

IS *ANOPHELES ARGYRITARSIS* A VECTOR OF MALARIA IN THE NEOTROPICAL REGION?

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Reports on the vector status of *Anopheles* (*Nyssorhynchus*) *argyritarsis* Robineau-Desvoidy in the Americas are contradictory and confusing. The present article is a thorough review of the literature on the vector status of *An. argyritarsis* in an attempt to clarify this situation.

Anopheles argyritarsis was described from females collected in Rio de Janeiro, Brazil, in 1827, and for more than 100 years this name was given to different species within the subgenus *Nyssorhynchus* (Linthicum 1988). This species is widely distributed in the Neotropics. It has been reported from Mexico to Argentina, including the Lesser Antilles (Knight and Stone 1977), but it is not considered a vector of malaria parasites over its entire geographic range.

Early reports on the vector status of *An. argyritarsis* are contradictory. Attempts to experimentally infect this species with various *Plasmodium* species have failed (Darling 1910, Benarroch 1931, Earle 1936), and several authors have failed to find sporozoites in the salivary glands of wild-caught specimens (Stephens 1921, Godoy and Pinto 1923, Benarroch 1931, Earle 1936). However, other authors have incriminated *An. argyritarsis* as a malaria vector. Boyd (1926) reported that 8% of the *An. argyritarsis* from Porto das Caixas examined had oocysts and sporozoites, incriminating it as the principal malaria vector in Rio de Janeiro. In Grenada, Earle (1936) experimentally infected *An. argyritarsis* but only reported to have found oocysts. Linthicum (1988) pointed out that the apparent contradiction in the reports before 1939 regarding the role of *An. argyritarsis* as a malaria vector is due to the "very poor taxonomic understanding of the *Argyritarsis* Section in the past." It is likely that *An. darlingi* Root, an efficient malaria vector, was sometimes misidentified as *An. argyritarsis*.

It is an alarming fact that classical books published after 1926, for example "Practical Malariology" (Russell et al. 1963) and "Manson's Tropical Diseases" (Manson-Bahr and Apted 1982, Manson-Bahr and Bell 1987), listed *An. argyritarsis* as a malaria vector in the Americas. Furthermore, the World Health Organization (1989) published "Geographical distribution of arthropod-borne diseases and their principal vectors" where again *An. argyritarsis* was listed

as a secondary vector of malaria in Central and South America. More recently, Wilkerson and Strickman (1990) referred to *An. argyritarsis* as a malaria vector in Central America, quoting White (1982).

During the past 10 years a number of field studies on *Anopheles* biology and vector incrimination have been carried out in different Latin American countries, but none of these indicate that *An. argyritarsis* is attracted to humans or found infected with sporozoites or gametocytes of *Plasmodium* spp. For instance, during intensive field studies carried out in different malaria endemic areas of Venezuela, resting females were collected on vegetation, but none were collected on human-bait or in light traps inside experimental huts (Rubio-Palis 1992; Rubio-Palis and Curtis 1992a, 1992b; Rubio-Palis et al. 1992; Berti et al. 1993; Rubio-Palis, unpublished data from Amazonas and Bolivar states, southern Venezuela).

From the above it is concluded that *An. argyritarsis* is not a vector of malaria parasite in Venezuela, and it is unlikely that it is a vector in Brazil or other Latin American countries.

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REFERENCES CITED

- Benarroch, E. I. 1931. Studies on malaria in Venezuela. *Am. J. Hyg.* 14:690-693.
- Berti, J., R. Zimmerman and J. Amarista. 1993. Adult abundance, biting behavior and parity of *Anopheles aquasalis*, Curry 1932 in two malarious areas of Sucre State, Venezuela. *Mem. Inst. Oswaldo Cruz, Rio de J.* 87 (in press).
- Boyd, M. F. 1926. Studies of the epidemiology of malaria in the coastal lowlands of Brazil made before and after the execution of control measures. *Am. J. Hyg. Monogr. Ser.* 5:1-261.
- Darling, S. T. 1910. Transmission of malaria fever in the Canal Zone by *Anopheles* mosquitoes. *J. Am. Med. Assoc.* 53:2051-2053.
- Earle, W. C. 1936. The relative importance of *Anopheles tarsimaculatus*, *Anopheles argyritarsis*, and *Anopheles pseudopunctipennis* as vectors of malaria in the Windward group of the West Indies. *Am. J. Trop. Med.* 16:459-469.
- Godoy, A. and C. Pinto. 1923. Estudios sobre malaria. *Braz. Med.* 37:29-33.
- Knight, K. L. and A. Stone. 1977. A catalog of the

- mosquitoes of the world (Diptera: Culicidae), 2nd ed. Thomas Say Found., Entomol. Soc. Am., Volume 6.
- Linthicum, K. J. 1988. A revision of the *Argyritarsis* section of the subgenus *Nyssorhynchus* of *Anopheles* (Diptera: Culicidae). *Mosq. Syst.* 20:99-271.
- Manson-Bahr, P. E. C. and F. I. C. Apter. 1982. Manson's tropical diseases, 18th ed. Bailliere Tindall, London.
- Manson-Bahr, P. E. C. and D. R. Bell. 1987. Manson's tropical diseases, 19th ed. Bailliere, London.
- Rubio-Palis, Y. 1992. Influence of moonlight on light-trap catches of the malaria vector *Anopheles (Nyssorhynchus) nuneztovari* in Venezuela. *J. Am. Mosq. Control Assoc.* 8:178-180.
- Rubio-Palis, Y. and C. F. Curtis. 1992a. Evaluation of different methods of catching anopheline mosquitoes in western Venezuela. *J. Am. Mosq. Control Assoc.* 8:261-267.
- Rubio-Palis, Y. and C. F. Curtis. 1992b. Biting and resting behavior of anophelines in western Venezuela and implications for control of malaria transmission. *Med. Vet. Entomol.* 6:325-334.
- Rubio-Palis, Y., R. A. Wirtz and C. F. Curtis. 1992. Malaria entomological inoculation rates in western Venezuela. *Acta Trop.* 52:167-174.
- Russell, P. F., L. S. West, R. D. Manwell and G. Macdonald. 1963. Practical malariology, 2nd ed. Oxford Univ. Press, London.
- Stephens, J. W. W. 1921. Malaria on a Venezuelan oilfield. *Ann. Trop. Med. Parasitol.* 15:435-444.
- White, G. B. 1982. Malaria vector ecology and genetics. *Br. Med. Bull.* 38:207-212.
- Wilkerson, R. C. and D. Strickman. 1990. Illustrated key to the female anopheline mosquitoes of Central America and Mexico. *J. Am. Mosq. Control Assoc.* 6:7-34.
- World Health Organization. 1989. Geographical distribution of arthropod-borne diseases and their principal vectors. WHO/VBC/89.967.