December Cluster Meeting

12.12.25


Gypsum Trial

Background to the trial

Launched in autumn 2020, this multi-year project aims to **monitor and improve nutrient use efficiency**, and ultimately improve water quality in the River Waveney and Broadland catchments.

In 2025, 10 farms trialing **application of liquid gypsum** with an ambition to increase the retention of nutrients in the soil, reducing leaching into nearby watercourses.

Fertiliser use efficiency was calculated using fertiliser application records and grain protein analysis.

Soil indicators were baselined in autumn 2024 and this testing was repeated in autumn 2025 to enable us to build a ‘before and after’ picture of the impacts on soil of applying liquid Gypsum.

Water quality testing, undertaken overwinter to assess leaching of nitrates and phosphates from the land drains,

Funding and Budgets

FUNDING SOURCES

- Self-funding £150 / farm / year £3,000
- Essex and Suffolk Water £500
- Farming in Protected Landscapes £2,233
- Soil Association – Innovative Farmers £13,750
- Carlsberg, WWF funding through Norfolk Rivers Trust £4,600
- Crisp Maltings - £500

ANTICIPATED COSTS

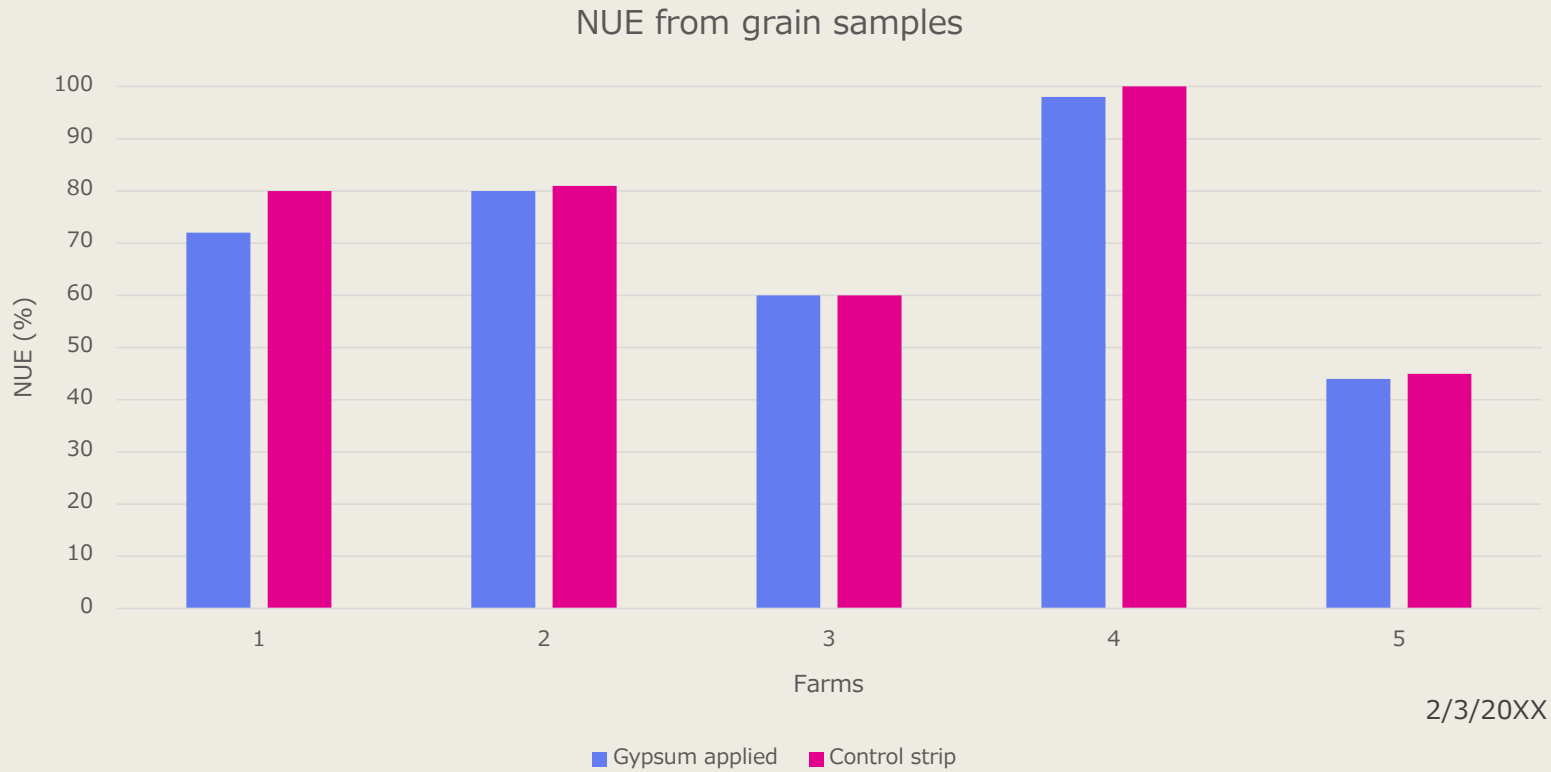
- Gypsum costs - £4,500
- Monitoring and testing costs £9,500
- Project management costs – £9,000
- Event costs – £500

