



Field lab: Does extended pasture resting after grazing improve soil microbiology and soil health?

Final report

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Authors: Rob Purdew & Becky Willson, Researchers, Farm Carbon Toolkit

Coordinator: Kate Still, Soil Association

Pre-report summary

Take home messages

The trial has shown that it is possible to improve degraded pastures by using tall grass grazing, although this does not necessarily always translate into growing more forage on a given area. Soil health and forage quality does improve under this grazing regime and it appears that milk yield does not suffer. There were challenges and further trials and further investigation of current trial sites would provide more definitive answers.

Context

There is increasing interest in using “tall grass” grazing with extended rest periods in grazing rotations to improve soil health, build soil organic matter and increase total forage production, improving the resilience of the farming system to extremes of climate without having a negative impact on milk yield.

Trial design

The three-year trial occurred on six farms, comparing a control plot managed routinely with a treatment plot. The control and treatment were side-by-side or in similar fields.

The treatment management aimed for:

- A higher pre-graze sward (30-50% taller than the control, approx 4500 kg/DM per ha entry cover).
- A residual/exit height of >7 cm or 2000-2500 kg/DM per ha (using a 1/3 eaten, 2/3 residual approach).
- Flexible grazing cell division and rotation timing were permitted, provided the specific entry/exit sward height protocols are maintained for both plots.

Findings

- Despite a challenging year in 2025 to complete soil sampling a clear advantage was found in the trial plots
- Soil moisture and total bacteria and fungi numbers were higher in the trial plots
- There was some improved soil structure and rooting deeper in the profile of the trial plots
- The fungi/bacteria ratio was significantly higher in the trial plots by the end of the trial period
- Forage quality was largely consistent, with the trial plots having slightly higher sugars and dry matter and the controls slightly higher ME, D value and crude protein
- Macro and micro mineral levels were higher in the trial plot forage, and antagonistic minerals lower
- Some farms grew more forage under the tall grass grazing regime, whereas others struggled to match the control. Tom Gregory (Home Farm), Dan Gammon (Oak Vale Farms) and Matt Senior (Eastfield Farm) all saw higher forage production whereas Matt Preston (Fortunes Wood Farm) and Steve and Clive (Perridge Farm Partnership) found they grew less grass overall.
- Milk yield appeared to not be affected once the trial farms adapted their approach to improve forage quality not taking the sward into the “browning” stage where grasses were senescing.

Recommendations & next steps

- All farmers are keen to continue to trial the higher swards, whether that be rolling out the system to more of the grazing platform or trying it on different fields, such as on a herbal ley over permanent pasture.

Useful resources

- Webinar: Herbal leys and dairy - [Webinar: Herbal Leys and Dairy](#)
- Webinar: Dan speaking at Groundswell regards resilient grazing systems (2024)

Main report

1 Field lab aims

This field lab will investigate the impact of a longer rest period/taller sward height on soil health characteristics, particularly soil fungi, bacteria as well as other physical and chemical characteristics. The farmers were interested in whether they can implement longer grass resting periods without risking drop in milk quality and yield.

2 Background

There is increasing interest and experimentation in 'tall grass' grazing and extended rest periods in grazing rotations to improve soil health, build soil organic matter and ultimately produce more forage growth.

This trial considers the rest period of the sward (e.g. effect of tall grass) and the incorporation/length of residual, as both of these are thought to have a positive effect on soil health, with soil biology metrics being of greatest interest.

If the farmers in the trials can demonstrate that there is some improvement in soil health characteristics by leaving grass to rest longer in the rotation without any negative impact on forage quality and milk yield, this will enable further practical evidence on how grazing practices can improve soil health and ideally in turn forage productivity and resilience.

'Tall grass' grazing is a type of rotational grazing that involves:

- High stocking densities
- Frequent moving of livestock using electric fencing
- A long rest period, leading to taller grasses with deeper root systems and greater sward resilience. In addition to the longer pre-graze sward height, stock will be removed to leave a greater post-graze residual, adopting the rule to graze one-third, trample one-third and leave one-third of the pasture.

Examples of similar grazing practices include 'mob', 'cell', 'adaptive multi-paddock' and 'regenerative' grazing.

These approaches have had greater uptake by beef and sheep farmers where animals are less sensitive to drops in forage quality. The nutritional content of grasses changes as they become taller (older), due to lignification, with the fibre content increasing but available sugars reducing. Dairy cows require a high calorific demand so there are concerns that more fibrous grass will not have the sugar content required. Additionally, many dairy farmers' leys are dominated by rye grass which has been bred to provide maximum sugar and leaf at a young growth stage. The plants also don't have the rooting depth to provide some of the soil benefits achieved from tall grass grazing.

Due to these factors, dairy farmers have been more cautious to adopt and potentially benefit from these alternative grazing approaches.

It is thought the greater leaf area and therefore increased opportunity for photosynthesis leads to increased root growth and depth; in turn, increased root mass helps feed the soil microbes (e.g. bacteria and fungi) which leads to improved overall soil health.

3 Methodology and data collection

The farmers in this field lab will adopt an approach that works for their system whilst ensuring an extended rest period and comparing the soil response under the trial area to other fields in the “conventional” rotation.

Trials will take place on six farms (reduced to five farms who completed the trial to the end) over three years.

Each farmer will choose a field to split or choose two fields with similar sward types and sward composition. One field or part of field will be the control plot which will be managed as routine within the grazing rotation. On two farms, underperforming fields were specifically chosen to focus on if the “tall grass” grazing approach could accelerate soil health improvement and subsequent forage productivity.

Pasture profile for trial farms:

All five farms who continued through the full three-year trial period were organic certified. On three farms the trial fields were permanent pasture, with a grass and clover dominated sward. On the other two farms the trial fields were diverse herbal leys, more recently reseeded.

The other half of the field will be the treatment plot, and management protocols are as follows:

- Aim to allow pre graze sward growth to reach a height 30 – 50% taller than in control field, with an aim where suitable, of an entry cover c. 4500 kg/DM per ha.
- Apply a 1/3 eaten, 2/3 residual/trampling approach, with stock removed at a minimum 7 cm or 2000 – 2500 kg/DM per ha.
- Apply a stocking rate/land parcel size to meet forage needs of group of cows.
- Treatment and control fields can be split into multiple grazing cells/paddocks depending on size/forage need of the group of stock.
- The control and treatment paddocks can be grazed at different points within the grazing rotation as long as the entry and exit sward height of the control field is in line with the “standard” rotation and the entry and exit approach of the treatment field is in line with above.

Data collection was in June 2022 (Baseline testing), this was a little later than originally planned in the trial protocol which will have impacted associated soil biology and physical outcomes due to low moisture levels. Following the trial period comprehensive data collection was again carried out at the end of three grazing periods year 3 (June 2025) as detailed below. Some additional physical soil observations were completed in 2023 and 2024 by the trial farms and reported as part of field lab meetings. This soil assessment strategy has been put in place to make best use of the budget and in recognition of the slow change in the chemical and biological characteristics of soils.

