
Relationships between plant community functioning and soil carbon stocks based on a study of 30 permanent mowed grasslands over two French Regional Natural Parks

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Abstract

Grasslands, the most widespread ecosystems on the surface of the earth, provide many ecosystem services. They are managed by farmers in order to produce provisioning services through the forage. They also provide regulation services for the humankind such as carbon (C) storage. According to their management, grasslands may constitute a C source and/or C sink. Plants control both C input through photosynthesis and C output release directly via their own respiration and indirectly via soil microflora respiration through organic matter mineralization. Plants can thus be considered as a gas stream center. To better understand the role of vegetation on soil C stocks, we studied the relationships between soil C stocks and the functioning of plant community compartment as a result of edaphic and climatic factors as well as management and history of the grasslands. 30 permanent mowed grasslands have been selected over two French Regional Natural Parks (Normandy-Maine / Lorraine) to ensure a great variability of all factors. We measured then their plant community composition as well as their functional composition through a trait based approach. Variations of leaf traits (SLA, LDMC, LNC, LC/N) measured at the plant community level (CWM traits) will be analyzed with respect to abiotic factors, management and grassland history. They will further be confronted to soil C stocks and grassland productivity.

Keywords: carbon storage, functional composition, leaf traits, soil

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