The presence of *Chane* Nieto and *Guajirolus* Flowers (Ephemeroptera, Baetidae) in Brazil with the description of a new species

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ABSTRACT. The presence of *Chane* Nieto and *Guajirolus* Flowers (Ephemeroptera, Baetidae) in Brazil with the description of a new species. The related genera *Chane and Guajirolus* are reported for the first time from Brazil. *Guajirolus rondoni*, **sp. n.** is described based on nymphs from Rondônia State and can be differentiated from the other species of the genus by the following combination of characteristics: 1) mandibles with minute spicules on outer margin; 2) maxillary palp three-segmented; 3) hypopharynx lingua with three rounded processes; 4) projection of second segment of labial palp with apex narrower than base; 5) abdominal color pattern; and 6) paraprocts with 13 to 15 organized spines. An updated key to the species of both genera is presented.

KEYWORDS. *Chane baure*; distribution; *Guajirolus rondoni*; Neotropics; taxonomy.

RESUMO. Presença de *Chane* Nieto e *Guajirolus* Flowers (Ephemeroptera, Baetidae) no Brasil com a descrição de uma nova espécie. Os gêneros relacionados *Chane* e *Guajirolus* são pela primeira vez registrados para o Brasil. *Guajirolus rondoni*, **sp. n.**, é descrita com base em ninfas do Estado de Rondônia e podem ser diferenciadas das demais espécies do gênero pela seguinte combinação de caracteres: 1) mandíbulas com pequenas espículas na margem externa; 2) palpo maxilar tri-segmentado; 3) língua da hipofaringe com três processos arredondados; 4) projeção do segundo artículo do palpo labial relativamente mais estreito no ápice do que na base; 5) padrão de coloração abdominal; e 6) paraproctos com 13 a 15 espinhos organizados. Uma chave atualizada para as espécies de ambos os gêneros é apresentada.

PALAVRAS-CHAVE. *Chane baure*; distribuição; *Guajirolus rondoni*; Neotropical; taxonomia.

In the last ten years the number of works dealing with the small minnow mayfly fauna (Ephemeroptera, Baetidae) from South America improved considerably. Until 1995 only eight genera were recorded from the region, contrasting with the 28 reported nowadays. In the meantime, Lugo-Ortiz & McCafferty (1999) gave evidences that two genera extensively recorded from South America, *Baetis* Leach, and *Pseudocloeon* Klapálek, are not represented in this area.

Among the South American countries, Brazil is the best documented, with the following genera reported until now: *Adebrotus* Lugo-Ortiz & McCafferty, 1995, *Americabaetis* Kluge, 1992, *Apobaetis* Day, 1955, *Aturbina* Lugo-Ortiz & McCafferty, 1996, *Baetodes* Needham & Murphy, 1924, *Callibaetis* Eaton, 1881, *Camelobaetidius* Demoulin, 1966, *Cloeodes* Traver, 1938, *Cryptonympha* Lugo-Ortiz & McCafferty, 1998, *Harpagobaetis* Mol, 1986, *Moribaetis* Waltz & McCafferty, 1985, *Paracloeodes* Day, 1955, *Rivudiva* Lugo-Ortiz & McCafferty, 1998, *Spiritiops* Lugo-Ortiz & McCafferty, 1998, *Tomedontus* Lugo-Ortiz & McCafferty, 1995, *Tupiara* Salles *et al.*, 2003, *Varipes* Lugo-Ortiz & McCafferty, 1998, *Waltzoyphius* McCafferty & Lugo-Ortiz, 1995, and *Zelusia* Lugo-Ortiz & McCafferty, 1998 (Salles *et al.* 2004, Nieto & Salles 2006). Except for some genera probably endemic to the Andes and Patagonia (as *Andesiops* Lugo-Ortiz & McCafferty, 1999, *Nanomis* Lugo-Ortiz & McCafferty, 1999, and *Mayobaetis* Waltz & McCafferty, 1985), the remaining genera reported from South America maybe represented in Brazil [e.g. *Corinnella* Thomas & Dominique, 2005, known exclusively from French Guyana (Dominique *et al.* 2005, Thomas & Dominique 2006)]. Their absence should be due the lack of surveys in several areas of the country, as was the case of *Harpagobaetis* and *Varipes*, recently found from West-Central Brazil (Salles & Lugo-Ortiz 2002, Salles & Batista 2004).

