SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

Five New Species of the Neotropical Genus *Ganodes* Townes (Hymenoptera: Ichneumonidae)

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Cinco Novas Espécies do Gênero Neotropical *Ganodes* Townes (Hymenoptera: Ichneumonidae)

RESUMO - Cinco espécies do gênero Neotropical *Ganodes* Townes, coletadas no México, Venezuela, Brasil e Argentina, são descritas e ilustradas: *G. bocaina, G. garciai, G. mexicanus, G. townesi* y *G. wahli*. É apresentada uma chave para sete espécies, incluindo duas descritas anteriormente, *G. balteatus* Townes e *G. matai* Gauld.

PALAVRAS-CHAVE: Poemeniinae, distribuição, chave de identificação

ABSTRACT - Five new species of the Neotropical genus *Ganodes* Townes, from Mexico, Venezuela, Brazil and Argentina, are described and illustrated: *G. bocaina, G. garciai, G. mexicanus, G. townesi* and. *G. wahli*. A key to seven species is provided, including two species described previously, *G. balteatus* Townes and *G. matai* Gauld.

KEY WORDS: Poemeniinae, distribution, key to species

Ganodes comprises seven rather similar species, extending from tropical Mexico south to Brasil and Argentina. Only two of them are described: *G. balteatus* Townes 1957 from Brasil and G. *matai* Gauld 1991 from Costa Rica.

Townes and Townes (1966) and Townes (1969) kept *Ganodes* into tribe Poemeniini, subfamily Pimplinae, but Gauld (1991) interpreted Poemeniini more broadly and recognized it as subfamily comprising ten genera, placed in three groups, the *Rodrigama* genus-group, the *Pseudorrhyssa* genus-group and the *Poemenia* genus-group. Later, Wahl & Gauld (1998) give a cladistic analysis of the genera of Poemeniinae, and divide the subfamily into three tribes: Pseudorhyssini, Rodrigamini and Poemeniini.

Ganodes is the only genus belonging to Poemeniini that occurs in the Neotropical Region (Wahl & Gauld 1998). The genus has two autapomorphies: tarsal claws of fore and middle legs of female with small teeth and vein 3rs-m of fore wing present. Additionally, species studied share two very conspicuous features: mesoscutum black with two pairs of white spots and hind leg with coxae and particularly trochantellus very elongate.

The species of *Ganodes* have a very slender flexible ovipositor which does not seem to be suitable for boring, like many species of Poemeniini and *Pseudorrhyssa*. Nothing is known about the biology of species of *Ganodes*, but there is a possibility that it might be biologically similar to *Pseudorrhyssa* (Gauld 1991).

Material and Methods

G. balteatus and *G. matai* were identified through comparison with paratypes provided by the NHM and the AEI. The following institutions provided specimens for this study:

AEI: the American Entomological Institute, Gainesville, USA

INBio: Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica

MIZA: Museo del Instituto de Zoología Agrícola, Maracay, Venezuela

NHM: The Natural History Museum, British Museum, London, UK

UCOB: Museo de la Universidad Centroccidental Lisandro Alvarado, Tarabana, Lara, Venezuela.

The nomenclatural treatment, morphological terminology and taxonomic characters used here follow the work of Gauld (1991).

Key to Species

1. Hind coxa and femur white with longitudinal black stripes (Fig. 1)..... 2

-. Hind coxa and femur without longitudinal black stripes..... 3

2. Face wholly white (cf Fig. 2); metapleuron with coarse

punctures ..... *G. matai* Gauld
-. Face white with a narrow longitudinal black stripe (Fig. 3); metapleuron with sparse and fine punctures ……..……..…..... *G. mexicanus* sp. nov.