Progress so far

- All gypsum applications have been undertaken – Spring and Autumn.
- Those fields that harvested grains this summer / autumn were tested to determine the **Fertiliser Use Efficiency** of these fields.
- Farm Carbon Toolkit undertook baseline **soil testing** in the Spring and soils have been retested over the autumn
- **Water testing** was undertaken for nitrate and phosphate content from field drains last Jan, Feb and March and is due to be recorded again in 2026.
- The project runs until autumn 2026. We’re hoping to undertake a workshop for participants next summer to ‘deep dive’ into the results, with a potential event in the Autumn to share successes, if appropriate.

NUE from grain samples

Grain samples were tested for Nitrogen uptake to calculate the NUE. Results showed **no increase in Nitrogen Use Efficiency in the grain samples where gypsum was applied** compared to the uptake in the grain in the control strips.



Farm Carbon Toolkit

Soil Health Monitoring

Gypsum trial soil results

Becky Willson

December 2025

Trial protocol – What we did

Soil analysis and data

For each field that was being assessed, soil observations were taken across the main trial area and a control.

Within each area (trial and control) 5 replicate samples were collected.

Data was collected for:

- Soil structure (at two depths)
- Aggregate stability
- Worm counts
- Infiltration rate

Data was collected ahead of the trial starting (November 2024) and then repeated in November 2025

Sampling

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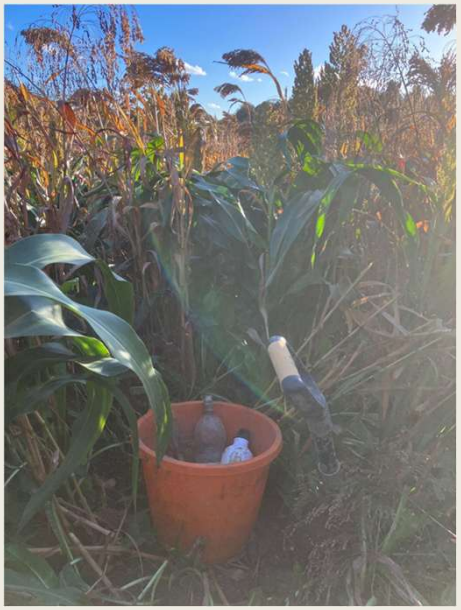
Sampling in November 2025



Predicted impacts of Gypsum on soil health

Soil structure

Gypsum works to improve soil health through flocculation and stabilisation of clay particles.

It should lead to:

- Enhanced soil aggregation (tested using the ag stability method)
- Improved infiltration and drainage (testing using the infiltration test)
- Reduction of compaction (tested using VESS)
- A positive impact on soil biology through better aeration and water balance alongside healthier soil which makes a better place for earthworms to live!

