

## Supporting Information

Additional Supporting Information may be found online in the Supporting Information section at the end of the article.

**Fig. S1** Layout of the 16 plots along the fertility gradient.

**Fig. S2** Principal component analysis (PCA) analysing Ellenberg indicator values of vascular plants of the ground vegetation layer.

**Fig. S3** Relationship between fertility index and mineral soil organic C concentration, N concentration, inorganic C concentration, pH, bulk density, stone content, moisture and temperature, respectively.

**Fig. S4** Relationship between fertility index and selected fungal guild ratios.

**Methods S1** Determination of total mineral soil organic carbon and nitrogen stocks.

**Methods S2** Calculation of integrative fertility index based on Ellenberg indicator values.

**Table S1** List of vascular plant species in the ground vegetation layer and their Ellenberg indicator values.

**Table S2** Total mineral soil organic C and N stocks.

**Table S3** List of fungal taxonomic groups including abundance and lifestyle/guild.

**Table S4** Relationship between relative abundance of selected soil fungal guilds, guild ratios, and microbial respiration, and potential enzyme activities in mineral soil.

**Table S5** Relationship between relative abundance of soil fungal guilds and microbial respiration, and potential enzyme activities per g soil C.

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