Herein, intending to contribute to the knowledge of the small minnow mayfly fauna from Brazil, two related genera of Baetidae are reported for the first time from the country, *Chane* Nieto, 2003, and *Guajirolus* Flowers, 1985. A new species of *Guajirolus* is also described from Rondônia State, and an updated key to the nymphs of the species of both genera is presented.

MATERIAL AND METHODS

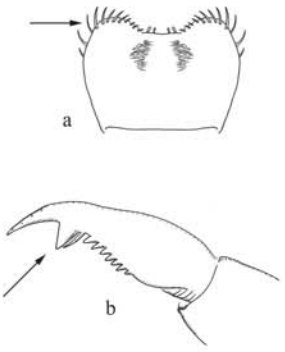
Material deposition is abbreviated as follows: Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA), Zoological Collection of the Universidade Federal do Espírito Santo (UFES), and Instituto-Fundación Miguel Lillo, Tucumán, Argentina (IFML).

Line drawings presented in the key, except for *C. baure* and *G. rondoni* **sp. n.**, are modified from the original papers (Flowers 1985, Lugo-Ortiz & McCafferty 1995, Nieto 2003, Thomas *et al.* 2005).

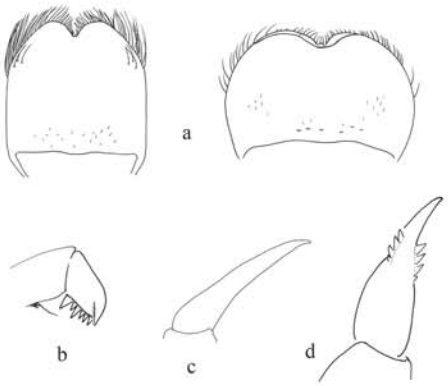
RESULTS

Key to the nymphs of the species of *Chane* Nieto and *Guajirolus* Flowers.

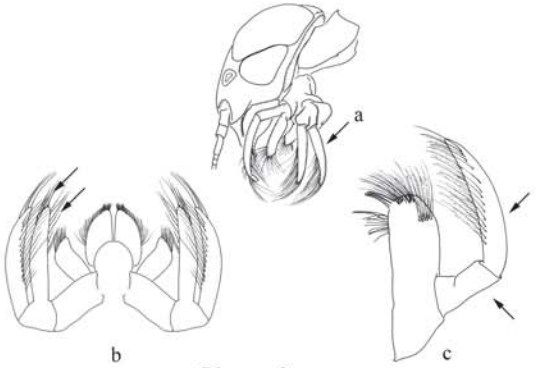
1. Labrum with a row of spines on the ventral surface (a); tarsal claws with a subapical denticle larger than the preceding ones (b)... 2



1'. Labrum may presents setae on ventral surface, but never spines (a); tarsal claws variable, but never with a subapical denticle larger than the preceding ones (b-d)... other Baetidae (not keyed further)

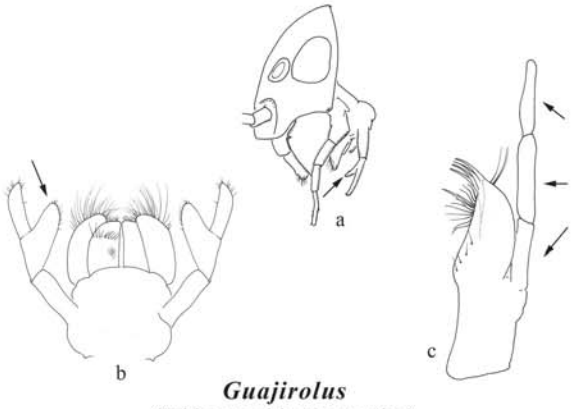


2(1). Segment 2 of labial palp extremely enlarged, dorsal surface with two rows of long, fine, simple setae (a,b); maxillary palp two segmented (a,c)



