

## SCIENTIFIC NOTE

Occurrence of *Toxorhynchites guadeloupensis* (Dyar & Knab) in Oviposition Trap of *Aedes aegypti* (L.) (Diptera: Culicidae)NILDIMAR A. HONÓRIO<sup>1,3</sup>, FÁBIO S.M. DE BARROS<sup>2,3</sup>, PANTELIS TSOURIS<sup>4</sup> E MARIA G. ROSA-FREITAS<sup>1,4</sup><sup>1</sup>Fiocruz - Laboratório de Transmissores de Hematozoários, Depto. Entomologia, Instituto Oswaldo Cruz Av. Brasil 4365, 21045-900 Rio de Janeiro, RJ, Brazil<sup>2</sup>Depto. Zoologia, Univ. Federal de Pernambuco, Av Prof Moraes Rego s/n 50670420, Recife, PE, Brazil<sup>3</sup>Núcleo Avançado de Vetores, Centro de Ciências Biológicas e da Saúde, Univ. Federal de Roraima, BR 174 s/nº Jardim Floresta, 69310-270, Boa Vista, RO, Brazil<sup>4</sup>Freitas & Tsouris Consultants, POBox 117, Spata-Attikis, 19004, Greece, maria@freitas-tsouris.com*Neotropical Entomology* 36(5):809-811 (2007)Ocorrência de *Toxorhynchites guadeloupensis* (Dyar & Knab) em Armadilhas para Ovos de *Aedes aegypti* (L.) (Diptera: Culicidae)

RESUMO - Larvas de *Toxorhynchites guadeloupensis* (Dyar & Knab), espécie raramente encontrada, foram observadas predando larvas de *Aedes aegypti* (L.), em uma armadilha para ovos de monitoração rotineira para o controle do dengue na área urbana da cidade de Boa Vista, RO, em 2003-2004. Essa observação constitui o primeiro registro de *Tx. guadeloupensis* em armadilhas para ovos de *Ae. aegypti* e pode ocasionar repercussões importantes na epidemiologia e no controle local do dengue, uma vez que a densidade de *Ae. aegypti* em um dado momento constitui uma das variáveis básicas na predição da doença. Se a predação de *Ae. aegypti* por *Tx. guadeloupensis* na Amazônia é significativa, é uma questão que precisa ser melhor investigada. A predação larval pode levar ainda a uma subestimativa do número real de espécimens de *Ae. aegypti* preditas pela amostragem. Juntas, essas hipóteses precisam de atenção visto que estão diretamente relacionadas à epidemiologia do dengue, ao sucesso de qualquer predição e programas de controle.

PALAVRAS-CHAVE: Predação, dengue, controle, predição, forma imatura

ABSTRACT - *Toxorhynchites guadeloupensis* (Dyar & Knab), a poorly known mosquito species, was observed preying upon *Aedes aegypti* (L.) larvae, in an oviposition trap placed for routine dengue entomological surveillance, during 2003-2004 in the urban area of Boa Vista, Roraima, Brazil. This is the first report for *Tx. guadeloupensis* using *Ae. aegypti* oviposition traps as breeding places. This finding may have important consequences in the epidemiology and local dengue control since *Ae. aegypti* density is a basic variable in dengue prediction. Whether predation of *Ae. aegypti* by *Tx. guadeloupensis* in the Amazon is of significance, is a question to be examined. Also, larval predation may be a cause for underestimation of the actual *Ae. aegypti* numbers. Together these hypotheses need to be better investigated as they are directly related to dengue epidemiology, to the success of any outbreak prediction and surveillance program.

KEY WORDS: Predation, dengue, prediction, control, immature form

*Toxorhynchites guadeloupensis* (Dyar & Knab) is a Neotropical mosquito species reported in Argentina, Brazil, Bolivia, Colombia, Haiti, Suriname, Trinidad and Tobago, Venezuela, Guadeloupe, Montserrat, Saba, Dominica (Lane 1953, Van der Kuyp 1954, Forattini 1962, Garcia-Ávila 1977, Guimarães 1997). *Toxorhynchites* (Theobald) adults are nectar-feeding and non-haematophagous. *Tx. guadeloupensis* larvae, as other *Toxorhynchites*, occur in natural phytotelmata and artificial containers. They predate a wide variety of small aquatic animals, including larvae of medically important

container-dwelling mosquitoes. In Brazil, *Tx. guadeloupensis* was registered in the Amazon Region (Lane 1953) and more specifically in Manaus, Amazonas State (Cerqueira 1961). Collection records suggest that *Tx. guadeloupensis* from the West Indies are primarily inhabitants of bromeliads (Frank & Curtis 1981). A brief reference by Lutz & Neiva (1913) states that *Tx. guadeloupensis* was reared (sic by Busck and Ulrich) from bromeliad tanks. *Toxorhynchites* are usually not found in artificial containers (Focks *et al.* 1980, Durso *et al.* 1982, Reyes-Villanueva *et al.* 1987, Lopes 1997). Little is known

of *Toxorhynchites* oviposition site preferences and relatively few observations were made regarding larval habitats under natural conditions.