The Farm Carbon Toolkit will undertake assessments on both the control and treatment fields:

- Soil Organic Matter 0-10cm, 10-30cm, 30-50cm
- VESS Scoring
- Infiltration rate
- Worm count
- Nutrient analysis

- Aggregate Stability
- Bulk density
- Biological activity

For more information about the Farm Carbon Toolkit' soil testing methodology and these tests, visit: farmcarbontoolkit.org.uk/toolkit-page/measuring-soil-health.

Additionally using SoilBioLab, soil bacteria and fungi lab tests will be completed for control and treatment fields. Baseline samples will be completed in June 2022. Final testing was completed in June 2025 to mirror the conditions of baseline sampling.

Following tests:

- Moisture Content
- Active and Total Fungi
- Active and Total Bacteria
- Hyphal Diameter
- Organism Ratios

Forage analysis

To understand the impact of changes in soil health and mineral availability there was the opportunity for farmers to collect their own forage samples to carry out micro mineral forage analysis twice. In the baseline year 1 (2022) (these samples were not collected) and year 2 (2024), with a quadrat being cut pre graze. Standard Forage analysis (NIRS) was completed by Sciantec.



4 Results and discussions

Soil structure – Across all the farms in the trial there was little change in the structure of the top 15cm of soil, using VESS, across the period of the trial as these were all generally good to begin with. There was a slight improvement in the structure of the soil in the 15-30cm range in some fields that were tall -grass grazed, likely due to the observed increased rooting activity at this depth from the taller grass growth.

Aggregate stability – there was no observed improvement in the aggregate stability of the soils, but this was already very good at the start of the trial period.

Earthworms – unfortunately due to the extreme weather conditions at the end of the trial period when the soils were re-sampled it was not possible to gain a representative idea of the effect of the trial on earthworm numbers, we found very few due to the dry soils.

Soil carbon stock – soil carbon stock decreased significantly across the trial period and results were undoubtedly affected by the extreme dry weather experienced in the summer of 2025. Interestingly the drops in soil carbon were less extreme in all of the trial plots that were tall-grass grazed with a 12% lower reduction here. It is assumed this is due to the heat effect of the sun being reduced from the higher covers in these plots, increased rooting from taller grasses and more retained moisture.

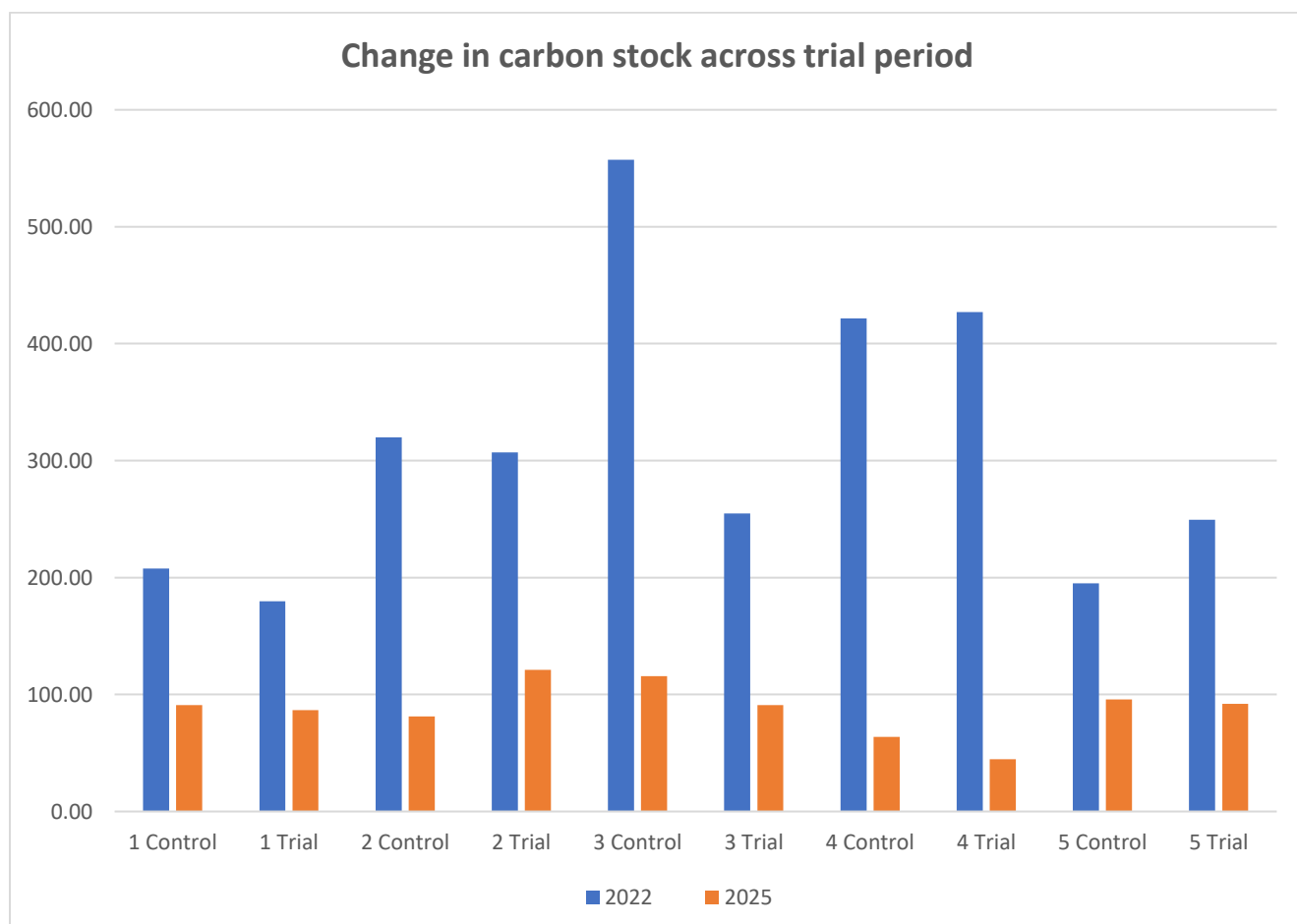


Figure 1: Change in soil carbon stock across the trial period

Soil biological analysis was carried out at Soil Biolab and gave some interesting results. At the end of the trial period the tall-grass grazed plots all had higher moisture levels and active bacteria and fungi levels, with the fungal/bacterial ratio being significantly higher by the end of the trial period on the trial plots as well. All of this goes some way to explaining the apparent improved resilience of the tall-grass grazed areas, particularly the reduced levels of soil organic carbon loss.