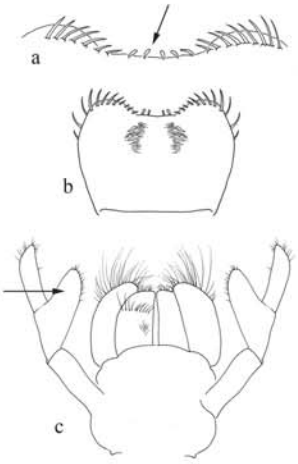
Chane baure
(Bolivia and Brazil)

2'. Segment 2 of labial palp enlarged, dorsal surface without rows of long, fine, simple setae (a,b); maxillary palp three segmented (c)... 3

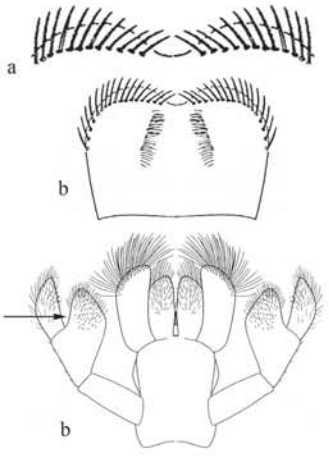


Guajirolus
(Widespread in Neotropics)

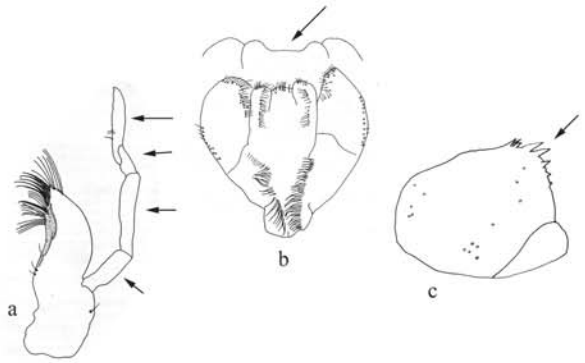
3(2'). Anterior emargination of labrum with stout setae and subequal in width to lateral process (a, b); projection of the second segment of labial palp with apex narrower than base (c)... 4



3'. Anterior emargination of labrum without stout setae and narrower than lateral process (a, b); projection of the second segment of labial palp with apex as broad as base (b)... 5

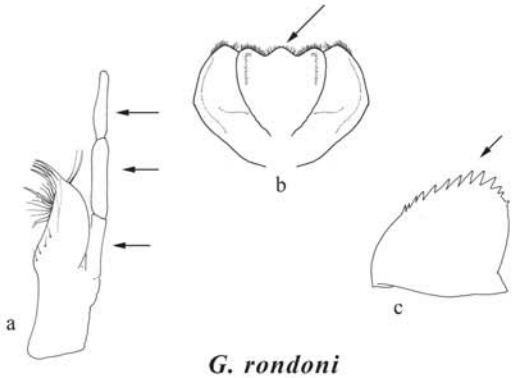


4(3). Maxillary palp four-segmented (a);
medial process of hypopharynx reduced, flattened (b);
paraprocts with 5 to 6 marginal spines (c)



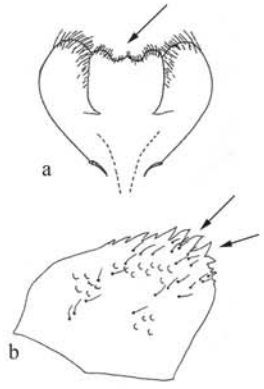
G. flowersi
(French Guyana)

