



# Tree planting: impacts on biodiversity and climate change



Scot Ramsey

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Increased tree planting will benefit the environment and the economy



**PM promises to treble the rate of tree-planting in the UK, with up to 30million more planted every year**



Press release

# Government launches new scheme to boost tree-planting

## NEWS

# Climate change: Tree planting rise 'needs to happen quickly'

News story

## Thousands of trees to be planted in England's towns and cities

Government to support tree-planting schemes through £10m Urban Tree Challenge Fund.

Environment

# UK needs to plant 1.5 billion trees to tackle climate change, government told

'Let's not shy away from the truth. It will be a challenge, it will cost money'

Phoebe Weston Science Correspondent | @phoebe0 | Tuesday 30 July 2019 15:04 | 32 comments

# Replanting Britain: 'It's about the right tree in the right place'

More than £1 per person a year is spent on planting English trees, but mistakes loom large  
[View our appeal here](#)

**Woodland Trust to plant 50 million trees over 5 years to fight climate crisis**



# Tree planting and climate change mitigation



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Tree biomass  
= stored  
carbon



Less carbon  
dioxide in  
the  
atmosphere



Reduces  
climate  
change

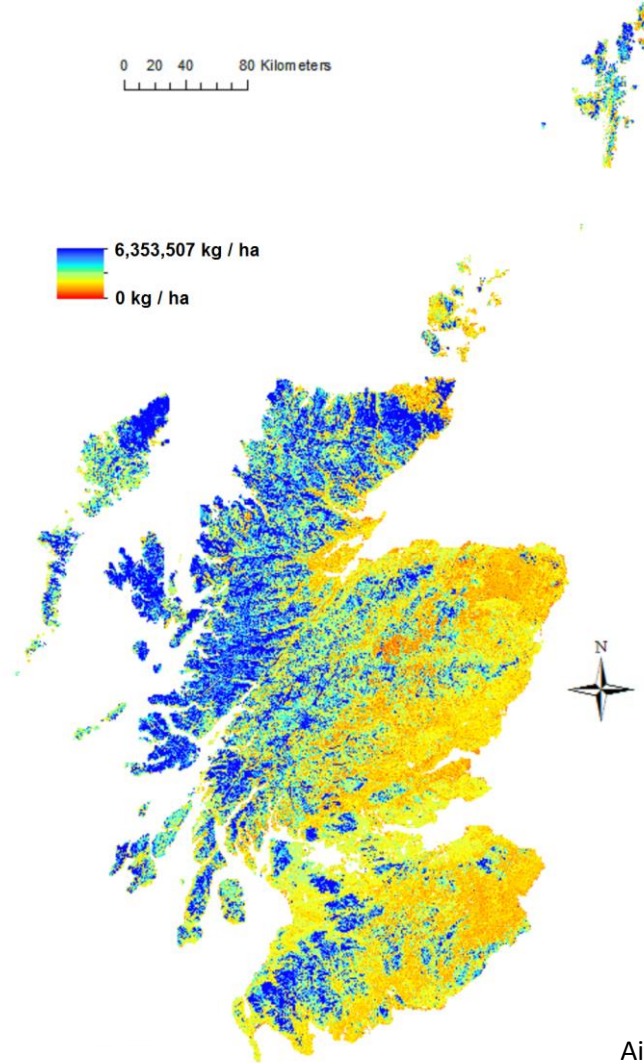
Is this always true?



