SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

A New Species of *Laranda* Walker 1869 (Orthoptera: Grylloidea, Phalangopsidae) from Remnant Patches of the Brazilian Atlantic Forest

Carina M. Mews[1], Cristiano Lopes-Andrade[1] and Carlos F. Sperber[2]

[1]*Programa de Pós-Graduação em Entomologia, Depto. Biologia Animal, Univ. Federal de Viçosa 36570-000, Viçosa, MG; carina@insecta.ufv.br, ciidae@gmail.com*
[2]*Lab. Orthopterologia, Depto. Biologia Geral, Univ. Federal de Viçosa, 36570-000, Viçosa, MG e-mail: sperber@ufv.br; corresponding author*

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Uma Nova Espécie de *Laranda* Walker 1869 (Orthoptera: Grylloidea, Phalangopsidae) de Remanescentes da Mata Atlântica Brasileira

RESUMO - O gênero *Laranda* possui seis espécies descritas e está confinado ao Sul e Sudeste do Brasil. Neste trabalho é descrita uma nova espécie, e a biologia e a distribuição do gênero são discutidas. A nova espécie pode ser distinguida das demais espécies do gênero pelas seguintes características: ausência de manchas amarelas no pronoto e base das tíbias posteriores; papila copulatória da fêmea: esclerotização em vista dorsal formando ângulos agudos opostos e lobos apicais estreitos e pequenos; genitália do macho: processo mediano do pseudepifalo curto e largo; parâmero pseudepifálico com ápice curvado e dobra ectofálica ultrapassando o ápice dos parâmeros. O gênero se distribui dentro do bioma Mata Atlântica; a nova espécie é encontrada sobre troncos de árvores, bem como sobre serrapilheira florestal.

PALAVRAS-CHAVE: Brasil, grilo, distribuição geográfica, ninfa

ABSTRACT - The genus *Laranda* has six described species and is confined to South and Southeast of Brazil. We describe a new species and discuss the biology and distribution of the genus. The new species can be distinguished from its known congeners by the following characteristics: absence of yellow spots on pronotum and base of posterior tibiae; female copulatory papilla: sclerotization in dorsal view forming opposing acute angles, apical lobes narrow and small; male genitalia: pseudepiphallic median process short and wide; pseudepiphallic paramere with apex incurved and ectophallic fold surpassing apex of the parameres. The genus is distributed within the Atlantic Forest biome; the new species is found on tree trunks, as well as on forest leaf litter.

KEY WORDS: Brazil, cricket, geographic distribution, nymph

The genus *Laranda* Walker 1869 currently comprises six species occurring in the South and Southeastern Brazilian regions: *L. tibialis* Walker, 1869; *L. major* Desutter-Grandcolas, 1994; *L. meridionalis* Desutter-Grandcolas, 1994; *L. castanea* Desutter-Grandcolas, 1994; *L. singularis* Desutter-Grandcolas, 1994; and *L. rogenhoferi* (Saussure, 1878).

According to Desutter-Grandcolas (1994), the monophyly of *Laranda* is ascertained by the following synapomorphies: (i) color of adults wholly dark, without annulated legs or bright facial marks (present in other Phalangopsidae); (ii) male genitalia with pseudepiphallic median process folded ventrally, beneath pseudepiphallus (differing from other groups of Phalangopsidae); (iii) copulatory papilla in the female genitalia with two apical lobes (unique in Phalangopsidae). Desutter-Grandcolas (1994) also mentioned as putative apomorphies the tilted setae located on inner crest of hind femur (upright in other Phalangopsidae) (Desutter-Grandcolas 1994) and integument with cuticular sculpture, visible with scanning electron microscopy (Desutter-Grandcolas 1994). As discussed by this author, the phylogenetic position of *Laranda* is still uncertain, as this taxon does not present the characters used to define groups within Phalangopsidae (Desutter 1988, 1990; Desutter-Grandcolas 1991, 1992a, b, 1993), and therefore it cannot be filed into any of them.

For only three species of *Laranda* (*L. meridionalis*, *L. tibialis* and *L. castanea*) schematic representations of male genitalia have been provided (Desutter-Grandcolas 1994). Males of *L. major*, *L. singularis* and *L. rogenhoferi* are unknown. The morphology of the copulatory papilla is thus the best available character to tell apart all the species of *Laranda*, although coloration and tibial spurs and spine may also be useful.

In this work, we describe *Laranda uai* sp. nov., the first species of *Laranda* reported to Minas Gerais State, Southeastern Brazil. This new species was first collected during a huge project on forest fragmentation, and was already mentioned by Sperber (1999) as "*Laranda* sp. A" and Ribas *et al*. (2005) as "*Laranda* sp".

