



# SOIL MICROBIAL COMMUNITIES IN HIGHLAND AND LOWLAND GRASSLANDS UNDER DIFFERENT MANAGEMENT INTENSITY

## INTRODUCTION

Permanent grassland ecosystems account for a large part of the currently utilised agricultural area in Europe and provide multifunctional ecosystem services. They are considered hotspots of biodiversity because they harbour many specialized organisms that can be influenced by factors like environmental conditions or the agricultural management intensity.

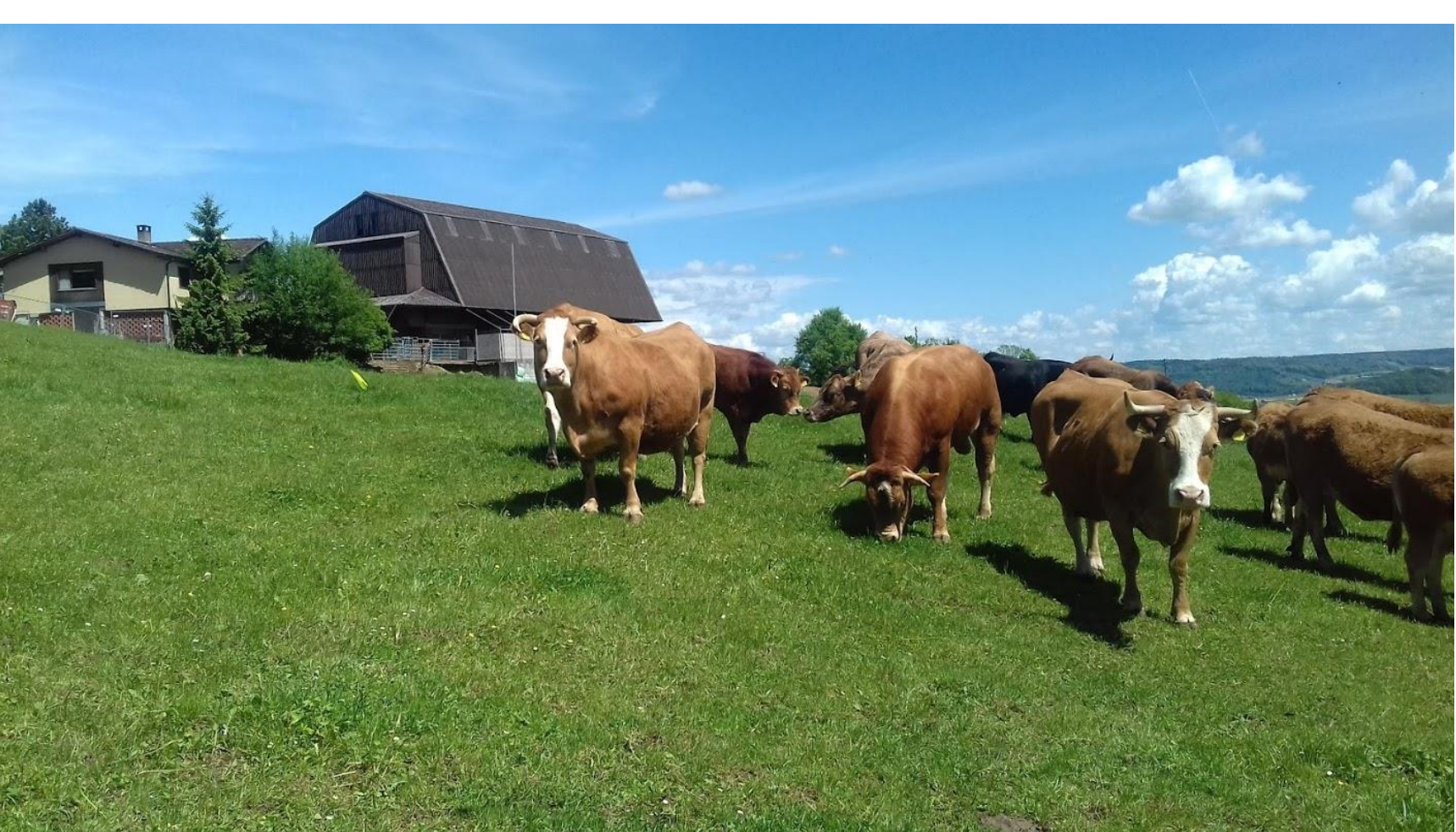
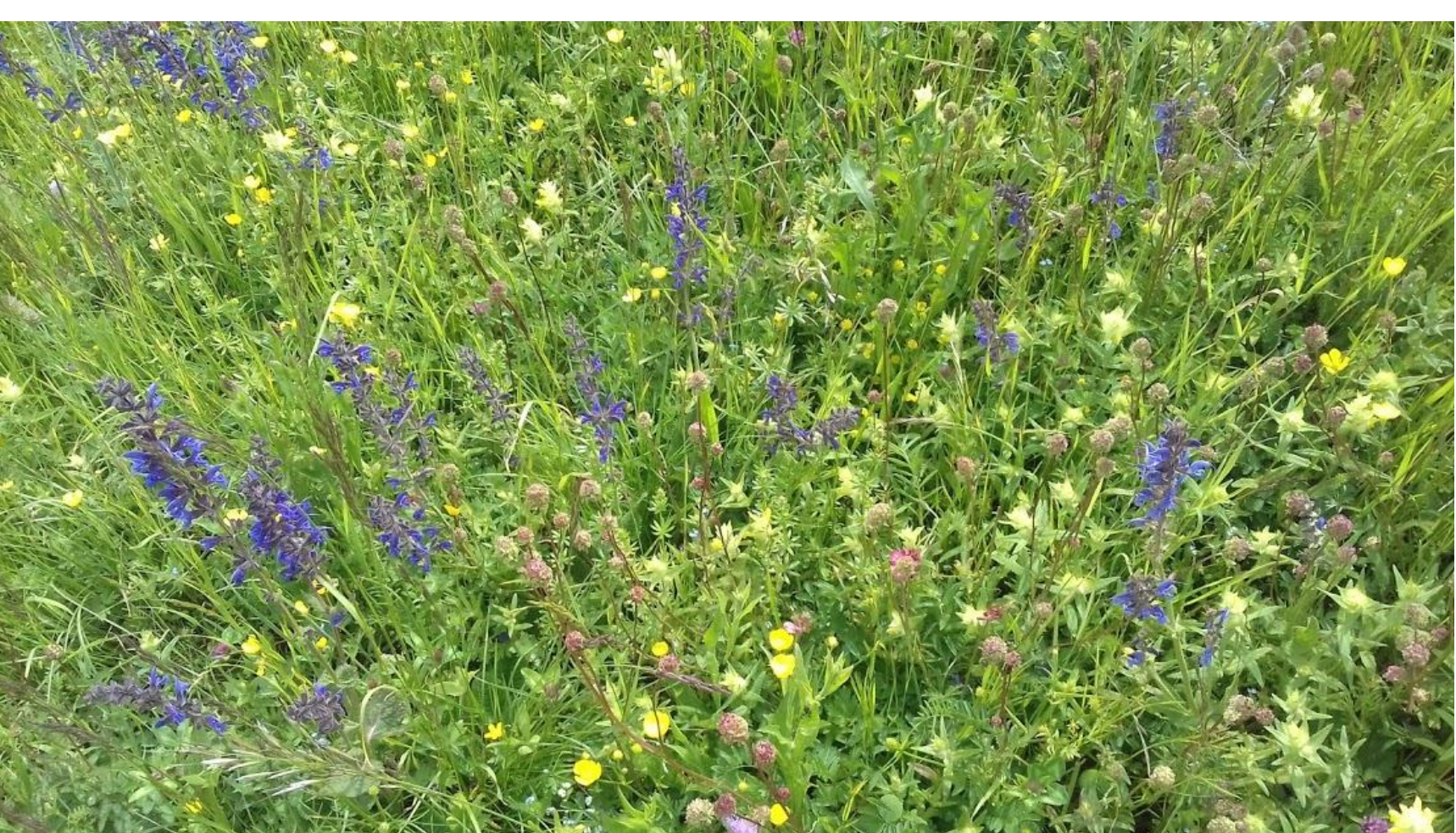
## OBJECTIVE