# Soil carbon

Carbon stored in:

- Above ground vegetation
  - Soil
- 
- Need to look at both

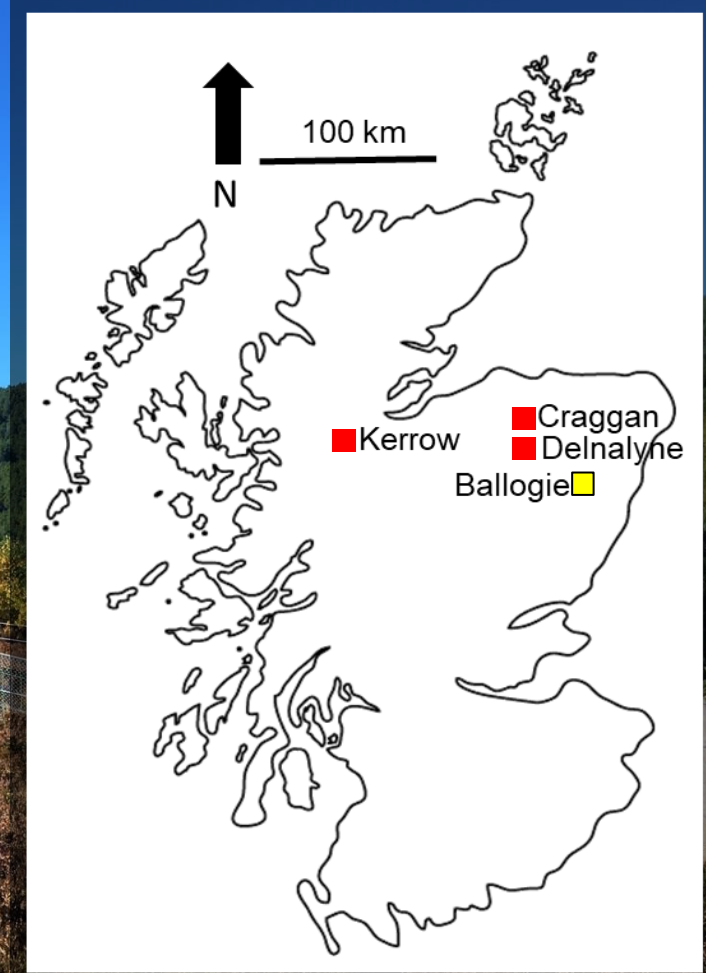


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# Test the assumption Planting trees = increased carbon storage

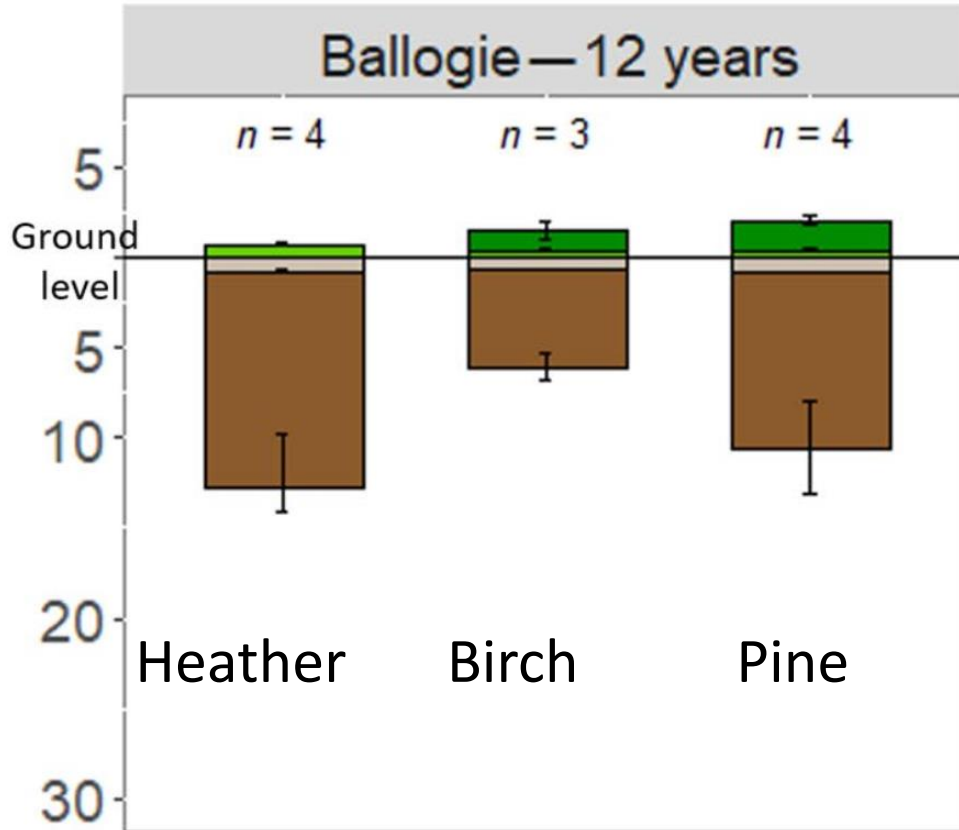
- Birch and Pine 12 years old
- Birch trees 39 years old



