

“Inspiring Farmers to Safeguard Soils”

Orchard View: A Participatory Research Farm Case Study

Farm Facts

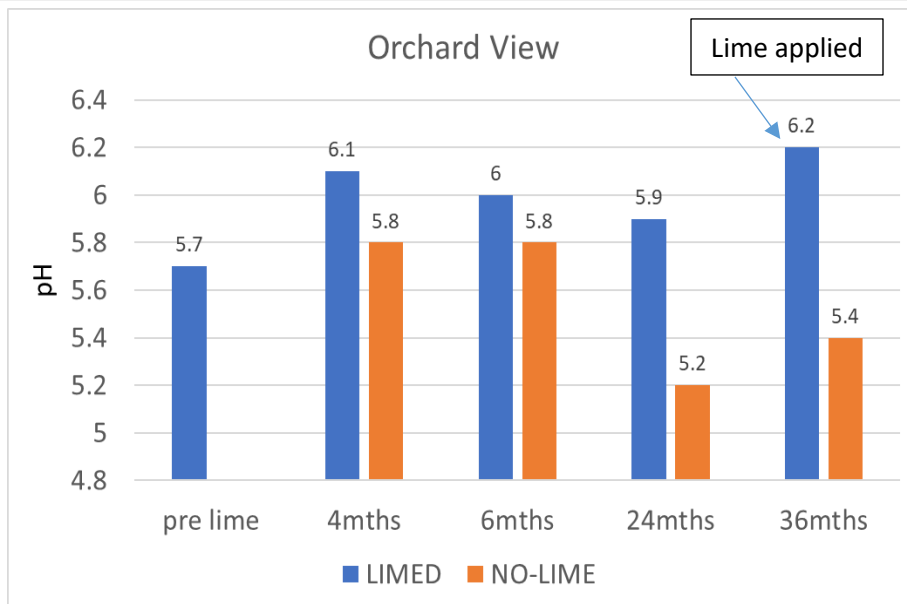
This smallholding near Cwmcarn, Monmouth at 140m elevation supports a flock of pedigree Welsh Black Mountain ewes. The PROSOILplus project site is on 3.5ha of rented ground surrounding Red Hill Fisheries nearby. The flock of approximately 70 sheep are primarily for breeding and showing. The ewe lambs are sold on for breeding and the majority of the ram lambs are sold to local top end restaurants. There is a high demand for the lamb



Hilary and John Garn

Liming

Maintaining soil pH at a target level of 6.0 to 6.2 is important for John and Hilary at Orchard View as it is in this range that essential nutrients and trace elements are most available in the swards that their ewes graze. Below this pH, soil biology is adversely affected - bacterial activity declines and earthworm activity is lower - leading to a buildup of organic matter on the surface. Other soil processes, such as nitrification (where ammonium is converted to nitrates that plants use for growth) and N fixation by legumes in the sward, are reduced if pH drops below pH 5.5.



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



What we found: In the trial, we applied lime at a rate of 5t/ha (2t/acre) to plots measuring 40 x 50m (0.2ha) and monitored the change in pH over three years, topping up when necessary.

Initially at a low pH of 5.7, the pH quickly rose to pH 6.1 within 4 months before maintaining that pH for around 18 months; after which it declined to pH 5.9. Lime was applied again and the soil tests showed that pH was 6.2 at 36 months. The pH of the un-limed plots remained low at <pH5.8 throughout (see chart above).

Muck and Compost

Soils at Orchard View are a valuable resource and foundation for the sheep enterprise and investigations into composting was used to:

- Identify changes in soil nutrient levels in small plots (1m by 2m) under different management.

These were:

- Compost applied; b) Sheep manure applied and c) None applied (control)

Manure and compost applied at 25t/ha

- Monitoring took place to measure changes in levels of soil Nitrogen, Phosphate and Potash
- We hoped to monitor earthworm populations and grass yields but this proved extremely difficult due to drought and results were very variable

The benefits that composting can bring:

- Reducing the volume of FYM and increasing the nutrient richness of the material spread
- Ability to act as a soil conditioner and increase organic matter content
- Other benefits such as pathogen and odour reduction and a reduced risk of pollution to watercourses

