



New records of *Haemagogus* (*Haemagogus*) from Northern and Northeastern Brazil (Diptera: Culicidae, Aedini)

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Haemagogus (*Haemagogus*) is restricted mostly to the Neotropical Region, including Central America, South America and islands (Arnell, 1973). Of the 24 recognized species of this subgenus, 15 occur in South America, including the Antilles. However, the centre of distribution of the genus *Haemagogus* is Central America, where 19 of the 28 species (including four species of the subgenus *Conopostegus* Zavortink [1972]) occur (Arnell, 1973).

Haemagogus (*Hag.*) includes species with great significance as vectors of Yellow Fever (YF) virus and other arbovirus, both experimentally (Waddell, 1949) and in the field (Vasconcelos, 2003).

During entomological surveys from 1982 to 2004, the Arbovirus Laboratory of Evandro Chagas Institute obtained specimens of *Haemagogus* from several localities not reported in the literature. New records are listed in Table 1 and study localities shown on Figure 1. Abbreviations for genera and subgenera follow Reinert (2001).

Haemagogus tropicalis Cerqueira & Antunes, 1938 was described from specimens collected in Currálinho (1°47'50" S 49°55'07" W), in the southern part of Marajó Island, Pará state, Brazil, and its known distribution in Currálinho is: Camucú River; Cupijó River; Cupijó-Mirim River, Boa Esperança; Maracujá-Mirim River, Ponta Grande; Massaranduba River (Cerqueira & Antunes, 1938). The species was reported also from Igarapé-Açu (1°42'04"N 47°48'17"W) and several other localities in the state of Pará, all in the eastern part of the Amazonas river mouth (Xavier & Mattos 1975). Kumm & Novis (1938) showed a map of the area, emphasizing Currálinho as the only site on the island having seasonally-floodable areas (locally called "várzeas"), and recorded the collection of one specimen (Table 4 of Kumm & Novis [1938]) among thousands of *Culex quinquefasciatus* (as *Cx. fatigans*) and smaller numbers of at least 18 other species. Kumm & Cerqueira (1951) showed a distribution restricted to Marajó Island. In an earlier report on visceral leishmaniasis, Chagas et al (1937) indicated the existence of this species in Abaetetuba, also in the eastern shore of the Amazon River mouth.

Our collections confirm the presence of *Hg. tropicalis* in some of these areas (e.g., Abaetetuba) and provide new records from Combu Island near the mouth of the Amazonas River, near Pará River (Fig. 1, localities 3–5). We collected the species in floodable places, in greater quantities in tree canopies, where specimens of both sexes were obtained. However, a complete study of the conditions of all the above localities is needed. Cerqueira & Antunes (1938) reported three species of trees where the immature stages of *Hg. tropicalis* were found in tree holes: *Euterpe oleracea* ("açazeiro"), *Carapa guyanensis* ("andiroba") and *Tecoma* sp. ("ipê").

Because of the species' presence in populated areas and the ability of related species to transmit arboviruses, *Hg. tropicalis* may have some epidemiological significance. The species has not been collected in other regions of Amazonia. Recently, 6,000 adult mosquitoes, not including *Hg. tropicalis*, were collected in two nearby localities in Amapá state (Currálinho and Lagoa dos Índios), which are located at the other side of the mouth of Amazonas river (Souto, 2003). This would suggest that *Hg. tropicalis* is restricted to areas near the Pará River (South of Marajó Island and to its East); additional collections on the west side of Marajó Island, and west of the mouth of Amazonas river are needed to confirm this. The apparently restricted distribution of *Hg. tropicalis* contrasts with those of other species in the genus (see below). Hutchings *et al.* (2005) reported the existence of paratypes of *Hg. tropicalis* in the collection of INPA, at Manaus, but

failed to locate the male holotype and female allotype in IOC collection. Given the latter, a neotype may need to be chosen.

