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Do fungi and bacteria respond similar across a steep local pH gradient?

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Soil pH is consistently recorded as the single most important variable explaining bacterial richness and community composition locally as globally. Bacterial richness responds to soil pH in a bell-shaped pattern, highest in soils with near-neutral pH, while lower diversity is found in soil with pH >8 and <4.5. Also, community turnover is strongly determined by pH for bacteria. In contrast, pH effects on fungi is apparently less pronounced though also much less studied compared to bacteria. Still, pH appears to be a significant determinant for fungal communities but typically not the most important. Rarely are bacterial and fungal communities co-analyzed from the same field samples taken across pH gradients. Here we analyze the community responses of fungi and bacteria in parallel over an extreme pH gradient ranging from pH 4 to 8 established by applying strongly alkaline wood ash to replicated plots in a Picea abies plantation. Bacterial and fungal community composition were assessed by amplicon-based meta-barcoding. Bacterial richness were not significantly affected by pH, while fungal richness and a-diversity were stimulated with higher pH. We found that both, bacterial and fungal communities increasingly deviated from the untreated plots with increasing amount of wood ash though fungal communities were more resistant to changes than bacterial. Soil NH_4, NO_3 and pH significantly correlated with the NMDS pattern for both bacterial and fungal communities. In the presentation we will discuss resistance versus sensitivity of different fungal functional guilds towards higher pH as well as the underlying factors explaining the community changes.