3. Hind femur light orange (Fig. 4); face wholly white (Fig. 2) …..... *G. wahli* sp. nov.
-. Hind femur black ……..….....……. 4

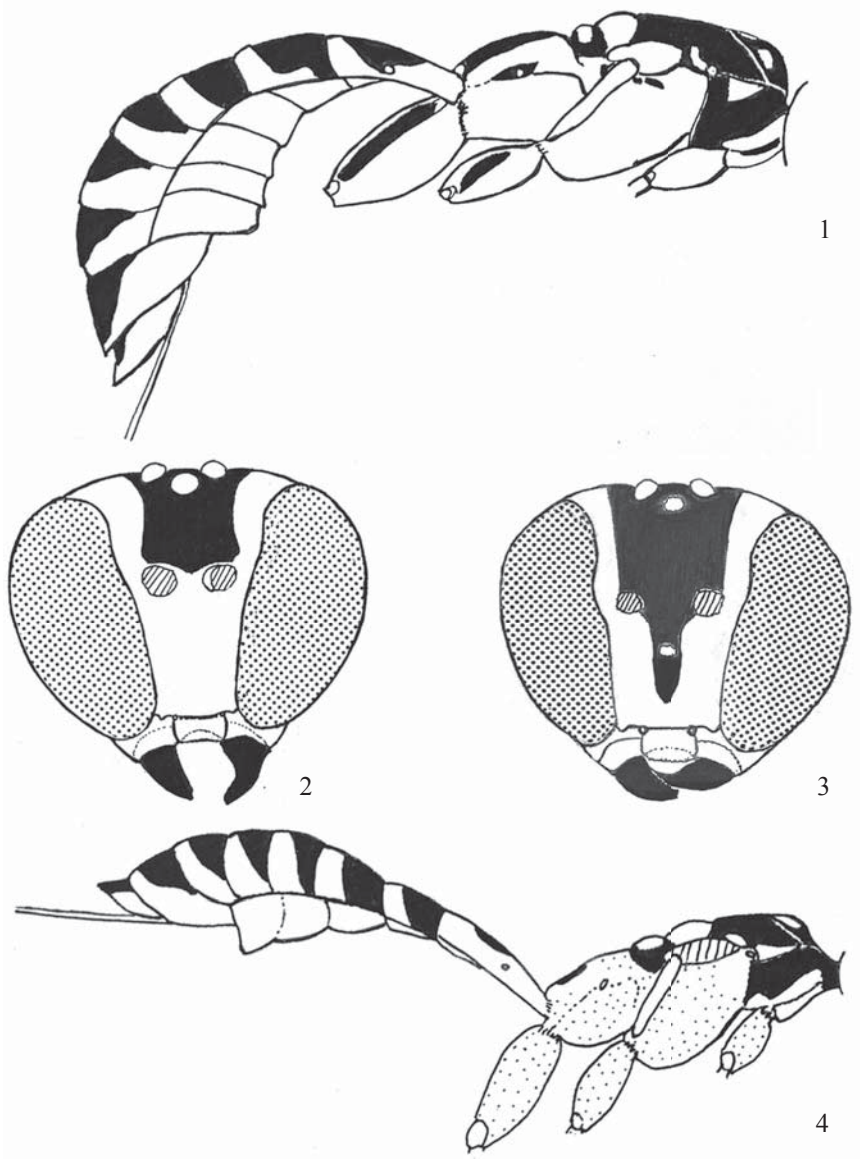
4. Hind coxa fulvous …..…….……. 5
-. Hind coxa black ……..……... 6

5. Fore coxa fulvous; mesopleuron and metapleuron fulvous, metapleuron with fine punctures (Fig. 5) .... *G. balteatus* Townes
-. Fore coxa black and white; metapleuron extensively white; mesopleuron with a broad diagonal white band surrounded by black (Fig. 6), metapleuron with very coarse punctures …… ……..…..…*G. bocaina* sp. nov.

6. Face wholly white; lateral margins of tergites II-IV white (Fig. 7); speculum with coarse punctures, lateral part of propodeum rugose- punctuate ..... *G. garciai* sp. nov.
-. Face white with a narrow longitudinal black stripe (cf Fig. 3); lateral margins of tergites II-IV black (Fig. 8); speculum with fine punctures, lateral part of propodeum evenly and finely punctuate ……..……...…. *G. townesi* sp. nov.

