



SCIENTIFIC NOTE

First Record of *Culex (Culex) brethesi* (Dyar) (Diptera: Culicidae) in Rio Grande do Sul State, Brazil

J DA C CARDOSO^{1,2}, MB DE PAULA¹, A FERNANDES¹, E DOS SANTOS², MAB DE ALMEIDA², DF DA FONSECA², MAM SALLUM¹

¹Depto de Epidemiologia, Faculdade de Saúde Pública, USP, São Paulo, SP, Brasil

²Divisão de Vigilância Ambiental em Saúde, Centro Estadual de Vigilância em Saúde, Secretaria da Saúde do Estado do RS, Porto Alegre, RS, Brasil

Keywords

Entomological surveillance, vector, Arbovirus

Correspondence

JÁDER DA C CARDOSO, Divisão de Vigilância Ambiental em Saúde, CEVS, SES/RS, Rua Domingos Crescêncio 132, 90650-090 Porto Alegre, RS, Brasil; jader-cardoso@saude.rs.gov.br

Edited by Neusa Hamada – INPA

Received 06 August 2009 and accepted 28 January 2010

Abstract

This is the first record of *Culex (Culex) brethesi* (Dyar) in Rio Grande do Sul state, Brazil. The species was identified from specimens collected in a sand bar vegetation with the aid of a Nasci's trap, during an expedition for surveillance of the West Nile Virus in July of 2006, in the city of Mostardas, Rio Grande do Sul, Brazil.

Mosquitoes are among the most important vectors of the West Nile Virus (WNV), an arbovirus of the genus *Flavivirus* (Flaviviridae), which infects equines and urban and wild birds and may lead to death. In humans, this virus causes fever, at times progressing to acute meningitis, encephalitis, and death. The WNV was detected in Africa, Asia, Europe (Natal & Ueno 2004), and in the United States (Petersen & Roehrig 2001). In 1999 the WNV has spread throughout North and Central America, and was first isolated in South America in 2006, in Buenos Aires, Argentina (Morales *et al* 2006). In the United States, between 1999 and 2008, tests performed in mosquitoes detected the WNV in 64 Culicidae species, of which the majority belonged to the genera *Culex* and *Aedes* (CDC 2009).

In Brazil, 156 species of the genus *Culex* are registered, grouped in nine subgenera (WRBU 2009). The subgenus *Culex* is one of the most important in the Neotropical region from an epidemiological point of view (Forattini 2002).

Due to the potentiality to be introduced in Brazil, the WNV surveillance includes entomological studies aiming to identify potential vector species, know their population dynamics, and detect and monitor viral activity in potential hosts. To achieve this, actions focused on adult forms of *Culex* spp. and *Aedes* spp. are recommended, both in areas of high risk of transmission (zoos, hunting reserves, feeding territories or migratory bird refuges) and places of notification of possible or confirmed WNV cases in birds, humans and other mammals (OPAS 2002). Between July 24th and 28th, 2006, as part of the WNV Surveillance Program routine, the Centro Estadual de Vigilância em Saúde, an organ of the Secretaria da Saúde do Rio Grande do Sul organized an expedition to the Parque Nacional Lagoa do Peixe (PNLP), the largest migratory bird refuge in this state. The park covers the cities of Tavares (80%), Mostardas (17%) and São José do Norte (3%), and is located between the Lagoa dos Patos and the Atlantic Ocean, on the central section of

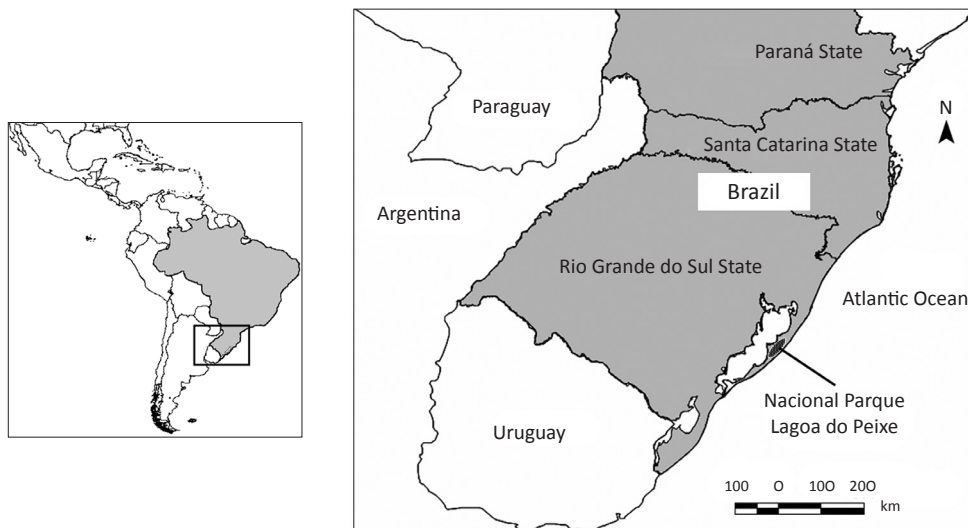


Fig 1 Parque Nacional Lagoa do Peixe, where the specimens were collected. State of Rio Grande do Sul, Brazil.

