How do Living Mulches Impact Soils and the Environment?

Learnings from our research at Denby Hall Farm

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Farming Innovation Programme and Innovate UK

To better understand the wider benefits and drawbacks of diversified cropping systems, researchers at ORC have been assessing the impact of different perennial legume understories, or living mulches, on biodiversity, carbon sequestration and soil health.

- Biodiversity metrics were higher in living mulch systems, which were particularly beneficial to pollinators and soil fauna
- Establishing living mulches also led to reduced net carbon balances compared to controls
- We found that soils underlying many of the living mulch species mixtures had higher organic matter and better structure than those without mulches



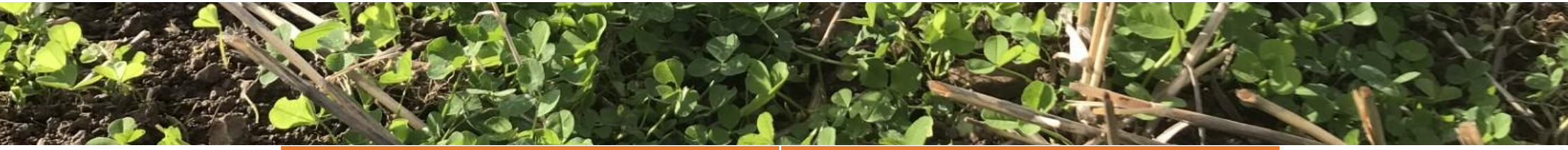




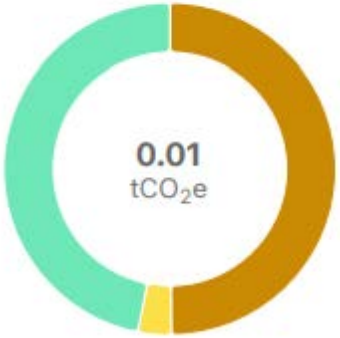
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Biodiversity and carbon sequestration is higher in Living Mulch systems

Using Sandy from Trinity Agtech, we analysed results from all the mulch treatments and found that associated emissions were higher, and sequestration was lower in strips without living mulches. Biodiversity scores for pollinators were much higher in the mulch treatment strips.



NET CARBON BALANCE



Scope 1 | Scope 3 (off-farm) | Sequestration

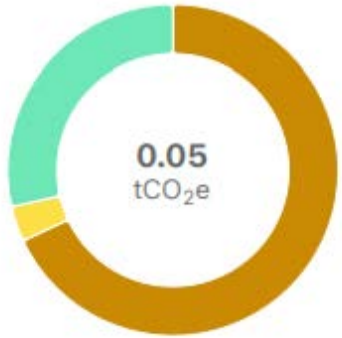
Living Mulch Strips

Farmland wildlife	2.8 / 5
Conservation species	2.6 / 5
Natural enemies	4.5 / 5
Pollinators	3.1 / 5
Soil biodiversity	4.3 / 5

Headland Strips

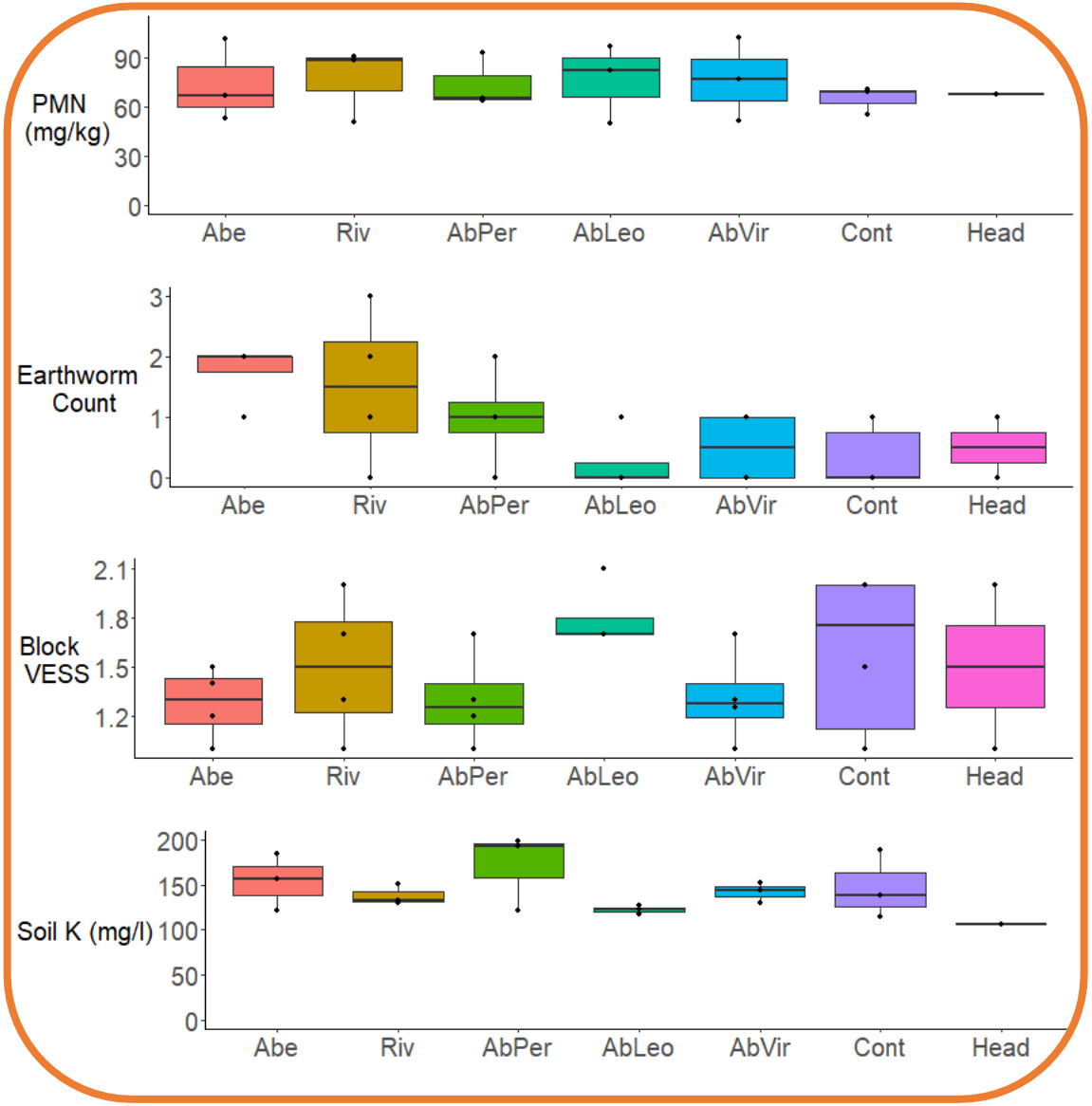
Farmland wildlife	2.4 / 5
Conservation species	2.8 / 5
Natural enemies	4.4 / 5
Pollinators	1.9 / 5
Soil biodiversity	4.1 / 5

NET CARBON BALANCE



Scope 1 | Scope 3 (off-farm) | Sequestration





Some early indications of better soil health were identified underlying selected living mulch species

- Microbial activity assessed using potentially mineralizable nitrogen (PMN) did not significantly differ between the treatment strips
- There were higher earthworm numbers in single-species living mulch strips (Aberace and Rivendel) than in those without mulches
- Soil structure (determined via VESS score) was generally better in strips containing living mulches
- Plant available soil potassium (K) was slightly higher in living mulch strips compared to control and headlands

There is clear evidence that establishing living mulches can potentially improve soil health and wider environmental outcomes