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EVIDENCE OF THE PRESENCE OF INTRACELLULAR BACTERIAL WOLBACHIA IN INSECTS LIVING IN MANGROVE OF GUADELOUPE

Suzanne Conjard, Yancy Billard, Anne-Marie Macal, Mélanie Manikon, Kassandra Romany & Olivier Gros

Institut de Systématique, Évolution, Biodiversité, ISYEB, UMR 7205, MNHN/CNRS Sorbonne Univ./EPHE/Univ. Antilles, Équipe Biologie de la mangrove. UFR SEN, 97100 Pointe-À-Pitre, Guadeloupe.

Corresponding authors: suzanne.conjard@gmail.com

Introduction

Wolbachia is an intracellular bacterial symbiont that colonizes nearly 60% of Arthropods. This bacterium has the ability to manipulate the sex ratio of the infected host in several ways: production of infected females, feminization of males, destruction of infected male embryos, and cytoplasmic incompatibility between infected males and uninfected females. Transmission of the bacterium can be either vertical or horizontal (Wiesen, 1997).

Among insects of the superfamily Gomphidae (Hemiptera: Gomphomorpha) from Guadeloupe in Lesser Antilles, Wolbachia was detected in three species: Limnognus franciscanus Uhler, 1894, Rheumatobates trinitatis (China, 1943). Two new strains of Wolbachia were detected in these Gerroidea. Limnognus franciscanus and Rheumatobates trinitatis are infected by the same Wolbachia strain (Wiflun) (Conjard et al., 2021), and Rheumatobates trinitatis is infected with a strain previously observed in Scirtothrips perseae (Ramos-Jiménez et al., 2007). Gerroidea are skittering insects that live on the surface of water bodies, both salt, and fresh (Hénin, 2011). These insects have an opportunistic carnivorous diet, feeding on preys that fall into the water surface: springtails, copepods, flies, leafhoppers, ants or spiders (Avensizou & Pouvreau, 1976). By looking for Wolbachia in Arthropods evolving in the same habitats as Gerroidea, if they share the same strain, it will be possible to validate the transmission of the bacterium in a horizontal way and thus by predation. Thus, we hope to have first indications of the interactions between these Arthropods.

Materials and Methods

1° Sampling and collection of the insects living in the marine fringe of the mangrove is done from the boat using a dip net. For the swamp forest ponds, was done by foot from the shore. Were stored at RT before analysis in the laboratory within two hours.

2° The insects collected were identified by using determination keys: (Guinot & Amadon, 2010; Manikon, 2013; Yancovic, 2013; Meurig et al., 2017; Merig & Remine, 2020).

3° The presence of Wolbachia was done after whole DNA extraction on the insects using the Wolbachia surface protein ( wsp) universal primer set (wspF and wspR919). The PCR products were directly sequenced by Eurofins (www.eurofinsgenomics.fr).

Results

“Baie à Chat”

Description of the environment: Marine fringe of the mangrove coastline. Buy little sheltered from the swell. Mangrove with Rhizophora mangrove.

Gomphidae present: Rheumatobates trinitatis (Photo 6) infected with Wfl strain and Rheumatobates plumieri (Photo 7) infected with a strain observed in S. perseae

Insects tested against the presence of Wolbachia: 3 species

Species collected and tested:

- Rheumatobates delphi (Photo 6)
- Leiopus bioculatus (Photo 7)

“Mangrove of Pigeon Island”

Description of the environment: Lagoon in the coastal mangrove. Space sheltered from the sea swell and composed of Rhizophora mangle

Gomphidae present: Rheumatobates trinitatis infected with Wfl strain

Insects tested against the presence of Wolbachia: 9 species

Species collected and tested:

- Rheumatobates delphi (Photo 6)
- Acromyrmex octospinosus (Photo 4)

“Menhir Fréchoù”

Description of the environment: Pond with trees, Annona glabra, at the bottom of a gully surrounded by a grassy lawn.

Gomphidae present: Limnognus franciscanus not infected, Microvelia pulchella Westwood, 1834, not infected

Insects tested against the presence of Wolbachia: 6 species

Species collected and tested:

- Acromyrmex octospinosus (Photo 3)

In this situation, L. franciscanus and R. trinitatis are infected with a single Wolbachia strain Wfl. However, in some cases, L. franciscanus may not be infected with Wolbachia, or may have a completely different, as yet unknown strain. Individuals of M. pulchella collected were tested negative for Wolbachia.

The same strain detected in the two mangrove Acromyrmex delphi Antilles Forest, 1899 and Acromyrmex octospinosus (Reich, 1893) was already described from Siccimymex sp. (LC072865.1). This strain must be specific to ants regardless of its habitat. Whatsoever they are collected, Leucogaster sp. White, 1841 individuals were positive for a new strain of Wolbachia that appears to be specific to this host species.

The two undefined species that belong to the orders Minidi and Brachyopod appear each have a new strain of Wolbachia observed in the “Étang à Fréchoù”.

References