# Results – impacts on carbon storage



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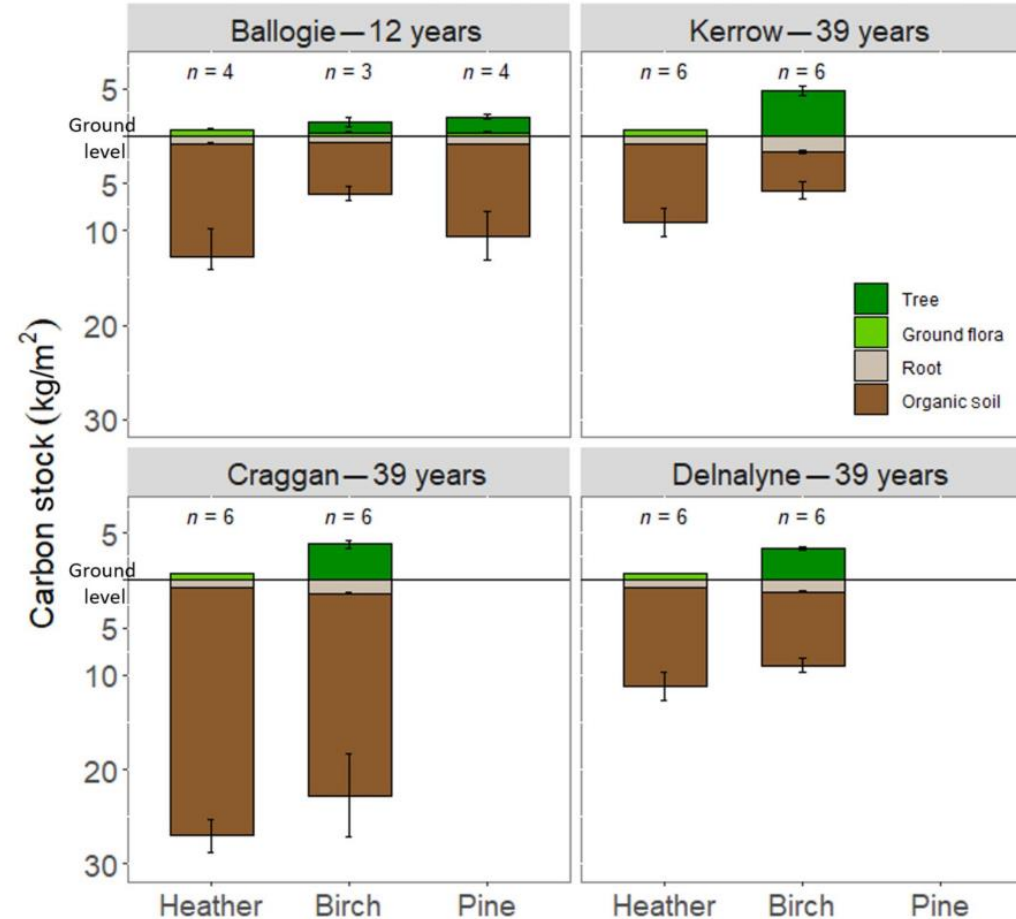


Friggens et al. 2020

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# Results – impacts on carbon storage



- Above ground – increase in carbon
- Below ground – losses of carbon
- Overall no net gain in carbon