Material and Methods

The field collections took place in Atlantic Forest remnants at Viçosa, Minas Gerais State, Brazil (20º45'30" to 20º50'00"S, 42º49'45" to 42º56'19"W), during the rainy seasons (November to February) of 1993 up to 2004. *Laranda uai* sp. nov. was collected upon leaf litter, using pitfall traps baited with faeces, carrion or banana; or manually, with oatmeal baits. Sperber *et al*. (2003) briefly described the areas where these field samples were taken.

L. tibialis was collected on walls and trunks of trees in Vale das Luas, Parque Estadual da Serra do Brigadeiro, Araponga, Minas Gerais State.

Analysis, comparisons and descriptions of general external morphology were made under a Leica MZ16. Measurements were taken under a stereomicroscope with a special scale ocular. Digital photographs of holotype and nymph were taken with a Canon S70. Images were arranged and standardized using image editing software.

To characterize male genitalia and female copulatory papilla of *Laranda uai* sp. nov., we used the nomenclature of Desutter (1987, 1988), with the modifications of Desutter-Grandcolas (2003). *L. uai* sp. nov. specimens were compared to *L. tibialis* specimens, and to published drawings of the remaining *Laranda* species (Desutter-Grandcolas 1994). To characterize geographic distribution of *Laranda*, we used GIS software to plot observed distribution and superposed it to recent maps for Brazilian biomes (IBGE 2004). We did not compare *L. uai* sp. nov. with *L. rogenhoferi,* because it was considered *incertae sedis* (Desutter-Grandcolas 1994).

Depositories. Holotype (male) and allotype (female) at Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP). Remaining paratypes kept at the Laboratório de Orthopterologia, Departamento de Biologia Geral, affiliated to the Museu de Entomologia da Universidade Federal de Viçosa (UFV), Minas Gerais, Brazil.

Laranda uai Mews, sp. nov. (Figs. 1-5)

Etymology. The specific epithet is derived from the word "uai", pronounced [waj], characteristic of the daily speech in Minas Gerais State. It is an interjection, expressing surprise, astonishment, scare, wonder, impatience; used to reinforce what has been said, wondering the interlocutor's doubt (Houaiss and Villar 2001).

Holotype. One male: Brazil, Minas Gerais, Viçosa, Fragmento P4, P4F1, 16.xii.1993, C. F. Sperber *leg*., #2994".

Diagnosis. This species can be distinguished from the other *Laranda* species by the following combination of characteristics: (i) absence of yellow spots on the pronotum (Fig. 1) and base of the posterior tibiae. Male genitalia: (ii) pseudepiphallic median process short and wide (Figs. 3A-D); (iii) pseudepiphallic paramere's hook with apex incurved towards frontal side (Fig. 3A), (iv) with large projection in its ventral side (arrow on Fig. 3C); (v) pseudepiphallic lobe large (pointed area) (Figs. 3A and D); (vi) ectophallic fold large, surpassing the parameres' apex in dorsal view (Fig. 3A). Female copulatory papilla: (vii) on dorsal view with the sclerotized portion of each side tapering to the middle, forming opposing acute angles (Fig. 4A); (viii) apical lobes narrow, comparatively small (Fig. 4B); (ix) laterally convex (Fig. 4C).

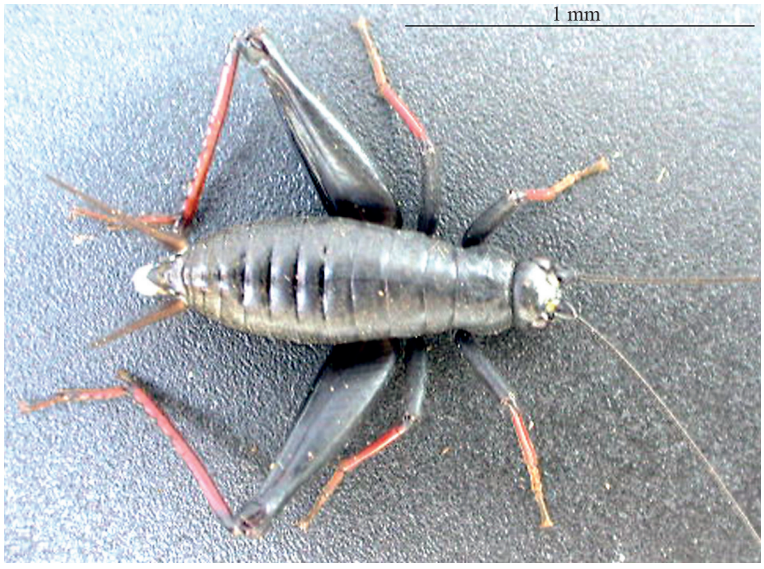

Fig. 1. *Laranda uai* sp. nov.: dorsal view of male holotype.

