

New species formed when the Mediterranean dried up

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Two Ibiza wall lizards. Credit: Day's Edge Productions

A new study may have uncovered why wall lizards have become the most successful reptile in the Mediterranean region. The results reveal how drastic changes in sea levels and climate 6 million years ago affected species formation in the area. The researchers believe they can now explain why the lizards became so diverse and widespread, something that has puzzled biologists since the 19th century. The study is

published in *Nature Communications*.

The evolution of wall [lizards](#) offers clues on how major events in the Mediterranean climate and geology millions of years ago affected how [species](#) formed or became extinct, and also paved the way for biodiversity.

Wall lizards date back around 20 million years. However, species formation seems to have picked up speed shortly after the Messinian Salinity Crisis 6 million years ago. During this period the Mediterranean almost dried out, only to rapidly fill up with water again as the Strait of Gibraltar opened.

"Our results show that the dramatic changes at the time probably contributed to the emergence of new species. They also shed light on why biodiversity looks the way it does today," says Tobias Uller, professor of evolutionary ecology at Lund University who led the international study.

The research indicates that species isolated from each other for millions of years occasionally have found each other and shared genes. By comparing DNA sequences from 26 species and eight subspecies, the team successfully mapped the major features of the evolution of wall lizards. This included what parts of the genome were transferred from other species through hybridization.

One example is the wall lizards found in Ibiza. Half of their genes come from wall lizards that today live on the Iberian Peninsula, and the other half from those found in the Balkans and among the Greek islands. The species in Ibiza thus originated as a hybrid, which provided evolution with great opportunities to combine old genes in new ways.

According to the researchers, this probably explains why species like the

Ibiza wall lizard are so strikingly variable in colouration: despite [close relationships](#) and [geographic proximity](#), they are a single colour on one island, but a variety of colours on the next, for example.

"We believe that hybridization has fuelled evolution, promoting biodiversity and extraordinary adaptability among certain species," concludes Tobias Uller.

More information: Weizhao Yang et al. Extensive introgression and mosaic genomes of Mediterranean endemic lizards, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-22949-9](https://doi.org/10.1038/s41467-021-22949-9)

Provided by Lund University

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