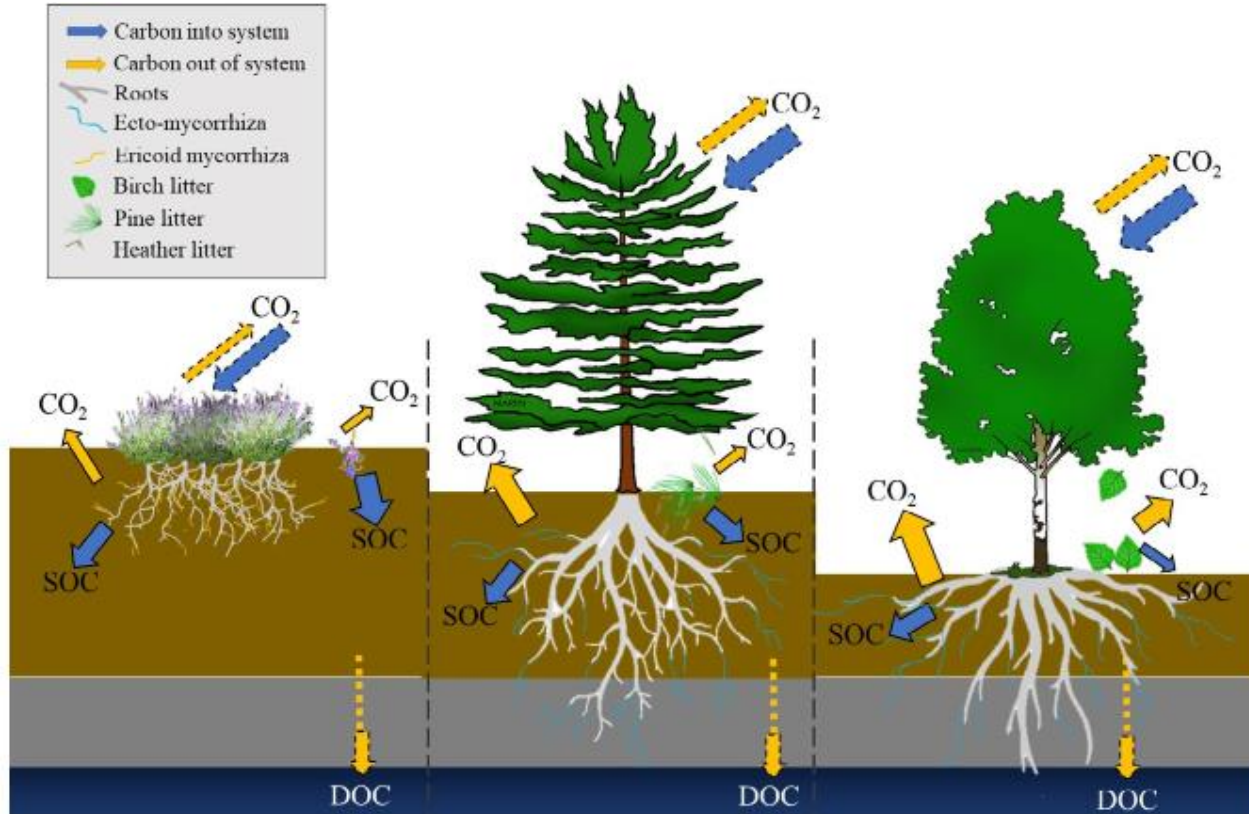
## Summary

- Below ground impacts of trees very important
- On decadal timescales, trees were not mitigating climate change