4'. Maxillary palp three-segmented (a);
medial process of hypopharynx rounded (b);
paraprocts with 13 to 15 marginal spines (c)



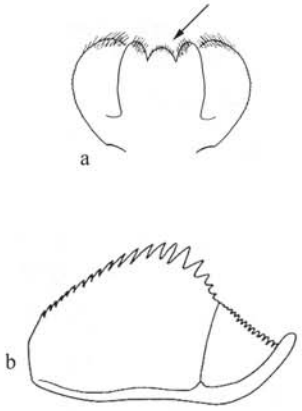
G. rondoni
(Brazil)

5(3'). Medial process of hypopharynx apically pointed (a);
paraprocts with unorganized spination (b)

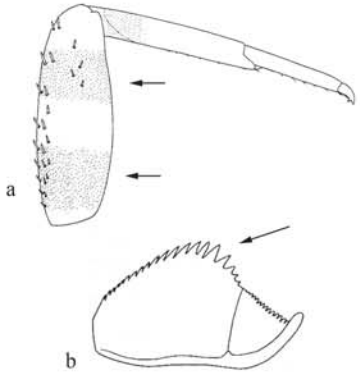


G. ektrapeloglossa
(Colombia and Panama)

5'. Medial process of hypopharynx rounded (a);
paraprocts with organized spination (b)... 6

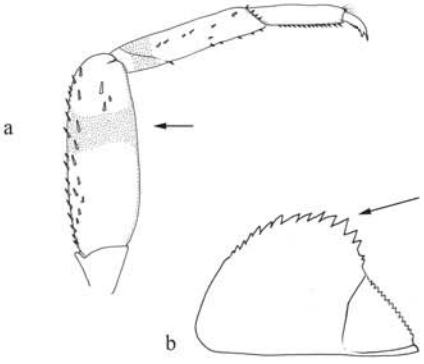


6(5'). Body size 3 to 4 mm;
femora with two broad brown bands (a);
paraprocts with 20 to 22 marginal spines (b)



G. nanus
(Costa Rica)

6'. Body size 4.8 to 5 mm;
femora with one broad brown band (a);
paraprocts with approximately 15 marginal spines (b)



G. queremba
(Argentina)

***Guajirolus rondoni* sp. n.**
(Figs. 1–13)

Mature nymph. Length of body: 3.3-4.0 mm; caudal filaments 1.7-1.8 mm.

Head. Whitish, compound eyes black. Antennae yellowish-white. Mouthparts: Labrum (Fig. 2) with numerous long, fine setae dorsally, a row of 12-13 spines on ventral surface at anterior and lateral margin, and upper surface depressed along midline with 4-6 stout setae anteriorly (Fig. 3). Mandibles (Figs. 4, 5) with minute spicules on outer margin, and tuft of setae between prostheca and mola. Maxillae (Fig. 6) with four large spine-like teeth, apex of galea-lacinia with two spine like setae and a row of long setae; galea-lacinia subequal to stipes; palp 3 segmented, first and second segments subequal, third 0.5 longer than the others combined. Hypopharynx (Fig. 7) lingua with rounded medial process. Labium (Fig. 8) with ventral surface of paraglossae with long and fine setae and glossae with short and fine setae; dorsal surface of glossae with large spine-like setae; projection of second segment of labial palp with apex narrower than base.

Thorax. Yellowish brown. Pro, meso and metathorax with a median yellowish irregular band (Fig. 1). Sterna yellowish. Legs yellowish-white, fore femur (Fig. 9) with two rows of short spines on dorsal edge, middle and hind femora with a single row of short spines. Claws (Fig. 10) with 7-9 denticles, the subapical larger than the preceding ones. Hind wing pads absent.

