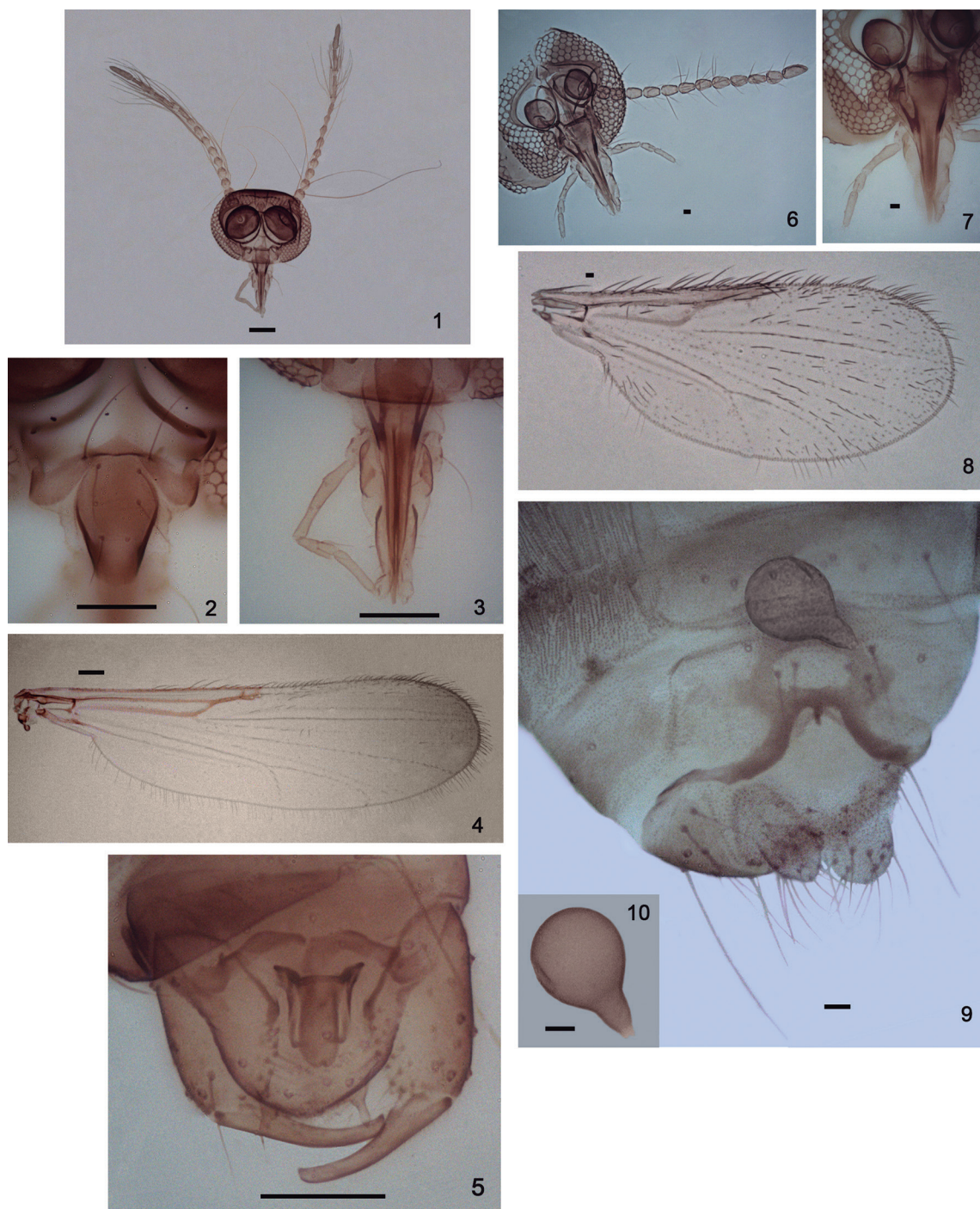
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un and with a digital camera Moticam 2300, both through a Nikon Eclipse E200 microscope.

Terminology for structures of adults follows those in the Manual of Central American Diptera (Brown *et al.*, 2009) and for special terms on the *Dasyhelea mutabilis* group see Díaz *et al.* (2014).

The studied specimens of *Dasyhelea jorgei* are deposited in the collection of the División Entomología, Museo de La Plata (MLPA), Argentina and the specimens of *D. mineira* are deposited in “Coleção de Ceratopogonidae da Fundação Oswaldo Cruz (CCER/FIOCRUZ)”.



