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# Hydrological control on vegetation composition and soil microbial community structure in a temporary wetland (Ghent, Belgium)

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Wetland hydrological fluctuations regulate the availability of oxygen in the soil, thus creating spatio-temporal variations in aerobic and anaerobic conditions. Vegetation composition and microbial community structure and activity in wetland soils are controlled by such conditions. In this study, we investigated the vegetation composition and microbial community structural and functional changes along a temperate wetland hydrological gradient. Two different vegetation communities were distinguished along the hydrological gradient; *Caricetum gracilis* at the wet depression and *Arrhenatheretum elatioris* at the drier upper site. At both sites, we applied phospholipid fatty acid (PLFA) based stable isotope probing with in situ $^{13}CO_2$ pulse labeling to identify the microbial groups actively involved in assimilation of newly photosynthesized, root derived carbon in the rhizosphere soil. Microbial community structural differences were observed between the two sites. At the drier upper site, gram negative bacterial communities were more abundant; while at the wetter lower site gram positive bacterial communities were more abundant. At both sites, deeper soil layers (10-20 cm) were relatively more inhabited by gram positive bacterial communities. Despite their large abundance, the metabolically active proportion of gram positive bacterial and actinomycetes communities was much smaller at both sites, compared to that of the gram negative bacterial and fungal communities. This suggests much slower assimi-

lation of root derived carbon by gram positive and actinomycetes communities than by gram negative bacteria and fungi at both sites. Groundwater depth also showed a significant effect on the relative abundance of several microbial communities. The relative abundance of gram negative bacteria was significantly decreased with increasing groundwater depth while the relative abundance of gram positive bacteria and actinomycetes at the surface layer (0-10 cm) increased with increasing groundwater depth. Therefore, gram negative bacteria appear to prefer the aerobic surface layer, while gram positive bacteria and actinomycetes appear to favor more anaerobic conditions imposed by the shallow groundwater depth.