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The relationship between successional vascular plant assemblages and associated microbial communities on coal mine spoil heaps

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The aim of the study was to investigate relationships between vascular plant species and associated soil microbial properties at various stages of vegetation development on unclaimed hard coal mine spoil heaps in Upper Silesia (south Poland). The spontaneous vegetation, soil chemistry as well as the activity and structure of microbial communities were recorded on this specific habitat. The colliery heaps were divided into four age classes and plant species composition and cover abundance were recorded on the established plots (2x2m). The soil microbial activity under vegetation patches was assessed using fluoresce in diacetate

hydrolytic activity (FDHA) and the soil microbial biomass and community composition were determined by phospholipid fatty acid (PLFA) biomarkers. Total microbial biomass in soils from the older vegetation plots was significantly higher than those in soils from the younger plots. In all studied samples, microbial communities consisted, primarily, of bacteria with the dominance of Gram negative bacteria over Gram positive and aerobic microorganisms were more dominant than anaerobic ones. Statistical analysis revealed a correlation between the type of vegetation and microbial community structure.