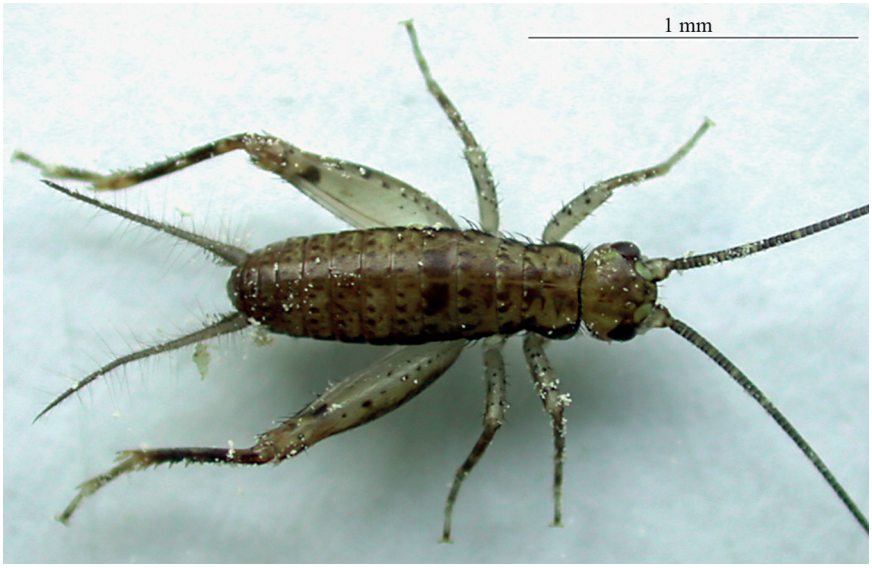

Fig. 2. *Laranda uai* sp. nov.: dorsal view of male nymph.