In the **BioInvent** project, the soil microbial communities in permanent grasslands were investigated along a pan-European gradient.



## MATERIAL AND METHODS

In this study, we compared two different agro-ecological areas (highlands and lowlands) in two different countries (Germany and Switzerland) along a gradient of management intensity (from intensive to extensive). The PLFA and NLFA (phospho- and neutral lipid fatty acid) analysis (Frostegård et al., 1993, *Soil Biol Biochem* 25:723-730) was used to estimate the total and the specific biomass of soil microbial groups as well as the microbial community structure.



## RESULTS

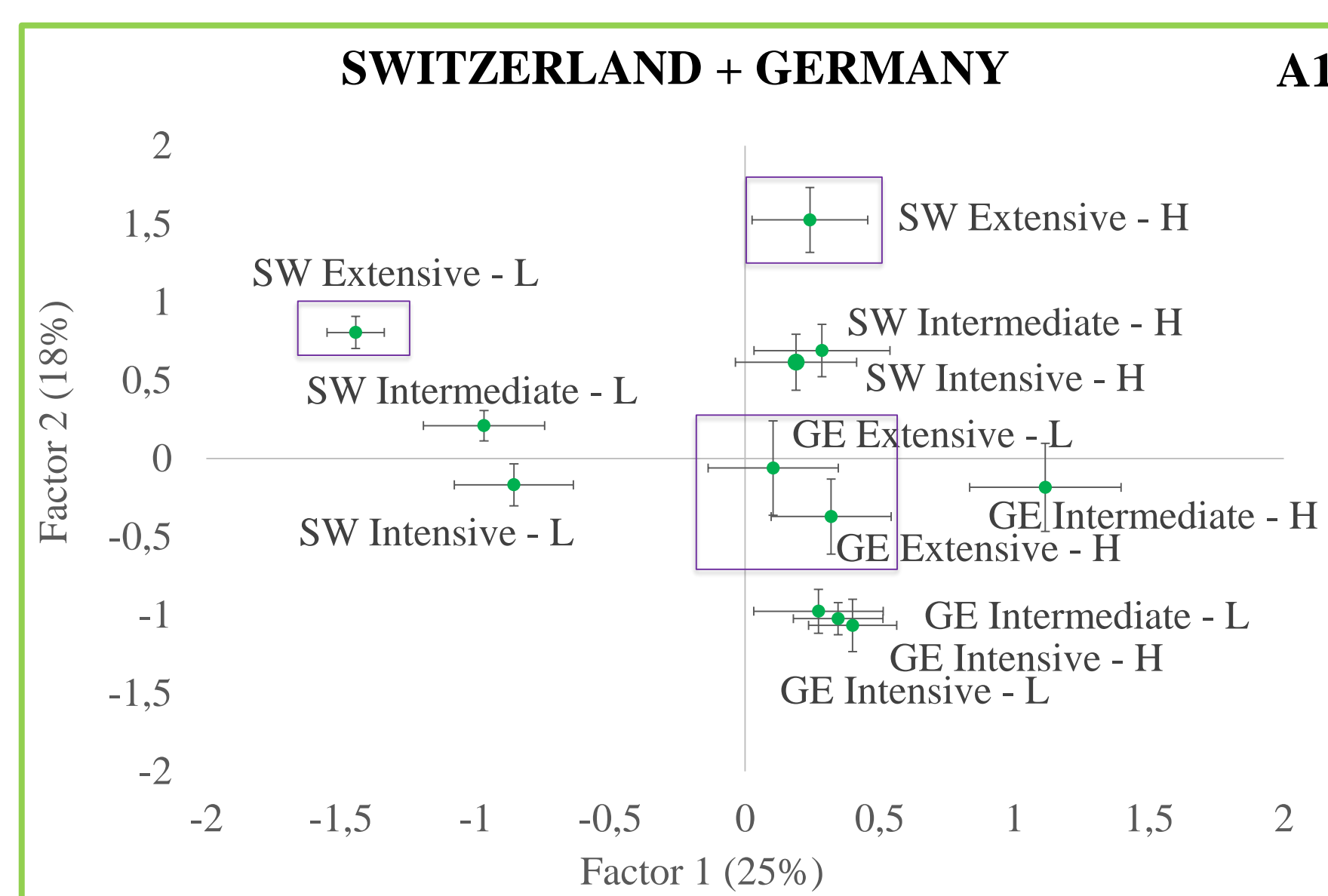


Figure 1: Principal component analysis of the PLFA data of the soil samples from lowlands (L) and highlands (H). A: Sample distribution; B: Variable distribution.

