DNA barcoding (COI and 16S genes) reveals several lineages of the exotic earthworm *P. corethrurus* in a Mexican Pacific Island

Carlos Fragoso[1], Juan Martínez[2], Noemí Matías[2], Alejandra Domínguez [2], Patricia Rojas[1], Antonio Angeles[1] and Bertha Pérez[1]

[1] Red de Biodiversidad y Sistemática. [2] Red de Interacciones Multitróficas. Instituto de Ecología AC, Xalapa, Veracruz, MEXICO,

INTRODUCTION:

Mexico harbors nearly 1400 islands or islets, but only 144 are currently inhabited by humans and, in general, they are very small. Tropical humid Mexican islands are rare, and the majority are found in the North Pacific region.

Hitherto, the earthworm fauna of these islands is completely unknown. One of these islands is the Socorro Island (131 km², Revillagigedo complex) a very important reservoir of marine biodiversity, birds and some endemic trees. It is a relatively recent and active volcanic island (3 million years old), the last eruption occurring as recent as 29 years ago.

OBJECTIVES:

- To identify the earthworms of the Mexican Socorro island
- To use COI barcode to confirm morphological identifications of adults and juveniles

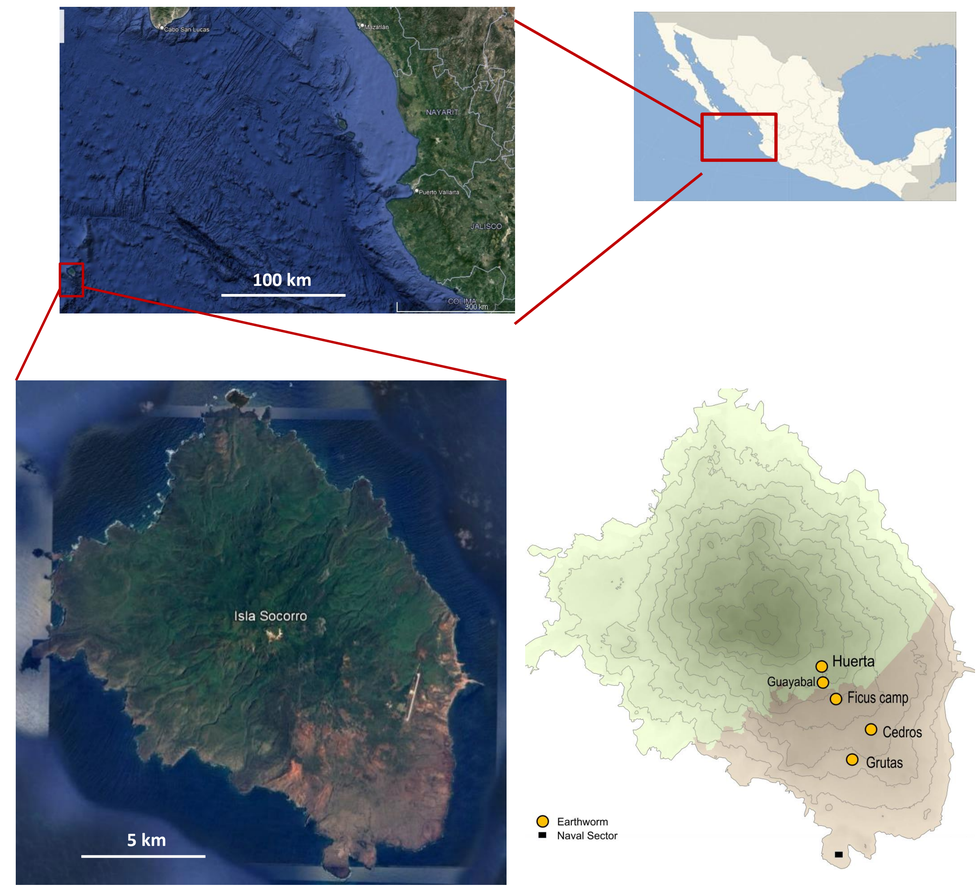
METHODS:

Sampling:

- Qualitative sampling of earthworms was carried out in December 2016, November 2017 and December of 2018.
- It was conducted along an altitudinal gradient in five disturbed sites (some with introduced ornamental and fruit trees): Grutas (232 masl), Cedros (342 m), Ficus (438 m), Guayabal (597 m) and Huerta (599 m); all worms were fixed in alcohol 96%

Molecular analysis:

- A small sample of caudal tissue was used
- DNA was obtained using the standard protocols for DNA purification, followed by PCR amplification of selected regions of mitochondrial COI (Folmer modified primers) and 16S rDNA (Palumbi modified primers).
- Obtained sequences (COI: 650 pb; 16S: 470 pb) were compared in BLAST to corroborate identifications.