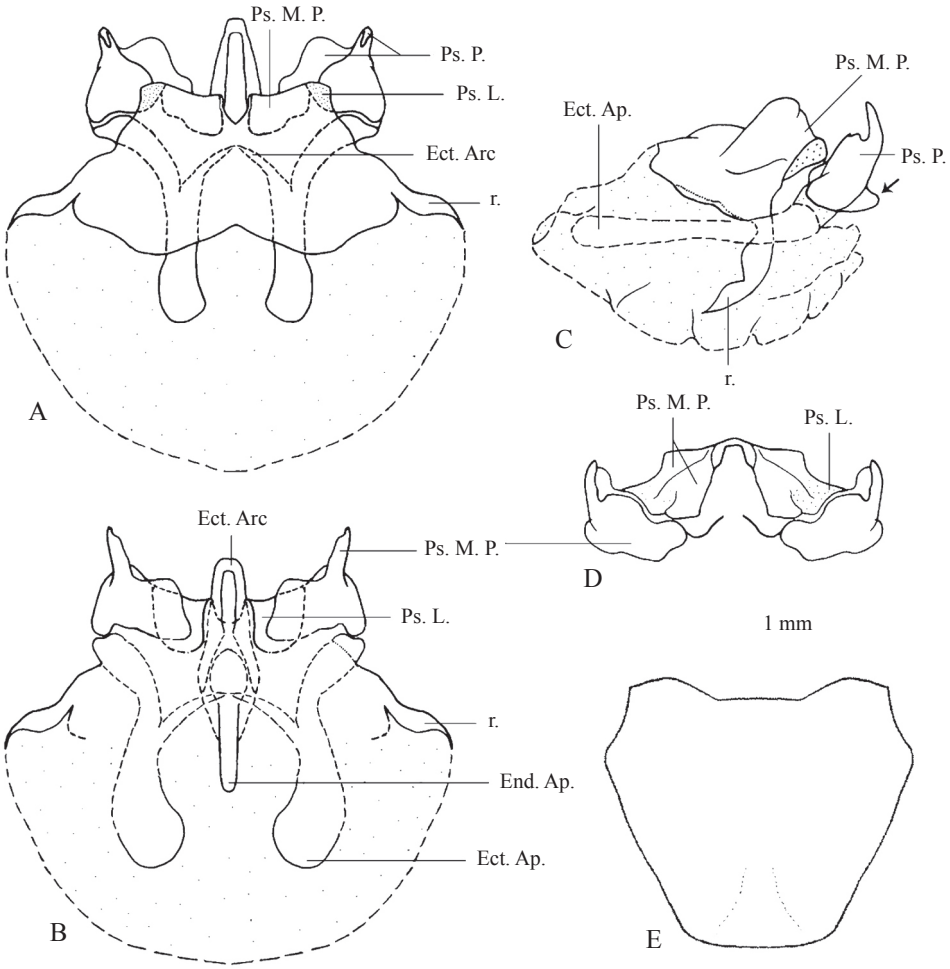

Fig. 3. *Laranda uai* sp. nov. Male genitalia on A) dorsal, B) ventral, C) lateral and D) posterior views. E. Subgenital plate. Arrow on ventral projection of pseudepiphallic paramere (B). Abbreviations: Ps. P.: pseudepiphallic paramere; Ps. L.: pseudepiphallic lobe; Ps. M. P.: pseudepiphallic median process; r: rami; Ect. Arc: ectophallic arc; Ect. F.: ectophallic fold; Ect. Ap.: ectophallic apodeme; End. Ap.: endophallic apodeme.

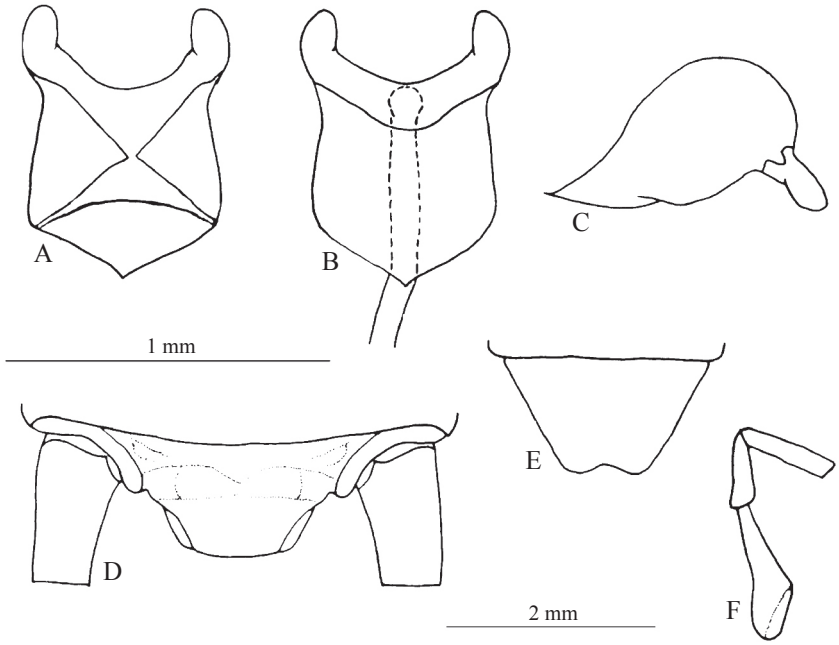

Fig. 4. *Laranda uai* sp. nov. Female copulatory papilla on A) dorsal, B) ventral and C) lateral views. D) Supra-anal plate. E) Subgenital plate. F) Maxillary palpi. Superior scale bar: A, B, C; inferior: D, E, F.

Male. Body uniformly dark brown (almost black) (Fig. 1) shining, slightly flattened. Antennae uniformly dark brown. Head dark brown, as the body. Clypeus, labrum, labial palpi and apex of maxillary palpi with pale portion. Disc of pronotum with a pair of shallow depressions; sculptures on tergite integument. Femora dark brown, prolonging the same coloration to base of tibiae. Remaining tibiae and tarsi reddish brown. On inner crest of hind femura there are tilted setae. Hind tibiae with four pairs of dorsal spurs; four to six spines in inner margin and nine to 14 in outer margin. Cerci reddish brown. Subgenital plate as in Fig. 4E. Phallic complex (Figs. 3A-D) relatively large; median indentation of the pseudepiphallus deep. Pseudepiphallic paramere's hook with apex incurved towards dorsal side (Fig. 3A); pseudepiphallic paramere with prominent projection on its ventral side (arrow in Fig. 3C). Pseudepiphallic median process large and broad (Fig. 3D), with slightly prominent apex (Fig. 3C). Rami short (Figs. A, B and C). Ventral valve reduced. Ectophallic apodeme not divergent (Fig. 3B). The ectophallic arc not totally sclerotized. Endophallic apodeme narrow and straight (Fig. 3B). Subgenital plate as on Fig. 3E.

