SOIL MICROBIAL BIOMASS AND COMMUNITY STRUCTURE IN GRASSLANDS ALONG AN EUROPEAN GRADIENT

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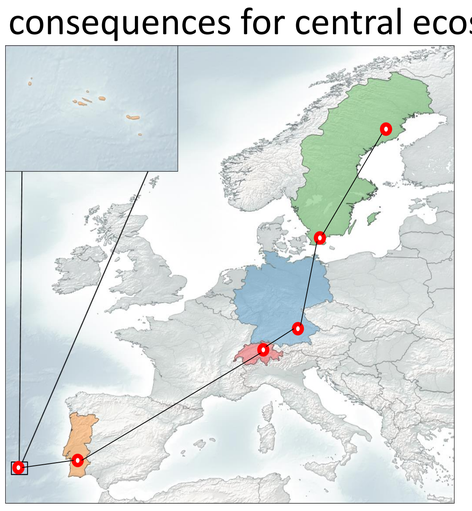
PROJECT

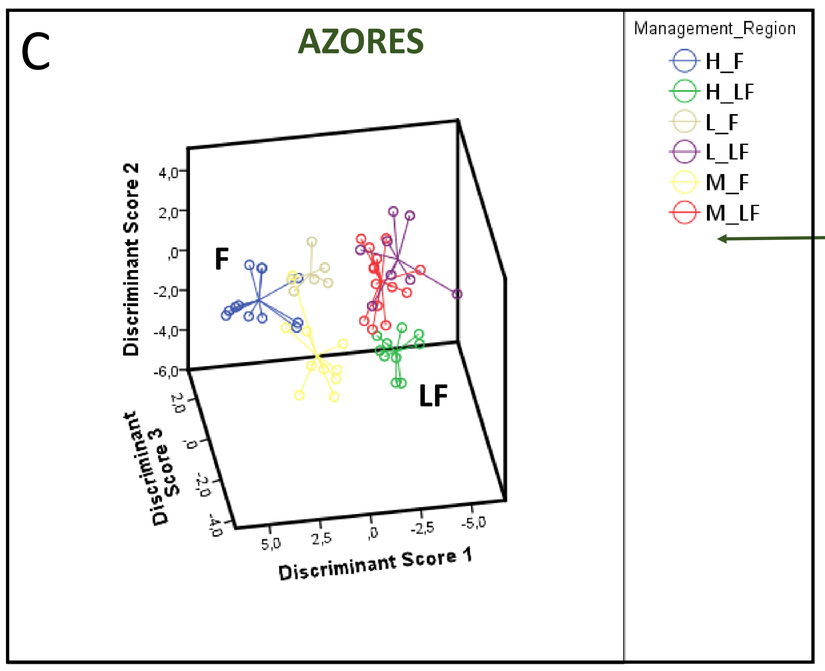
The pan-European study scale of BIOINVENT contributes to on-going EU-incentives to develop future-oriented management and monitoring objectives to reach optimal protection of soil biodiversity and its contribution to various ecosystem services in permanent grassland ecosystems. BIOINVENT will result in a profound understanding of interdependent effects of grassland management and agro-ecological distinctions on soil microbial dynamics and their consequences for central ecosystem services.

MATERIALS & METHODS

Soils from ten agro-ecological regions, including favourable (F) and less favourable (LF) growth conditions in five geographical regions (Sweden, SE; Germany, DE; Switzerland, CH; Portugal mainland, PT and Azores, AZ), were sampled. In each of these regions, a gradient of management intensity from intensive grasslands with high nutrient inputs and utilization frequency (H), to grasslands with less intensive (M) and extensive management intensity (L), was selected. The PLFA and NLFA (phospholipid- and neutral lipid fatty acid) analysis (*Frostegård and Bååth 1996, Biology and Fertility of Soils 22:59-65*) was used to estimate the specific biomass of the soil microbial groups; as well as the soil microbial community structure.



