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SCIENTIFIC NOTE

NATURAL BREEDING SITES FOR *HAEMAGOGUS* MOSQUITOES (DIPTERA, CULICIDAE) IN BRAZIL¹

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Haemagogus contains 28 species (Arnell, 1973). Some of them have epidemiological importance through their involvement in the transmission of jungle or sylvan yellow fever (SYF). At least five species have been found naturally infected by the SYF virus and are responsible for maintaining the natural cycle of this zoonosis, and *Hg. janthinomys* Dyar has been incriminated as the main vector (Arnell, 1973).

Immature forms of the genus *Haemagogus* develop mostly in natural sites such as holes in tree trunks. Less commonly, occurrences in other natural receptacles like bamboo and coconut husks have been recorded. More rarely, occurrences in abandoned vehicle tires have been found. Most of the common sites are well above ground level in the forest canopy (Forattini, 1965). Therefore, these observations remain scarce due to sampling difficulties.

The study of the biology of the tropical populations that comprise this genus is of prime importance. There is still no in-depth knowledge regarding the ecology of this genus in areas that are considered to be enzootic for sylvan yellow fever.

This paper records breeding sites used by species of *Haemagogus* collected in different areas of hydroelectric dams and/or environmental preservation areas in Brazil. The study areas are formed by tropical forest biomes characteristic of the Brazilian Atlantic Forest or gallery forest: Tinguá Biological Reserve, State of Rio de Janeiro; Itatiaia National Park, State of Rio de Janeiro; Vale do Rio Doce Forest Reserve, State of Espírito Santo; Chapada dos Guimarães National Park, State of Mato Grosso; Municipality of Uruaçu, State of Goiás; Municipality of Fortaleza, State of Ceará and Municipality of São Salvador, State of Tocantins (Table 1). Some collections were made by the research group of the Arbovirus Laboratory of Instituto Evandro Chagas (Belém, Pará).

Specimens were collected by a manual water suction device and pipettes. The water was poured into polyethylene trays and the retained larvae and pupae were removed with the aid of a thin paintbrush. The larvae and pupae were then pipetted and packed into 250-ml plastic bags (Whirl-Pak® Bags) for transportation.

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⁴ Species named *Aedes* (*Howardina*) *fulvithorax* until the revision by Reinert (2000).

Table 1. Specimens of *Haemagogus* collected from 2005 to 2008, in different regions of Brazil.

Collection location	Lat. (S)	Long. (W)	Alt. (m)	Species	Breeding site	N	Height of breeding site	Date	Collection
São Salvador do Tocantins-TO	13° 03' 16"	48° 18' 04"	366	<i>Hg. janthinomys</i>	Cut bamboo	4	0.40 m	25/11/08	IOC
São Salvador do Tocantins-TO	13° 03' 16"	48° 18' 04"	366	<i>Hg. leucocoelaenus</i>	Cut bamboo	6	0.40 m	25/11/08	IOC
Chapada dos Guimarães National Park - MT	15° 27' 59"	55° 45' 13"	833	<i>Hg. janthinomys</i>	Tree hole	5	1.70 m	26/10/07	IOC
Uruaçu - GO	14° 31' 33"	49° 08' 43"	497	<i>Hg. janthinomys</i>	Tree hole	4	1.80 m	13/03/05	IOC
Itatiaia National Park - RJ	22° 27' 06"	44° 36' 25"	1420	<i>Hg. leucocoelaenus</i>	Drilled bamboo	11	1.50 m	22/02/06	IOC
Tinguá Biological Reserve - RJ	22° 27' 14"	43° 28' 08"	158	<i>Hg. capricornii</i>	Drilled bamboo	3	2.00 m	15/04/05	IOC
Tinguá Biological Reserve - RJ	22° 27' 14"	43° 28' 08"	158	<i>Hg. leucocoelaenus</i>	Drilled bamboo	8	1.60 m	15/04/05	IOC
Vale do Rio Doce Forest Reserve - ES	19° 09' 20"	40° 02' 75"	25	<i>Hg. janthinomys</i>	Tree hole	19	1.40 m	23/12/05	IOC
Fortaleza - CE	03° 43' 85"	38° 32' 38"	23	<i>Hg. spegazzinii</i> *	Tree stump	5	1.20 m	19/04/85	IEC

Acronyms for states: TO- Tocantins; MT- Mato Grosso; GO- Goiás; RJ- Rio de Janeiro; ES- Espírito Santo; CE- Ceará.
* Personal communication: Hamilton Monteiro - Instituto Evandro Chagas (IEC).

The samples were labeled regarding location, date and type of breeding site. In the laboratory, the larvae were screened onto larval trays and were kept in the water from the breeding site itself, which was periodically topped up with distilled water. The pupae were transferred to small tubes, where they remained until reaching the adult stage. Following this, to identify the species, the exuviae were slide-mounted in Canada balsam.

The culicids were identified under optical microscopy, using the dichotomous keys and diagnoses of Arnell (1973) and Forattini (2002). Genera and subgenera are abbreviated in accordance with Reinert (1975).

