

Mosquito immatures in bamboo internodes in eastern Santa Catarina State, South Brazil (Diptera: Culicidae)

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Resumo

Imaturos de mosquitos em internódios de bambus no leste do Estado de Santa Catarina, Sul do Brasil. Considerando relatos anteriores de mosquitos imaturos em bambus em Santa Catarina, foi desenvolvido de janeiro a março de 2011 um estudo em oito localidades do leste do estado, para avaliar a fauna de mosquitos associados a bambus artificialmente furados. Foram coletadas 91 formas imaturas de mosquitos das seguintes espécies: *Aedes albopictus* (Skuse, 1894) (1,1%), *Culex soperi* Antunes & Lane, 1937 (11,0%), *Onirium personatum* (Lutz, 1904) (6,6%), *Sabethes aurescens* (Lutz, 1905) (38,5%), *Sabethes identicus* Dyar & Knab, 1907 (16,5%), *Sabethes intermedius* Lutz, 1904 (3,3%), *Sabethes purpureus* (Theobald, 1907) (1,1%), *Trichoprosopon pallidiventer* Lutz, 1905 (5,9%), *Trichoprosopon soaresi* Lane & Cerqueira, 1942 (2,2%) e *Wyeomyia limai* Lane & Cerqueira, 1942 (24,2%). O encontro de *Ae. albopictus* em bambus perfurados e de fauna diversificada, em geral com biologia pouco conhecida, indica a necessidade de estudos mais detalhados sobre sua biologia na região. Os internódios furados de bambus constituem importantes criadouros para várias espécies de mosquitos, nativas ou exóticas no leste do Estado de Santa Catarina. É registrado pela primeira vez no estado o encontro de *Sabethes intermedius* e *Culex soperi*.

Palavras chave: *Aedes albopictus*; Aedini; *Culex*; Novos Relatos; Culicinae; Sabethini

Abstract

Since mosquito immatures had been previously reported found in bamboo internodes in the Brazilian state of Santa Catarina, a study was conducted from January to March 2011 to evaluate the mosquito fauna associated with artificially drilled bamboos in eight localities in the eastern region of this state. Ninety-one mosquitoes of the following species were recorded: *Aedes albopictus* (Skuse, 1894) (1.1%), *Culex soperi* Antunes & Lane, 1937 (11.0%), *Onirium personatum* (Lutz, 1904) (6.6%), *Sabethes aurescens* (Lutz, 1905) (38.5%), *Sa. identicus* Dyar & Knab, 1907 (16.5%), *Sa. intermedius* Lutz, 1904 (3.3%), *Sa. purpureus* (Theobald, 1907) (1.1%),

Trichoprosopon pallidiventer Lutz, 1905 (6.6%), *Trichoprosopon soaresi* Lane & Cerqueira, 1942 (2.2%) and *Wyeomyia limai* Lane & Cerqueira, 1942 (24.2%). The finding of *Ae. albopictus* in perforated bamboos and the diversified mosquito fauna, whose biology is mostly poorly known, indicates the need of more detailed studies. Bamboo internodes constitute an important breeding place for mosquitoes of several species in the studied area. *Sabethes intermedius* and *Culex soperi* are reported for the first time in the state.

Key words: *Aedes albopictus*; Aedini; Culicinae; *Culex*; New Records; Sabethini

The immature forms of several mosquito species develop in bamboos and have been studied in southern Brazil (LOZOVEI, 2001; MÜLLER et al., 2008), and those found in artificially drilled bamboo internodes from the Atlantic Forest in Santa Catarina State have been reported (MÜLLER et al., 2008).

From January to March 2011, immature forms of mosquitoes were collected from bamboos in a secondary forest in Peri Lagoon Park (abbreviated PLP, 27°43'59.30"S and 48°30'54.41"W), Pantanal (27°36'35.27"S and 48°28'56.3"W), two growths of bamboos in Conceição Lagoon Hill (CLH, 27°35'59.00"S and 48°28'54.34"W, 27°35'53.65"S and 48°28'47.11"W), Ratonés (27°30'17.33"S and 48°27'57.15"W) and Environmental Conservation Unit Desterro (UCAD, 27°31'55.69"S and 48°30'43.08"W), all on Santa Catarina Island, Florianópolis Municipality, and in Spitzkopf Park (SKP, 26°59'42.22"S and 49°6'25.72"W, Blumenau Municipality), Itapema (27°5'20.87"S and 48°38'19.52"W) and Santo Amaro da Imperatriz (SAI, 27°43'57.33"S and 48°48'31.38"W), in the eastern mainland part of that state. All bamboos were identified as *Bambusa tudoides*, except those of the first growth above in Conceição Lagoon Hill, which was of *Bambusa vulgaris*. This growth and that of Pantanal are respectively situated along the side of a road and a street, along the edge of a creek.

Five-millimeter holes were drilled in 5-6 internodes in six bamboos per locality, at a height of 1 to 2.5 m, utilizing a battery-powered electric driller (MARCONDES; MAFRA, 2003). One month later, the internodes were cut, except in *B. vulgaris* bamboos, which were drilled with a hole drill bit (20 mm), to aspirate the water. Immature forms were reared in small vials in the laboratory, utilizing distilled water mixed with water from internodes, at 25±1°C, until obtaining

adults, which were identified, preserving exuviae in 80% ethanol. Water from bamboo internodes was maintained in the laboratory for 30 days, to obtain additional immature forms (ZEQUI; LOPES, 2001). Mosquitoes were identified using the keys of Lane (1953) and Consoli and Oliveira (1994) and original descriptions. Genera and subgenera were abbreviated according to Reinert (2009).

