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Climate Change and the Shifting Biogeography of Prokaryotic and Eukaryotic Taxa

Idera Lawal*

College of Life Science and Technology, Xinjiang University, China

***Corresponding author:** Idera Lawal, College of Life Science and Technology, Xinjiang University, China; E-mail: ideraoluwa.lawal@ttu.edu

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Abstract

Climate change is reshaping ecosystems across the globe, altering temperature regimes, precipitation patterns, and biogeochemical cycles. These changes are not only affecting the distribution of plants and animals but also profoundly influencing microbial communities. The biogeography of both prokaryotic (bacteria and archaea) and eukaryotic taxa is undergoing significant shifts, driven by climate-induced changes in habitat suitability, dispersal dynamics, and ecological interactions. Understanding these shifts is essential for predicting ecosystem resilience, managing biodiversity, and mitigating environmental impacts.

***Keywords:** Temperature; Prokaryotic; Eukaryotic*

Introduction

Biogeography refers to the spatial distribution of organisms across geographic regions. Climate is a primary determinant of biogeographic patterns, influencing species ranges, community composition, and ecosystem function. As climate change accelerates, organisms are forced to adapt, migrate, or face extinction. While eukaryotic taxa such as plants and animals have been extensively studied in this context, microbial biogeography is only recently gaining attention [1].

Prokaryotes are foundational to ecosystem processes, including nutrient cycling, soil fertility, and carbon sequestration. Despite their small size and high dispersal potential, prokaryotic communities are sensitive to climate variables such as temperature, moisture, and pH [2].

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A study found that soil bacterial diversity in the Tibetan Plateau and northern North America is more strongly correlated with historical climate than current conditions, suggesting a lag in microbial response. This lag may be due to slow changes in soil properties, which mediate microbial habitat suitability [3].

In Australia, reported that bacterial distributions are more resistant to climate change than fungal communities, with soil properties playing a dominant role in shaping bacterial biogeography. However, climate projections indicate a southward shift in bacterial and fungal patterns, highlighting the dynamic nature of microbial distributions under changing conditions [4].

In the Tibetan Plateau, soil bacterial communities are not yet in equilibrium with current climate conditions found that bacterial distributions align more closely with climate from 50 years ago. This lag suggests that microbial biogeography may continue to shift even if climate stabilizes, due to slow changes in soil chemistry and structure. Similarly, fungal communities in Australia are projected to undergo more pronounced changes than bacteria, with 24% of topsoils expected to experience significant shifts in fungal structure by 2040. These findings underscore the need to consider microbial dynamics in climate adaptation strategies [5].

Conclusion

Climate change is reshaping the biogeography of life on Earth, from microscopic bacteria to towering trees. While prokaryotic taxa may respond rapidly, their distributions often lag behind climate shifts due to environmental mediation. Eukaryotic taxa face greater dispersal constraints and ecological dependencies, making them more vulnerable to disruption. By linking microbial and eukaryotic biogeography, we gain a deeper understanding of ecosystem resilience and the future of biodiversity in a warming world.

References

1. Coelho LP, Alves R, Del Río ÁR, et al., Towards the biogeography of prokaryotic genes. Nature. 2022;601(7892):252-6.
2. Ramette A, Tiedje JM. Biogeography: an emerging cornerstone for understanding prokaryotic diversity, ecology, and evolution. Microbial ecology. 2007;53(2):197-207.
3. Bowman JP, McCuaig RD. Biodiversity, community structural shifts, and biogeography of prokaryotes within Antarctic continental shelf sediment. Applied and Environmental Microbiology. 2003;69(5):2463-83.
4. Lacap DC, Lau MC, Pointing SB. Biogeography of microscopic organisms: Is everything small everywhere. Biogeography of prokaryotes. 2011;12(3):35-42.
5. Salazar G, Cornejo-Castillo FM, Benítez-Barrios V, et al., Global diversity and biogeography of deep-sea pelagic prokaryotes. The ISME journal. 2016;10(3):596-608.

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