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Does drought modify the decomposability of grassland species ? An incubation study

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Climate projections in Europe predict an increase in length and frequency of droughts within the next decades. This might be particularly an issue in sensitive ecosystems that are considered as carbon sink, like for example alpine grasslands. A variation in moisture content directly affects both litter decomposition and biomass production. Additionally, drought may alsopotentially affect the biochemical quality of plant litter reaching the soil. Under water limiting conditions, significant modifications of plant tissues composition have been observed (for example an increase of the cutin content), which could modify decomposition dynamics of the litter layer.
In this study, we followed the decomposition of three grassland species (Poa pratensis L., Lolium multiflorum et Trifolium repens L.) that grew i/ under real climate and ii/ during an artificial drought. These plants were sampled on an experimental site (Chamau, Switzerland) during a three-year drought simulation experiment.
The biochemical characteristics of the different plants were estimated by C, N content, water-soluble C, Diffuse Reflectance Infrared Fourier Transform Spectroscopy and lignin CuO oxidation. We followed the microbial community structure before and after the decomposition study using a Biolog system. The decomposition of the organic matter was followed under controlled conditions (23°C, water level regularly adjusted). The decomposition dynamics were measured by CO2 trapping in NaOH.
First results show that Trifolium litter that grew under drought decomposes more slowly than one that grew under regular conditions. No significant difference was found for the other species.