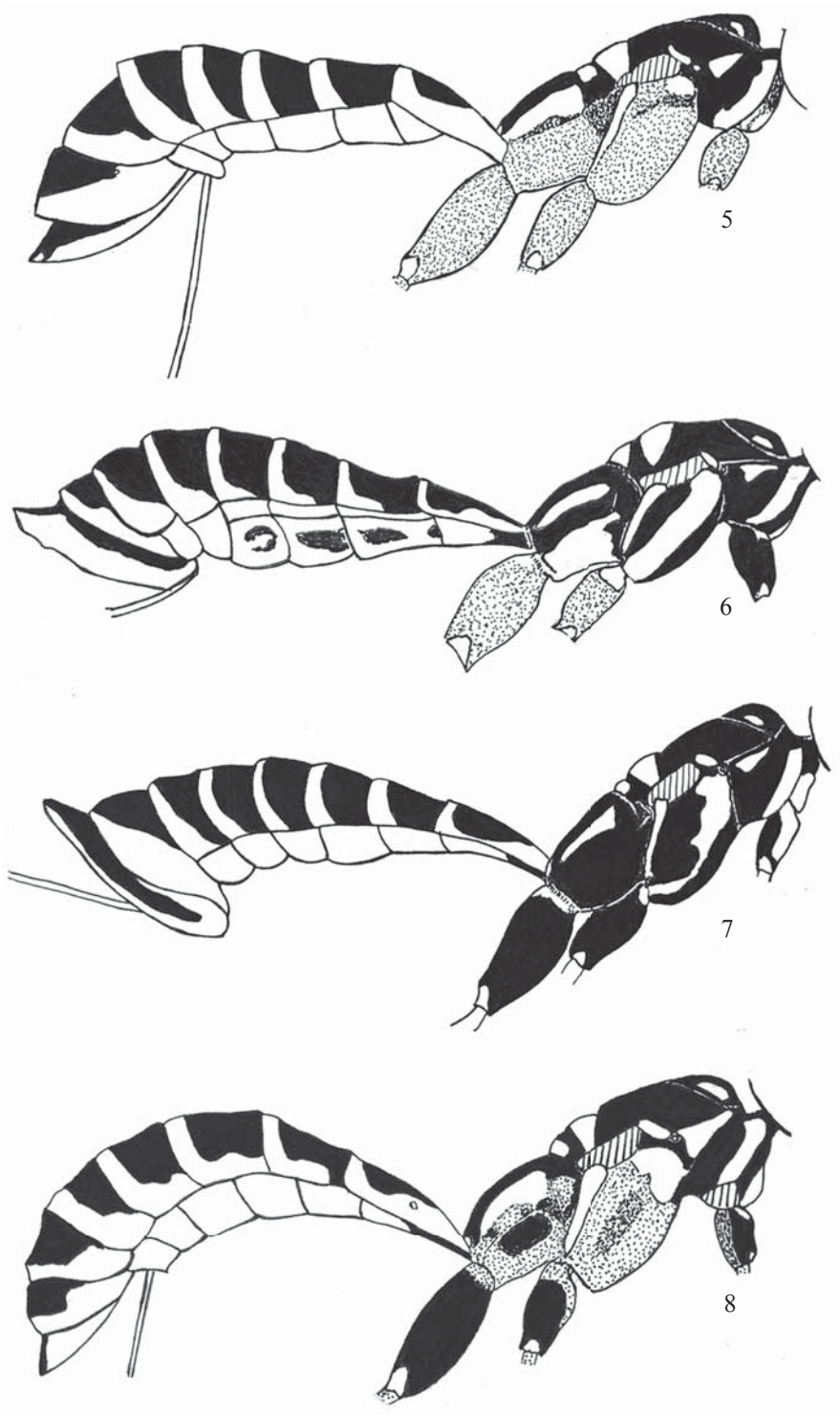
Ganodes bocaina **Díaz sp. nov.** (Fig. 6)

Female. Face 0.7-0.8 times as broad as high; face polished,



Figs. 1-4. 1. *Ganodes mexicanus*, mesosoma and metasoma showing color pattern; 2. *Ganodes wahli*, head anterior view; 3. *Ganodes mexicanus*, head anterior view; 4. *Ganodes wahli*, mesosoma and metasoma showing color pattern.

centrally slightly striate, laterally striate punctate; posterior ocellus separated from eye by 1.5-1.6 times its own maximum diameter. Mesoscutum barely polished, finely and sparsely punctate; scutellum flattened. Mesopleuron finely punctate, centrally tending to rugose. Metapleuron closely and coarsely punctate. Propodeum dorsally finely transversely striate, laterally tending to rugose punctate. Fore wing length 10.0-12.7 mm. Metasoma with tergite I anteriorly coriaceous,