RESULTS



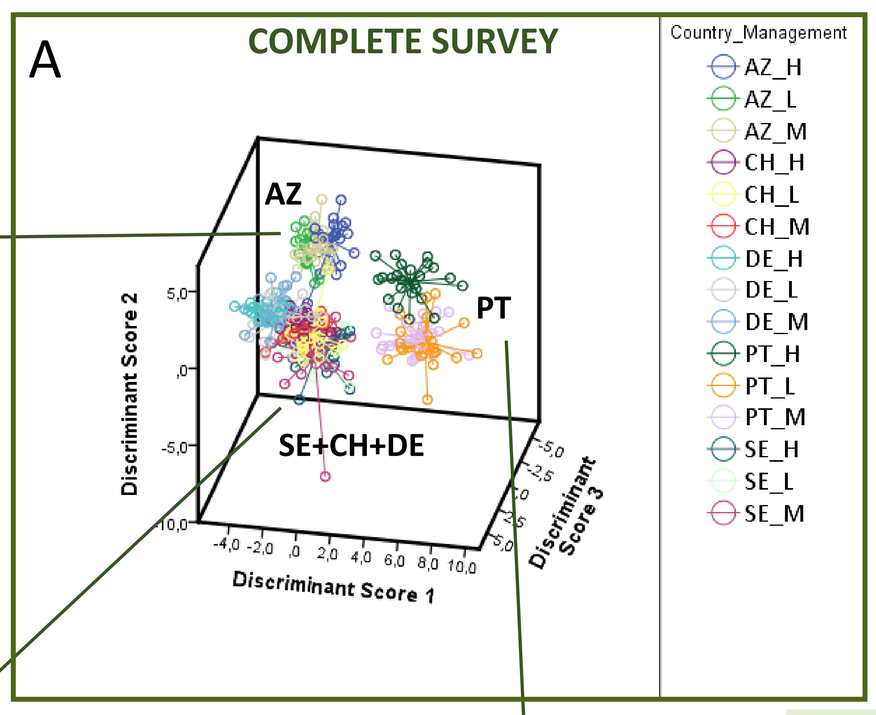
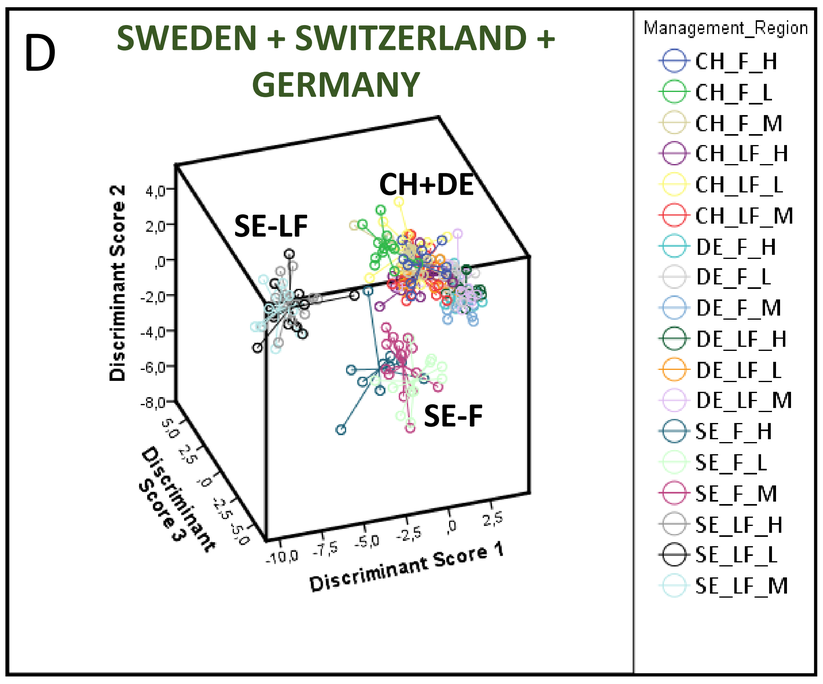


Figure 1: Canonical Discriminant Analysis of the PLFA values (%) from the whole survey (A), Portugal mainland (B), Azores (C) and Sweden + Switzerland + Germany (D). F: favourable; LF: less favourable; SE: Sweden; DE: Germany; CH: Switzerland; AZ: Azores; PT: Portugal mainland; H, intensive management; M, less intensive management; L, extensive management.