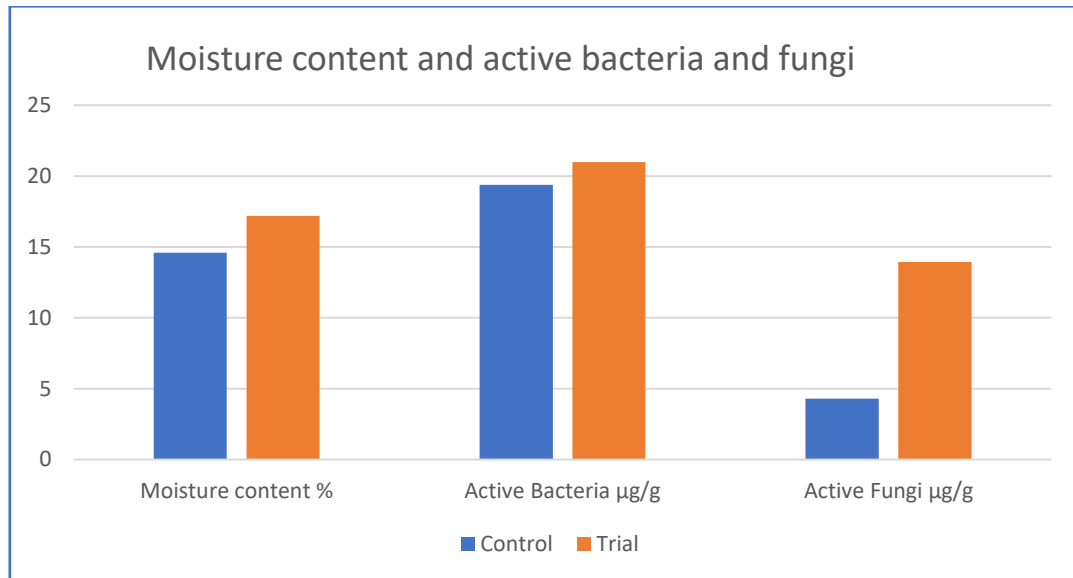


Figure 2: Comparison of moisture content, active bacteria and active fungi levels

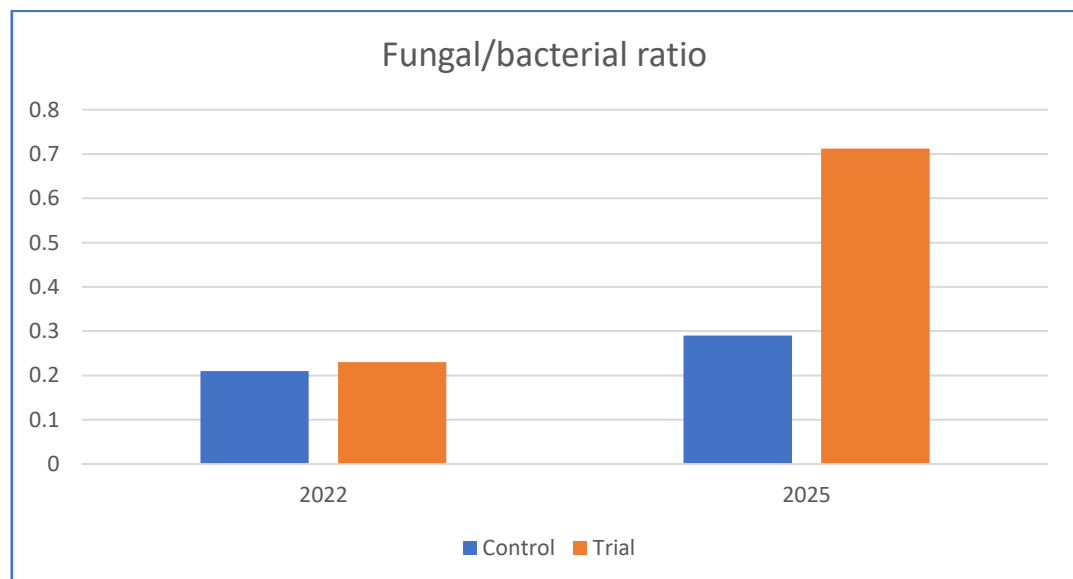


Figure 3: Comparison of fungal to bacterial ratio between 2022 and 2025

Forage analysis for each of the trial and control plots also illustrated some interesting points. There was only a small amount of variation in the levels of forage quality values across the farms, with dry matter and sugar levels marginally higher in the trial plots and D Value, ME and Crude Protein higher in the controls.

Interestingly across all farms the levels of both macro and micronutrients were generally higher in the trial plots compared to the controls. This tallies with the higher fungal levels and deeper rooting,

suggesting the plants are better able to access the nutrients within the soil. Furthermore, levels of antagonistic minerals tended to be lower in the trial plots as well, all of which suggests higher nutritional quality from the trial forages.

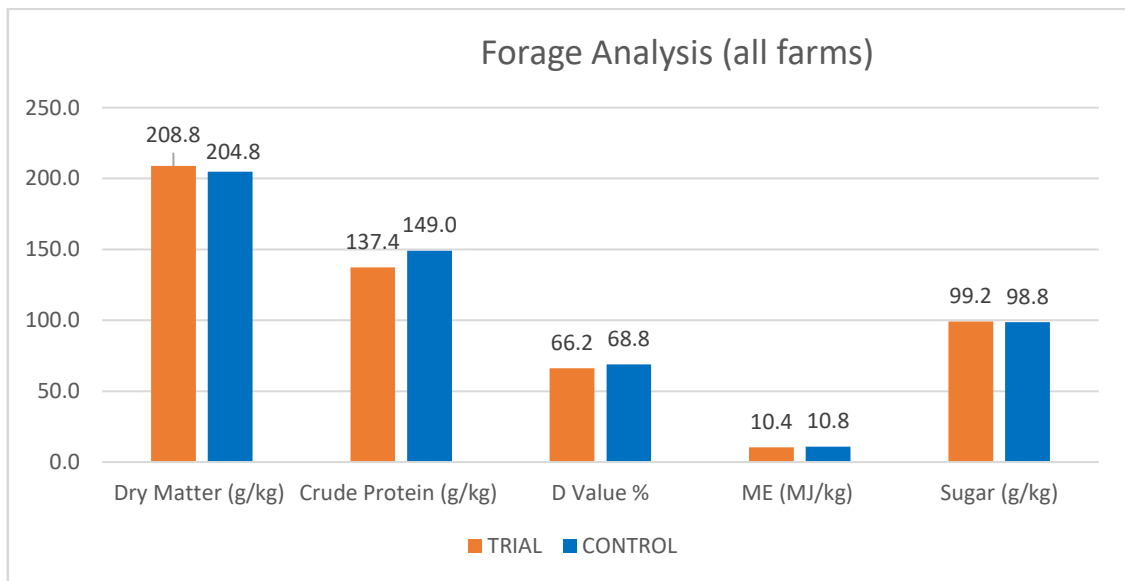


Figure 4: Comparison of forage quality across trial and control plots at the end of the trial