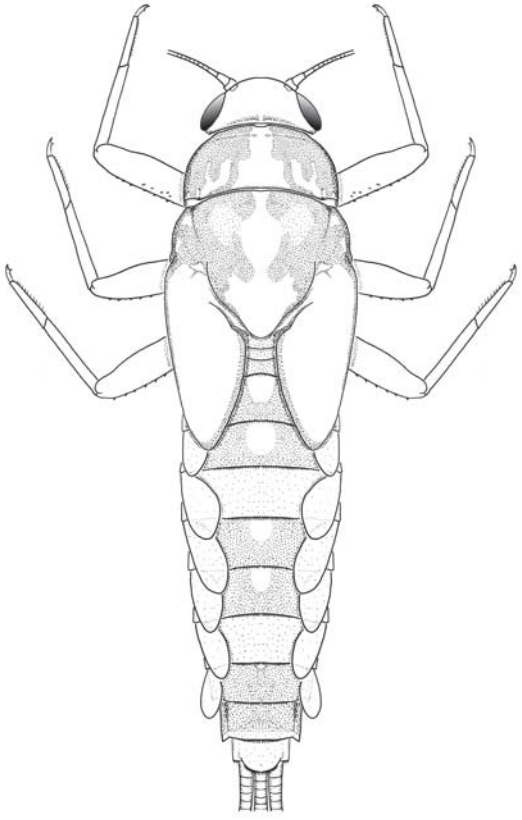


Fig 1. *Guajirolus rondoni,* **sp. n.** 1. General habitus of nymph.

Abdomen. Yellowish brown(Fig. 1), terga of segments 2, 3, 5, 6, 8, 9 with anteromedian yellowish mark, smaller on segments 8 and 9, often not reaching posterior margin. Posterior margin of tergum 9 and tergum 10 whitish. Tergal posterior margin with broad denticles (Fig. 11). Sterna yellowish, paler toward apex. Gills (Fig. 12) whitish translucent, on segments 2-7 only. Paraprocts with approximately 13-15 organized spines (Fig. 13). Caudal filaments yellowish white with distinct brownish medial and apical bands.

Adults. Unknown.

Etymolgy. The epithet of the new species is an allusion to the state where the material was collected, Rondônia. As the name of the state, the epithet of the new species is in honor of Marechal Cândido Rondon, Brazilian explorer of the beginning of the 20th Century, known as a pacifist because of his conduct with Brazilian indigenous people.

Diagnoses. 1) mandibles (Figs. 4, 5) with minute spicules on outer margin; 2) maxillary palp three-segmented (Fig. 6); 3) hypopharynx (Fig. 7) lingua with rounded medial process; 4) projection of second segment of labial palp with apex narrower than base (Fig. 8); 5) abdominal color pattern (Fig. 1); 6) paraprocts with 13 to 15 organized spines (Fig. 13).

Remarks: Despite the fact that all species of *Guajirolus* present one or two brown bands on the femora of all legs, I was unable to find these marks on *G. rondoni*. However, as the specimens were light colored because of the preservation, especially the legs, I do not discard the possibility that they are present.

Material examined: **Holotype:** Brazil, **Rondônia State**, Rio Jaci, 25/iii/2004, N. Hamada, female nymph (INPA). **Paratypes:** same data as holotype, 6 nymphs (INPA). Rio Abunã, 19/xi/2003, N. Hamada, 1 nymph (INPA); Igarapé Jaci Paraná, tributary of Rio Madeira, km 88 of BR 364, 25/xi/2003, N. Hamada, 8 nymphs (4 in UFES, 4 in IFML); Rio Abunã, 07/vi/2004, N. Hamada, 8 nymphs (INPA).