Figs. 5-8. 5. *Ganodes balteatus*, mesosoma and metasoma showing color pattern; 6. *Ganodes bocaina*, mesosoma and metasoma showing color pattern; 7. *Ganodes garciai*, mesosoma and metasoma showing color pattern; 8. *Ganodes townesi*, mesosoma and metasoma showing color pattern.

posteriorly smooth, laterally slightly striate and with scattered punctures, without lateromedian carina; tergites II-IV closely punctate, with posterior margin smooth. Ovipositor projecting beyond apex of sternite by 2.5-2.6 times length of hind tibia.

Head black with clypeus, face, lower part of gena, frontal orbits and occipital margin white. Antenna black with a flagellar white band in flagellomeres 9-16. Mesosoma white with black as follows: lateral and posterior margins of propleuron, a broad stripe centrally on pronotum, from collar to lower corner, extending up to spiracle; mesoscutum entirely, except for two pairs of white spots; a broad stripe along mesopleural suture, area between mesopleuron and mesosternum; basal and lower margin of metapleuron; a broad stripe dorsally and a narrow stripe along pleural suture on propodeum. Metasoma black with lateral and posterior margins of all tergites white yellowish. Fore leg with coxa black in upper surface, white in lower surface, trochanters and femur blackish in upper surface, yellow in lower surface, tibia yellow, two first tarsomeres slightly infuscate in upper surface, yellow in lower surface, rest of tarsus infuscate. Middle leg with coxa fulvous, its extreme basal apex white, trochanters red, femur black except for its lower surface yellow, tibia and tarsus yellow, last three tarsomeres infuscate, infuscation stronger in upper surface. Hind leg with coxa fulvous, its extreme basal apex white, trochanters fulvous, femur black, tibia and tarsus yellow, last tarsomere infuscate. Wings hyaline, pterostigma blackish.

Male. Unknown

Variations. Two specimens has white in speculum, and middle and hind coxae are tinged with black

Etymology. This species is named after the type locality. In Tupi-Guarani language bocaina means way to highlands.

Remarks. *G. bocaina* can be easily distinguished by its color pattern, has the fore coxa black and white and the metapleuron extensively white.

Material examined. Holotype female, Brasil, *Sao Paulo*, S J Barreiro, Serra da Bocaina, 1650 m. XI-1968. Alvarenga & Seabra (AEI). Paratypes: two females, same data as holotype (AEI).

Ganodes garciai Díaz sp. nov. (Fig. 7)

Female. Face 0.7-0.8 times as broad as high; face polished, with fine, weak punctures; posterior ocellus separated from eye by 1.3-1.4 times its own maximum diameter. Mesoscutum barely polished, finely and closely punctate; scutellum flattened. Mesopleuron finely and closely punctate, except along lower half of mesopleural suture, the punctures on speculum stronger and coarser. Metapleuron sparsely and strongly coarsely punctate. Propodeum dorsally finely transversely striate, laterally tending to rugose. Fore wing length 9.0-11.2 mm. Metasoma with tergite I polished, almost impunctate, without lateromedian carina; tergite II dorsally almost impunctate, tergites III-IV finely and closely punctate, with posterior margin smooth. Ovipositor projecting beyond apex of sternite by 2.4-2.7 times length of hind tibiae.

Head black with clypeus, face, lower part of gena, frontal orbits and occipital margin white. Antenna black with a flagellar white band in flagellomeres 8-17. Mesosoma black with white as follows: propleuron, upper and lower margins of pronotum, two pairs of marks on mesoscutum along notauli, scutellum, central part of metanotum, tegula, a broad irregular band across mesopleuron, subalarum, mesepimeron and a lateral stripe on propodeum. Metasoma black with lateral and posterior margins of tergite I and posterior margin of remaining tergites white.

Fore leg: coxa, trochanters and femur with upper surface black, its lower surface yellowish white. Tibia and basitarsus yellow, rest of tarsus infuscate. Middle leg with coxa black, its extreme basal apex yellowish, trochanters and femur blackish dorsally, tibia yellow, tarsus infuscate. Hind leg with coxa, trochanters and femur black, tibia and tarsus yellow, last two tarsomeres blackish. Wings hyaline, pterostigma brown.