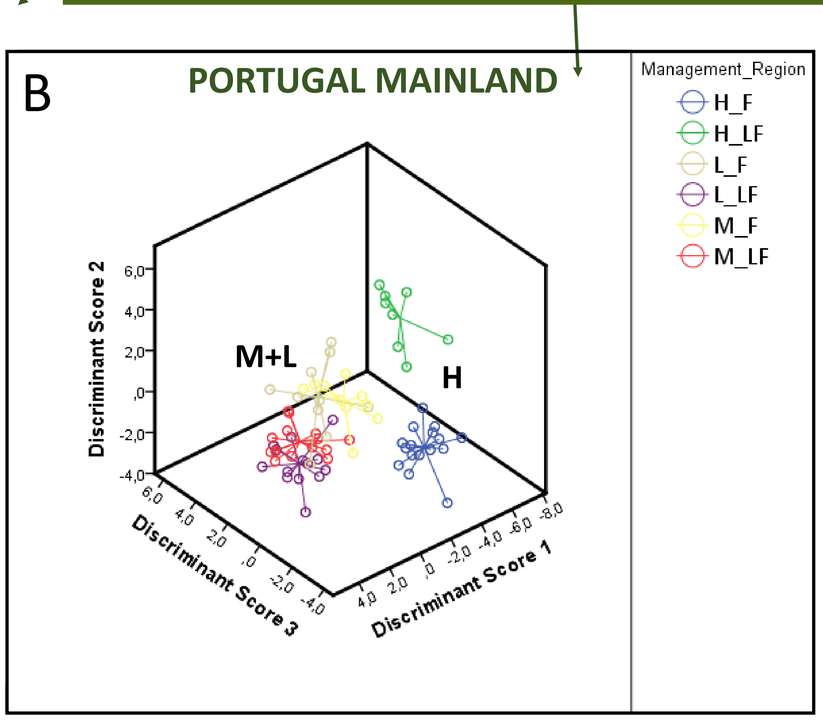
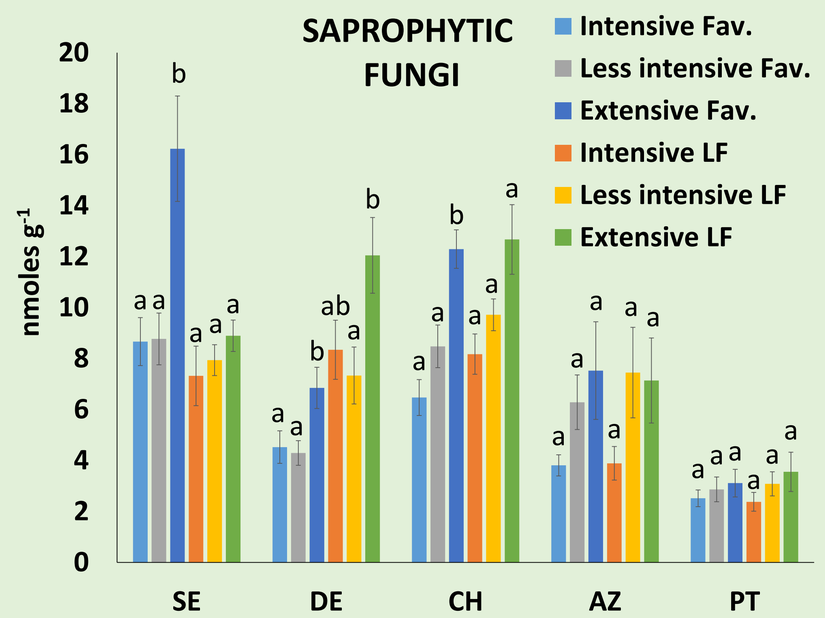


Figure 2: Saprophytic fungal biomass. Fav: favourable; LF: less favourable; SE: Sweden; DE: Germany; CH: Switzerland; AZ: Azores; PT: Portugal mainland. Different letters (within region) mean significant differences (ANOVA, p<0.05)



CONCLUSIONS

Agro-ecologic region had the greatest effect on soil microbial communities. Within agro-ecological region, the extensive grassland management provided the most prosperous habitat for fungal colonization.