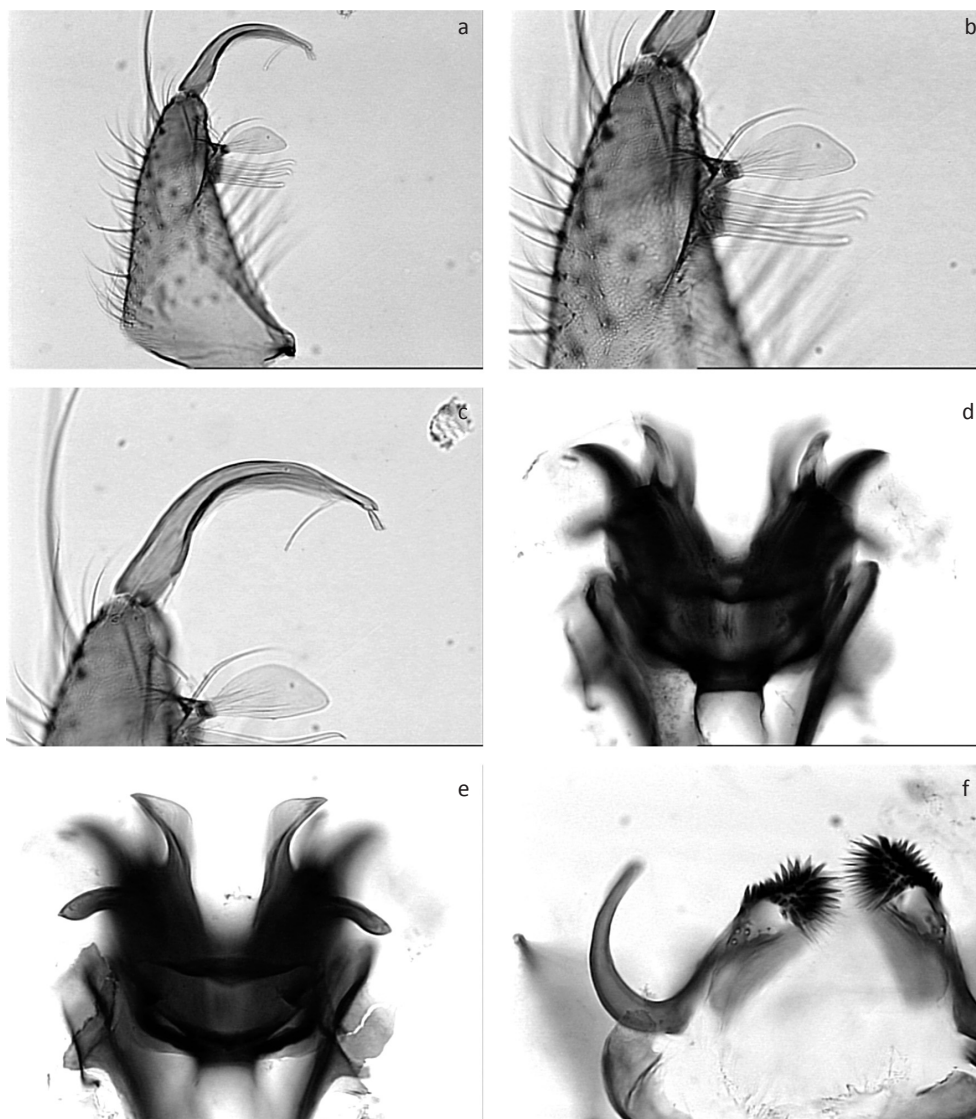


Fig 2 *Culex (Culex) brethesi*. Male genitalia. a) Gonocoxite and gonostylus; b) Detail of the subapical lobe of the gonocoxite; c) Detail of the subapical lobe of gonocoxite, showing setae g and h; d) Phallosome, showing the ventral arms of lateral plate; e) Phallosome, showing the dorsal arms and lateral arms of lateral plate; f) Proctiger.

the Coastal Plains of the state of Rio Grande do Sul (Fig 1). According to its management plan, the PNLN covers an area of 344 km² and is 62 km long and 6 km wide on average. Mean annual temperature varies from 18°C and 20°C and mean annual rainfall reaches 1,186 mm. Except for a long belt of coastal dunes, the topography is flat, and the soil is basically formed by marine quartz sands (Loebmann & Vieira 2005).

