

RESEARCH NOTE

Presumed *Dirofilaria immitis* Infections in Wild-Caught *Aedes taeniorhynchus* and *Aedes scapularis* in Rio de Janeiro, Brazil

Ricardo Lourenço-de-Oliveira,
Leonidas M Deane

Laboratório de Transmissores de Hematozoários,
Instituto Oswaldo Cruz, Av. Brasil 4365, 21045-900
Rio de Janeiro, RJ, Brazil

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During the course of studies on the ecology of mosquitoes in the State of Rio de Janeiro (R Lourenço-de-Oliveira 1984 *Mem Inst Oswaldo Cruz* 79: 479-490), the gut of 569 mosquitoes belonging to 20 species caught in Granjas Calábria, a coastal lowland farm in Jacarepaguá, city of Rio de Janeiro, were dissected, as follows: 3 *An. albitarsis* Lynch-Arribalzaga, 1878, 29 *An. aquasalis* Curry, 1932, 292 *Ae. scapularis* (Rondani, 1848), 48 *Ae. taeniorhynchus* (Wiedmann, 1821), 6 *Ps. confinnis* (Lynch-Arribalzaga, 1891), 1 *Ps. pseudomelanota* Barata & Cotrim, 1971, 5 *Cx. amazonensis* (Lutz, 1905), 15 *Cx. bidens* Dyar, 1922, 1 *Culex chidesteri* Dyar, 1921, 3 *Cx. declarator* Dyar & Knab, 1906, 5 *Cx. nigripalpus* Theobald, 1901, 9 *Cx. quinquefasciatus* Say, 1823, 25 *Cx. saltanensis* Dyar, 1828, 2 *Cx. ribeirensis* Forattini & Sallum, 1985, 3 *Cq. venezuelensis* (Theobald, 1912), 91 *Ma. titillans* (Walker, 1848), 9 *Ph. deanei* Lourenço-de-Oliveira, 1983, 1 *Ph. theobaldi* Lane & Cerqueira, 1942, 3 *Wy. forcipenis* Lourenço-de-Oliveira & Silva, 1985 and 18 *Wy. leucostigma* (Lutz, 1905).⁽¹⁾

Mosquitoes with midgut lacking blood were identified to species, dissected in sterile physiological saline and examined microscopically on the day after collection on human or animal baits (R Lourenço-de-Oliveira, R Heyden 1988 *Mem*

Inst Oswaldo Cruz 81: 15-27). Only guts and Malpighian tubules were examined. A compression was done by pressing the guts and Malpighian tubules over with a coverslip in order to squeeze out the detected parasites, which were then Giemsa stained.

Surprisingly, one *Ae. taeniorhynchus* harbored five active early third-stage nematode larvae free in the lumen of the Malpighian tubules and one *Ae. scapularis* contained a single sausage-stage larva, also free in the Malpighian tubules. They were presumed to be *D. immitis* larvae. Presumptive identification was based on morphological characteristics of the filarioid parasites known in the area, according to AER Taylor (1960 *J Helminth* 34: 27-38) and PFL Boreham and RB Atwell (1988 *Dirofilaria*, C.R.C. Press, Boca Raton, Florida, 249 pp.). The site of development of the worm within the mosquito was also taken in consideration. That is, filariae present in the Malpighian tubules are assumed to be *D. immitis*, because amongst Onchocercidae, only species of the genus *Dirofilaria* are known to develop within the tubules' cells and lumen (CB Symes 1960 *J Helminth* 34: 39-42, LL Walters, MMJ Lavoipierre 1982 *J Med Entomol* 19: 15-23, DM Sauerman Jr & JK Nyar 1983 *Mosq News* 43: 222-225, TJ Bradley et al. 1984 *J Parasit* 70: 82-88, Boreham & Atwell 1988, *loc. cit.*). Besides, *D. immitis* is the only species belonging to genus *Dirofilaria* found in the city of Rio de Janeiro. However, seven other species of filarioid parasites of this genus have been identified in Brazil, whose hosts included man and wild animals (slot, otter, peccary and jaguar) captured outside the city of Rio de Janeiro. *D. repens* has only once been reported in the State of São Paulo. Most of these findings correspond to either single records (some species of doubtful taxonomic status) or poorly described species which have never been found again (H Lent & JFT Freitas 1937 *Mem Inst Oswaldo Cruz* 32: 37-54/443-448, JM Mendonça 1948 *Mem Inst Oswaldo Cruz* 46: 647-651, JFT Freitas & H Lent 1949 *Rev Brasil Biol* 9: 377-380, JFT Freitas & LR Mayal 1953 *Rev Brasil Med* 10: 463-467, ND Levine 1968 *Nematode parasites of domestic animals and of man*, Burgess P. Co., Minneapolis, MG Freitas & HM Costa 1970 *Arq Esc Vet* 22: 33-94).