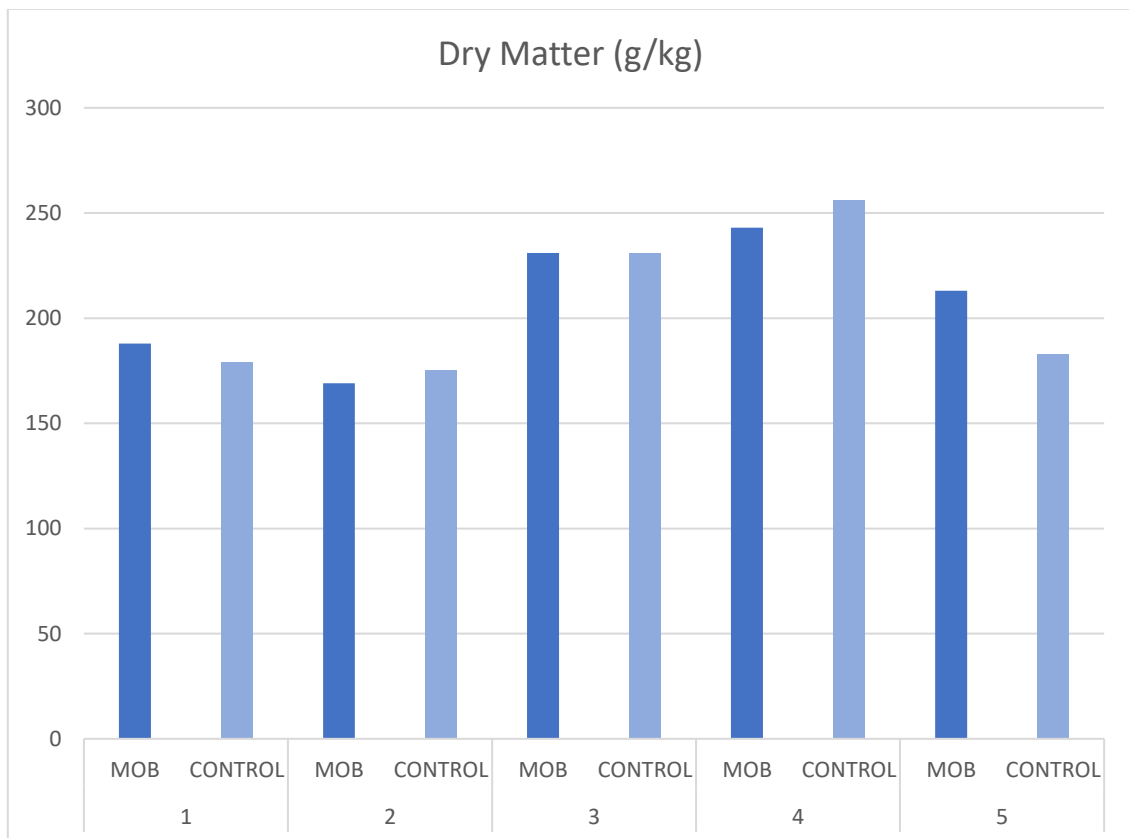


Figure 5: Dry matter content change between trial years

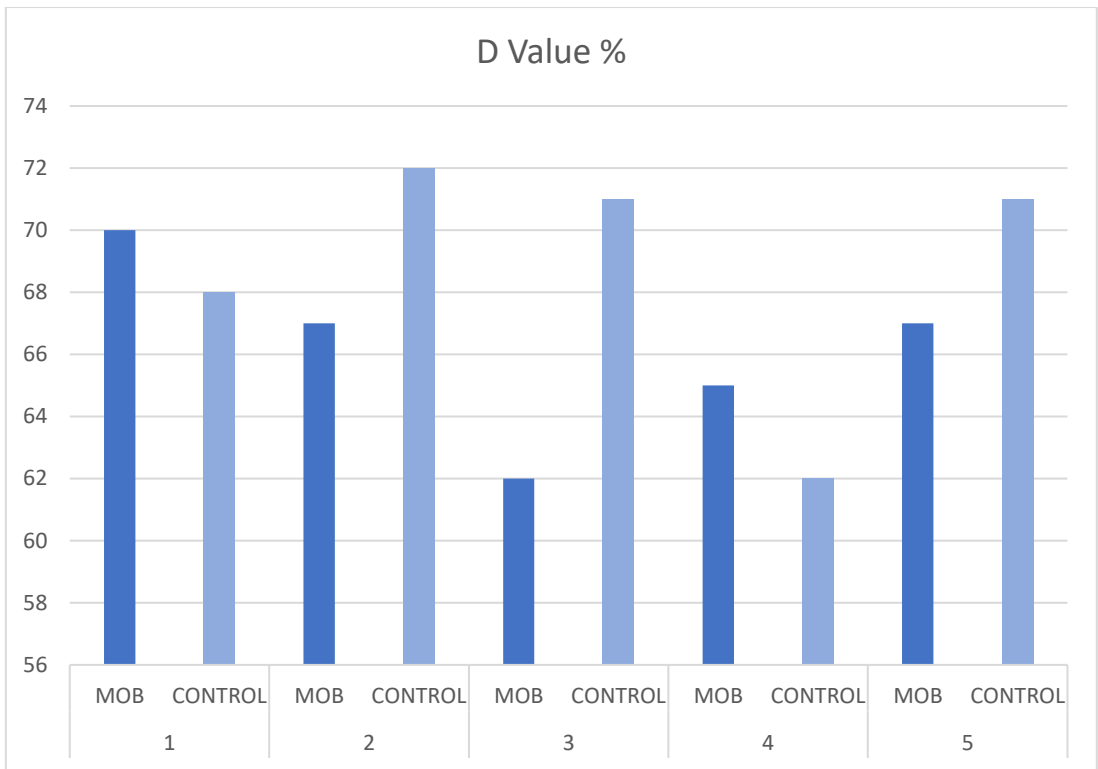


Figure 6: D Value change between trial years

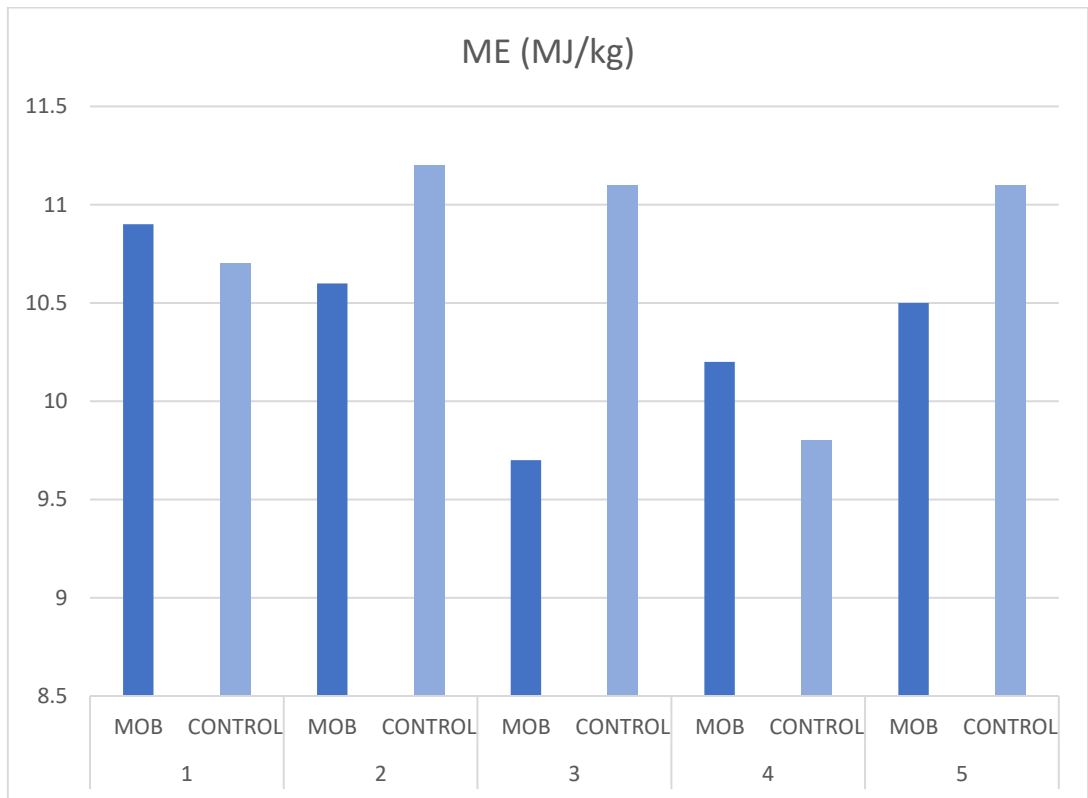


Figure 7: ME change between trial years

