

## INTRODUCTION

- Colonisation on *Calluna* moorlands by birch (*Betula* spp.) is an important ecological process, but birch growth is spatially very variable and unpredictable.
- We hypothesised that successful colonisation of moorland by birch is associated with the formation of ectomycorrhizas on birch by fungi capable of tolerating the toxic conditions created by *Calluna*.
- The aim of this study is to survey the ectomycorrhizal (ECM) fungal community on birch planted on moorland 25 years ago, where the growth of the trees show 5-fold differences in plots < 10m apart.
- ITS-PCR and tRFLP were used to generate ECM fungal community profiles.



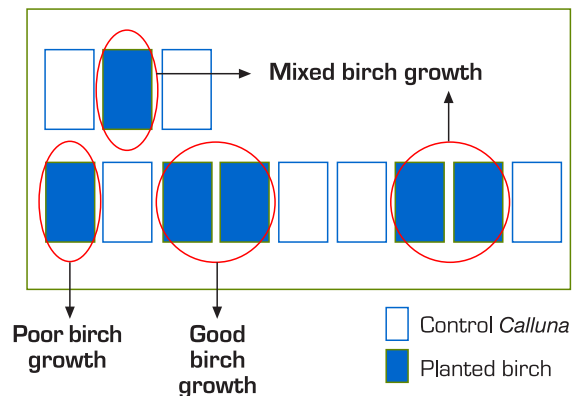
Fig. 1: The field site at Delnalyne, Scotland, showing 25 year old plots of (A) poor and (B) good birch growth.



## METHODS

- 12 x 12 m birch plots were divided into 9 (4 x 4 m) subplots.
- Two soil cores were taken 0.5 m from the base of one representative birch sapling in each subplot.
- The height and diameter of the sapling, and all other saplings within 1 m, were recorded.
- Ectomycorrhizas were extracted from each core, and one tip of each different morphotype present was placed in CTAB to give a composite sample for each subplot.
- DNA was extracted from the composite sample and the ITS region was amplified using ITS1f-FAM and ITS4-HEX labelled primers.
- tRFLP profiles were produced using *Hinf* I and *Taq* I restriction enzymes.

## EXPERIMENTAL DESIGN



## PRELIMINARY RESULTS

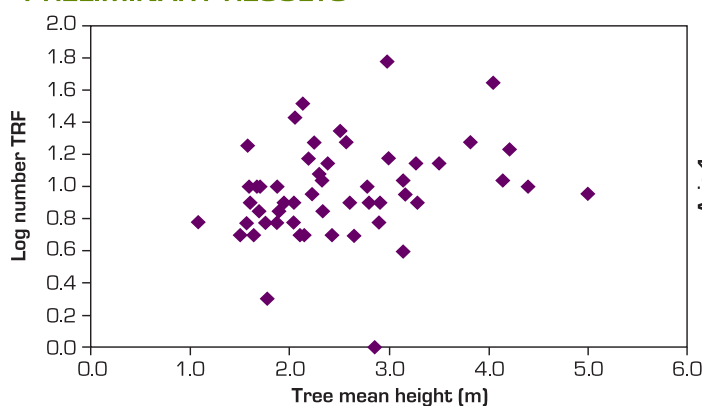


Fig. 2: Relationship between mean tree height and the log numbers of TRF's in each core

- The number of *Hinf* I fragments was positively related to the average height of the saplings within 1 m of the core.
- Taken together these results indicate that the tRFLP patterns, and by implication the composition of the ectomycorrhizal fungal community, is related to the growth of the birch saplings.

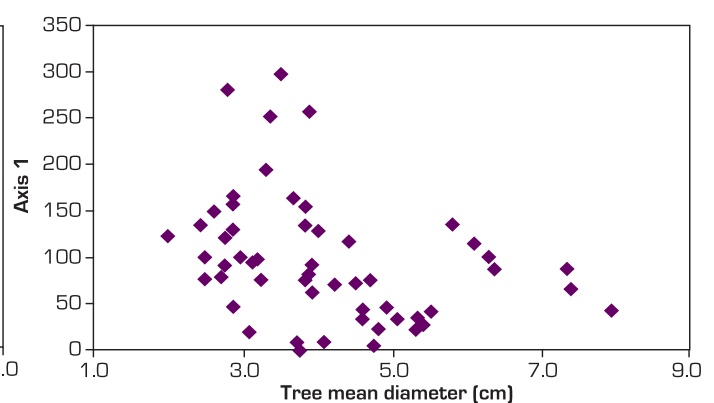


Fig. 3: Detrended Correspondence Analysis ordination of the 21 most frequent *Hinf* I fragments and mean tree diameter

- The Axis 1 score of the Detrended Correspondence Analysis ordination is positively related to the average diameter of saplings within 1 m of the core.

## FUTURE WORK

The next step is to construct a database of TRFs for ectomycorrhizas and sporomes of ectomycorrhizal fungi from the site. This will allow us to use the tRFLP output to generate information on the presence and absence of ECM fungi in each sample and to investigate further the relationship between tree growth and ECM fungal community composition.