The collections in the Tinguá Biological Reserve, Rio de Janeiro, were concentrated in a thicket of bamboo plants (Gramineae), from which four larvae of *Hg. capricornii* Lutz and seven of *Hg. leucocelaenus* (Dyar & Shannon) were collected from drilled bamboos at approximately 1.20 m from ground. These species were found in different internodes. This was not observed in the collections performed in the municipality of São Salvador do Tocantins, where immature forms of *Hg. janthinomys* and *Hg. leucocelaenus* were collected from only one cut bamboo, at a height between 0.30 and 0.40 m above the ground. In the same container, were also found *Limatus durhamii* Theobald, *Wyeomyia arthro stigma* Lutz and *Ochlerotatus fulvithorax* (Lutz).⁴ In the Itatiaia National Park, State of Rio de Janeiro, immature forms of *Hg. leucocelaenus* occurred in three drilled bamboos, 0.35, 0.47 and 1.20 m above ground. In the Chapada dos Guimarães National Park, State of Mato Grosso, and the municipality of Uruaçu, State of Goiás, immature forms of *Hg. janthinomys* and *Hg. leucocelaenus* were found only in two tree holes, during five successive surveys.

Positive containers for *Hg. janthinomys* and *Hg. leucocelaenus* were also found in the Vale do Rio Doce Forest Reserve, State of Espírito Santo, with *Oc. terreus* (Walker) as an accompanying species.

In the outskirts of Fortaleza, State of Ceará, immature forms of *Hg. spegazzinii* were collected from water in rotten trunks of mango trees, cut down at a height of 1-1.50 m above the ground. Such manmade containers are rarely used by this species. In Panama, this species has been found in artificially cut bamboo internodes, but it is more frequently found in primary forest environments (Galindo, Carpenter and Trapido, 1955).

During 1935 and 1936, Kumm and Novis (1938) conducted studies on the distribution of yellow fever on the island of Marajó, State of Pará, and reported the collection of immature stage of *Hg. janthinomys* from tree holes and *Hg. tropicalis* Cerqueira & Antunes from these habitats and also from artificial receptacles. More recently, Alencar (2008) found *Hg. tropicalis* associated with the "seasonally flooded forest" ("várzea") in eastern Amazonia.

The containers where the immature stages of *Hg. janthinomys* develop have the same general characteristics as those where other species of this genus are found. However, finding the immature forms is not easy and they are never abundant. As in preceding studies (Forattini, 1965), our findings of immature forms did not agree with the high densities of adults on certain occasions.

Although *Hg. janthinomys* has been referred as acrodendrophilous, with its breeding sites in holes and hollow trunks located in high and unreachable locations (Forattini, 2002), the present results agree with the observations by Galindo, Trapido and Carpenter (1955), who found breeding sites at lower heights above the ground. *Hg. leucoelaenus* larvae were found by Silva and Lozovei (1999) in tree holes near ground level.

Haemagogus species within Brazilian territory were present in two types of natural containers. Although they are important from an epidemiological point of view, with regard to transmission of several arboviruses, the ecology of these taxa remains poorly known.

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LITERATURE CITED

- Alencar, J., F. C. Castro, H. A. O. Monteiro, O. V. Silva, N. Dégallier, C. B. Marcondes, and A. E. Guimarães.** 2008. New records of *Haemagogus* (*Haemagogus*) from Northern and North-eastern Brazil (Diptera: Culicidae, Aedini). *Zootaxa* 1779: 65-68.
- Arnell, J. H.** 1973. Mosquito studies (Diptera: Culicidae). XXXII. A revision of the genus *Haemagogus*. *Contributions of the American Entomological Institute* 10: 1-174.
- Forattini, O. P.** 1965. *Culicidologia Médica - 3o Volume: Culicini, Haemagogus, Culiseta. Sabethini. Toxorhynchini. Arboviroses. Filariose bancroftiana. Genética.* Editora da Universidade de São Paulo, São Paulo. 416 pp.
- Forattini, O. P.** 2002. *Culicidologia Médica: Identificação, biologia, epidemiologia.* Editora da Universidade de São Paulo, São Paulo. 860 pp.
- Galindo, P., S. J. Carpenter, and H. Trapido.** 1955. A contribution of the ecology and biology of tree hole breeding mosquitoes of Panama. *Annals of the Entomological Society of America*. 48: 158-64.
- Kumm, H. W. and A. Novis.** 1938. Mosquito studies on the Ilha do Marajó, Pará, Brazil. *American Journal of Hygiene*. 27: 498-515.
- Reinert, J. D.** 1975. Mosquito generic and subgeneric abbreviations (Diptera: Culicidae). *Mosquito Systematics* 7: 105-110.
- Silva, M. A. N. da and A. L. Lozovei.** 1999. Ocorrência de *Haemagogus* (*Conopostegus*) *leucoelaenus* (Dyar & Shannon) e *Toxorhynchites* (*Lynchiella*) *theobaldi* (Dyar & Knab) em ocos de árvore em capão de mata, Curitiba, Paraná, Brasil. *Revista Brasileira de Zoologia* 16 (Supl.1): 257-267.