Almost 10% of the dogs in Brazil have microfilaremia due to *D. immitis*. The highest prevalence amongst the localities surveyed in the country has been found in the State of Rio de Janeiro (16.1%, in 1988), essentially in its northern seashore (49%, in 1990) (J Guerrero et al. 1992 Proceedings of the Heartworm Symposium, Austin, Texas, p. 31-36, Am. Heartworm Soc. Publ.). *D. immitis* circulating microfilariae have been detected in at least 12.7% of the dogs from

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⁽¹⁾ The generic names were abbreviated according to JF Reinert, 1975, *Mosquito System* 7: 105-110.

neighborhoods close to Granjas Calábria (N Labarthe, personal communication, GLG Almeida 1981 *Reavaliação da filariose canina no Rio de Janeiro: Epidemiologia e diagnóstico*. MSc Thesis. UFRRJ, 79 pp.). In spite of canine heartworm being widespread in Brazil and enzootic in some regions, wild-captured mosquitoes had never been examined before to determine the natural vector in the country.

A single infected field collected *Ae. taeniorhynchus* and *Ae. scapularis* does not allow any definitive statements to be made, nevertheless these mosquito species, especially the former, should be considered natural potential vectors of dog heartworm in the coastal lowland areas of Rio de Janeiro. *Ae. taeniorhynchus* has long been considered a vector of *D. immitis* in the eastern seaboard of the U.S.A. (KW Ludlan et al. 1970 *JAVMA* 157: 1354-1359). JK Nyar and DM Sauerman Jr (1975 *J Insect Physiol* 21: 1965-1975) have demonstrated high experimental vector potential in *Ae. taeniorhynchus* from Florida, which was able to survive and refeeding while heavily infected with *D. immitis*. These workers later confirmed the involvement of this mosquito in the natural transmission in that area (Sauerman Jr & Nyar 1983 *loc. cit.*). On the other hand, *Ae. scapularis* has never been described as potential vector of *D. immitis*. It has been considered probable vector of *Wuchereria bancrofti* in southern Brazil (RG Rachou 1956 *Rev Bras Malariol D Trop* 8: 267-275).

The detection of the presumed *D. immitis* larvae in the Malpighian tubules of *Ae. taeniorhynchus* and *Ae. scapularis* is epidemiologically important because there are no further barriers to their development at this stage. The larval migration to the Malpighian tubules and survival and development of the prelarvae depend on their capability of surpassing barriers that may hinder its development (Nyar & Sauerman Jr 1975 *loc. cit.*). Both *Ae. taeniorhynchus* and *Ae. scapularis* are considered opportunistic species, feeding on a wide variety of vertebrates, although domestic mammals, especially horses and cows, are their

major blood sources in Southeastern Brasil (Lourenço-de-Oliveira, Heyden 1986 *loc. cit.*, OP Forattini et al. 1987 *Rev Saúde Públ São Paulo* 21: 171-187). We have never made a serious attempt to evaluate the frequency with which this mosquitoes feed on dogs in Rio de Janeiro, but we have seen dozens of females of both species aggressively attacking these animals several times during our field works. Field studies to know the species composition of mosquito attracted to dogs in enzootic areas as well as on the susceptibility of these insects to *D. immitis* must be performed to confirm the local vectors.

Additionally, more 371 *An. aquasalis*, 70 *Ae. scapularis* and 21 *Ae. taeniorhynchus* collected in São Bento, Duque de Caxias (22°43'S 43°16'W), 13 *Ae. scapularis*, 8 *Cx. coronator* Theobald, 1903, 26 *Ps. ciliata* (Fabricius, 1749) and 22 *Ps. confinnis* caught in Seropédica, Itaguaí (22°50'S 43°41'W), and 24 *Hg. leucocelaenus* (Dyar & Shannon, 1924) captured in Represa do Cigano, Jacarepaguá (22°57'S 43°12'W), all in the State of Rio de Janeiro, were also dissected and examined. None of them harbored filarioid larva.

Finally, trypanosomatidae flagellates were found in 16 *Ae. scapularis*, 2 *Cx. saltanensis* and 2 *Ma. titillans* from Granjas Calábria and in 6 *Ae. scapularis* and 1 *Ae. taeniorhynchus* from São Bento. All trypanosomatids were found in the hindgut, being choanomastigotes (genus *Crithidia*), except those detected in *Ma. titillans* which were promastigotes in the midgut. The species of *Crithidia* found in *Cx. saltanensis* has been recently described as a new species, *C. ricardo* (A Sibajev et al. 1993 *Mem Inst Oswaldo Cruz* 88: 541-546), being morphologically indistinguishable from those found in the 22 infected *Ae. scapularis*.

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