Haemagogus albomaculatus Theobald, 1903 was described from a female specimen collected in Guiana, and the male was described from material collected in the same country by Komp (1954). Its distribution was thought to be restricted to the northern part of South America (Surinam and French Guiana) (Arnell, 1973). Subsequently, its presence in Brazil and its role in the transmission of YF virus were reported in the municipality of Monte Alegre, state of Pará (Travassos da Rosa *et al.*, 1984; Hervé *et al.*, 1986). Vasconcelos (2003) indicated it to be one of the most important vectors of silvatic YF. Cordellier & Dégallier (1992) recommended “the bioecological study of other potential vectors like *Haemagogus albomaculatus*...”.

New records of *Hg. albomaculatus* include Altamira. While Monte Alegre (1°59'60" S 54°04'42" W) is in the northern edge of the Amazonas River, Altamira is more southeastern. It is the biggest municipality in Brazil, extending from the western edge of the Xingu River to the frontier of the state of Mato Grosso, in the south.

Haemagogus celeste Dyar & Nuñez-Tovar, 1927 had been reported from Colombia, Trinidad & Tobago and Venezuela (Arnell, 1973), and from the state of Amazonas in Brazil (Hutchings *et al.*, 2005). It also was collected during an outbreak of dengue in Boa Vista, Roraima state (Brazil) by Travassos da Rosa *et al.* (1982). The present report confirms its presence in the area. Due to its tendency to bite primates, this species could transmit YF virus (Travassos da Rosa *et al.*, 1987); it also is a potential vector of Mayaro virus in Venezuela (Torres *et al.*, 2004).

