



PRESS RELEASE – State Museum of Natural History Stuttgart

Drylands: Adaptation to extreme climate zones enables unexpected plant diversity.

Researchers publish a new study on the adaptability of plants in arid regions in the scientific journal "Nature".

Stuttgart, 13.08.2024. In a major international study, scientists, including Dr Pierre Liancourt, plant ecologist at the State Museum of Natural History Stuttgart, have investigated how plants in arid regions have adapted to these extreme habitats. For eight years, over 120 researchers from 27 countries collected samples from numerous selected drylands on six continents. This made it possible to analyse over 1300 observation series and more than 300 plant species. The results, published in the scientific journal "Nature", show that plants in arid regions use a wide variety of adaptation strategies. Surprisingly, this diversity increases with the degree of aridity.

The isolation of plants in arid regions appears to have reduced competition between species, allowing them to develop a diversity of forms and functions that is unique in the world. "This study demonstrates the importance of drylands as a global reservoir of plant diversity. It offers a new perspective on plant architecture, the adaptation of plants to extreme habitats, the historical colonisation of terrestrial habitats by plants and the ability of plants to respond to current global changes," says Dr Pierre Liancourt.

The study is the first of its kind in the world. A central hypothesis at the beginning of the study was that aridity would reduce plant diversity through selection. However, the scientists found that the opposite is true in the driest grazing areas on earth. Instead, the plants here exhibit a broad spectrum of individual adaptation strategies. For example, some plants have developed a high calcium content, which strengthens the cell walls as protection against dehydration. Others contain high concentrations of salt, which reduces transpiration.

"Many areas of the world are threatened by increased aridity, grazing pressure and desertification. We need to understand how plants respond to such stresses in order to protect fragile ecosystems and their biodiversity. Although drylands have fewer species at the local level than other regions of the world, especially temperate or tropical zones, the plants there have an extraordinary diversity of shapes, sizes and functions that is twice as great as in temperate climates," says Dr Pierre Liancourt.

Drylands are defined as tropical and temperate zones with a degree of aridity below 0.65. They cover 45% of the Earth's terrestrial surface and are home to a third of the global human population. They include, for example, the Mediterranean landscape, steppes, savannahs and deserts.



For the editors

Original publications:

Gross, N., Maestre, F.T., Liancourt, P. *et al.* Unforeseen plant phenotypic diversity in a dry and grazed world. *Nature* (2024). 07.08.2024.

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Image 1: Tree in Namib Desert_Lixin Wang

Description: Lonely tree in the Namib Desert, Namibia

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Image 2: Patagonian steppe_ Juan José Gaitán

Description: Patagonian steppe in Argentina

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The Stuttgart Natural History Museum:

Innovative research and knowledge transfer in focus.

With its research collections, the "archives of diversity", the museum houses over 12 million objects. Its scientific activities focus on researching the evolution of life and analysing the biodiversity of different ecosystems. In two permanent exhibitions, changing special exhibitions, events and guided tours, the State Museum of Natural History Stuttgart conveys both basic natural history knowledge and current research findings to the general public in order to promote a lasting understanding of nature and its complex interrelationships.
www.naturkundemuseum-bw.de

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