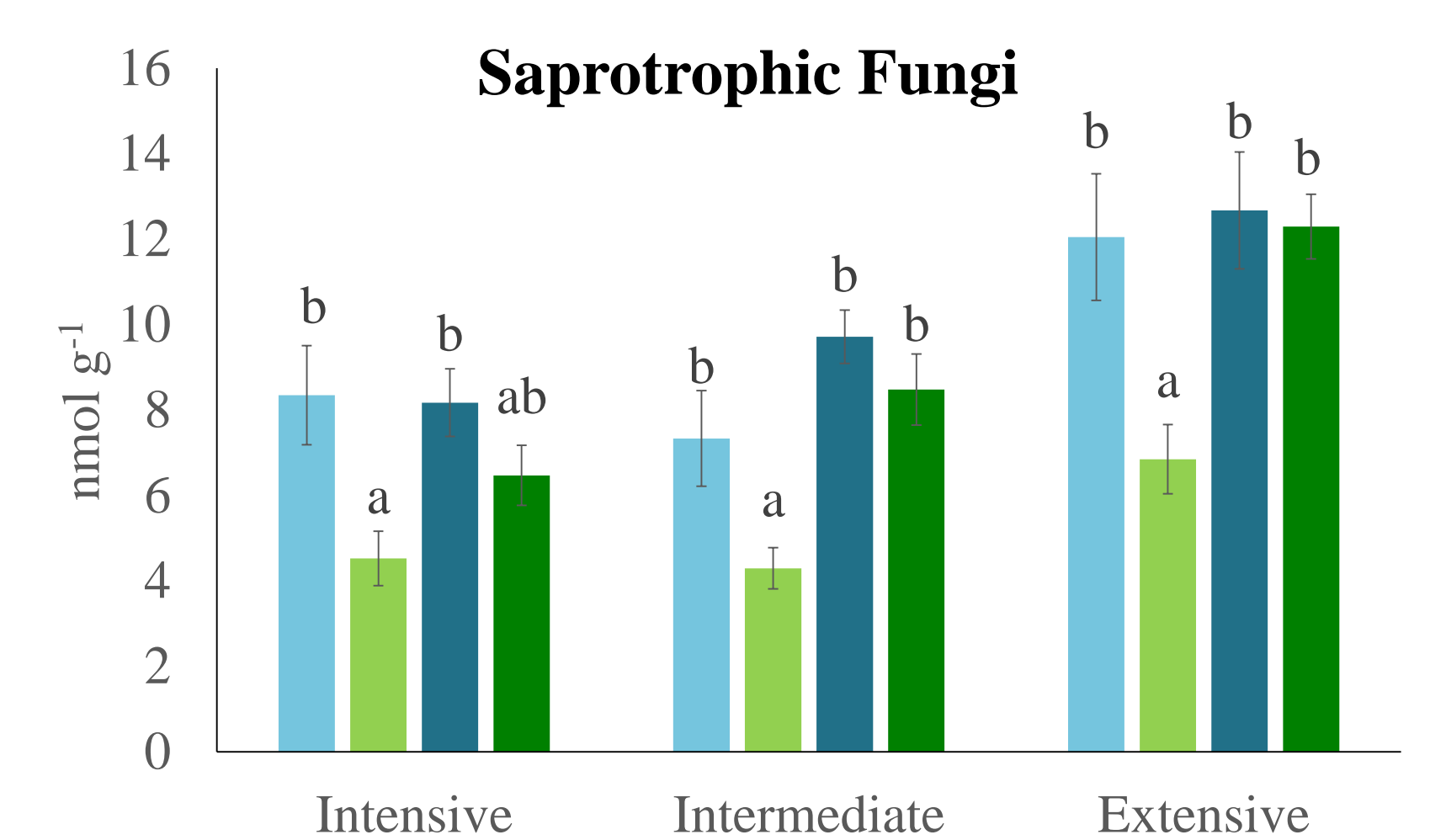
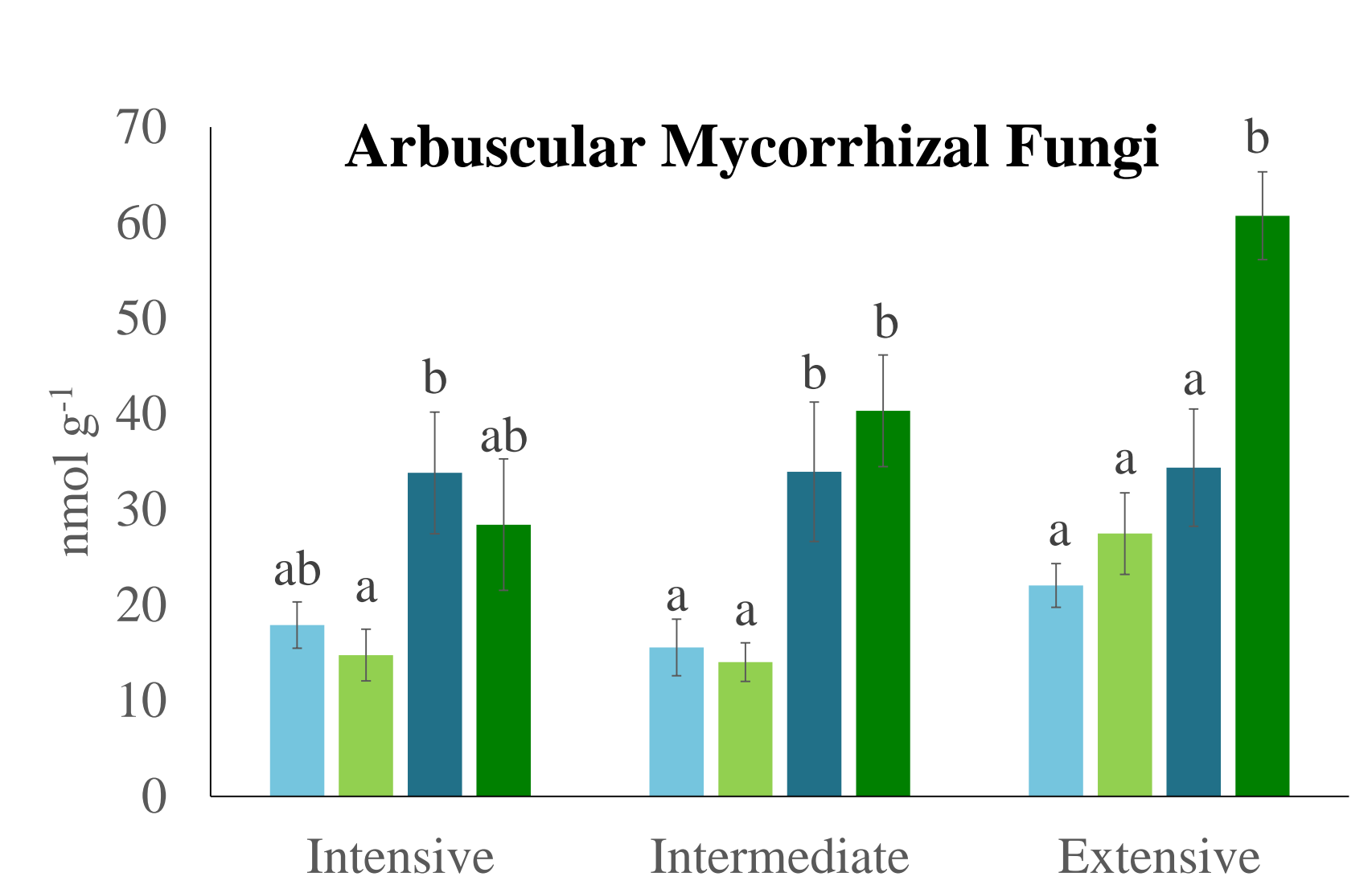
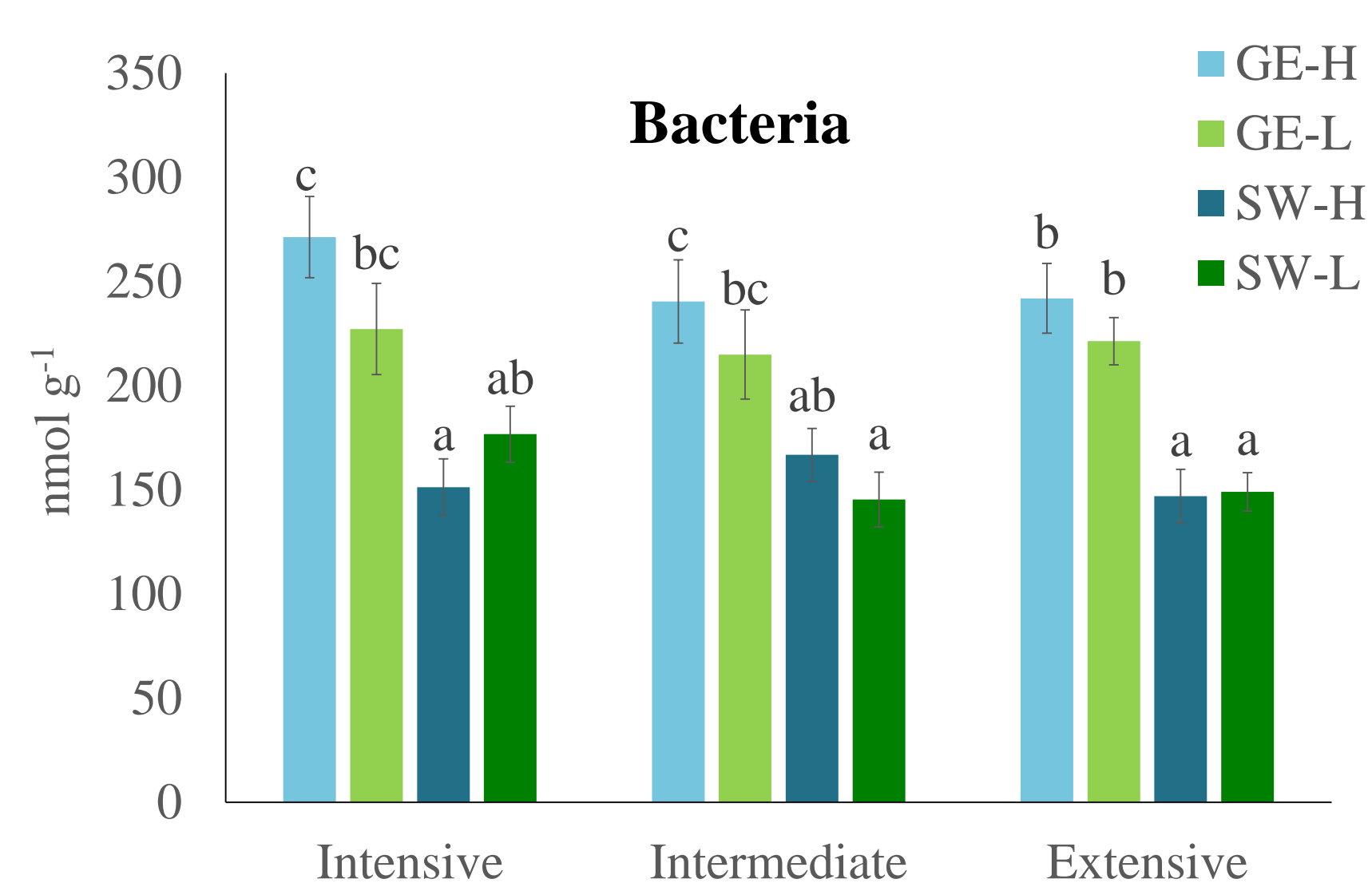
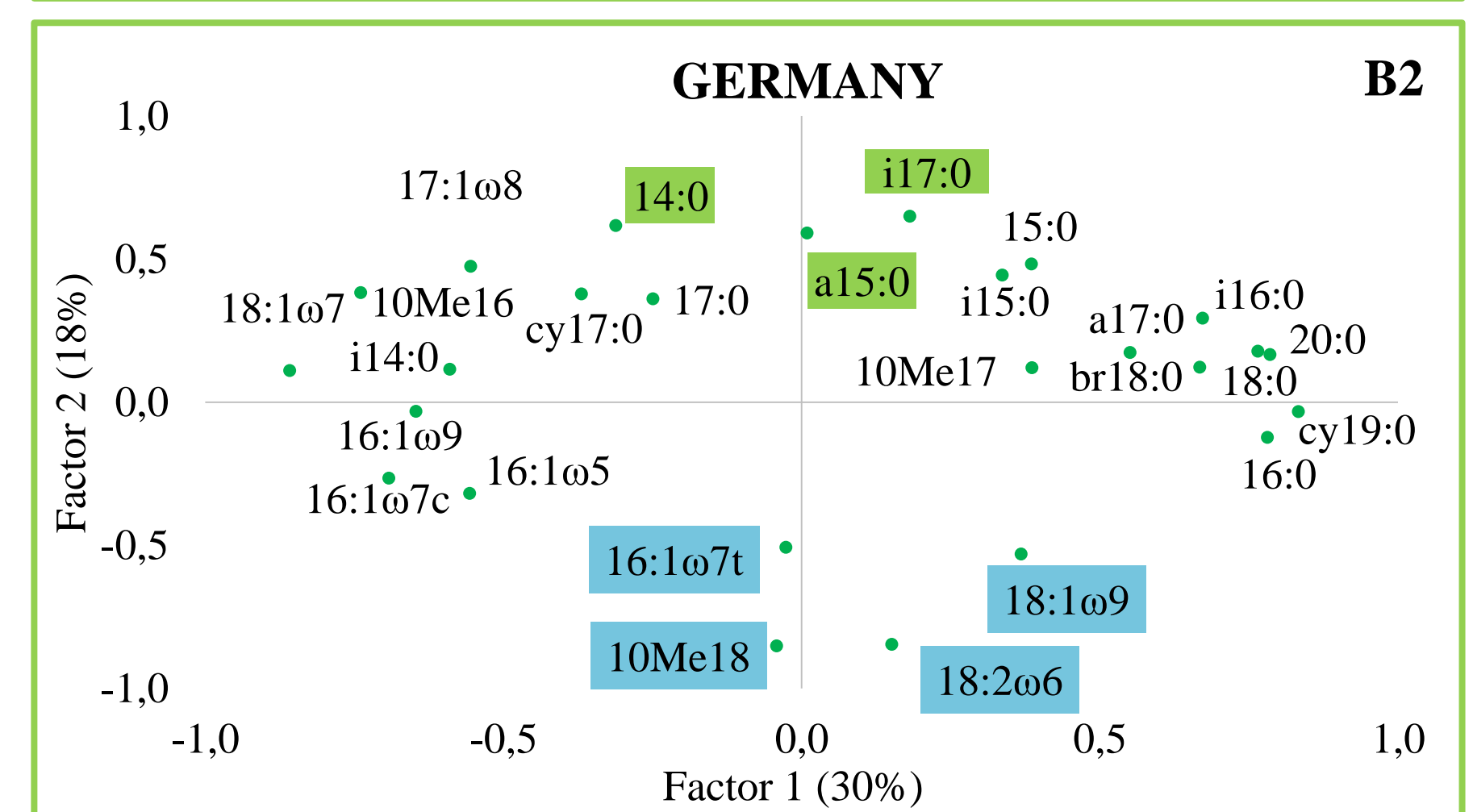