**FIGURES 1-10:** *Dasyhelea jorgei* Díaz, Felipe-Bauer & Spinelli sp. nov. Holotype male, adult. (1-5) male; (6-10) female. (1, 6) antennal flagellum; (2) clypeus; (3, 7) palpus; (4, 8) wing; (5) genitalia; (9) subgenital plate; (10) spermathecae. Scale bars: 0.05 mm.

## RESULTS

***Dasyhelea jorgei* Díaz, Felipe-Bauer & Spinelli  
sp. nov.**

(Figures 1-10, 20-23)

*Holotype*: ♂, Peru, Cuzco: Pagoreni, VII.2004, J. Williams col., at light (MPLA). *Paratypes*: 3 ♂, 1 ♀ same data as holotype (MLPA).

*Diagnosis*: male with posterolateral arms single and subparallel, and posteromedian projection of aedeagus stout and rounded with notched tip. Female with palpal segment 5 very slender and slightly shorter than segment 3, and spermatheca pyriform with stout and straight neck.

*Description*: Male adult. Antennal flagellum brown; with flagellomeres 2-4 globular, 5-9 rhomboid, 10-13 elongates (Fig. 1). Clypeus with 4 pairs of setae (Fig. 2). Palpus (Fig. 3) pale brown; segment 5 0.60 length of segment 3; PR 5.33-6.16 (5.70, n = 4). Scutellum with 6 large, 2 thinner setae. Wing (Fig. 4) length 0.80-0.88 (0.84, n = 4) mm, width 0.26-0.30 (0.27, n = 4) mm; CR 0.44-0.47 (0.46, n = 4). Genitalia (Figs. 5, 20): tergite 9 broad on anterior half, distal half tapering to rounded tip, reaching to level of apex of gonocoxites, apicolateral process slender with apical seta; cercus short with 3-4 setae; sternite 9 (Fig. 21) 0.4 length of greatest width, posteromedian projection rounded, reaching ½ of total aedeagus length. Gonocoxite stout, 1.8 X longer than greatest, mesal width, with short mesal process; gonostylus 0.9 length of gonocoxite, base wide, slightly curved with pointed tip. Paramere and gonocoxal apodemes (Figs. 5, 22) forming an asymmetrical structure; gonocoxal apodemes stout, proximal ⅔ nearly straight, distal ⅓ directed mesally, with short, pointed, subbasal tooth; right apodeme broadly fused with paramere, left apodeme not contacting paramere, latter slender, simple, tapering distally, tip rounded, produced beyond apex of sternite 9 by short distance. Aedeagus (Figs. 5, 23) 1.1 X longer than greatest width, W/L ratio 0.38-0.45 (0.41, n = 4); anterior margin slightly convex, basal arms slender, well sclerotized, directed anterolaterally; posterolateral arms single, subparallel, each with apex abruptly recurved ventrolaterally; posteromedian projection stout, rounded with notched tip, produced beyond recurved apices of posterolateral arms.

*Description*: Female adult. Similar to male, except: Head brown. Eyes contiguous for distance of width

of 2-3 ommatidia. Antennal flagellum brown; with flagellomeres 2-8 vasiform, 9-13 more elongate vasiform, 13 longest (Fig. 6) AR 0.74. Clypeus with 5 pairs of setae. Palpus (Fig. 7) pale brown; segment 5 0.83 length of segment 3; PR 4.33.

*Thorax*: Uniformly brown; scutellum with 6 large, 1 thinner setae. Legs brown; apex of hind tibia with 8 spines; foreleg TR 1.60, midleg TR 2.03, hind leg TR 2.14. Wing (Fig. 8) length 0.56 mm, width 0.28 mm; CR 0.46; membrane hyaline, densely covered with macrotrichia; radial cells obliterated; cubital fork at level of beginning of second radial cell. Halter pale.

*Abdomen*: Dark brown. Subgenital plate (Fig. 9) semi-circular, with broad, lumen, posterior margin straight; posteromedian projection slender, pointed; posterolateral arms stout, curved. Spermatheca (Figs. 9-10) pyriform, well sclerotized, measuring 26 × 34 μm, neck stout, straight, measuring 16 μm.

*Etymology*: This species is named after Prof. Jorge D. Williams, herpetologist at the Museo de La Plata, Argentina, in recognition of his friendship and important help collecting ceratopogonids.