# Where did all that carbon go?



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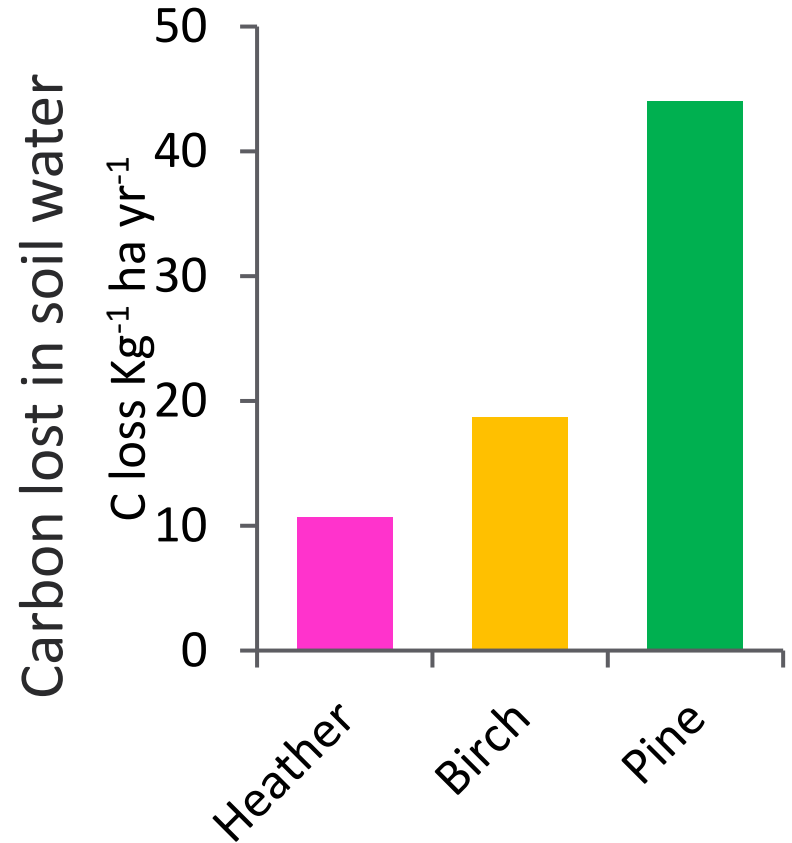
Friggens et al. 2020

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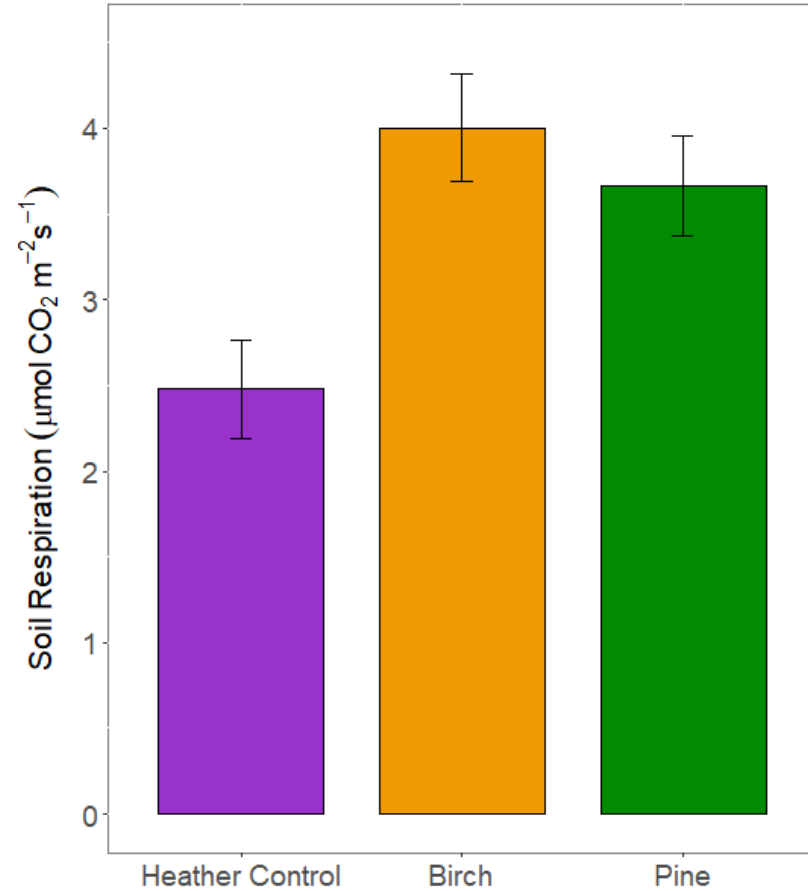
# Where did all that carbon go?