The 91 mosquitoes collected belonged to three tribes in Culicinae: Aedini, Culicini and Sabethini. One *Aedes albopictus* (Skuse, 1894) (1.1% of total) (Ratonés), ten *Culex soperi* Antunes & Lane, 1937 (11.0%) (PLP, Ratonés and SKP), six *Onirium personatum* (Lutz, 1904) (6.6%) (SAI), 35 *Sabethes aurescens* (Lutz, 1905) (38.5%) (PLP, Pantanal, CLH and UCAD), 15 *Sabethes identicus* Dyar & Knab, 1907 (16.5%) (Pantanal, Itapema and SAI), three *Sabethes intermedius* (Lutz, 1904) (3.3%) (Pantanal), one *Sabethes purpureus* (Theobald, 1907) (1.1%) (Itapema), six *Trichoprosopon pallidiventer* (Lutz, 1905) (6.6%) (SKP and SAI), two *Trichoprosopon soaresi* Lane & Cerqueira, 1942 (2.2%) (Pantanal and CLH) and 22 *Wyeomyia limai* Lane & Cerqueira, 1942 (24.2%) (CLH, Pantanal, PLP, UCAD and Itapema) were collected.

Lozovei (1998; 2001) collected *Cx. soperi* from internodes with several kinds of holes and two other species of the subgenus *Carrollia* (*Culex iridescens* (Lutz, 1905) and *Culex kompi* (Valencia, 1973)) in cut internodes in Quatro Barras (Paraná State, 974 m a.s.l.). Valencia (1973) considered species of *Culex* (*Carrollia*) as associated with several breeding places, indicating a high ecological plasticity, where broken or cut bamboos were found to be frequently colonized by their immature forms. *Culex soperi* was supposedly distributed from Brazilian state of Espírito Santo to the Argentinian province of Misiones, at altitudes lower than 200 m

(VALENCIA, 1973); this is the first report of this species for Santa Catarina State. The report of Lozovei (1998; 2001) indicates a localization out of the purported range of altitude, and the finding of this species in northwest Amazonas State (HUTCHINGS et al., 2005) expands its known distribution considerably.

Immature forms of *Aedes albopictus* had previously been reported from bamboo internodes with holes in Malaysia (MACDONALD; TRAUB, 1960) and also in those situated along the border of UCAD and in the laboratory, when a perforated bamboo internode was placed in the cage containing an *Ae. albopictus* colony (MÜLLER; MARCONDES, 2010), to try to promote egg-laying by *Wy. limai*, reared in bamboos and blood-fed. The importance of this habitat for *Ae. albopictus* in the southern Brazil should be investigated. The bamboo where the immature form of this species was found was on the edge of the forest.

Sabethes purpureus had previously been reported in tree holes in the state of São Paulo (GOMES et al., 1992) and in UCAD (MARCONDES et al., 2003), and this is the first report of this mosquito in bamboos with holes. *Sabethes aurescens* was the only species in bamboos with holes in the western part of Santa Catarina (MARCONDES et al., 2006) and also seems to be very common in the eastern part of the state, having been found in four of the seven localities studied. It had previously been collected from bamboos at SKP (MARCONDES et al., 2003), and was very rare in collections on humans in UCAD (PATERNO; MARCONDES, 2004). *Sabethes identicus* had been reported in Itapema (MARCHI et al., 2010), but this is the first report of *Sa. intermedius* for Santa Catarina. The last species is widely distributed in South America (Argentina, Brazil, Bolivia, Colombia and French Guiana) (HARBACH, 1994), always developing in bamboos, and was found in uncut and in broken bamboos in Salesópolis (São Paulo), along with *Sa. aurescens*, *Wy. limai* and *Toxorhynchites* sp., and with *Cx. (Car.) iridescens* and *Cx. (Microculex) sp.* (HEINEMANN; BELKIN, 1979). Immature forms of *Tr. soaresi* have not yet been described, probably due to their fragility (LOZOVEI, 2001). It seems to be a rare species in internodes with holes. Lozovei (1998; 2001)

found this mosquito only in cups of bamboo internodes.

Lozovei (1998; 2001) emphasized differences between associated fauna in bamboo internodes with holes and cups made of bamboo internodes and the influence of the shape of holes, and reported mosquitoes of 17 species from 3,752 internodes in Paraná State. The study of more internodes in eastern Santa Catarina, where ca. 350 green internodes were perforated and examined, would possibly find more species than the ten reported here. In fact, Müller (2008) collected four additional species from drilled internodes in UCAD: *Sabethes xhyphides* Harbach, 1994, *Shannoniana fluviatilis* (Theobald, 1903), *Toxorhynchites bambusicola* (Lutz & Neiva, 1913) and *Tx. theobaldi* (Dyar & Knab, 1906). LOZOVEI (2001) examined bamboo in Quatro Barras, Paraná with holes with a diameter around that of the present study (1-8 mm) and found 11 species, three of *Wyeomyia*, including *Wy. limai*, *Sh. fluviatilis*, *Sa. aurescens*, *Toxorhynchites bambusicola* (Lutz & Neiva, 1913) and others.

Alencar et al. (2010) obtained at least 12 species from bamboo internodes in an Atlantic Forest area in the state of São Paulo, and the only species coincident in both studies was *Tr. pallidiventer*, but some of their specimens were identified only at the genus level.

Bamboo internodes constitute an important breeding place for mosquitoes of several species in the areas studied, and their ecological and medical importance should be investigated. The rarity of bamboos with natural holes (unpublished observations) in the east of Santa Catarina, unlike those near Curitiba (LOZOVEI, 1998; 2001), probably restricts available breeding places, favoring more ubiquitous species such as *Sa. purpureus*, and artificial drilling may have increased their populations in the present study.

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