*Distribution*: Peru (Cuzco).

*Discussion*: *Dasyhelea jorgei* sp. nov. is very similar to the other species herein described as new, *D. mineira* sp. nov., by virtue of the very elongate and slender palpal segment 5. However, in males of *D. mineira* sp. nov. the paramere and gonocoxal apodemes form a symmetrical structure, and the female spermatheca has a stout and oblique neck.

This new species is also similar to the Patagonian species *D. pseudolacustris* Díaz & Spinelli. However, the palpal segment 5 of the latter species is shorter and stouter, the paramere and gonocoxal apodemes form a symmetrical structure, and the female spermatheca is spherical.

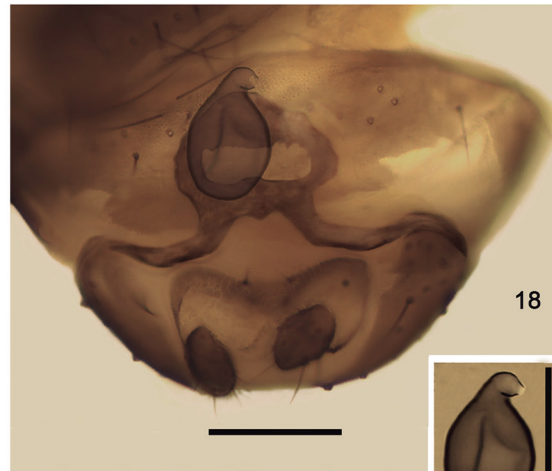
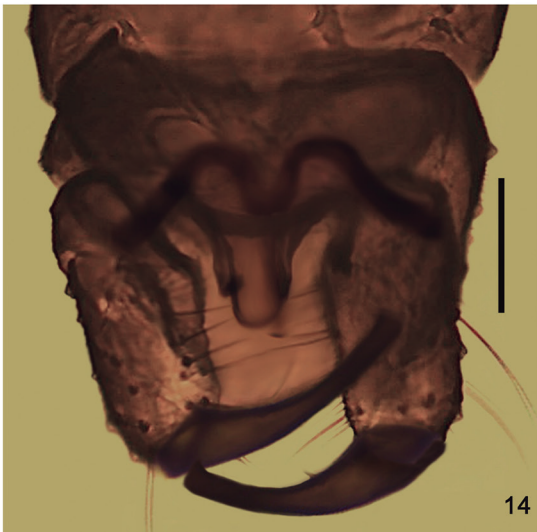
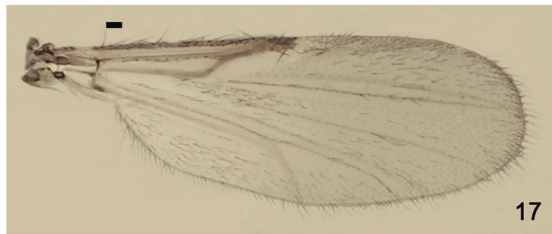
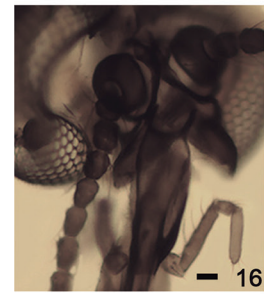
***Dasyhelea mineira* Díaz, Felipe-Bauer & Spinelli  
sp. nov.**

(Figures 11-19, 24-27)

*Holotype*: ♂, Brasil, Minas Gerais State: Municipality of Santana do Riacho, National Park of Serra do Cipó, 16.I.2011, A.C. Neves col. (CCER 537, FIOCRUZ). *Paratype*: ♀, same data holotype except 15.I.2011, J.L. Davis col. (CCER 539, FIOCRUZ).

*Diagnosis:* male with posterolateral arms of aedeagus single, and paramere and gonocoxal apodemes forming a symmetrical structure; paramere straight, tip rectangular, slightly folded. Female with palpal seg-

