

Functional Soil Ecology and Conservation of Machair in relation to Changing Land Management

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Introduction

Machair is a rare coastal habitat on a calcareous sandy soil in North West Scotland

It is characterised and maintained by low-intensity agricultural practices:

- rotational, mixed cropping
- use of traditional crop varieties with field grown seed
- seaweed fertilisation
- extensive winter grazing by cattle and sheep

This small scale agriculture has led to a diverse and patchy plant community

The belowground component of the Machair is still relatively unknown

The importance of several key functional soil groups will be examined through an ecological survey and greenhouse experiments



South Uist Machair with traditional stooks

Ecological Survey

Hypotheses:

- Differences in management regimes will be reflected in the Machair soil community
- There will be seasonal and physio-chemical differences in Machair soil communities

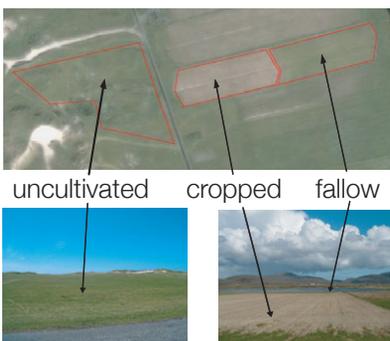


Method:

The 3 main landuse types have been identified and sampling is taking place 3 times a year at 15 different locations

Nematode, mycorrhizal and general microbial community structure and abiotic measurements will be assessed on soil or roots of three characteristic plant species as appropriate

Map showing the 15 sampling locations



The 3 landuse types used in the survey

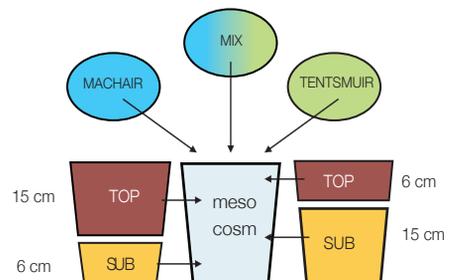
Mesocosm Experiment

Hypothesis:

- Soil biotic and/or abiotic components drive Machair vegetation dynamics

Method:

A reciprocal mesocosm experiment was established to investigate the performance of indigenous and non-indigenous seed spray using Machair and an acidic sandy soil



The correlation between plant performance and the major functional groups identified in the ecological survey will be assessed

Future work

Analyses of samples from survey and mesocosm experiment

Results will determine to a large extent my future work

Possible experiments into :

Impact of seaweed fertilisation on soil biota

Interplay between local crop varieties and nutrient availability

Influence of weeds on belowground community composition