



NOTA BREVE:

The first record for *Wolbachia* in a scorpion: the parthenogenetic yellow scorpion *Tityus serrulatus* (Scorpiones, Buthidae)

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Revista Ibérica de Aracnología

ISSN: 1576 - 9518.

Dep. Legal: Z-2656-2000.

Vol. 14, 31-XII-2006

Sección: Artículos y Notas.

Pp: 183 – 184.

Fecha publicación: 25 Octubre 2007

Edita:

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Índice, resúmenes, abstracts

vols. publicados:

<http://entomologia.rediris.es/sea/publicaciones/ria/index.htm>

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NOTA BREVE:

The first record for *Wolbachia* in a scorpion: the parthenogenetic yellow scorpion *Tityus serrulatus* (Scorpiones, Buthidae)

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Abstract:

Wolbachia are endosymbiont bacteria of arthropods and nematods. The first record for *Wolbachia* in a scorpion is presented for the parthenogenetic yellow scorpion *Tityus serrulatus*. *Wolbachia* was found in *T. serrulatus* by PCR amplification of a fragment of 16S rDNA gene.

Key words: Scorpiones, *Wolbachia*, parthenogenesis, endosymbiosis, South America, Brazil.

Primera cita de *Wolbachia* en un escorpión: el escorpión amarillo partenogenético *Tityus serrulatus* (Scorpiones, Buthidae)

Resumen:

Wolbachia son bacterias endosimbiontes de artrópodos y nemátodos. La presencia de *Wolbachia* en Scorpiones es registrada por primera vez, para el escorpión amarillo partenogenético, *Tityus serrulatus*. Hemos encontrado *Wolbachia* en *T. serrulatus* por intermedio de amplificación por PCR del gen 16S rDNA.

Palabras clave: Scorpiones, *Wolbachia*, partenogénesis, endosimbiosis, Sudamérica, Brasil.

Introduction

Wolbachia are intracellular endosymbiont, alpha-proteobacteria, of hundreds of arthropods and nematods. They are capable of manipulating the reproduction of arthropod hosts, inducing parthenogenesis, selectively killing males and inducing feminization of genetic males (Werren, 1997; Stouthamer et al. 1999; Charlat et al. 2003; McGraw EA & O'Neill, 2004).

Among arthropods, *Wolbachia* has been isolated from insects, crustaceans and mites, and more recently, it was also detected in spiders (Oh et al. 2000; Rowley et al. 2004; Goodacre et al. 2006) and pseudoscorpions (Zeh et al. 2005). Here we report for the first time the presence of *Wolbachia* in a scorpion, the yellow parthenogenetic scorpion *Tityus serrulatus* Lutz & Mello, 1922, which is the most medically important species in South America (Matthiesen, 1962; Eickstedt et al. 1996).

Material and Methods

Individuals of *T. serrulatus* were collected in the city of São José do Rio Pardo (S 21° 35'; W 46° 56'), State of São Paulo, Brazil. Voucher specimens were deposited in the collection of Instituto Butantan, São Paulo, Brazil.

Total DNA was extracted from 10 individuals (three adults and seven juveniles) of *T. serrulatus*, according to protocol of Jowett (1998). DNA samples were submitted to PCR for detection of W-Spec fragment of *Wolbachia* 16S rDNA, according to Werren & Windsor (2000).

PCR-amplified fragments were sequenced using BigDye 2.0 automated sequencing kit (Applied Biosystems) with the same W-Spec primers. Sequences were obtained from an ABI377 sequencer and were analyzed through the software Sequence Navigator (Applied Biosystems) and compared with sequences from the GenBank database (Blast tool, at website: www.ncbi.nih.gov).

Results

A fragment correspondent to the W-Spec was amplified in all samples. Its resulting sequence of 414 bp was deposited in GenBank (accession # AY996129). Sequences were identical in all 10 samples and were also 100 % similar to other 16S rDNA sequences, such as those from *Wolbachia* endosymbiont of *Drosophila innubila* Spencer, 1943, and the Hymenoptera *Nasonia longicornis* Darling, 1990 and *Nasonia giraulti* Darling, 1990 (GenBank #AY876253, M84691, M84690, respectively).

Discussion

The sequences obtained and presented here are identical to the W-Spec portion of the gene 16S rDNA of *Wolbachia*, therefore confirming *T. serrulatus* to be a host. This appears to be the first record of *Wolbachia* in scorpions according to the updated online database of *Wolbachia* hosts (www.wolbachia.sols.uq.edu.au/hosts.cfm).

The present new record of *Wolbachia* opens a new field for the study of parthenogenesis in scorpions. One of the questions to be answered is the possible influence of the endosymbiont in parthenogenesis. *Wolbachia* has been suspected to cause sexual malformations in bothriurids (Mattoni, 2005), which straightens this idea. The possible influence could be accomplished by evaluating the effects of antibiotic-mediated bacteria elimination on the scorpion, as it was done with the wasp *Trichogramma* (Stouthamer *et al.* 1990). Such experiments are currently being carried out by the authors

Acknowledgements

L. Suesdek-Rocha acknowledges John Werren for advising on *Wolbachia* detection by PCR. Support for R.B.: Fapesp 03/12587-4.

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