Results

Soil Structure: VESS

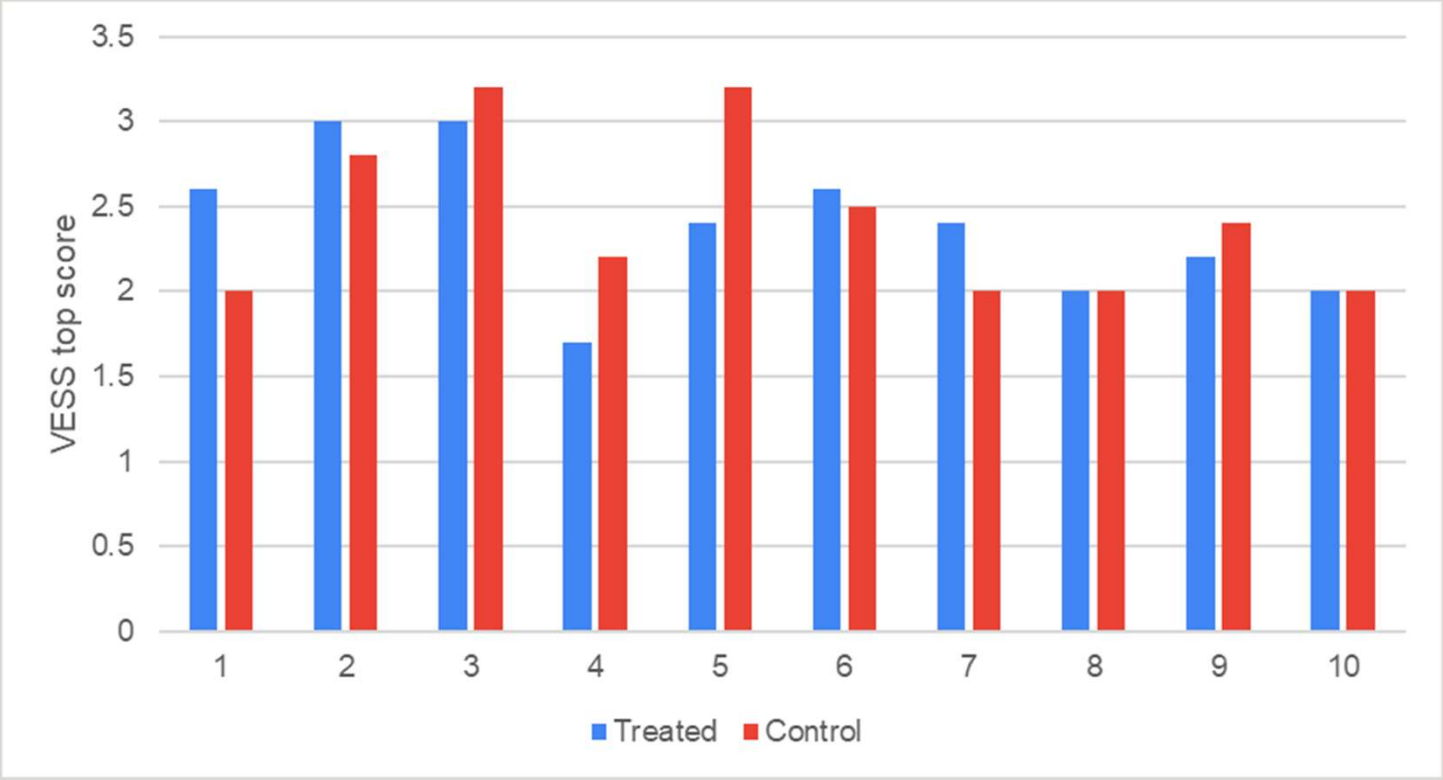
Why is soil structure important?

Foundation of EVERYTHING!

VESS test methodology:

- Extract block of soil 30x30x30
- Assess soil structure by assessing root activity, crumbliness of soil and how easily it breaks apart, smell, colour and texture.
- Soils are assessed using the VESS methodology at the surface (top 10cm) and then lower down soil profile - 15-30cm.
- Soils are then scored between 1-5 where **1: crumbly well aggregated soil** that is in excellent condition, and **5: significantly compacted** preventing crop performance and soil function.