Sampling sites in Island Socorro, Pacific ocean, state of Colima, MEXICO

Grutas

Ficus

Guayabal

Huerta

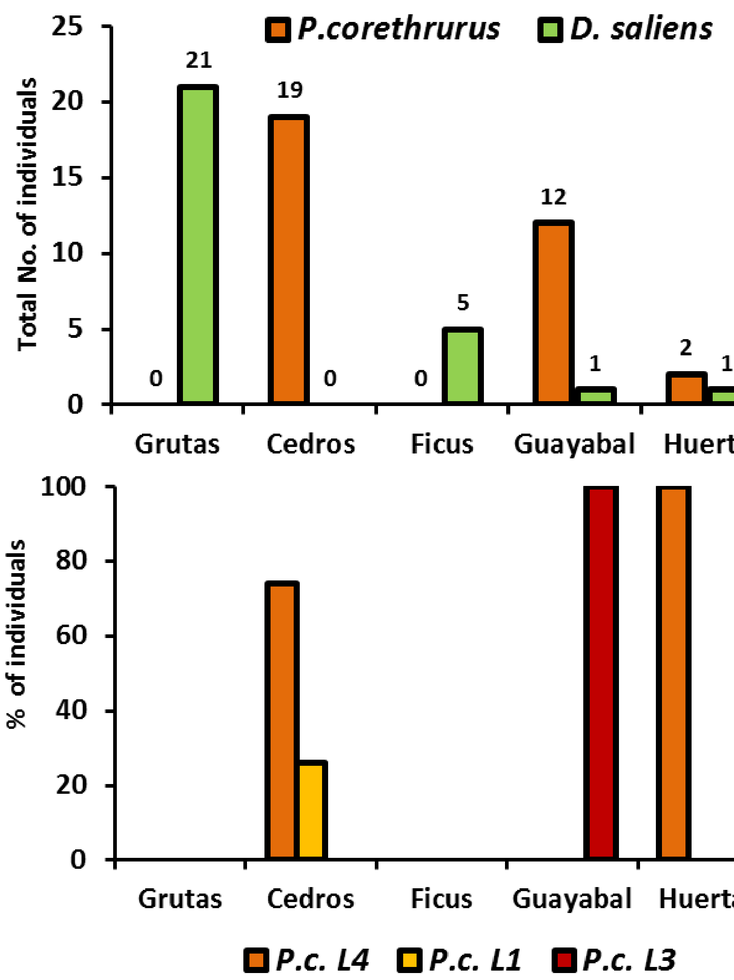
RESULTS:

Earthworm species of Socorro islands:

- Only **two morphological species** were found: ***Pontoscolex corethrurus*** (3 disturbed sites) and ***Dichogaster saliens*** (4 disturbed sites).
- **COI and 16S** barcode **confirmed identity** of both species in BLAST.
- In the case of ***P. corethrurus***, **three lineages** (Tahiri et al. 2018) were identified: **L1, L3 and L4**
- The **three lineages never occurred together**. Only L1 and L4 were found in one site (Cedros, more close to the port).

Pontoscolex corethrurus

Dichogaster saliens



CONCLUSIONS:

- ***In a period of 60 yr**, since the island was settled and the introduction of plants mainly occurred, **two exotic earthworm species invaded the island***.
- In that period of time **three distinct lineages of *P. corethrurus* arrived to** the island in a single or more events.
- Lineage **L1**, the more widely distributed all over the tropical world, **was not the dominant lineage.**
- Dominant lineage (**L4**) has **proved to be** particularly well **adapted to volcanic hostile soils.**
- **Future studies should clarify if** tolerant **L4 lineage predominates** in other Mexican volcanic islands

Poster presented at ISEE 12, Rennes FRANCE, 10 – 15 JULY 2022

Acknowledgements: To Mexican Navy and CONANP.