Undetermined ***Guajirolus***
(Fig. 14)

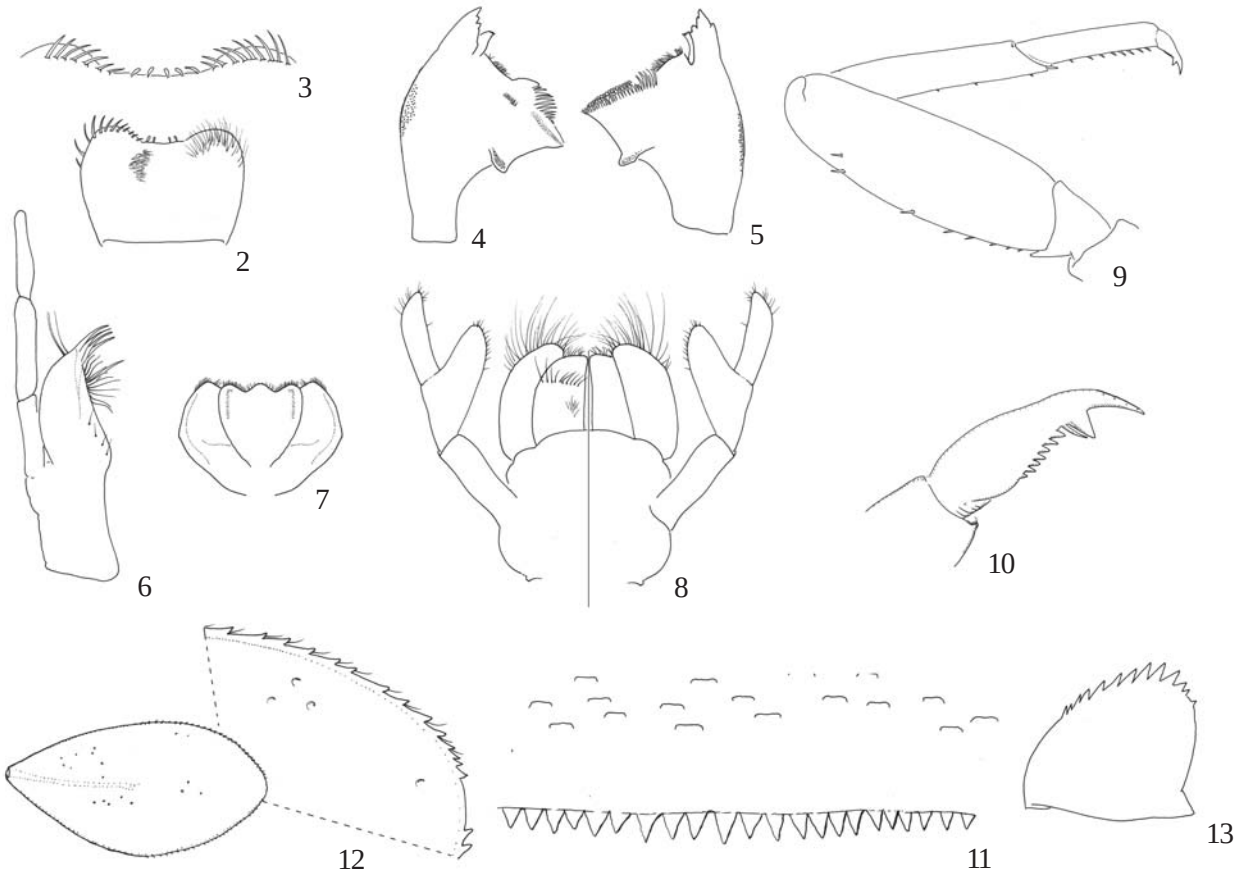
Material examined: Brazil, **Mato Grosso do Sul State**, Rio Ivinhema, xi/2003, S.M. Melo, A. Takeda (one nymph) (INPA). Brazil, **Amazonas State**, Tabatinga, Palmares, igarapé, 02/ix/2003, N. Hamada, J.L. Nessimian, (one nymph) (INPA).

