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1. REPORT DATE <b>2005</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2005 to 00-00-2005</b>	
4. TITLE AND SUBTITLE <b>Anopheles Triannulatus (Neiva and Pinto): A New Anopheles Record from Trinidad, West Indies</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Walter Reed Army Institute of Research, Department of Entomology, 503 Robert Grant Avenue, Silver Spring, MD, 20910</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <b>see report</b>					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

## SCIENTIFIC NOTE

### *ANOPHELES TRIANNULATUS* (NEIVA AND PINTO): A NEW *ANOPHELES* RECORD FROM TRINIDAD, WEST INDIES

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**ABSTRACT.** We report the first collection of *Anopheles triannulatus* from Trinidad, West Indies. Adults were captured using human bait while larvae and pupae were collected from a pond located in Valencia, north Trinidad. The associated species was *An. oswaldoi*. This new record increases the number of mosquito species belonging to the Genus *Anopheles* to 14 and the total species count from 162 to 163 in Trinidad, West Indies.

**KEY WORDS:** *Anopheles triannulatus*, adults, immatures, Trinidad, new record

*Anopheles (Nyssorhynchus) triannulatus* (Neiva and Pinto) is widely distributed throughout South America east of the Andes as far south as Argentina, throughout Brazil, Paraguay, most of Bolivia, the Guianas, Colombia, Venezuela, Ecuador, and Peru. This species is also found in Central America as far north as Central Nicaragua (Faran 1980). The immature stages are found mostly in permanent ponds, lakes, canals, slow-flowing streams or river margins, ditches, and swamps, either exposed to the full sun or partial shade, often associated with water lettuce (*Pistia*) (Faran 1980). Although extensive studies on the mosquitoes of Trinidad have been conducted, this *Anopheles* species has not been previously identified (Senior White and Lewis 1951, Heinemann et al. 1980). Senior White and Lewis (1951) reported 13 species of *Anopheles* from Trinidad while Heinemann et al. (1980) reported a total of 161 mosquito species, including 13 species of *Anopheles*, of which 3 were undetermined, but *An. triannulatus* was not among them.

Because human bait collections were used, a study protocol was submitted, reviewed, and approved by the Institutional Review Board of the Insect Vector Control Division, Ministry of Health, and each mosquito collector volunteered to work and signed informed consent forms.

On August 12 and 15, 2000, adult mosquitoes, including *Culex*, *Anopheles*, and *Haemagogus* were collected off human bait. Among these were adults of *An. triannulatus*. In addition, immatures were collected from two locations, a pond (10°39.45'N, 61°09.99'W) and near houses (10°39.46'N, 61°09.94'W) in Valencia, North Trinidad. All specimens collected were brought to the Insect Vector Control Division laboratory in Trinidad, where they were identified using the taxonomic keys of Faran (1980) and immatures were reared to adults. Reared

and preserved 4th instar larvae, pupae, adult females, and males were identified as *An. triannulatus*. The associated mosquito species collected from the pond were 8 3rd and 4th instar larvae and 8 pupae of *Anopheles (Nys.) oswaldoi* (Peryassu). Specimens of *An. triannulatus* (TR9 and TR12) have been deposited in the Smithsonian Institution, National Museum of Natural History, Washington, DC.

Although the collection of *An. triannulatus* from Trinidad represents a new collection record, this species is apparently endemic and has gone undetected or misidentified over the years. Recently, Chadee et al. (2003) reported the first collection of *Aedes albopictus* Skuse in Trinidad. We now add a new mosquito record to the mosquito fauna of Trinidad (Heinemann et al. 1980, Chadee 2003), thus bringing the total number to 163 and the number of *Anopheles* species to 14. *Anopheles triannulatus* females can be distinguished by the presence of a patch of light scales on the anterior mesepimeron and apical light band of foretarsal segment 4 (Faran 1980). It is worth noting that *An. triannulatus sensu lato* may be a species complex. Recently, Silvo de Nascimento and Lourenco-de-Oliveira (2002) described a species from central Brazil, *An. (Nys.) halophylus*, that has all the traditional key characters used for identification of *An. triannulatus* but was found to be genetically and biologically distinct from it. In addition, we know of another species from Ecuador that is also distinct (unpublished data and M. Faran, personal communication). Only further studies will reveal if there are other species and what names might apply to them. Fritz et al. (2004) recently developed a multiplex polymerase chain reaction tool for the identification of *An. triannulatus*, which should help in detecting potential sibling species. *Anopheles triannulatus* is a secondary vector of malaria in Venezuela (Benarrochi 1931, Gabaldon and Cova Garcia 1946), primarily when the adult densities are high and adults survive long enough to complete the intrinsic incubation period (Hill 1934). Therefore, the identification of *An. triannulatus* in Trinidad represents the presence

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of another potential vector of malaria in Trinidad. Previously identified vectors include *An. (Nys.) aquasalis* Curry, *An. (Nys.) marajoara* Galvao and Damasceno, *An. (Nys.) oswaldoi*, *An. (Kerteszia) bellator* (Dyar and Knab) and *An. (Ker.) homunculus* (Komp). Further studies are suggested to characterize the ecology and geographical distribution of *An. triannulatus* in Trinidad.

#### ACKNOWLEDGMENTS

We thank R. Persad, Lester James, Stephen Deonaraine, Jerome Alfonzo, Doolam Lalla, and Kelvin Ram for assistance in the field. This research was performed under a Memorandum of Understanding between the Walter Reed Army Institute of Research and the Smithsonian Institution, with institutional support provided by both organizations. The material to be published reflects the views of the authors and should not be construed to represent those of the Department of the Army or the Department of Defense.

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