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Increase in soil respiration  
The soil community is changing

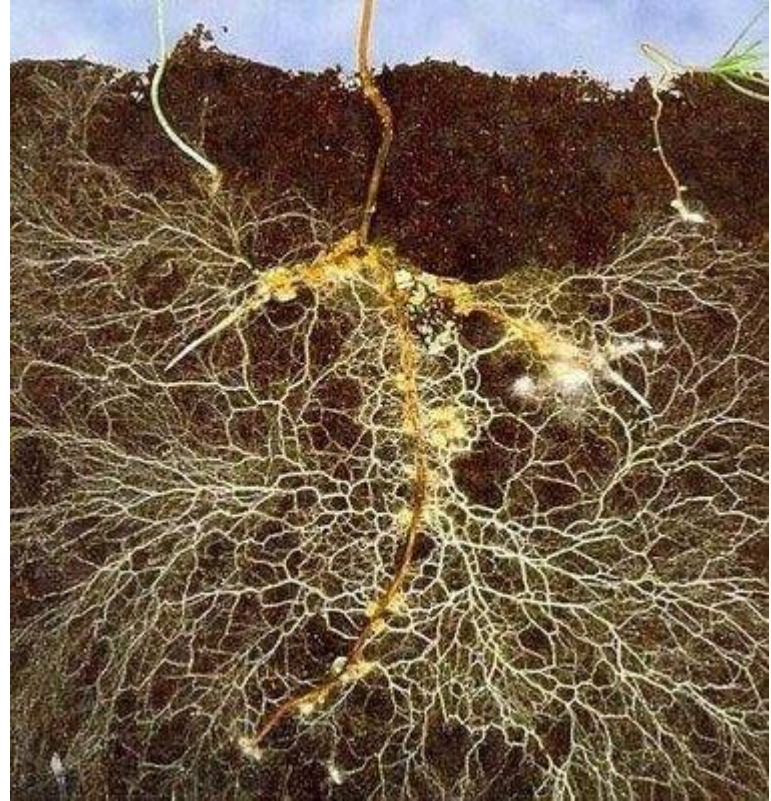




# Changes in the fungi in the soil



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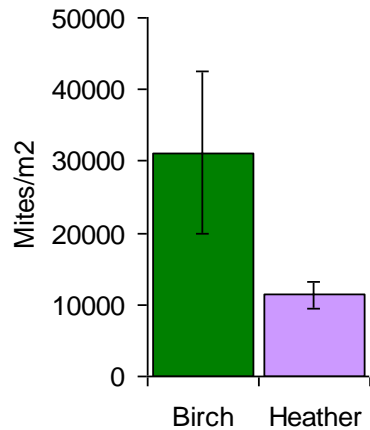
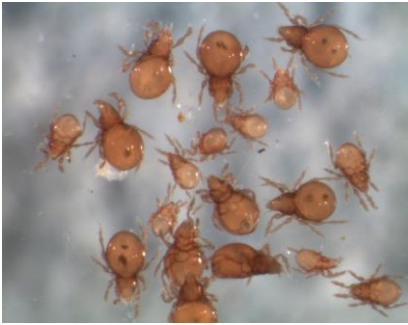


