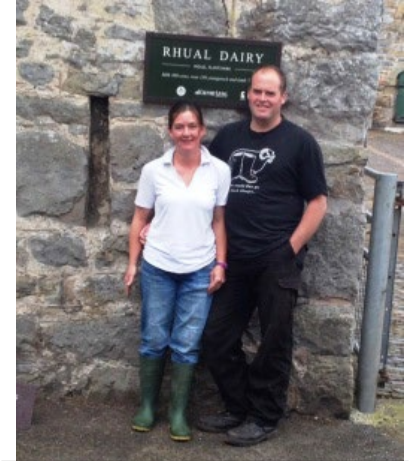


“Inspiring Farmers to Safeguard Soils”

Rhual Dairy: A Participatory Research Farm Case Study

Farm Facts

Rhual dairy is a 232ha farm at 244m asl. The farm lies in an NVZ and is on light sandy soil with residential areas close by. Cropping includes 190ha of perennial ryegrass leys plus 30ha of maize and 12ha of barley. Although maize and potatoes are grown on some areas the mainstay of the grassland is long term leys. The livestock include 336 Holstein Friesians, grazed, and fed by TMR and conc. in the parlour. The herd is all year-round calving. There are around 190 replacement heifers; all home reared and calve at 24 months. There is also a flock of 100 Poll Dorset ewes on farm. The target milk yield is c.9000l/cow from about 2.3t/cow concentrates. The aspiration currently is to increase production from grass/forage by 1000 litres and to achieve improvements in transition cow management. Cows are bedded on mattresses with crushed husks. Farm-yard manure is spread from looseboxes and slurry forms the remainder of the animal manures and is spread by low emission techniques like trailing shoes and dribble bar.



Anna and John Booth

Undersowing Maize

Careful soil management is needed to reduce the risks of surface runoff as well as sediment and nitrate leaching losses to water from maize cropping systems.

Maize at Rhual is typically harvested mid- Sept to mid-October, when soils can be ‘wet’, increasing the risks of soil compaction by harvest machinery and the potential for surface runoff and sediment loss to surface water systems. Bare ground overwinter increases the risks of nitrate leaching losses as there is no plant uptake of soil mineral nitrogen over winter.

John and Anna were interested in oversowing the maize area by drilling to assess the most appropriate grass species and timing of oversowing to successfully establish ground cover that will reduce the environmental impact of maize post-harvest. Studies have demonstrated that oversowing maize with ryegrass, to provide established ground cover at harvest (e.g. Oct-Nov), can be effective at reducing overwinter surface runoff (by up to 60%), sediment losses (by up to 90%), phosphate losses (by up to 85%) and nitrate leaching losses (by up to 70%) compared to bare ground (i.e. stubble).



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



Multispecies Leys

Another focus at Rhual Dairy has been the use of multispecies herbal leys. The herbal leys were chosen to:

- Investigate the importance of trace elements
- Identify the level of trace elements in the ley ie in the Chicory, Plantain, Clovers and Grasses
- Improve soil structure and carbon capture
- Identify the main benefits of a multispecies ley compared to a conventional grass ley in a dairy enterprise setting

Fifteen mineral and trace elements are essential to animal production, with minerals like calcium and phosphorus needed in relatively large amounts; trace elements like Manganese, Zinc, Selenium, Copper, Cobalt and Iodine are equally important but needed in much smaller quantities for health, growth and fertility.

Results from investigations at Rhual show improved levels of both macro elements (calcium and magnesium) and the trace elements (Zinc, Selenium, Copper, Cobalt and Iodine) present in the herbal ley compared with perennial ryegrass alone (see Table 1.) Further investigations would be beneficial to confirm whether differences in milk content from the herbal ley are significant.

	Rhual Herbal Ley	Rhual PRG only
Macronutrient %		
Calcium	1.67	0.52
Phosphorus	0.41	0.43
Magnesium	0.26	0.16
Potassium	2.99	3.29
Sodium	0.24	0.13
Sulphur	0.25	0.22
Micronutrients (mg/kg DM)		
Manganese	39.9	68.3
Zinc	51	42.9
Selenium	0.49	0.14
Copper	25	8.3
Cobalt	0.19	0.18
Iodine	1.01	0.73



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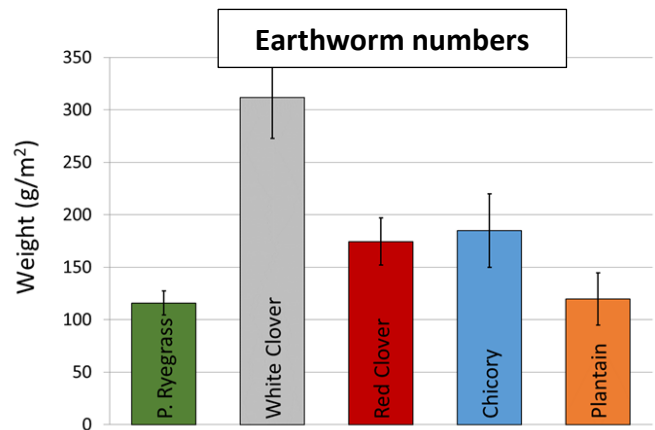
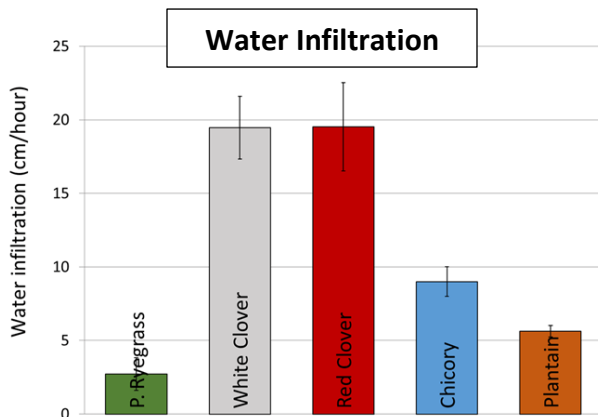
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IBERS PROSOIL Project Research Link

- There is current interest in the extent to which agricultural practices affect flood risk
- Research has focussed on soil compaction exacerbating this risk; less attention has been paid to how management practices increase infiltration and temporary storage of rainwater to mitigate these risks
- We investigated differences in water infiltration under various forage species with different rooting habits and interactions with earthworm populations
- Perennial Ryegrass, White Clover, Red Clover, Chicory and Plantain were sown in plots at IBERS in an experiment to investigate the effect of forage on chemistry, biology and physical properties of the soil
- Infiltration, penetration resistance, earthworms, yields & roots were measured periodically



Perennial ryegrass showed lower infiltration rates than clovers. White clover but not red clover had large earthworm populations.

John and Anna Booth: “Looking to the future we are going to continue under sowing the maize with Italian ryegrass and sow more multi species leys. This year we are going to try overseeding our existing leys with multi species varieties to see if this increases their resilience on our light soils to the changing seasons we seem to be experiencing.”

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