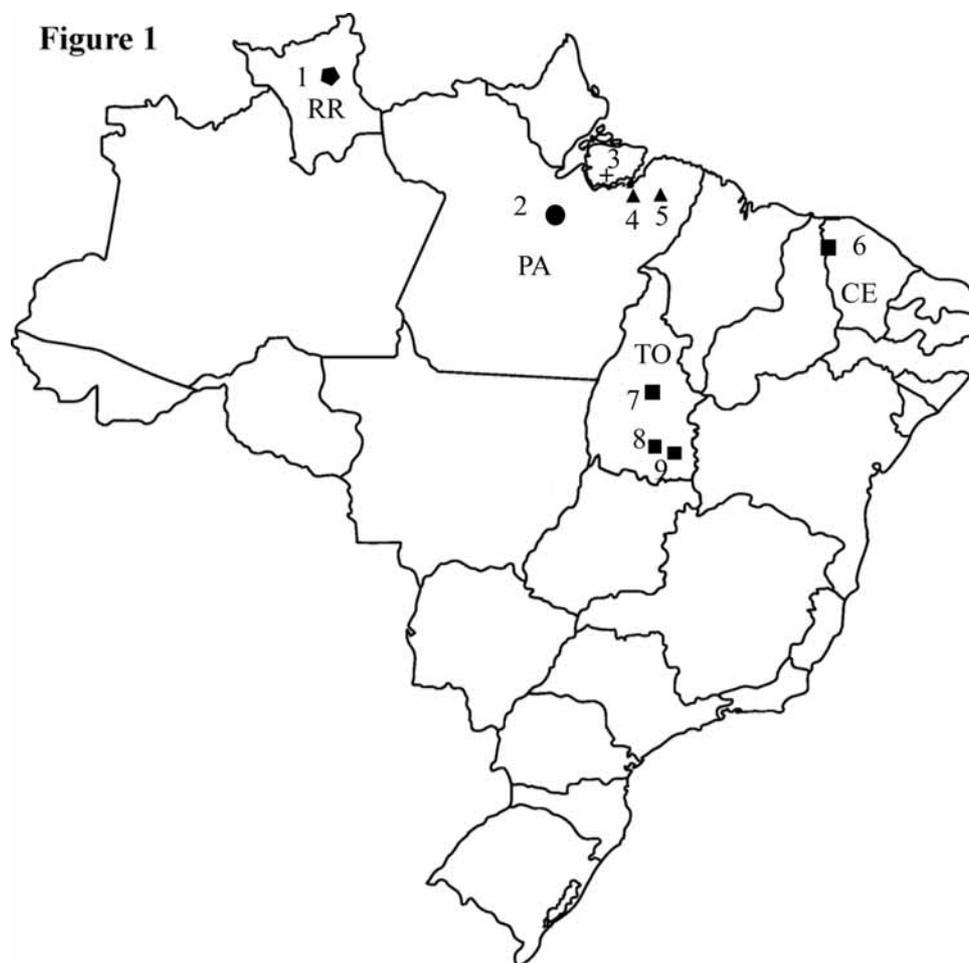


FIGURE 1. Localities of new records of *Haemagogus* (*Haemagogus*) in Brazil: 1—Boa Vista (*Hg. celeste*); 2—Altamira (*Hg. albomaculatus*); 3—Currálinho (type locality for *Hg. tropicalis*); 4—Abaetetuba (*Hg. tropicalis*); 5—Combu Island (*Hg. tropicalis*); 6—Pacujá (*Hg. spegazzinii*); 7—Palmas (*Hg. spegazzinii*); 8—Almas (*Hg. spegazzinii*); 9—Porto Nacional (*Hg. spegazzinii*). RR—Roraima; PA—Pará; To—Tocantins; CE—Ceará.

TABLE 1. Localities of new records *Haemagogus* (*Haemagogus*) in Brazil.

Municipality - state	Species	Quantity		Lat. (S)	Long. (w)	Alt.(m)	Date	Collection
		M	F					
Altamira - PA	<i>Hg. albomaculatus</i>	0	5	03° 12' 12"	52° 12' 23"	109	28.X.2002	IEC
Boa Vista - RR	<i>Hg. celeste</i>	0	7	24° 91' 01"	60° 40' 24"	85	5.V.1982	IEC
Abaetetuba – PA*	<i>Hg. tropicalis</i>	0	12	01° 43' 05"	48° 52' 57"	10	11.VIII.2006	IEC
Combu Island- PA	<i>Hg. tropicalis</i>	3	12	01°31'11"	48°29'34"	150	9.VII.2004	IEC
Pacujá – CE	<i>Hg. spegazzinii</i>	2	4	03° 59' 17"	40° 41' 51"	142	4.III.2001	IOC
Porto Nacional - TO	<i>Hg. spegazzinii</i>	0	1	10° 10' 37"	48° 27' 38"	212	11.III.2000	SESAU - TO
Palmas - TO	<i>Hg. spegazzinii</i>	0	2	10° 12' 46"	48° 21' 37"	230	14.III.2000	SESAU - TO
Almas - TO	<i>Hg. spegazzinii</i>	0	2	11° 34' 25"	47° 10' 13"	397	14.III.2000	SESAU - TO

IEC: Instituto Evandro Chagas, IOC: Instituto Oswaldo Cruz, SESAU-TO: Secretaria de Saúde do Estado do Tocantins. *Since Chagas *et al.* (1937) collected *Hg. tropicalis* in Abaetetuba, this is not a new record; however, it was included to be useful for future additional studies.

Haemagogus spegazzinii Brethes, 1912 was described from specimens collected in the northwestern province of Jujuy, Argentina, and its distribution seems to also include northern, northeastern and southeastern Brazil (Forattini, 2002). However, its distribution, with *Hg. janthinomys* and *Hg. capricornii* (Arnell, 1973; Forattini, 2002) is not well defined, and a careful review of available material should be completed. Additional collections, including an analysis of natural infection by YF virus, should also be made. Based on the current state of taxonomic knowledge for this and related species, we recorded *Hg. spegazzinii* from three municipalities in Tocantins and one in Ceará.

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