Male. Unknown

Variations. the specimen from Bolivar state, Venezuela, has the metasomal segments almost impunctate, the first metasomal segment has the lateral margin black, the flagelar white band in flagellomeres 5-19, the mesopleural white band is complete and the metapleuron has two white spots.

Etimology. This species is named in honour of José Luis García, for his invaluable contributions to the knowledge of Venezuelan proctotrupoids.

Remarks. This species differs from all other species in having hind coxa and femur, metapleuron and most of mesopleuron black.

Material examined. Holotype, female. Venezuela, *Lara*, Terepaima National Park, Sector Los Naranjos, vía Río Claro. 1500 m. X-2006, F. A. Díaz (UCOB). Paratypes: One female, Venezuela, *Lara*, Yacambú National Park, Sector El Blanquito, 1400 m. IV-2006, F. A. Díaz (UCOB). One female, Venezuela, *Bolívar*, 10 km N Luepa, Gran Sabana, 1500 m, VI-VIII-1967, S & J. Peck (AEI).

Ganodes mexicanus Díaz sp. nov. (Figs. 1, 3)

Female. Face 0.8 times as broad as high; lower face polished, with fine, weak punctures; posterior ocellus separated from eye by 1.5 times its own maximum diameter. Mesoscutum polished, finely and sparsely punctate, scutellum flattened. Mesopleuron centrally polished, with close shallow punctures, laterally impunctate along mesopleural suture, upper part of mesepimeron with scattered punctures. Metapleuron very convex, finely and sparsely punctate. Propodeum dorsally finely transversely striate, laterally with striae grading to rugose-punctate. Fore wing length 12.0 mm. Metasoma with tergite I polished, with scattered punctures, without lateromedian carina; tergites II-IV rather evenly convex, closely punctate, with posterior margin smooth. Ovipositor projecting beyond apex of sternite by 2.1 times length of hind tibiae.

Head black with clypeus, face, except for a black central narrow stripe, lower part of gena, frontal orbits and a triangular spot below the center of occipital carina white. Antenna black with a central white flagellar band in flagellomeres 8-20. Mesosoma white, black marked as follows: pronotum entirely except for a triangular white spot in its upper part, mesoscutum entirely except for two pairs of white spots,

a short stripe between mesopleuron and mesosternum, the posterior extreme apex of scutellum, a broad stripe dorsally along propodeum and a narrow lateral stripe along pleural carina. Metasoma black with lateral and posterior margins of tergite I and posterior margin of remaining tergites all broadly white. Legs predominantly white. Fore coxa with one longitudinal black stripe; middle and hind coxae with two longitudinal black stripes; upper surface of trochanters and femora with longitudinal black stripes, fore and middle tibiae and tarsi slightly infuscate; hind tibia and tarsus yellow. Wings hyaline, pterostigma brown.

Male. Unknown

Etimology. This species is named for the country where the holotype was collected.

Remarks. *G. mexicanus* is similar in color to *matai* but *mexicanus* has a black longitudinal stripe in the face, which is absent in matai, Besides, mexicanus has the metapleuron sparsely and finely punctate, *matai* has it coarsely punctate.

Material examined. Holotype: female. Mexico, *Oaxaca*, 6 mil. S. Valle Nacional. 20-V-1971. Henry Howden. (AEI).

Ganodes townesi Díaz sp. nov. (Fig. 8)

Female. Face 0.8 times as broad as high; face polished, with fine weak punctures; posterior ocellus separated from eye by 1.3 times its own maximum diameter. Mesoscutum polished, very finely and closely punctate, scutellum flattened. Mesopleuron finely and closely punctate except along mesopleural suture. Metapleuron very closely and strongly coarsely punctate. Propodeum dorsally finely transversely striate, laterally punctate. Fore wing length 12.5 mm. Metasoma with tergite I almost impunctate, without lateromedian carina; tergite II dorsally almost impunctate, tergites III-IV closely punctate, with posterior margin smooth. Ovipositor projecting beyond apex of sternite by 2.3 times length of hind tibiae.