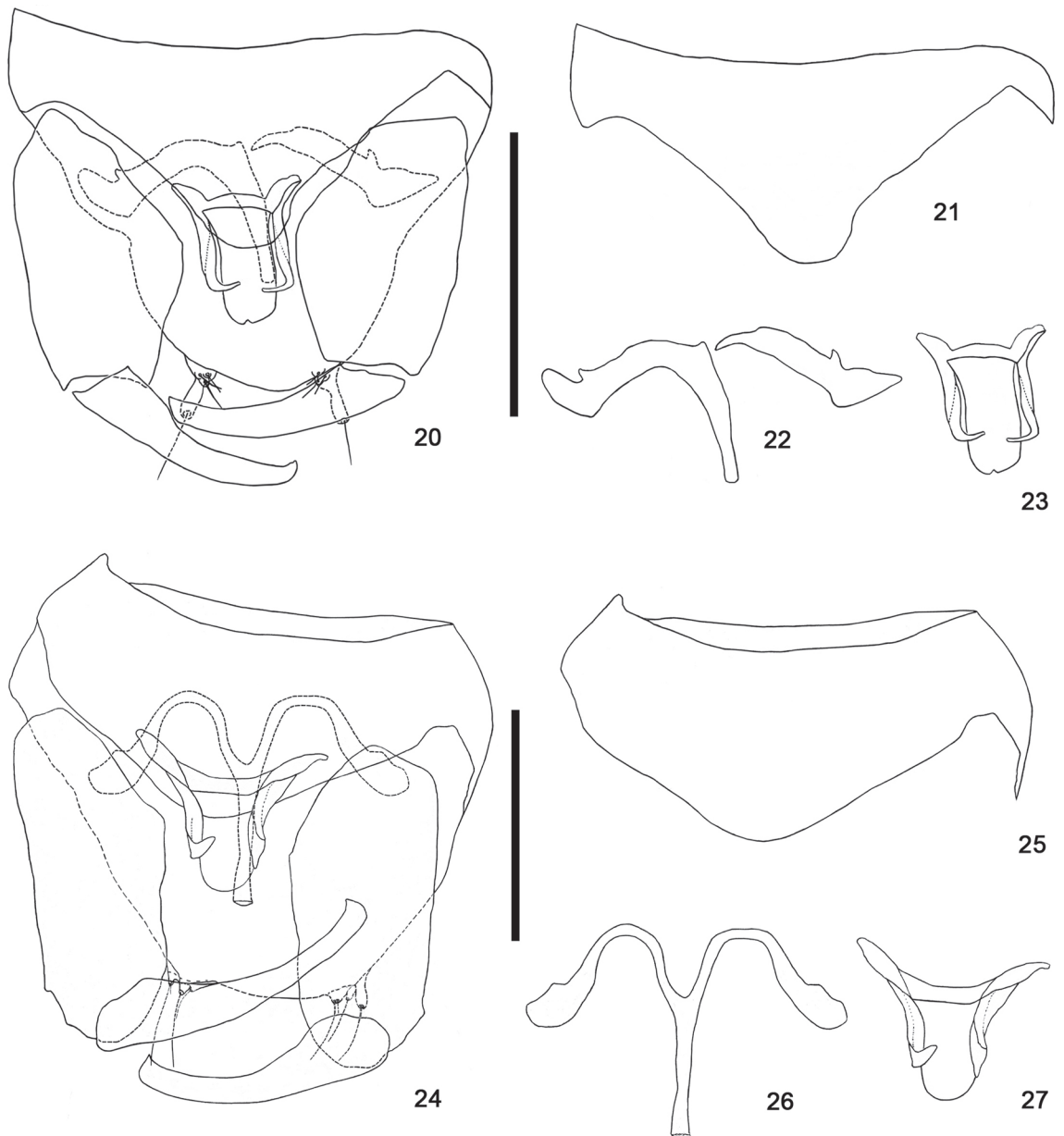
ment 5 very slender and slightly shorter than segment 3, anterior margin of subgenital plate subtriangular, and spermatheca pyriform with stout and recurved neck.



FIGURES 11-19: *Dasyhelea mineira* Diaz, Felipe-Bauer & Spinelli sp. nov. Holotype male, adult. (11-14) male; (15-19) female. (11, 15) antennal flagellum; (12, 16) palpus; (13, 17) wing; (14) genitalia; (18) subgenital plate; (19) spermathecae. Scale bars: 0.05 mm.

