Outlook

Contact 9th Meeting of the Swiss Microbial Ecology from irene.cordero@wsl.ch

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Date Sat 11/30/2024 6:42 AM
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Type of presentation:
Oral presentation

Title:
Multiple superimposed global change perturbations affect soil microbial communities

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Abstract (300 words maximum): :
Global change is one of the most pressing challenges of our time, but assessing the effects of global change in ecosystems is not straightforward, especially when multiple perturbations are considered at the same time. Understanding the response of ecosystems to multiple superimposed perturbations is essential, as in nature perturbations rarely occur in isolation. Yet, to this date, the majority of research considers global change perturbations individually. Moreover, the effects of global change in belowground ecosystems are still very difficult to understand and to predict, although soil microbial communities are essential for human and ecosystem health. In this study, we experimentally tested how ten superimposed perturbations related with climate change or land use intensification affect grassland soil functioning and diversity under realistic conditions, i.e.: by using intact soil cores, undisturbed soil sections with the plant communities that naturally grow on them. We measured bacterial and fungal communities in soils through metabarcoding of 16S and ITS genes, respectively, and their associated functions in the soil: soil organic matter decomposition, potential soil enzymatic activity, microbial biomass, nutrient pools and soil respiration. Microbial diversity or richness was not strongly affected by the perturbations applied, either individually or in combination. However, these effects still translated in strong changes in microbial functionality. Microbial biomass, decomposition rate and soil respiration all declined with increasing number of perturbations, while nutrients in the soil accumulated. While individual perturbations showed positive and negative effects, when applied in combination they always showed directional negative effects. These results highlight the importance of studying

perturbations in combination to be able to better predict the response of the soil ecosystem to global change.
