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New records of mosquito species (Diptera: Culicidae) from Neuquén and La Rioja provinces, Argentina

Novo registro de mosquitos (Diptera: Culicidae) nas províncias de Neuquén e La Rioja, Argentina

ABSTRACT

The presence of *Aedes aegypti* is reported beyond its current limit of distribution in Argentina, in the city of Neuquén, Neuquén Province. Ovitrap were placed to collect *Ae. aegypti* eggs between December 2009 and April 2010. The geographical distribution of *Culex eduardoi*, *Psorophora ciliata* and *Ps. cingulata* is extended with new records from two provinces.

DESCRIPTORS: Insect Vectors. *Aedes aegypti*. *Culex eduardoi*. *Psorophora ciliata*. *Psorophora cingulata*. Argentina.

RESUMO

Relata-se a presença de *Aedes aegypti* ao sul de seu limite atual de distribuição na Argentina, na cidade de Neuquén, província de Neuquén. Ovitrapas foram instaladas de dezembro/2009 a abril/2010. A distribuição geográfica de *Culex eduardoi*, *Psorophora ciliata* e *Ps. cingulata* aumenta, incluindo novos registros para duas províncias.

DESCRITORES: Insetos Vetores. *Aedes aegypti*. *Culex eduardoi*. *Psorophora ciliata*. *Psorophora cingulata*. Argentina.

INTRODUCTION

Several mosquito species stand out because of their medical importance as reservoirs and vectors of pathogens of diseases such as dengue, yellow fever, malaria, filariasis and encephalitis. Knowledge of their distribution is of paramount importance for control programs as it is essential to determine areas of potential risk of disease transmission, especially for species of public health concern. This study aimed to report new mosquito species from Neuquén (southwest) and La Rioja (northwest) provinces in Argentina.

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METHODS

Data were obtained from an entomological surveillance project for *Aedes aegypti* carried out in the city of Neuquén by the local health department, and from the National University of La Rioja research project conducted to update the mosquito fauna in La Rioja Province.

Samples of *Ae. aegypti* eggs were collected using ovitraps. An ovitrap consisted of a 1000-mL plastic cup lined with a layer of brown colored filter paper. Ovitrap were filled with a dry grass infusion (750 mL/ovitrap) to increase the likelihood of attracting gravid females.^a Forty ovitraps were placed in the urban area of Neuquén city, near a bus station and surrounding area, and in low-lying areas (<1.5 m high), and were weekly replaced from December 2009 to April 2010. The eggs collected, from only three ovitraps that were active during January and March, were kept on moist filter paper for at least four to five days to ensure embryogenesis, and later were transferred to the Centro de Investigaciones Entomológicas de Córdoba (Universidad Nacional de Córdoba, Argentina) for rearing.

Immature stages belonging to other mosquito species were collected from natural water bodies at ground level using a 300-mL dipper in both La Rioja and Neuquén provinces. Larvae were individually reared, as appropriate, to obtain larvae and associated pupal exuviae and adults. Species were identified from larvae, males and females, as described by Darsie (1985).⁴ Information on locality and date of collection, altitude above sea level (in meters), phytogeographical region, climate, number and stage of the specimens collected, and collectors were recorded for each species. Life stages and other terms used are abbreviated as follows: male (M); male genitalia (MG); female (F); pupa (P); pupal exuviae (Pe); fourth-instar larva (L); larval exuviae (Le); eggs (E); person making the determination of the species (det.), and collector (coll.).

Voucher specimens confirming these new records are deposited in the mosquito collection of Centro de Investigaciones Entomológicas de Córdoba (Universidad Nacional de Córdoba, Argentina).

RESULTS

Aedes (Stegomyia) aegypti (L.). Neuquén Province: Neuquén city (38°57'S, 68°03'W; WGS 84; 271 m);

January, March 2010; Monte phytogeographical region, cold semiarid climate (average yearly temperature 14.7°C, July mean temperature 5.6°C); 39 E, 2 L, 4 M, 1 F; colls: Roccia and Korin; det: Laurito and Almirón.

Culex (Culex) eduardoi Casal & García. Neuquén Province: Neuquén city (38°57'S, 68°03'W, WGS 84; 271 m); December 2009; Monte phytogeographical region, cold semiarid climate (average yearly temperature 14.7°C, July mean temperature 5.6°C). 4 MG, 3 Pe, 13 L, 5 Le; colls: Roccia and Korin; det: Laurito.

Psorophora (Psorophora) ciliata (Fabricius). La Rioja Province: Milagro (30°58'S, 65°37'W, WGS 84; 715 m); March 2010; Chaco phytogeographical region, arid climate of hills and fields; 2 F, 2 L; colls: Visintin and Lorenzo; det: Visintin.