Mosquitoes were collected in sand bar vegetation on the road (31°06'42" S; 50°51'59" W) that connects the city of Mostardas with the coast. A total of two 15-min manual aspirations were performed (from 09:30h to 09:45h and from 10:15h to 10:30h), using Nasci's traps (Nasci 1981). The mosquitoes collected were stored in entomological boxes and sent to the Laboratório de Entomologia em Saúde Pública - Universidade de São Paulo, to identify the species. A total of four *Culex (Culex) brethesi* (Dyar) specimens were identified, based on characters of the male genitalia.

Culex brethesi was described from the genitals of a male collected in San Isidro, in the province of Buenos Aires, Argentina. Its geographic distribution is not well known. While Guimarães (1997) points to the occurrence of *Cx. brethesi* in Argentina and questions its presence in Brazil, the Smithsonian Institution online catalogue of mosquitoes records the presence of this species only in Argentina and Uruguay (WRBU 2009). In Brazil, Taipei-Lagos & Natal (2003), in a study of mosquito ecology in the Parque Ecológico Tietê located in the outskirts of the city of São Paulo, identified four *Cx. brethesi* specimens. However, the authors did not specify whether they were male or female. Rossi (2006) used material originated from collections made in Buenos Aires and from the Museu de la Plata archives to re-describe the male, female, pupa and 4th instar larva. In addition, information about taxonomy and geographic distribution of the species was updated. According to Rossi (2006), *Cx. brethesi* occurs in the Argentinean provinces of Buenos Aires, Córdoba, Mendoza, Misiones, Santa Fe, Santiago del Estero, Entre Ríos, Corrientes and Misiones. The author suggests that other records of this species could have resulted from mistaken identifications, not based on male genital structures.

In this study *Cx. brethesi* is recorded for the first time in Rio Grande do Sul state, making clear its occurrence in Brazil. The specimens were identified based on characteristics of the male genitalia (Fig 2), and incorporated into the Coleção Entomológica of the Faculdade de Saúde Pública da USP (FSP-USP).

Even though this species has not been associated, until now, with the transmission of pathogens that cause diseases in humans this finding shows the importance of detailed collection activities of the Culicidae fauna as an entomological surveillance strategy.

Acknowledgments

We acknowledge the Parque Nacional Lagoa do Peixe management for permitting the collections. MAMS is financially supported by the Fundação de Amparo à Pesquisa do Estado de São Paulo, FAPESP (Grant 05/53973-0), and Conselho Nacional de Desenvolvimento Técnico e Científico (CNPq BPP 300351/2008-9 to MAMS).

References

- Centers for Disease Control and Prevention (CDC) (2009) West Nile Virus: entomology. Available from <http://www.cdc.gov/ncidod/dvbid/westnile/mosquitoSpecies.htm> (Accessed 16 March 2009).
- Forattini OP (2002) Culicidologia médica. Identificação, biologia, epidemiologia. São Paulo, EDUSP, 864p.
- Guimarães JH (1997) Systematic database of Diptera of the Americas South of the United States (Family Culicidae), São Paulo, Plêiade/FAPESP, 286p.
- Loebmann D, Vieira JP (2005) Amphibians list from Lagoa do Peixe National Park, Rio Grande do Sul, Brazil. *Rev Bras Zool* 22: 339-341.
- Morales M A, Barrandeguy M, Fabbri C, Garcia J B, Vissani A, Trono K, Gutierrez G, Pigretti S, Menchaca H, Garrido N, Taylor N, Fernandez F, Levis S, Enría D (2006) West Nile virus isolation from equines in Argentina, 2006. *Emerg Infect Dis* 12: 1559-1561.
- Nasci RS (1981) A lightweight battery-powered aspirator for collecting resting mosquitoes in the field. *Mosq News* 41: 808-811.
- Natal D, Ueno H M (2004) Vírus do Nilo Ocidental: características da transmissão e implicações vetorais. *Entomol Vect* 11: 417-433.
- Organização Pan-Americana da Saúde (OPAS) (2002) Diretrizes para vigilância, prevenção e controle do Vírus do Nilo Ocidental (West Nile Vírus - WNV). Available from www.paho.org/Portuguese/AD/DPC/CD/wnv-guidelines.pdf (Accessed 15 March 2009).
- Petersen L R, Roehrig J T (2001) West Nile Virus: A reemerging global pathogen. *Emerg Infect Dis* 7: 611-614.
- Rossi G C (2006) Redescription of *Culex (Culex) brethesi* Dyar, 1919 (Diptera: Culicidae). *Zootaxa* 1312: 25-35.
- Taipe-Lagos C B, Natal D (2003) Abundância de culicídeos em área metropolitana preservada e suas implicações epidemiológicas. *Rev Saúde Pública* 37: 275-279.
- Walter Reed Biosystematics Unit (WRBU) (2009) Systematic catalog of Culicidae. Available from http://www.mosquitocatalog.org/species/species_profile.asp?ID=3425 (Accessed 08 June 2009).