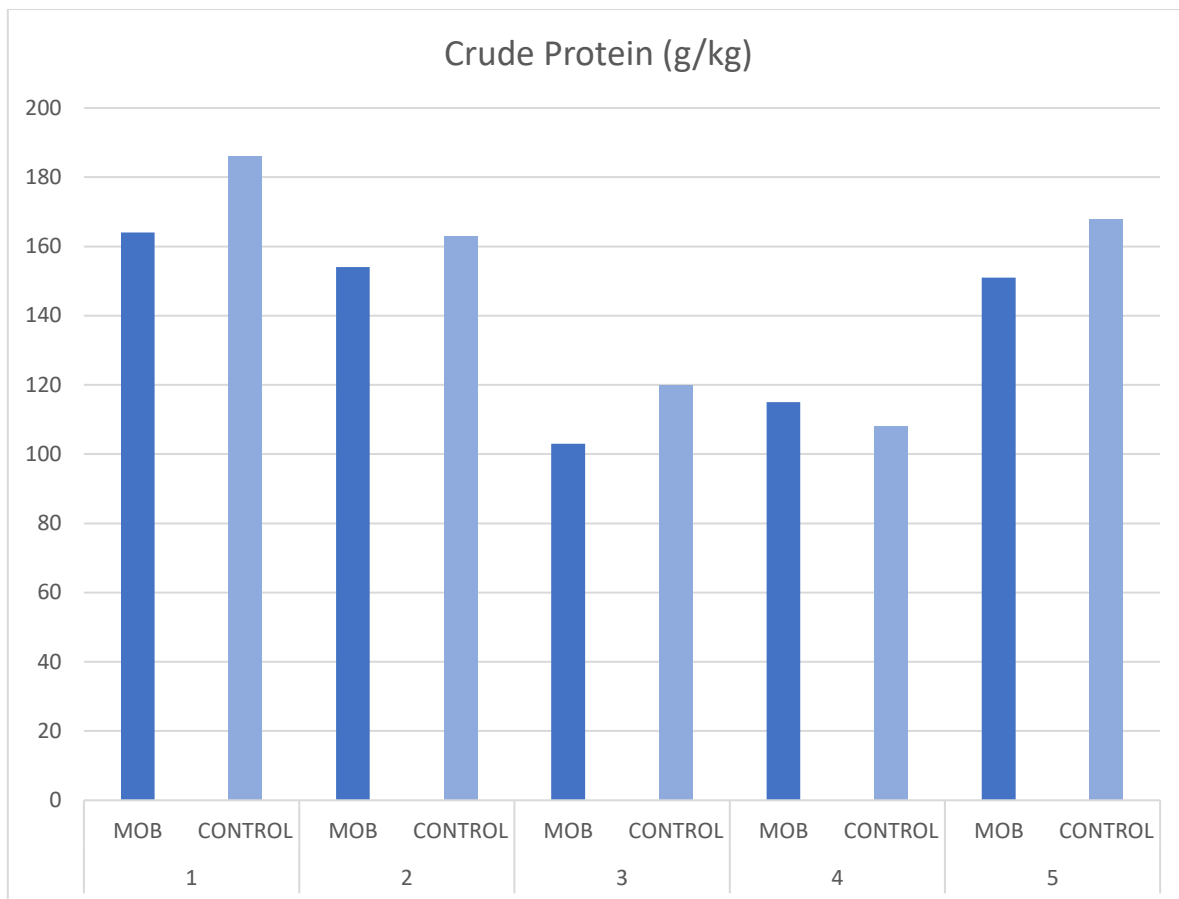


Figure 8: Crude protein change between trial years

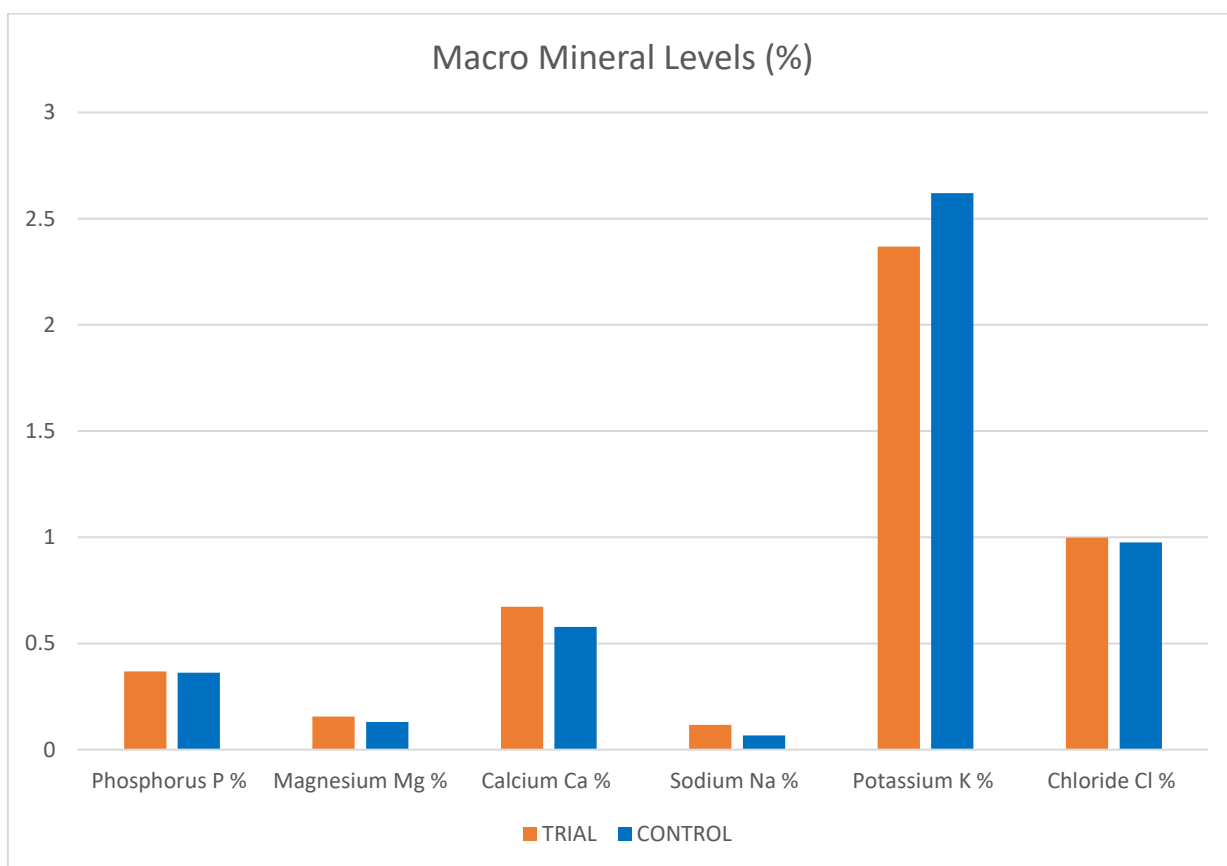


Figure 9: Comparison of macro mineral levels across trial and control plots at the end of the trial

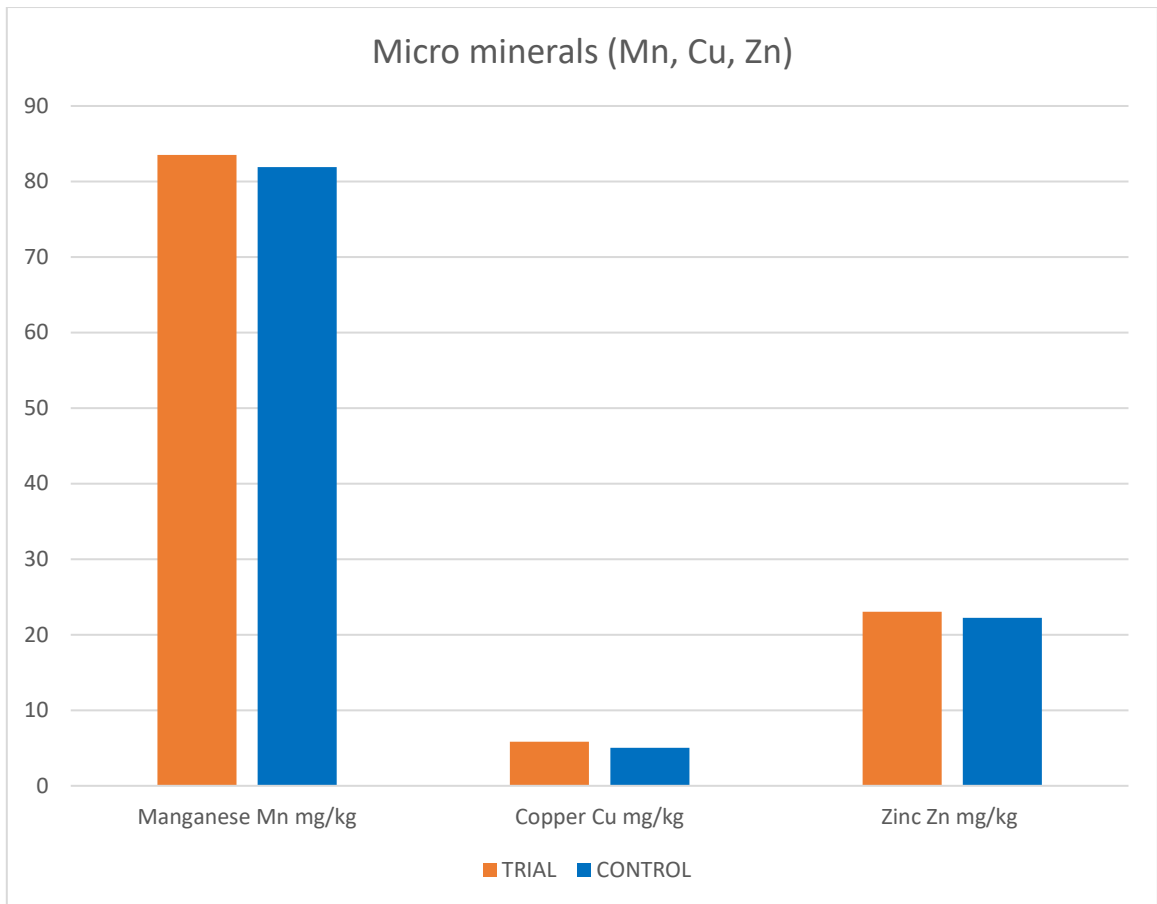


