EGU22-58, updated on 14 Aug 2022
https://doi.org/10.5194/egusphere-egu22-58
EGU General Assembly 2022

High consistency of trophic niches in soil microarthropod species (Oribatida, Acari) across soil depth and forest type

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Generalist species vary in resource use with environments. High intraspecific variation in resource use may hamper trophic niche differentiation and coexistence of microarthropod species. To better understand intraspecific niche variation, we quantified stable isotope ratios of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) within and between populations of 40 Oribatida species (Acari) that co-occur in litter (O_L) and soil (0–5 cm, mainly $O_{F/H}$, A_H) of five forest types (native European beech, non-native Douglas fir, range-expanding Norway spruce, two beech–conifer mixed forests). Although stable isotope signature of bulk material differed between litter and soil, $\delta^{13}C$ and $\delta^{15}N$ values of Oribatida species were remarkably stable irrespective of soil depth. Furthermore, Oribatida were more enriched in ^{13}C in European beech than in coniferous forests, but $\delta^{15}N$ values of Oribatida were similar across forest types. We conclude that trophic position ($\delta^{15}N$ values) of Oribatida species is highly consistent across forest type, and that Oribatida species occupy virtually identical trophic niches ($\delta^{13}C$ and $\delta^{15}N$ values) irrespective of the soil depth they colonize. Despite that stable isotope analysis cannot reveal what animals actually feed on, our results suggest that low intraspecific variability facilitates niche differentiation and coexistence of Oribatida species. Overall, the results indicate that generalist species of soil microarthropods may be highly consistent in their resource use irrespective of environments.