# Other impacts on soil communities

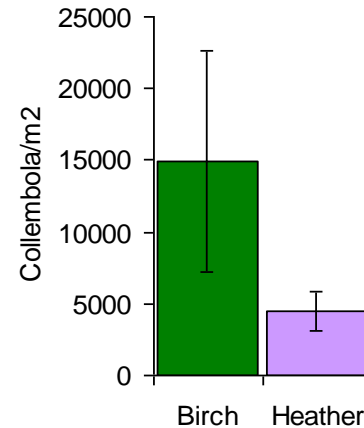


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Mites



Springtails



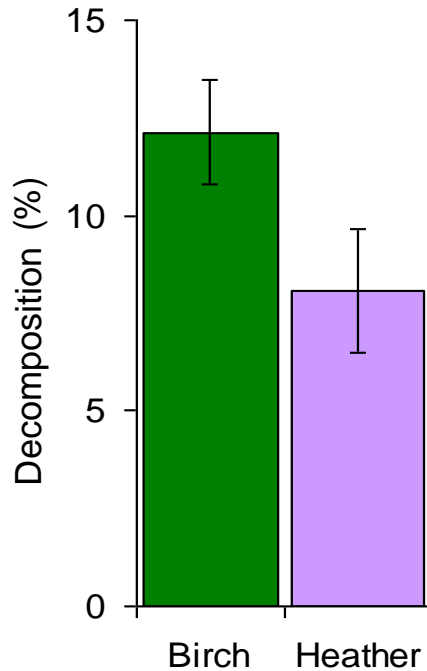


# Consequences for nutrient cycling rates

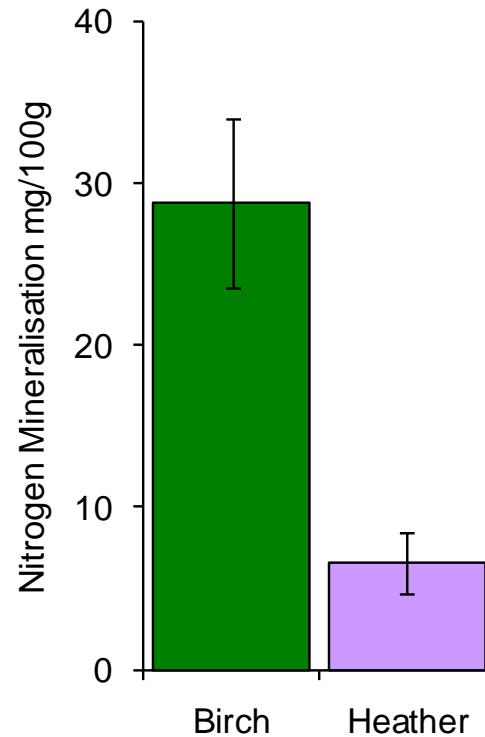


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Decomposition



Nitrogen mineralisation





# Relevance to policy

- Experiment time scales  $\approx$  Net zero timescales of 2050
- No net carbon gain for c 25% of potential tree planting area?

## However

- Mineral soils likely to lead to net gain
- Differences between tree species
- Ground disturbance when planting increase soil carbon losses



This project receives funding under the Forestry Grant Scheme.



### The Forestry Grant Scheme

Scotland's woodlands and forests are a vital national resource and play an important role in rural development and sustainable land use. As well as helping to reduce the impacts of climate change and providing timber for industry, our forests enhance and protect the environment and provide opportunities for public enjoyment.

The Forestry Grant Scheme funding is supported by the European Union, is supporting the sustainable management of existing woodlands and the creation of new woodlands – contributing towards the Scottish Government's published targets for woodland creation.

#### Forster Woodland Creation

This is a Forestry Grant Scheme (FGS) funded commercial planting which delivers a UKFS woodland by creating a commercial conifer woodland on land which is suitable for timber production and is accessible for timber transport. This planting will help deliver the outcomes set out in the Scottish Forestry Strategy.

This forest is being managed through deer exclusion, weeding and replacement of dead trees to ensure successful establishment. This woodland captures and stores carbon and will provide a sustainable supply of timber in the future.



The European Agricultural Fund for Rural Development:  
Europe investing in rural areas



Scottish  
Woodlands

01738 625 128

Challenges the assumption that tree planting will always mitigate climate change

# Thank you to you for listening and...



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## The Funders

- Nature Conservancy
- ITE/CEH/NERC
- British Ecological Society
- Strategic Research Programmes of the Scottish Government.

## The Landowners

- Ballogie Estate
- Invercauld Estate
- RSPB
- Crown Estate



Scottish Government  
Riaghaltas na h-Alba  
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