Figure 10: Comparison of micro mineral levels across trial and control plots at the end of the trial

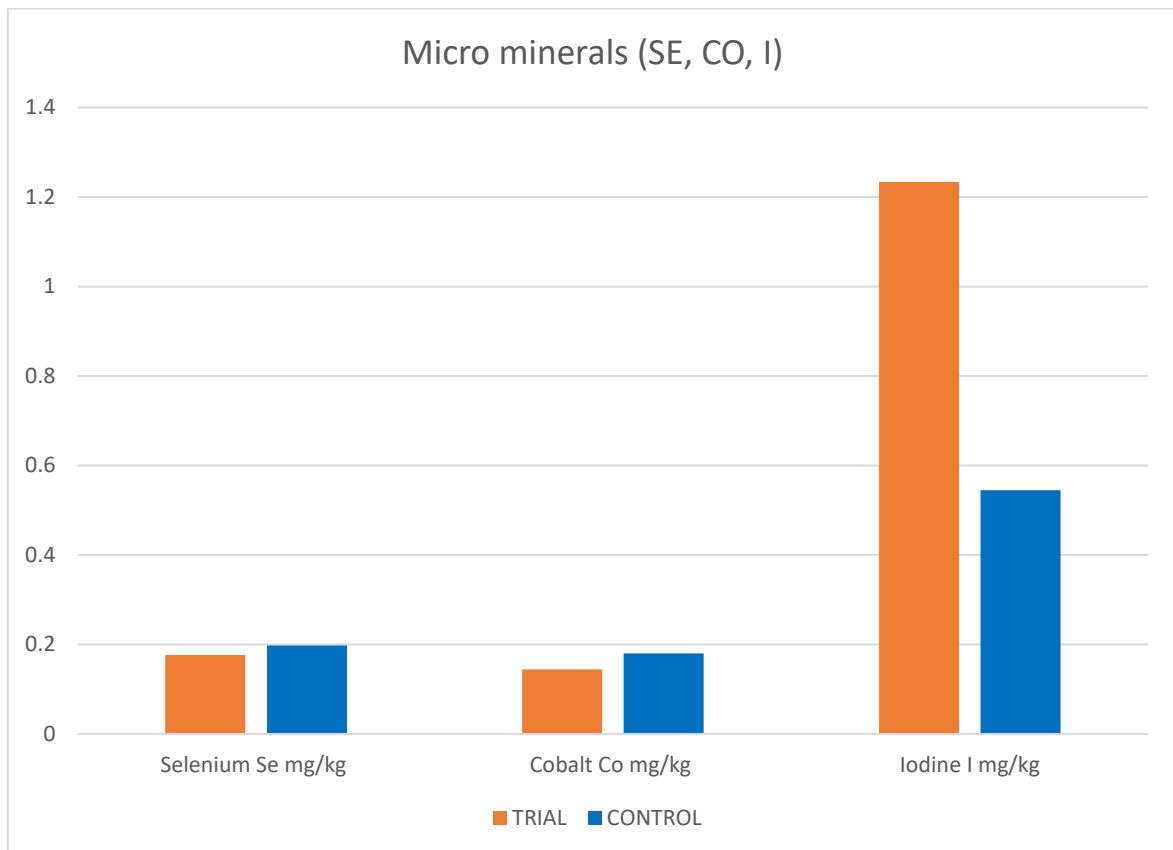


Figure 11: Comparison of micro mineral levels across trial and control plots at the end of the trial

