RESEARCH NOTE

First Record of *Anopheles benarrochi* Gabaldon, Cova Garcia & Lopez from the State of São Paulo, Southern Brazil

Maria Anice Mureb Sallum, Eduardo Sterlino Bergo*, Oswaldo Paulo Forattini/+

Departamento de Epidemiologia, Núcleo de Pesquisa Taxonômica e Sistemática em Entomologia Médica, Faculdade de Saúde Pública, Universidade de São Paulo, Av. Dr. Arnaldo 715, 01246-904 São Paulo, SP, Brasil *Superintendência de Controle de Endemias (SUCEN), Rua Itália 1617, 14801-350 Araraquara, SP, Brasil

Key words: *Anopheles benarrochi* - first record - State of São Paulo - Brazil

According to ME Faran (1980 *Contrib Am Entomol Inst 15*:1-215) the distribution range of *Anopheles benarrochi* Gabaldon, Cova Garcia & Lopez is limited to the Orinoco basin and eastern versant of the Andes including the llanos plateau region of Colombia, localities of the upper Amazon in Brazil (Rondônia, Acre, Amazonas) and Loreto, Peru. While conducting ecological studies in Bocaina, near Araraquara City, State of São Paulo, Brazil, it was possible to raise progeny broods of female of several species of *Anopheles (Nyssorhynchus)*. Among the families we raised, one of them was identified as *An. benarrochi* which is, for the first time, recorded in the State of São Paulo.

Females *Anopheles* were collected on human bait, in open land, near edge vegetation, at Jacaré-Pepira River, Santa Leonor Farm, Route SP 255 km 125, Bocaina, near Araraquara, State of São Paulo (22°04'19" S and 48°26'47"W), about 420 m above sea level, in a man-made environment with intense agricultural activities, mainly sugar-cane and pasture. The remainder natural vegetation corresponds to edge vegetation along the Jacaré-Pepira River, patches of savanna and tropical deciduous forest. According to the climatic classification of Koeppen (J Setzer 1966 *Atlas climático do Estado de São Paulo*, São Paulo, Comissão Interestadual da Bacia Paraná - Uruguai - Centrais Elétricas de São Paulo) the climate is subtropical humid. The collections were made on human bait during the dusk hours following methodology reported by OP Forattini et al. (1981 *Rev Saúde Públ 15*: 557-586), on 3rd July 1995. Females of several species of *Anopheles* were collected besides that of *An. benarrochi* and identified as *An. darlingi* Root, *An. evansae* (Brethes), *An. galvaoi* Causey, Deane & Deane, *An. rondoni* (Neiva & Pinto), *An. strodei* Root, *An. triannulatus* (Neiva & Pinto) and *An. albitarsis* l.s. The adult female of *An. benarrochi* was misidentified as *An. strodei*. Females were fed and left to lay eggs in small glass vials with wet cotton and filter paper on the bottom. After eclosion the larvae were raised to the adult stage in order to have adults associated with larval and pupal exuviae. Specimens were identified using Forattini's (1962 *Entomologia Médica*, v.1, São Paulo, Fac. Higiene e Saúde Pública, 662 pp.), Faran's (*loc. cit.*) and RAGB Consoli and R Lourenço-de-Oliveira's (1994 *Principais mosquitos de importância sanitária no Brasil*. Ed. Fiocruz, Rio de Janeiro, 225 pp.) keys.

According to Faran (*loc. cit.*) the adult female of *An. benarrochi* is indistinguishable from that of *An. aquasalis* Curry. Although similar to *An. strodei* it can be separated from *An. strodei* by having hindtarsomere 2 dark in about basal half (0.3-0.6 basal), light wing spots at least on veins C and R light cream to yellowish, never white. In *An. strodei* the hindtarsomere 2 is dark in less than basal 0.4, or when greater than 0.4 then the light wing spots are white, never light cream to yellowish. The author emphasized that a great care should be taken when examining specimens of *An. benarrochi* from other localities because he examined only few individuals.

Consoli and Lourenço-de-Oliveira (*loc. cit.*) considered that the adult female of *An. benarrochi* can be distinguished from those of *An. strodei, An. aquasalis, An. galvaoi* and *An. evansae* by possessing vein M mostly dark-scaled at least on ventral surface, and in the other species it is mostly white-scaled. Faran's and Consoli and Lourenço-de-Oliveira's keys do not allow one to identify *An. benarrochi* from Bocaina, State of São Paulo. In Faran´s key individuals of *An. benarrochi* can be misidentified as *An. strodei* and in Consoli and Lourenço-de-Oliveira's key as *An. galvaoi*.

Partially supported by grant no.95/7157-2, Fundação de Amparo à Pesquisa do Estado de São Paulo.
+Corresponding author. Fax: +55-11-282.1898
Received 26 August 1996
Accepted 30 October 1996

However, *An. benarrochi* can be easily distinguished from *An. strodei*, *An. galvaoi* and *An. aquasalis* by characters of the male genitalia and immature stages. Faran (*loc. cit.*) did not include in his key the immature stages of *An. galvaoi*, *An. rondoni* and *An. anomalophylus* Komp. The later species has not been found in Brazil, and according to Wilkerson and Strickman (1990 *J Am Mosq Control Assoc 6*: 7-34) its distribution is limited to Central America. The other two species are known from several localities in the State of São Paulo as well as in other localities throughout Brazil. In Consoli and Lourenço-de-Oliveira's and Faran's keys the larva of *An. benarrochi* can be separated from those of similar species by having seta 3-C with moderately long to long branches, in the other species seta 3-C is single or with minute aciculae. Faran (*loc. cit.*) did not include the pupae of *An. galvaoi* and *An. rondoni* in his key, however, he considered that the pupa of *An. benarrochi* can be recognized by having seta 9-VII short, less than or equal to 0.33 length of segment, pinna 4.4-5.5 length of meatus, not appearing to taper toward apex in lateral aspect, meatal cleft moderately pointed to rounded at base, seta 6-II much longer than 7-II, 10-C subequal to 11-C and more than 0.5 length of 12-C and 6-I 1.5-2.0 length of 7-I.

Although difficult to recognize adult female of *An. benarrochi* from State of São Paulo using Faran's and Consoli and Lourenço-de-Oliveira's adult keys, this species can be easily identified in the larval and pupal stages and male genitalia. As a conclusion, the progeny broods of females collected in Bocaina, State of São Paulo, were identified as *An. benarrochi* by characters of larva, pupa and male genitalia.