*Description:* Male adult. Antennal flagellum with flagellomeres 2-4 globular, 5-9 rhomboid, 10-13 elongates (Fig. 11). Palpus (Fig. 12) pale brown; segment 3 bearing scattered sensilla; PR 7.00. Scutellum with 6 large, 3-4 thinner setae. Wing (Fig. 13) length 0.90 mm, width 0.28 mm; CR 0.44. Genitalia (Figs. 14, 24): tergite 9 slightly tapering distally, reaching to  $\frac{2}{3}$  of level of apex of gonocoxites; apicolateral process slender, with long, thin seta; cercus short with 2-3 long setae; sternite 9 (Fig. 25) 0.4 X longer

than greatest width, posteromedian projection rounded, reaching  $\frac{1}{2}$  of total aedeagus length. Gonocoxite stout, 2.5 X longer than greatest width, with short anteromedian process directed anteromesad; gonostylus 0.9 length of gonocoxite, base wide, tapering abruptly distally, tip pointed, slightly hooked. Paramere and gonocoxal apodemes (Figs. 14, 26) forming a symmetrical structure; gonocoxal apodemes slender, with stout subbasal tooth; both fused to paramere, latter straight, tip rectangular, slightly folded. Aedeagus



**FIGURES 20-27:** (20-23) *Dasyhelea jorgei* Diaz, Felipe-Bauer & Spinelli sp. nov. Holotype male (24-27) *Dasyhelea mineira* Diaz, Felipe-Bauer & Spinelli sp. nov. Holotype male, (20, 24) genitalia; (21, 25) sternite 9; (22, 26) paramere and gonocoxal apodemes; (23, 27) aedeagus. Scale bars: 0.05 mm.

(Figs. 14, 27) 0.8 X longer than greatest width, W/L ratio 0.40; anterior margin nearly straight, basal arms short, directed anterolaterad; posterolateral arms single, tips recurved anteromesally; posteromedian projection stout with rounded tip.

*Description:* Female adult. Similar to male, except: Head dark brown. Eyes contiguous for distance of width of 1-2 ommatidia. Antennal flagellum dark brown, with flagellomeres 2-8 vasiform, 9-13 more elongate vasiform, 13 longest (Fig. 15); AR 1.02. Clypeus with 7 pairs of setae. Palpus (Fig. 16) brown; segment 3 as long as 4+5; PR 6.00.

*Thorax:* Scutum dark brown; scutellum with 6 large, 4 thinner setae. Legs brown, tarsomeres 5 infuscated; apex of hind tibia with 6 spines; foreleg TR 2.24, midleg TR 2.47, hind leg missing in the available specimen. Wing (Fig. 17) length 1.03 mm, width 0.40 mm; CR 0.46; membrane hyaline, densely covered with macrotrichia; radial cells obliterated; cubital fork at level of beginning of second radial cell. Halter missing.

*Abdomen:* Dark brown. Subgenital plate (Fig. 18) with anterior margin subtriangular, posterior margin straight, lumen broad; posteromedian projection small, triangular; posterolateral arms slender, curved. Spermatheca (Fig. 19) pyriform, well sclerotized, measuring  $67.5 \times 50$   $\mu\text{m}$ , neck stout, curved, measuring 20  $\mu\text{m}$ .

*Etymology:* The specific epithet “*mineira*” is a reference to the type-locality, in the state of Minas Gerais, Brazil.

*Distribution:* Brazil (Minas Gerais).

*Discussion:* Characters for distinguishing *D. mineira* sp. nov. from *D. jorgei* sp. nov. may be found in the discussion under the description of the later species.

*Dasyhelea minera* sp. nov. is also similar to the Patagonian species *D. pseudolacustris* Díaz & Spinelli and *D. ingrami* Díaz & Spinelli. However, the posterolateral arms of the aedeagus of *D. pseudolacustris* are divided and the posteromedian projection is stout and broad; the female has the clypeus with 3 pairs of setae, the scutellum is paler and the spermatheca is spherical. *Dasyhelea ingrami* is easily distinguished from the new species by the paramere and gonocoxal apodemes forming an asymmetrical structure and the aedeagus lacks the posteromedian projection; the female differs by the subgenital plate lacking posteromedian projection, with the posterolateral arms gen-

tly recurved over 90°, and by the spermatheca with straight neck.

## RESUMEN

*Macho y hembra de dos nuevas especies de Dasyhelea Kieffer, Dasyhelea jorgei Díaz sp. nov. and Dasyhelea mineira Díaz sp. nov., se describen, ilustran y fotografian provenientes de Perú y Brasil respectivamente. Ambas especies son típicos miembros del grupo mutabilis y son comparadas con las especies similares dentro del grupo.*

**PALABRAS-CLAVE:** Ceratopogonidae; Sistemática; *Dasyhelea*; Perú; Brasil.

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