Female. Coloration as male. Ovipositor light reddish-brown. Female genitalia (Figs. 4A-C) with copulatory papilla short, cylindrical and large. On dorsal view, median line membranous, laterally sclerotized (Fig. 4A). On ventral view, the copulatory papilla is entirely sclerotized, except for apical lobe, and base forms obtuse angle (Fig. 4B). On lateral view convex (Fig. 4C). Supraanal plate as in Fig. 4D. Subgenital plate slightly concave (Fig 4E). Maxilary palpi as in Fig. 4F.

Nymph. Body slightly flattened dorso-ventrally. Dorsum light-colored (Fig. 2), with two longitudinal dark stripes on each side, dark spots present in all visible tergites, two distinctly larger ones present on the third tergite. Head dark, bearing four light longitudinal dorsal stripes. Femora light yellow colored, with dark brown spots; tibiae and tarsi light reddish brown; cerci darker. Hind tibiae with one to three spines between the first and second pairs of dorsal spurs, and four to five between the second and third pairs. Subgenital plate as in adult.

Measurements in mm. Male (n = 3, including the holotype): body length: 17.2-20.4; head width: 3.4-3.5; intra-ocular distance: 0.70; pronotum length: 2.2-2.4; pronotum width: 4.2-4.6; femur III length: 12.1-12.5; tibia III length: 9.3-10.2. Female (n = 10): body length: 18.6-23.3; head width: 3.5-4.2; intra-ocular distance: 0.8-0.9; pronotum length: 2.0-3.3; pronotum width: 4.7-5.6; femur III length: 12.6-14.6; tibia III length: 9.3-11.2; ovipositor: 17.4-24.0.

Material examined. Holotype male: Viçosa, MG, Fragmento P4, P4F1, 16.xii.1993, Sperber *leg*. #2994; Allotype female: Mata da Biologia, 10.i.2002: #6048; Paratypes: one male Fragmento P1, P1F1, 13.i.1994: #3186; four male Mata da Biologia, 10.i.2002: #6086; 8.iii.1998: #6500; 13.xi.2002: #6503: M18C3, 21.i.1995: #3416; Mews *leg*. 24.xi.2004: #6570; one female Fragmento P4, P4F3, 16.xii.1993: #2978; three female Fragmento GER, G63C1, 17.xii.1993: #2221; eight female Mata da Biologia, Sperber *leg*. 10.i.2002: #6081, #6045; 8.iii.1998: #6501; 13.xi.2002: #6502; Mews *leg*. 24.xi.2004: #6571, #6572, #6573, #6574 and two nymphs female: #6575, #6576.

Discussion

The geographical occurrence of *L. uai* sp. nov., within the Atlantic forest biome, confirms Desutter-Grandcolas' (1994) suggestion that *Laranda* is endemic to this biome (Fig. 5).

We found adults and nymphs of *L. uai* sp. nov. active at night, generally above 1 m height, on tree trunks, branches and flat surfaces, such as walls, and rarely on leaf litter. *L. uai* sp. nov. individuals move very quickly, climbing in spiral trajectories up the tree trunk when threatened. According to Desutter-Grandcolas' classification (Desutter-Grandcolas *et al*. 1998), *L. uai* sp. nov. is dendrophilous, with nocturnal habit. This coincides with the observations of Desutter-Grandcolas (1994) for the other described *Laranda* species.

The habit of *L. uai* sp. nov. nymphs, particularly their coloration, is remarkably distinct from the adult. Nonetheless, it can be distinguished from other co-occurring species. To our knowledge this is the first cricket (Grylloidea) species description that includes nymph characters. Detecting nymph diagnostic features in crickets is difficult, but very important, particularly for ecological studies.

Laranda species differ in body morphology from all other Phalangopsidae (Desutter 1988, 1990; Desutter-Grandcolas, 1991, 1992a, b, 1993) in being dorso-ventrally flattened. This may be an adaptation to hide under bark and in narrow natural crevice during the day, opposed to the remaining Phalangopsidae, which hide within tree hollows (Desutter-Grandcolas 1994).

L. uai sp. nov. is close to *L. tibialis*, due to similarities in the male genitalia, female copulatory papilla, number of subapical spurs of the hind tibia, coloration of the body and legs.

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Fig. 5. Geographic distribution of *Laranda* Walker, 1869 species in South and Southeast of Brazil. Legend: 1 - *L. major*; 2 - *L. castanea*; 3 - *L. uai* sp. nov.; 4 - *L. tibialis*; 5 - *L. singularis*; 6 - *L. meridionalis* (Modified to IBGE 2004).

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