Cynllun PROSOIL+ Project

"Inspiring Farmers to Safeguard Soils"

Newsletter 3

Welcome to the third newsletter of the PROSOILplus project. In this newsletter, we are discussing the importance of protecting the health of Welsh soils and the impact that different forages species can have on soil structure.

Why soils matter

- Welsh soils contain 410 million tonnes of carbon (Agriculture in Wales, 2019)
- Most of the biodiversity within agricultural systems resides below ground
- Healthy soil is essential for achieving 13 of the 17 UN Sustainable Development Goals. Examples of these goals include food, fibre, flood mitigation and carbon storage

How can soil health be measured?

- Counting earthworm numbers is a practical technique for measuring soil health
- Under ideal conditions a healthy earthworm population can process around 12 tons of soil and organic matter per year
- Earthworms can be counted by simply digging a hole: this should be a spade width by a spade depth. Break apart the soil to count the number of earthworms present
- Counting should take place at the same time each year: spring or autumn is best when soils are moist

How can earthworm numbers be improved?

- **Organic matter** – earthworms need organic matter to sustain themselves and soils with low organic matter have depleted earthworm numbers
- **Soil pH**- an acidic soil severely impacts on earthworm numbers- the optimum is above pH6
- **Soil compaction-** heavily compacted soils limit the earthworm's ability to burrow. In a well aerated soil, the earthworm's movement acts as a piston, forcing air deeper into the soil, increasing drainage, and nutrient uptake. Their burrows are also very important for letting water into and through soil. This influx of water can flush air out of the soil to be replaced by 'fresh' air

Prosoilplus is counting earthworm number in several experiments – results will be given in the next newsletter which is due out soon

This project is funded through the Welsh Government Rural Communities - Rural Development Programme 2014-2020, which is funded by the Welsh Government and the European Union.

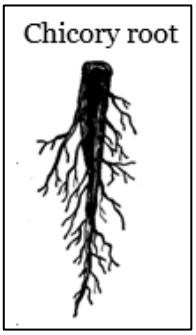
April 2022

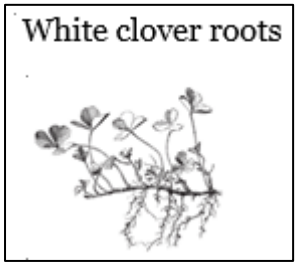
Why forage matters

- Grassland accounts for more than 70% (1.3 million ha) of the farmed area in Wales
- Forage is the cheapest feed for ruminant livestock
- Forage species can be selected based on the farms individual stock and nutritional requirements

Does forage type have an effect on soil biology?

- Different forages have different rooting systems
- Perennial ryegrass has a shallow but extensive rooting system that is highly branched and produces fine roots
- Chicory and to a lesser extent red clover produce deep tap roots that have the potential to 'mine' soil resources inaccessible to other shallower rooting plants





- White clover roots, after initially producing a short tap root spread through the production of stolons at root nodules
- IBERS research showed differences in root structure affect soil biology

How can multi-species leys improve efficiency of livestock production?

- Multi-species leys contain different forage species including grasses, legumes and herbs
- This diversity can increase forage intake which in turns improves livestock performance
- Multi-species leys can enhance the protein content of the sward and the presence of legumes can fix nitrogen
- Deep rooting species have the potential to improve mineral content of the forage livestock consume

The Prosoilplus project

The overall aim of the project is to safeguard soil and optimise nutrient use efficiency from soil on livestock farms. The objectives are:

- *Managing & protecting landscapes*
- *Conserving & enhancing biodiversity*
- *Managing soil to conserve carbon & reduce erosion*
- *Support co-operation for technology changes*
- *Improving water surface run-off & managing water to help reduce flood risk*

We hope you have enjoyed reading this second newsletter and we look forward to giving you a roundup of IBERS Research activity in our next newsletter. You will find more information on our website www.prosoil.wales. If you have any queries, please email Jan Newman at jln@aber.ac.uk

This project is funded through the Welsh Government Rural Communities - Rural Development Programme 2014-2020, which is funded by the Welsh Government and the European Union. **April 2022**