As part of the dengue vectorial control in Boa Vista, Roraima, neighborhoods with high building infestation rates for *Aedes aegypti* (L.) were under surveillance. Asa Branca (02°52'N, 60°41'W) was one of the neighborhoods with high building infestation rates (7.7%, FUNASA-SESAU-SEMSA 2003). *Ae. aegypti* collection methodology consisted of 40 ovitraps placed in Asa Branca peridomiciles. Ovitrap were as standardized by PAHO (2006; i.e. 5 cm wide mouth 350 ml plastic container, 12 cm depth, painted black on the outside and filled with 270 ml of tap water and 30 ml of a 10% w/v hay infusion previously incubated for seven days and a 12 cm x 5cm wooden paddle).

In October 2003, at the end of the rainy season in Roraima, during a routine ovitrap collection for *Ae. aegypti*, six specimens of *Tx. guadeloupenis* larvae were found in a single oviposition trap (out of 40) preying upon *Ae. aegypti* larvae. The particular ovitrap where *Tx. guadeloupenis* larvae were found was placed in the immediate peridomicile of a residence in Asa Branca. The peridomiciliary environment was a garden that differed from neighboring domiciles by having large trees, mainly palms trees (buriti, *Mauritia flexuosa* L.). The ovitrap with *Tx. guadeloupenis* was placed on the floor, close to a wall, protected from children and pets, in a permanently shadowed area. The shadowing was provided by the amount of plants present in the house's garden (palm trees of many species, ferns, bromeliads).

Together with the six larvae of *Tx. guadeloupenis*, 15 *Ae. aegypti* larvae of 2nd and 3rd instars were alive, five others were partially eaten. One *Tx. guadeloupenis* larva was observed with an *Ae. aegypti* larva in its mouth parts. No pupal exuviae were observed. *Tx. guadeloupenis* larvae were of 2nd instar (three larvae), 3rd instar (two larvae) and 4th instar (one larva). *Tx. guadeloupenis* larvae were brought to the laboratory, identified (Lane 1953) and raised to adulthood. Larvae were kept at 28°C (± 2°C) and fed daily with *Ae. aegypti* larvae. Two males and one female *Tx. guadeloupenis* reached adulthood and were deposited in the collection of the Núcleo Avançado de Vetores (NAVE) in the Universidade Federal de Roraima (UFRR). Repeated attempts to locate larvae in potential natural habitats like tree holes and bromeliads were unsuccessful. No other *Tx. guadeloupenis* larvae were observed during the ovitrap surveillance that extended throughout the dry season (April 2004).

The use of *Toxorhynchites* alone is unlikely to reduce pest or vector species significantly. However, these mosquitoes can be a valuable control tool in areas where containers and treeholes substantially contribute to mosquito numbers (Jones & Schreiber 1994).

Vector population size is an important variable in dengue prediction (Favier et al. 2006). *Ae. aegypti* development from egg to adult is reported to be 7.2 ± 0.2 days at 35°C (Tun-Li, Burkot & Kay 2000). Maximum daily temperatures around 35°C are common in Boa Vista. During the period January 2003 - December 2004, maximum temperature mean registered in Boa Vista was 35.6°C (Agritempo 2006). Even though inspected in a weekly basis, ovitraps are left in the

field for a period that may vary from two to three weeks. The 7-day period interval for each inspection may suffice for predation to take place and decrease the number of *Ae. aegypti* larvae observed in the ovitraps. Larval predation therefore may lead to underestimation of the actual *Ae. aegypti* numbers. However, whether predation of *Ae. aegypti* by *Tx. guadeloupenis* in the Amazon is of significance remains a question to be examined. The importance of ovitrap and larval premise indices has been increasingly recognized. Ovitrap and larval premise indices were considered as the most sensitive and practical measures to assess *Ae. aegypti* infestation in surveillance and control programs (Morato et al. 2005, Romero-Vivas & Falconar 2005). Bionomics of *Tx. guadeloupenis*, biological characteristics of the predation interaction and predation influence on indices are hypotheses that need to be better investigated as they are directly related to dengue epidemiology and success of control programs.

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