

Response of soil nematode community to increased plant species diversity in an intensively managed grassland

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Introduction

Plant productivity, decomposition and nutrient cycling are important processes that are controlled by plant-soil-biota interactions. Studies have shown that increasing plant species diversity results in increased biomass yields in intensively managed grasslands. However, little is known about the response of soil nematodes (the most abundant metazoans in the soil) to increasing plant species diversity in intensively managed grasslands.

Aim

To investigate the effect of increasing plant species diversity, on the soil nematode faunal assemblage in an intensively-managed grassland

Experimental design/methods

Six plants belonging to 3 functional groups (grasses, legumes, herbs) were planted in the field either as monocultures or in order of increasing plants species diversity (from 1 to 6)



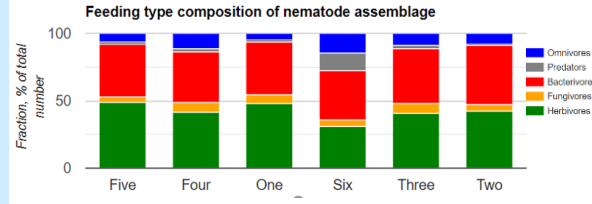
Ryegrass (*Lolium perenne* L.) and timothy (*Phleum pratense* L.); legumes: red clover (*Trifolium pratense* L.) and white clover (*Trifolium repens* L.); herbs: ribwort plantain (*Plantago lanceolata* L.) and chicory (*Cichorium intybus* L.)

Methodology

- Soil samples were collected from each plot after harvest
- Nematodes were extracted using a modified Ostentbrink elutriator
- Extracted nematodes were counted and identified using morphological features observed under a light microscope
- Nematode-based indices were calculated

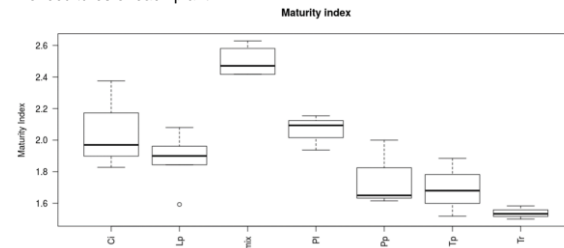
Results

- 1) Increased abundance of omnivores and predators in the six species compared to the monoculture



Results

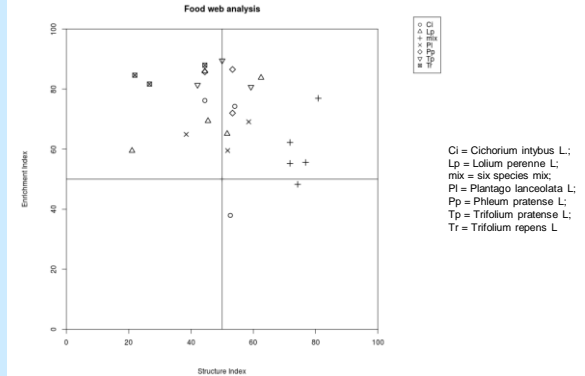
- 2) Significantly higher maturity index in the six species mix compared to the monocultures of each plant



Ci = *Cichorium intybus* L.; Lp = *Lolium perenne* L.; mix = six species mix; Pl = *Plantago lanceolata* L.; Pp = *Phleum pratense* L.; Tp = *Trifolium pratense* L.; Tr = *Trifolium repens* L.

Results

- 3) The six species mix presented a more structured community (structure index above 60)



Conclusions

- Increasing plant diversity in intensively managed grasslands resulted in a positive effect on the belowground soil biota
- The abundance of plant-feeding nematodes (herbivores) were significantly lower in the six species plots than in the monocultures
- Overall, our findings contribute to knowledge of the positive effects of increased aboveground plant diversity on the belowground diversity of soil biota. This creates a pathway towards sustainable production with reduced fertilizer inputs

City and Time Zone

Wexford (Ireland). Irish Standard Time (GMT+1)