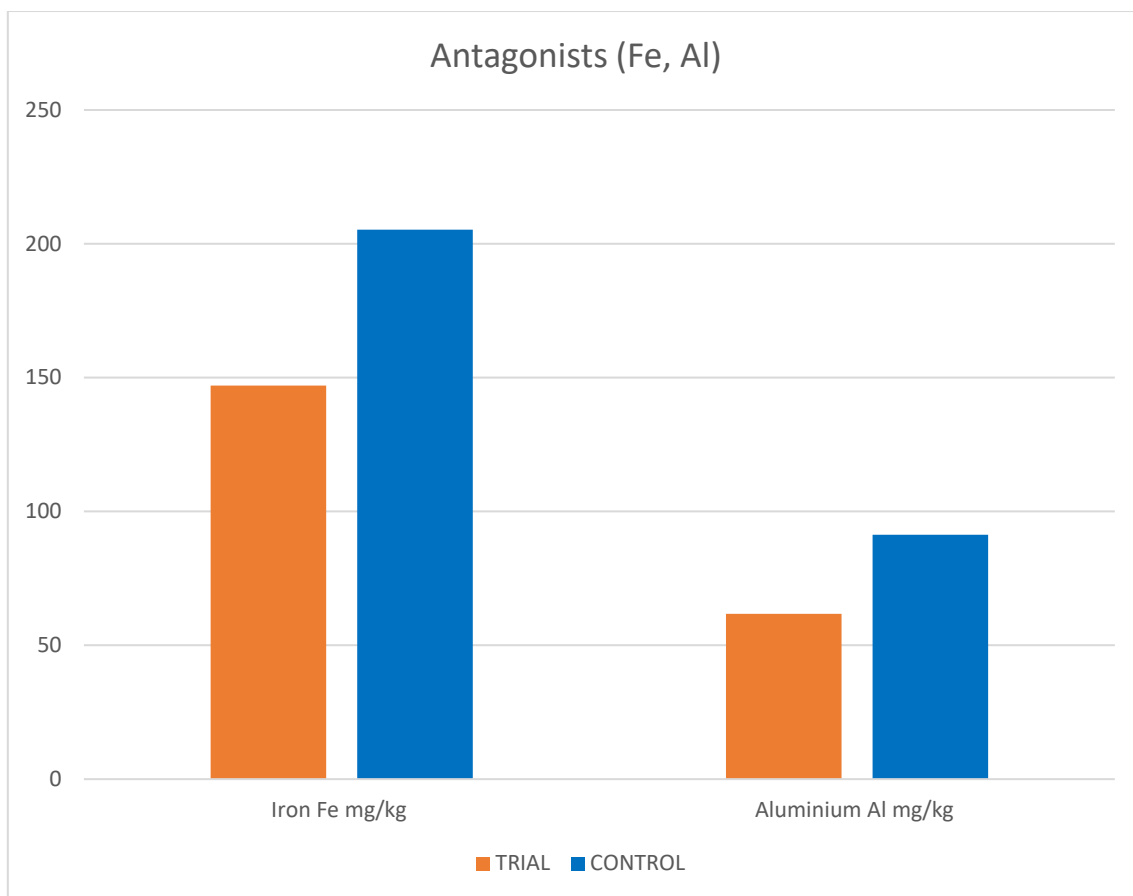


Figure 12: Comparison of antagonist mineral levels across trial and control plots at the end of the trial

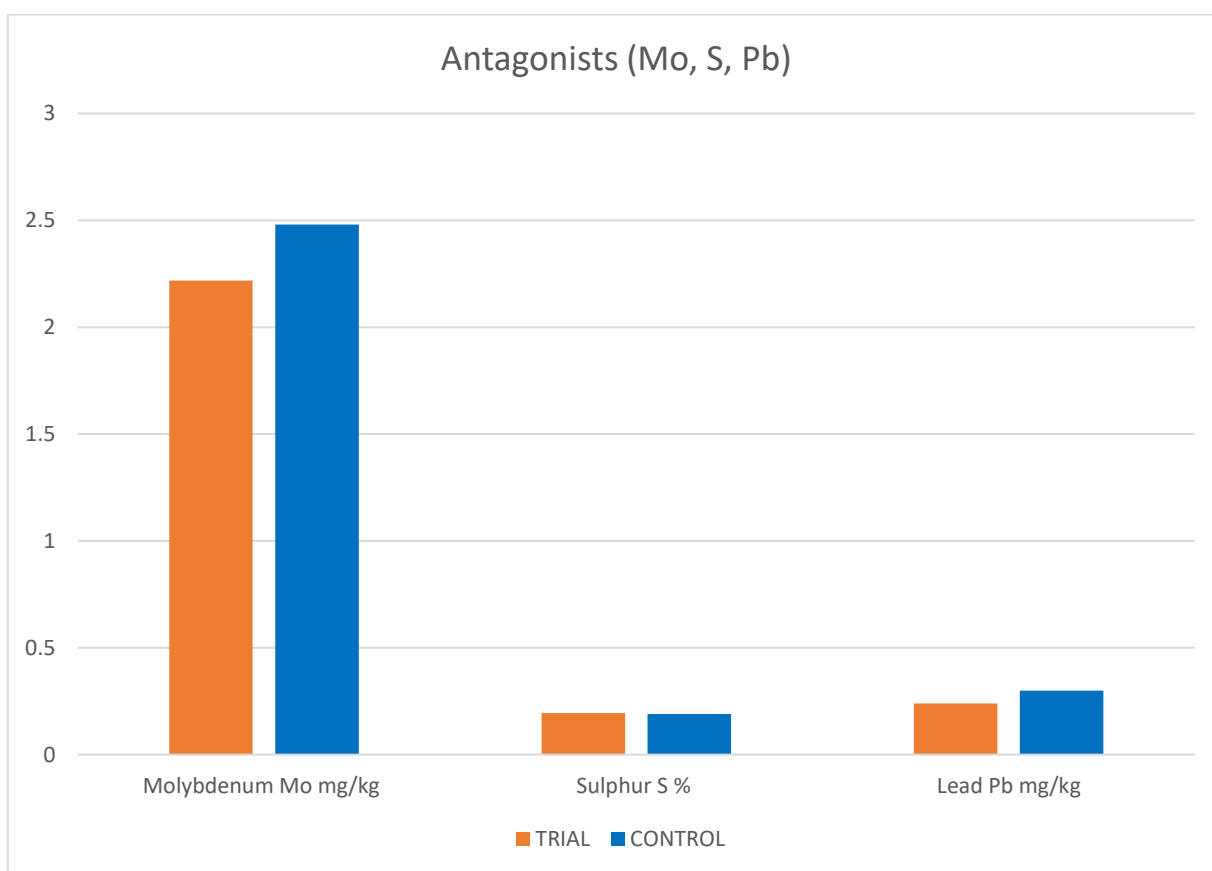


Figure 13: Comparison of antagonist mineral levels across trial and control plots at the end of the trial