***Chane baure* Nieto, 2003**
(Fig. 14)

Material examined: Brazil, **Roraima State**, Caracaraí, Rio Branco, Cachoeira Bem-Querer, 01º55'748''N, 61º00'143''W, 20 nymphs, 23/iii/2001, N. Hamada.

DISCUSSION

Chane and *Guajirolus* are two related genera possessing remarkable characteristics in the nymphal stage, as unusual



Figs. 2-12. *Guajirolus rondoni*, **sp. n.**, nymph. 2. Labrum (left-ventral; right-dorsal). 3. Labrum (detail of anterior margin). 4. Left mandible. 5. Right mandible. 6. Maxilla. 7. Hypopharynx. 8. Labium (left-dorsal; right-ventral). 9. Foreleg. 10. Detail of tarsal claw. 11. Tergum 4 (detail of posterior margin). 12. Gill 4. 13. Paraproct.

mouthparts and tarsal claws. They can be easily differentiated from other known genera of the family by their labrum with a row of spines on the ventral surface (Figs. 2 and 3A), and by their tarsal claw with a subapical denticle larger than the preceding ones (Figs. 10 and 3I). Besides these characters, both genera have the second segment of the labial palp internally enlarged (Figs. 8 and 3G), though in *Chane* they are extremely so, giving the impression of a bifid labial palp (Fig. 3G) (from Nieto 2003).

The genus *Chane*, with only one species described, *C. baure*, was known until the present work exclusively from the type-locality in Bolivia (Nieto 2003). *Guajirolus*, on the other hand, is now represented by five nominal species: *G. ektrapeloglossa* Flowers, from Colombia and Panama; *G. nanus* Lugo-Ortiz & McCafferty, from Costa Rica; *G. queremba* Nieto, from Argentina; *G. flowersi* Thomas & Dominique, from French Guyana; and *G. rondoni*, **sp. n.**, from Brazil (Flowers 1985, Lugo-Ortiz & McCafferty 1995, Nieto 2003, Thomas *et al.* 2005). Besides the two undetermined species recorded from Brazil in the present work, another unnamed species of *Guajirolus*, described as "Genus 3 nr. *Pseudocloeon*" by Roback (1966), is also reported from Peru.

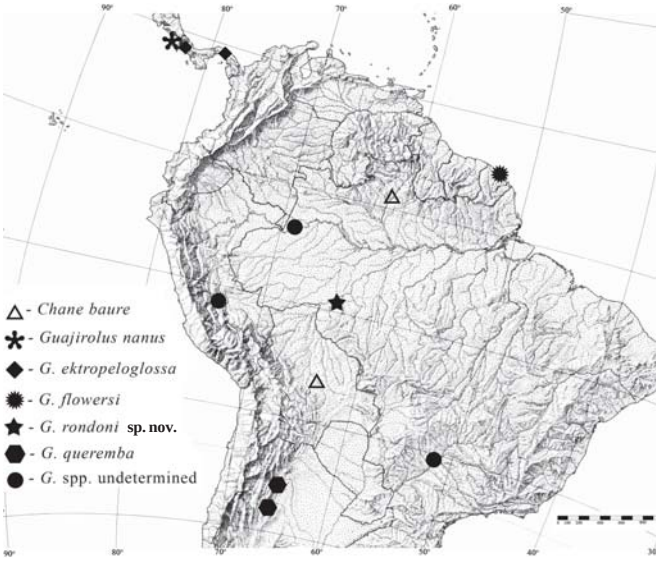


Fig. 14. Geographic distribution of the species of *Chane* and *Guajirolus* (Partial map of Neotropical Region modified from Holzenthal & Flint 1995).

Unfortunately, due to the poor condition of part of the material examined, I was unable to identify the nymphs of *Guajirolus* from Mato Grosso do Sul and Amazonas states studied in the present work. However, the records herein presented (Fig. 14) extend significantly the known distribution range of both genera, demonstrating that they may be found in several other areas of South America, especially in Brazil.

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