Psorophora (Grabhamia) cingulata (Fabricius). La Rioja Province: Ambil (31°01'S, 66°14'W, WGS 84; 715 m); February 2011; Chaco phytogeographical region, arid climate of hills and fields; 2 M, 2 F; colls: Visintin and Lorenzo; det: Visintin.

DISCUSSION

Dengue is a major mosquito-borne viral disease, and is widely distributed in tropical and subtropical regions. *Ae. aegypti* is currently the vector of dengue virus in Argentina and neighboring countries, and was the vector of yellow fever virus in the past. During 2009 there was an epidemic of dengue-1 serotype in the central and northwestern provinces of Argentina with more than 25,000 reported cases.^b *Aedes aegypti* was previously reported in subtropical and temperate areas in central and north Argentina. In 1930, before the implementation of the *Ae. aegypti* eradication program in the Americas, this species had been reported as south as the city of Bahía Blanca (38°44'S, 62°16'W, WGS 84) in Buenos Aires Province.^c In the last years, it has spread towards the west to San Luis Province,¹⁰ and south to Santa Rosa city (36°35'S, 64°16'W, WGS 84) in La Pampa Province.⁸ *Ae. aegypti* has not been recently reported in Bahía Blanca city where entomological surveys were performed as well.^d Our study reports the presence of *Ae. aegypti* in Neuquén Province, in the Patagonia region, being the southernmost record in Argentina. However, the finding of *Ae. aegypti* eggs does not imply that the mosquito is now established in Neuquén city. The eggs collected were probably laid by female mosquitoes that moved between cities due to

^a Reiter P, Nathan MB. Guías para la evaluación de la eficacia del rociado especial de insecticidas para el control del vector del dengue *A. aegypti*. Geneva: World Health Organization; 2003 [cited 2010 Mar 15]. Available from: http://whqlibdoc.who.int/hq/2003/WHO_CDS_CPE_PVC_2001.1_spa.pdf

^b Ministerio de Salud de la Nación (AR). Plan nacional para prevención y control del dengue y la fiebre amarilla. Buenos Aires; 2009 [cited 2009 Aug 05]. Available from: http://www.msal.gov.ar/dengue/descargas/plan_nacional%20prevencion_control_dengue_f_amarilla.pdf

^c Schweigmann N, Boffi R. *Aedes aegypti* y *Aedes albopictus*: situación entomológica en la región. In: Temas de zoonosis y enfermedades emergentes. Segundo Congreso Argentino de Zoonosis y Primer Congreso Argentino y Latinoamericano de Enfermedades Emergentes Buenos Aires. 1998; p. 259-63.

^d Municipalidad de Bahía Blanca. Subsecretaría de Gestión Ambiental. Saneamiento ambiental. Identificación del mosquito transmisor del virus del dengue. Buenos Aires; 2011 [cited 2011 Apr 15]. Available from: http://www.bahia blanca.gov.ar/saneamiento/aedes_dengue.php

travel and commerce. They completed embryogenesis under local environmental conditions in Neuquén city, similar to that seen in Bahía Blanca city (average yearly temperature 15.4°C, July average temperature 7.6°C) where *Ae. aegypti* was previously reported.

It is yet unknown the epidemiological importance of *Cx. eduardoi*. However, their breeding sites are often found next to urban areas.⁷ *Cx. eduardoi* has previously spread south from Buenos Aires Province to the temperate cold and dry area of Chubut Province,² and Santa Cruz Province,⁹ being the first record from Neuquén Province. These mosquitoes along with other three species of *Culex* (*Cx. pipiens*, *Cx. dolosus*, and *Cx. acharistus*) can be as widespread as the Patagonia region, southern Argentina.⁹

Psorophora are widespread pest mosquitoes and several species are vectors of arboviruses. *Psorophora ciliata* has not been yet incriminated in any disease transmission. However, females of this species are large and aggressive mosquitoes, attacking any time, and inflicting a painful injury. The larvae of *Ps. ciliata*

are predacious on other medically important mosquito larvae occurring in the same breeding sites such as *Aedes taeniorrhynchus*, *Ps. ferox* and *Ps. confinnis*.^{3,5} In Argentina, *Ps. ciliata* was previously reported in subtropical and temperate areas of the country, with La Pampa Province as its southernmost limit of distribution.⁸ This species is reported for the first time in the semiarid area of La Rioja Province.

It is unknown the epidemiological importance of *Psorophora cingulata*. However, Ilheus virus was isolated from a pool of *Psorophora* spp. mosquitoes from Trinidad, where *Ps. cingulata* was present.¹ This mosquito species has the ability to adapt to anthropogenic environments, and this feature could have major epidemiological implications.⁶ This is the western record of *Ps. cingulata* in Argentina, being reported for the first time in La Rioja Province, semiarid region.

This is the first record of the presence of *Ae. aegypti* in Neuquén Province. There is a need for effective surveillance measures to prevent the establishment of this mosquito in southern Argentina.

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