Bacterial diversity of Tablas de Daimiel studied for first time

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Researchers from the University of Valencia and the Biomedical Research Centre Network in Epidemiology and Public Health studied the structure of the bacterial community in four types of environments in the Tablas de Daimiel National Park in Ciudad Real, Spain. Credit: Giuseppe D'Auria

Researchers from the University of Valencia (UV) and the Biomedical Research Centre Network (CIBER) in Epidemiology and Public Health studied the structure of the bacterial community in four types of environments in the Tablas de Daimiel National Park in Ciudad Real, Spain. These were the aquatic environment, the first few centimetres of sediment representing the interface between water and sediment (superficial sediment), deeper sediment (lower sediment), and the biofilms that grow on the areas bordering the water and non-inundated soil.

"This semiarid wetland is home to a high diversity of bacterial groups, with relatively low dominance values, which indicates a good division between the various taxonomic groups found", Giuseppe D'Auria, lead author of the study and a researcher at the UV's Cavanilles Institute for Biodiversity and Evolutionary Biology.

According to the study published in the journal *Aquatic Microbial Ecology*, the four environments studied reveal similarities and differences: "the water sample is more similar to that of the water-sediment interface (upper sediment), while the biofilm sample is more similar to that of the deeper sediment".

The results also show a high number of still unknown sequences, which were found in all the samples analysed, making the Tablas de Daimiel "a reservoir for bacterial biodiversity and of key importance in maintaining it", the scientist explains.

265 new phylum groups

The researchers extracted the total DNA contained in the samples. Using molecular biology techniques, they obtained the DNA sequences of a bacterial gene called 16S, which represents a kind of signature or label for each bacterium. "Bioinformatic analysis enabled us to draw up profiles of the bacterial distributions in each environment studied", explains D'Auria.

By comparing the sequences found with those of international bacterial diversity databases, the team managed to find sequences that were still unknown to science, discovering 265 new phylum groups. "Most of the phylum groups found were related to the large Proteobacteria group. "These were found in progressively smaller quantities in the samples from the lower sediment, biofilms, water and upper sediment", the scientist points out.

Cyanobacteria, which carry out photosynthesis in an identical way to micro algae and higher plants, were found primarily in the superficial sediment sample, at the interface with the water column.

The Tablas de Daimiel National Park suffers from continuous problems in terms of water availability and quality, which are primarily related to farming practices in the area and nearby. However, despite all this, a large variety of plants, land and aquatic animals and micro organisms live in this semi-arid wetland.

It was declared a Special Protection Area for Birds (SPAB) in 1979 because of its great ecological value, and was also included on the list of internationally-important wetlands in 1982. The research team believes it is of "vital importance" to ensure that this area "does not stop being the wetland that it once was, a cradle of biodiversity".

More information: D'Auria, Giuseppe; Barón Rodríguez, María Mercedes; Durban-Vicente, Ana; Moya, Andrés; Rojo, Carmen; Latorre, Amparo; Rodrigo, María A. "Unravelling the bacterial diversity found in the semi-arid Tablas de Daimiel National Park wetland (central Spain)" Aquatic Microbial Ecology 59(1): 33-44, 2010. doi: 10.3354/ame01382.

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