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Aboveground and belowground plant traits as drivers of microbial abundance and activity.

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Although there is growing awareness of the roles that plant-soil interactions play in regulating ecosystem processes, our understanding of the role that specific aboveground and belowground plant traits play in defining them is limited. In this study, we aimed to develop a conceptual model linking plant functional trait impacts on soil microbial functional diversity and their coupled effects on ecosystem processes. This was done by replicating three mesocosm studies, based on model sub-alpine grasslands, across three sites in different parts of Europe as part of the pan-European project, VITAL. We manipulated community plant traits by planting communities of varying abundance and dominance of 4 common grassland species. After 1.5 years, we then measured aboveground traits (specific leaf area, leaf dry matter content, leaf nitrogen and carbon content and leaf C:N ratio), belowground traits (specific root length, average diameter, root dry matter content, root nitrogen and carbon content and root C:N ratio) microbial community abundance (using phospholipid fatty acid (PLFA) analysis and gene abundance of nitrifier and denitrifier communities), and microbial activity (via potential nitrification and denitrification rates). We present links between manipulated community traits, microbial properties and ecosystem processes, supporting the role of plant traits in driving microbial properties.