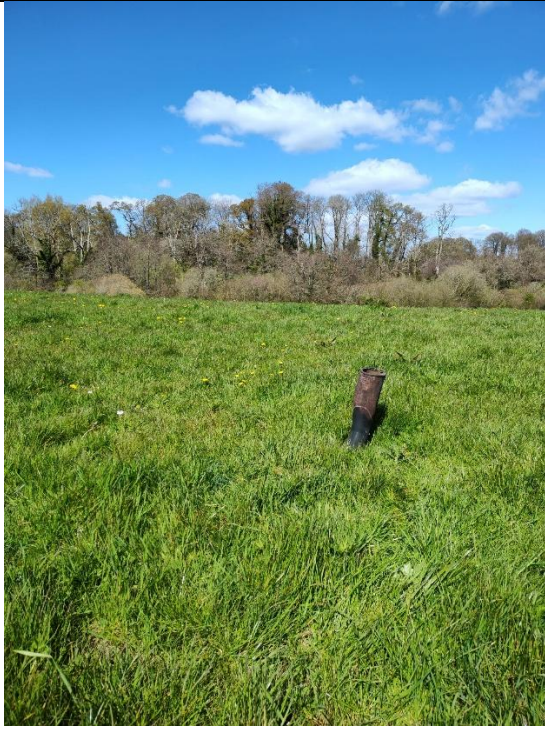
	2023 grazing season		2024 grazing season		2025 grazing season	
	Mob paddock	Control paddock	Mob paddock	Control paddock	Mob paddock	Control paddock
Oakvale Farms			6.1 T DM (until June)	3.1 T DM (until June)	7.5 T DM	6.0 T DM
Fortunes Wood Farm	5.8 T DM	5.8 T DM	8.0 T DM	?	3.0 T DM	4.2 T DM
Eastfield Farm			Similar production – 6 grazings	Similar production – 10 grazings	6.8 T DM – 6 grazings	8.8 T DM – 8 grazings
Home Farm	7.9 T DM	6.8 T DM	6.5 T DM	4.5 T DM	3.5 T DM	2.4 T DM
Perridge Farm Partnership	8.37 T DM – 6 grazings	6.31 T DM – 9 grazings	5.44 T DM – 7 grazings	3.78 T DM – 8 grazings	3.21 T DM – 6 grazings	3.2 T DM – 6 grazing

Figure 9: Comparison of dry matter production between trial and control plots across the period

It is important to note here that sward type did not appear to effect the results. Swards that grew more grass included both recently established herbal leys as well as permanent pasture, and a similar pattern was found in those swards that grew less total grass.



Oakvale Farm (May 24) “Second grazing mob field. Milked into first half of night break. Going to graze day and night to get through it quick 4 moves in 24 hrs. Estimate 4000 pre graze”



Fortunes Wood: 21_04_24 Control



Fortunes Wood: 21_04_24 Mob



Manor Farm Control 21_04_24



Manor Farm Mob 21_04_24

5 Discussion

While the soil, biology and forage testing provides useful information, the experiences of the individual farmers is also important to consider.

Matt Senior of Eastfield Farm found the trial very useful and was able to prove the concept of grazing taller grass covers without losing milk yield and seeing improved rooting and soil structure in the trial paddock. While the trial paddock grew less grass there was the benefit of being able to graze here on wetter days, especially late in the season with youngstock and the sward showed better resilience to climate overall.

Dan Gammon Oak Vale Farms also found the trial plot showed better resilience, and especially in the past year when rainfall has been virtually non-existent for much of the grazing season. Dan grazed higher covers (4-4500 kgDM/ha) but still only took off 1500 kg of dry matter per hectare, leaving higher covers behind which protected the soil and grew grass back quicker than the control. Overall production was up with the trial plot growing 7.5t DM/ha compared to 6.1t from the control and a farm average 6.2t DM/ha. Again milk production was not affected but Dan wonders how performance in both milk and grass production would be affected should the trial be extended across a greater area.



Matt Preston of Fortunes Wood Farm again did not see an impact on milk yield but the trial plot grew less grass than the control and Matt feels in hindsight he should have probably chosen different fields to use in the trial where production potential might have been greater.

Steve and Clive of Perridge Farm Partnership also had their struggles in regards to grass growth across both trial and control plots and although they didn't see a drop in milk yield they feel this would have been largely down to the amount of supplementary feeding they had to do in tricky grass growth years. They did observe improved soil conditions in the trial plot with much better penetrometer readings here.

Tom Gregory of Home farm feels he has answered the main question of the trial for him, that being whether you can improve degraded pasture through the use of mob grazing on taller grass covers. The improved soil conditions on the farm prove the concept and the mob grazed trial plot grew 14% more grass than the control plot and 15% more grass than the average across the whole platform.

5 Conclusions

While the final data, for both soil and forage, was affected by the extreme heat and dry of the 2025 summer there were some clear benefits demonstrated from the tall-grass grazing approach. Improved soil structure deeper in the soil structure and the fact the soil held more moisture for longer demonstrate an increased resilience. The greatly increased fungal/bacterial ratio were another benefit of this grazing approach and in itself likely had a benefit, perhaps demonstrated by the greater mineral levels in the forage, which would also have been contributed to by the greater rooting of the higher grass covers.

There was a range of results in terms of total amount of forage growth across the farms, but the general conclusion is that milk production was not affected, although separating the grazing method from supplementary feeding makes it hard to definitively answer this question. Several of the farms grew a good bit more grass whereas others grew less and again further work would be needed to separate out this from challenging seasons and the grazing method itself.



6 Next steps

There is an appetite across the group of farms to continue the trial by keeping both the same trial and control fields as well as potentially expanding the area in tall grass grazing on some farms and adding other fields that may suit the system better on others. It would be valuable to do further soil and forage testing across a further 3 year period as well, in order to see if the current positive trends in soil health continue and to understand the potential impact of this method in an ideal growing year, should such a thing ever occur.

8 Further reading

Useful resources

- Webinar: Herbal leys and dairy - [Webinar: Herbal Leys and Dairy](#)
- Webinar: Dan speaking at Groundswell regards resilient grazing systems (2024)

9 Appendix