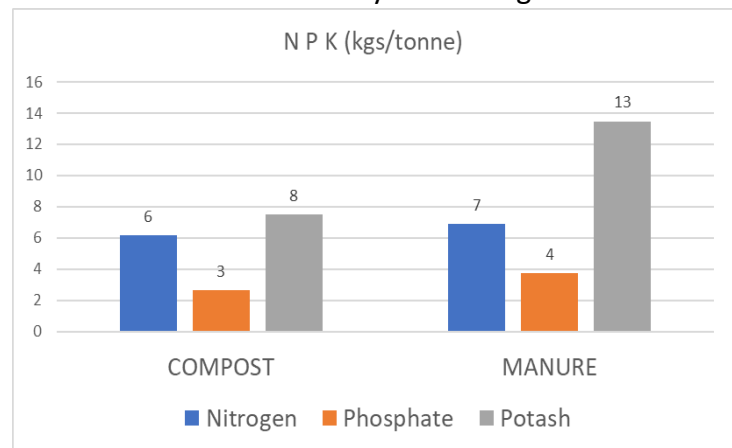
At that time, fertiliser prices were extremely high in 2022 and caused John and Hilary to think again about the value of the sheep manure that they had available and the potential it had to improve the phosphate and potash indices of the paddocks.

Figure 2.

Fertiliser costs MAY 2022

NITRAM 34.5%	£790
TSP 46%	£860
MOP 60%	£680

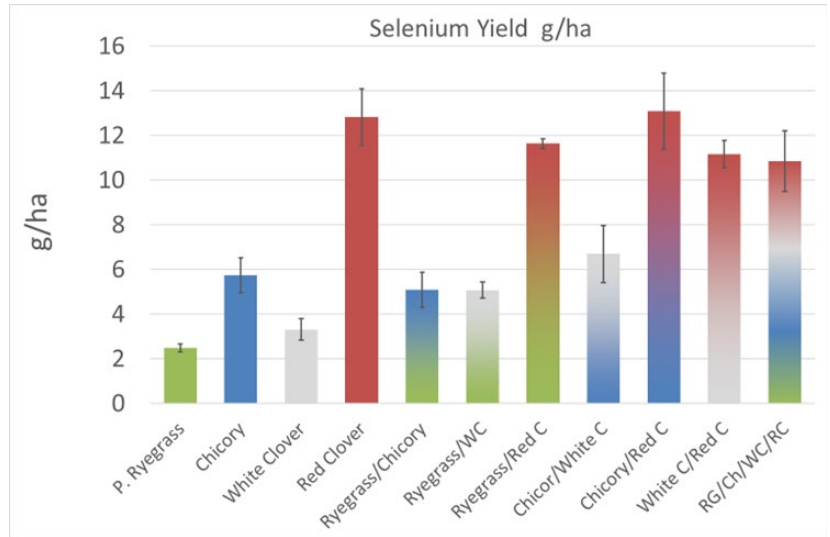
We found that soil indices changed over the 6 months following application of manure and compost. Phosphate index rose from 1 to 2/3; Potash indexes rose from 2- to 3/4, with no difference between plots receiving compost or manure. Indices remained at their original pre-treatment level on control plots (Fig 2).



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Fig 1. Levels of Selenium (g/ha) in species sown in the study



IBERS PROSOIL Project Research Link

Trace elements and minerals are an important part of a sheep’s diet and necessary for health, wellbeing, fertility and growth of both the ewe and lamb. Cobalt (in Vit B12) is essential for thrifty growing lambs, especially post-weaning; Copper is needed to prevent “swayback”; Zinc is required for healthy feet and wool production; Selenium acts with Vit E to prevent white muscle disease and improve immunity. A **resilience and diversity study** at IBERS looked at the effect different forage mixtures had on the nutrient uptake and chemical composition of the sheep’s diet. It was shown that forage species, such as those oversown into the sward at Orchard View, had higher Cobalt, Selenium, Zinc and Copper content than Perennial Ryegrass (see Fig 1). **The study at IBERS showed the potential nutritional benefits of including Chicory, Red Clover and White Clover in leys for sheep grazing.**

John and Hilary Garn: “When we joined the PROSOIL project we simply wanted to understand the selective grazing our flock were doing. We have since learned the importance of a species rich sward and healthy soils. We are what we eat and the importance of soil cannot be underestimated. Being involved in PROSOILplus has been an amazingly fascinating journey, and one we can only thank the team for. During the challenging events of the Covid pandemic, the farm and livestock benefited enormously from the addition of lime and we also attempted to increase sward diversity; the over sowing of chicory and plantain although appeared not to flourish initially, must have a presence as the sheep are frequently seen grazing in that particular area.”



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