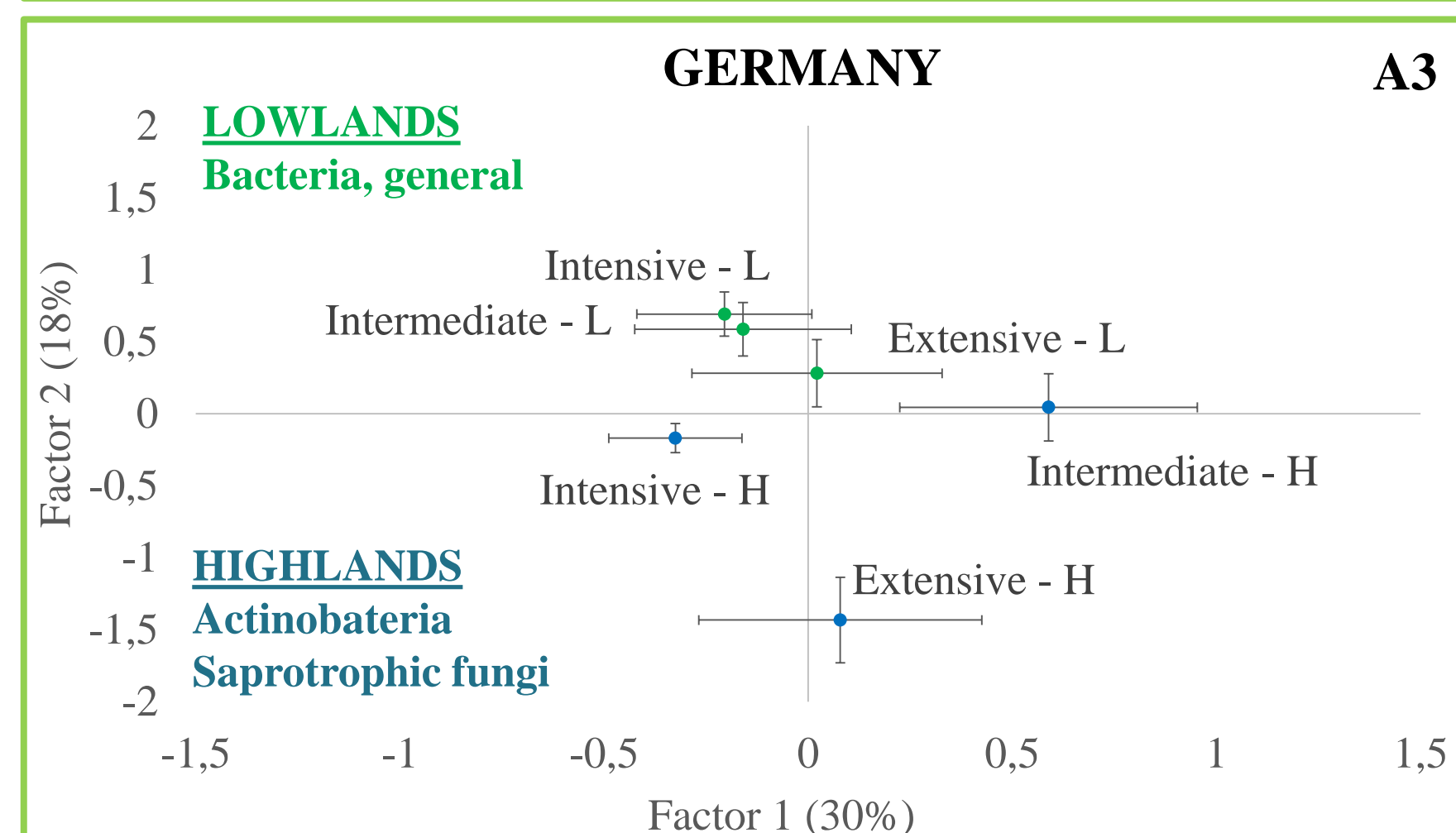
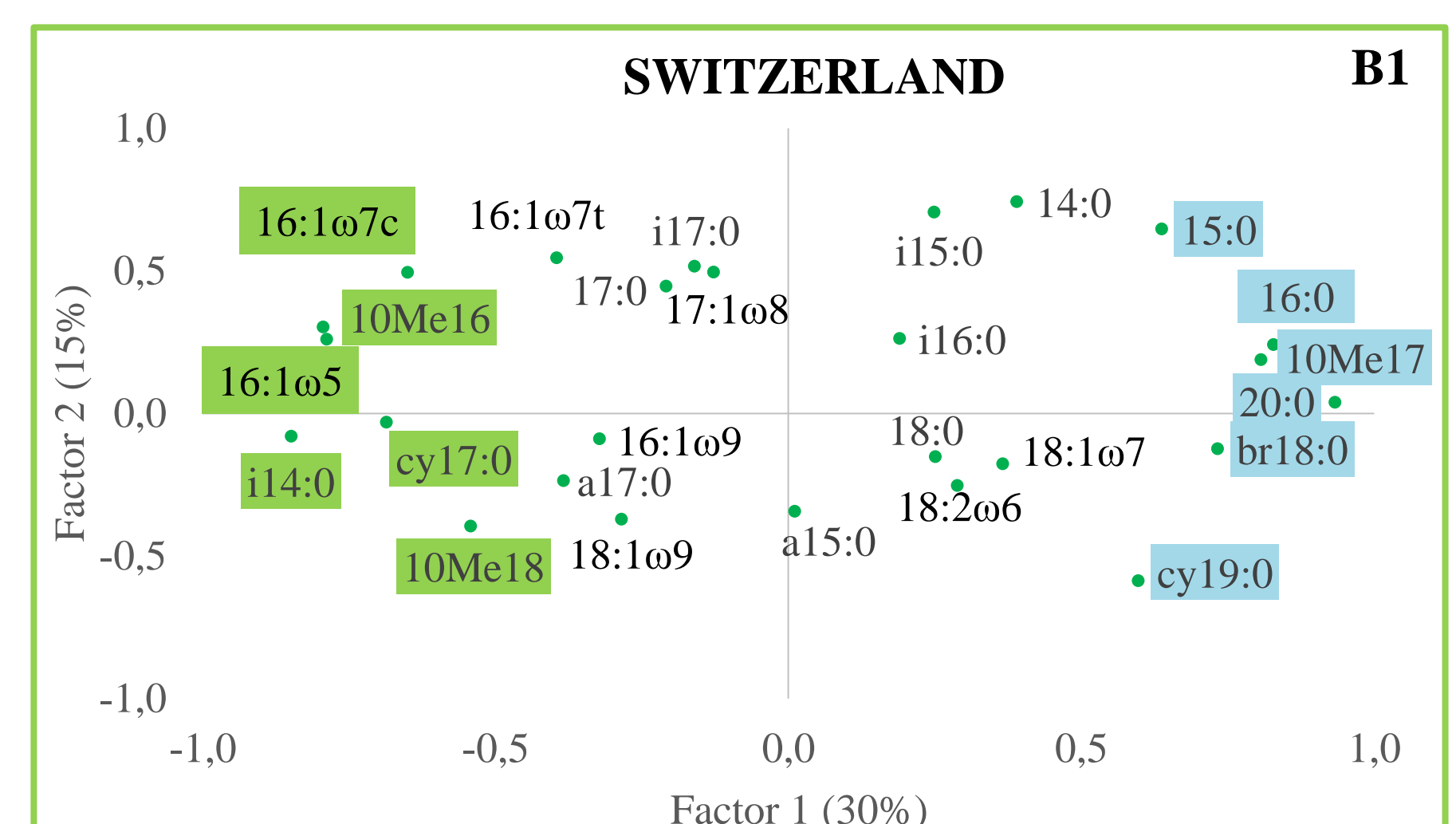
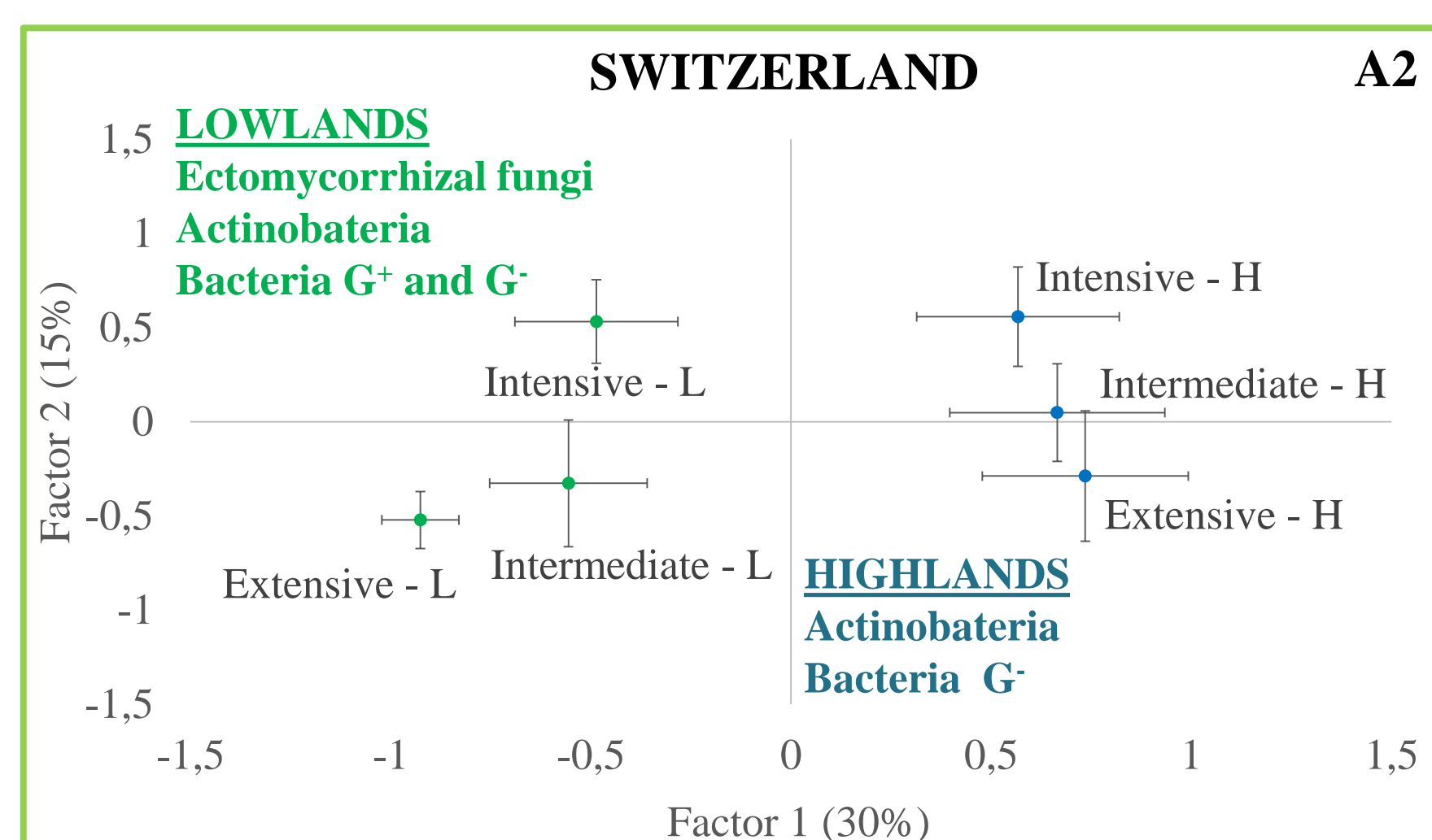


Figure 2: Microbial biomass (nmol g<sup>-1</sup>). Different letters mean significant differences (Anova; p<0,05), in each management intensity. GE: Germany; SW: Switzerland; H: Highlands; L: Lowlands.

Both saprotrophic and mycorrhizal fungal biomass, are higher in the extensive grasslands than in the other management intensities.

## CONCLUSION:

The soil microbial community structure differs between the highlands and the lowlands, while the management intensity gradient more clearly affects the fungal biomass. The extensively managed, i.e. semi-natural, grasslands provide a distinct habitat for fungal colonization.