ARPHA Conference Abstracts 9: e202347
doi: 10.3897/aca.9.e202347

OPEN ACCESS

Conference Abstract

Context-dependent effects of soil mesofauna diversity on invasive plant growth under drought and native competition

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Received: 02 Jun 2026 | Published: 02 Jun 2026

Citation: Jin H, Zhang Z, van Kleunen M, Liu Y (2026) Context-dependent effects of soil mesofauna diversity on invasive plant growth under drought and native competition. ARPHA Conference Abstracts 9: e202347. https://doi.org/10.3897/aca.9.e202347

Abstract

Global change drivers such as drought can strongly influence plant invasion, yet studies have not reached consistent conclusions regarding the direction and magnitude of global change effects. Likely, this variability is partly regulated by biotic factors that modulate the responses of invasive plants and the native competitors to global change. However, it remains unclear whether biodiversity of soil mesofauna can modulate the effects of global change on plant invasion. We conducted two multispecies greenhouse experiments with 12 invasive and 33 native plant species, manipulating drought and the presence of competition with a native community in both experiments, and varying soil mesofauna richness in the first experiment and both richness and abundance in the second. Across both experiments, drought suppressed both invasive and native plant biomass, but its effect on invasive biomass proportion differed between experiments: drought reduced this proportion in the soil mesofauna richness experiment but had no effect in the richness-and-abundance experiment. Higher soil mesofauna richness increased invasive plant biomass and proportion. In the richness-and-abundance experiment, soil mesofauna modulated drought effects on invasive biomass proportion, with drought decreasing it under low mesofauna levels but increasing it under high levels. Native community competition significantly modified the inhibitory effect of drought

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on invasive plants, depending on whether the native community directly suppressed invasive plant growth. In the absence of native competition, high soil mesofauna richness enhanced the suppressive effect of drought on invasive plants. In contrast, in the presence of native competition, drought effects did not differ significantly among mesofauna-richness treatments. These findings suggest that competition by a native community can weaken or override the regulatory role of soil mesofauna richness in mediating drought effects on plant invasion.

Keywords

biodiversity, biological invasions, exotic-native plant interactions, global change, soil fauna

Presenting author

Huifei Jin

Presented at

Neobiota 2026, the 14th International Conference on Biological Invasions

Acknowledgements

We would like to express our sincere appreciation to all participating institutions, including Anhui Agricultural University, College of Resources and Environment (Hefei, China); Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences (Changchun, China); and the University of Konstanz (Konstanz, Germany).

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Author contributions

LYJ conceived the ideas. JHF and ZZ designed the study. JHF performed the experiment. JHF and ZZ wrote the first draft of the manuscript, with several rounds of inputs from MvK, and further inputs from LYJ. All authors participated in the revision of the manuscript.

Conflicts of interest

The authors have declared that no competing interests exist.