Head black with clypeus, face, except for a black central narrow stripe, lower part of gena, frontal orbits and occiput along lateral portion of occipital carina white. Antenna black with a flagellar white band in segments 8-18. Mesosoma colored as follows: propleuron black with a white spot, pronotum white with a broad black stripe from collar to lower corner, mesoscutum entirely black except for two pair of black spots, scutellum white, its posterior margin black, central part of metanotum and tegula white; mesopleuron reddish with subalarum, a spot below subalarum and mesepimeron white. Metapleuron with upper half black, its lower half reddish. Propodeum dorsally black, laterally white, along pleural carina blackish red. Metasoma black with lateral and posterior margins of all tergites white. Fore leg with coxa black, its lower surface extensively white; trochanters, femur and last three tarsomeres infuscate, tibia and rest of tarsus yellow. Middle leg with coxa red, its upper surface blackish, rest of middle leg infuscate. Hind leg with coxa, trochanters and femur black, tibia and tarsus yellow, last tarsomere blackish. Wings hyaline, pterostigma brown.

Male. Similar in structure and color. Wings broken.

Etimology. This species is named in memory of Henry K. Townes.

Remarks. *G. townesi* has a black longitudinal stripe in face, and hind coxa and femur black.

Material examined. Holotype female, Argentina, *Jujuy*, Jujuy. 14-I-1966. H. & M. Townes. (AEI) Paratype: one male, same data as holotype, collected 16-I-1966 (AEI).

Ganodes wahli Dìaz sp. nov. (Figs. 2, 4)

Female. Face 0.70-0.80 times as broad as hig; face polished, sparsely punctate; posterior ocellus separated from eye by 1.4-1.7 times its own maximum diameter. Mesoscutum barely polished, sparsely punctate, its center with transverse irregular striae; scutellum flattened. Mesopleuron polished along lower half of mesopleural suture, rest of mesopleuron with close shallow punctures. Metapleuron closely and slightly coarsely punctate. Propodeum dorsally finely transversely striate, laterally with striae grading to rugose-punctate. Fore wing length 9.3-11.3 mm. Metasoma with tergite I smooth and polished, almost impunctate, without lateromedian carina; tergites II-IV closely punctate, with posterior margin smooth. Ovipositor projecting beyond apex of sternite by 2.3-2.7 times length of hind tibiae.

Head black with clypeus, face, lower part of gena, frontal orbit and occipital margin white. Antenna black with a flagellar white band in segments 8-9 to 17-18. Mesosoma colored as follows: propleuron white, pronotum white with a centrally black band from collar to lower corner that extends up to spiracle, mesoscutum entirely black except for two pairs of white spots, scutellum white surrounded by black, metanotum black except for its central part white, subalarum and mesepimeron white, rest of mesopleuron orange except for a diagonal white stripe below subalarum, propodeum dorsally red with a pair of black contiguous stripes, laterally with a white stripe, rest of propodeum reddish. Metasoma black with anterior, lateral and posterior margins of tergite I and posterior margin of remaining tergites white. Fore and middle legs predominantly orange yellowish, last three tarsomeres infuscate, hind legs orange, tibia and tarsus yellow, last tarsomere infuscate. Fore wing hyaline, pterostigma brown.

Male. Similar in structure and color, but fore wing 5.0-9.0 mm.

Variations. Mainly in color, metapleuron varies from yellowish to orange, the black stripes in propodeum can occupy all the dorsum or can be very reduced, the diagonal white stripe in mesopleuron can be present as a broad band from subalarum to base of mid coxa or can be absent and mesopleuron is wholly orange.

Etimology. This species is named in honor of David B. Wahl for his invaluable contributions to the study of Ichneumonidae.

Remarks. *G. wahli* can be easily distinguished by its color pattern, it has the coxae and femora light orange.

Material examined. Holotype, female: Venezuela, *Lara*, Terepaima Nacional Park, 1000 m. V-2006, T. Malaise, F. A. Díaz & J. Díaz (UCOB). Paratypes: five males, same data as holotype (UCOB). two females, three males, Venezuela, *Lara*, Yacambú National Park, sector El Blanquito, 1480 m.,

VIII-2006, yellow pan trap, F. A. Díaz & F. Sosa (UCOB). One male, BRAZIL, *Bahia*, Encruzilhada, 980 m, XI-1974, M. Alvarenga (AEI).

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