VESS Top scores from yr 2 data

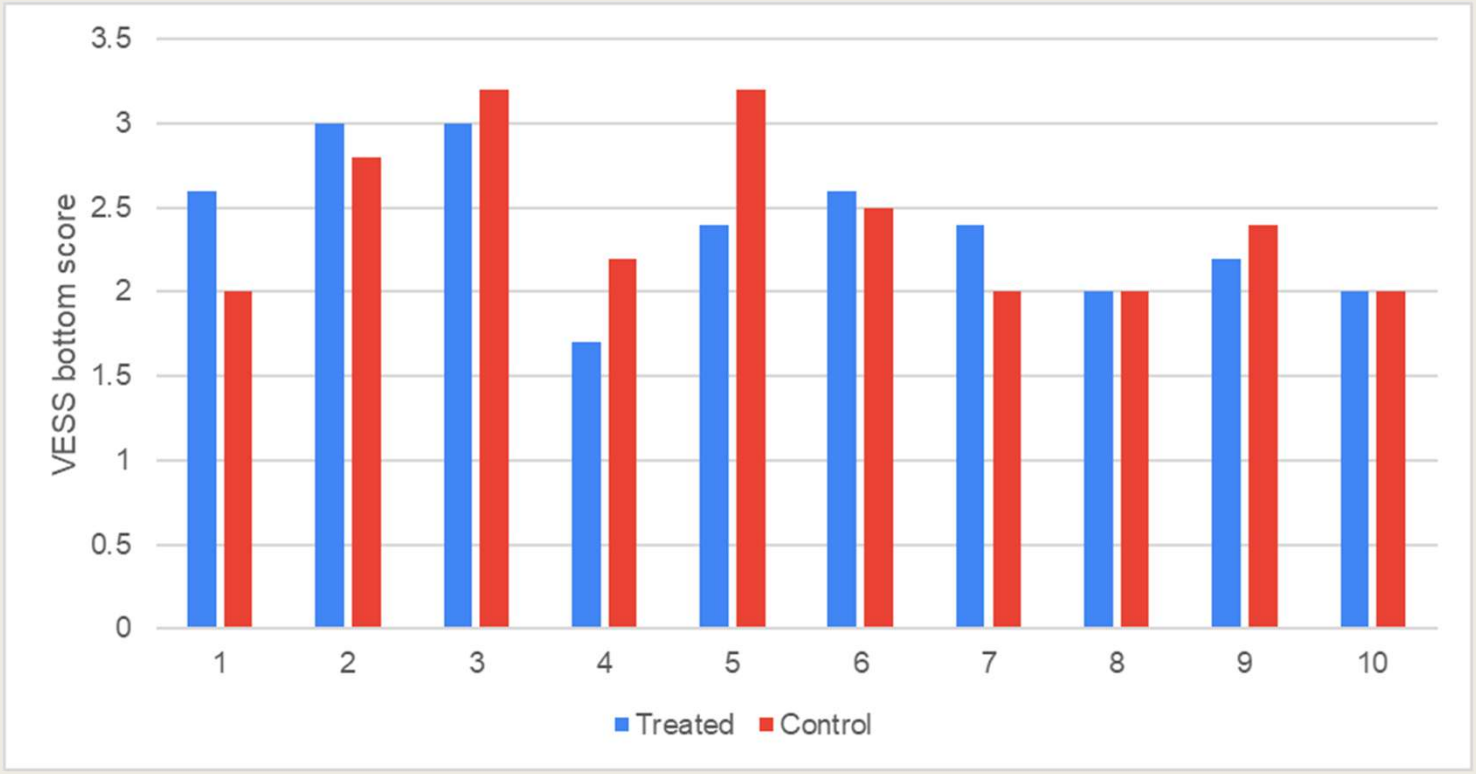


VESS top (0-10cm)

What do the stats say?

No significant difference between treated and untreated with gypsum on VESS top score.

VESS bottom year 2 score data

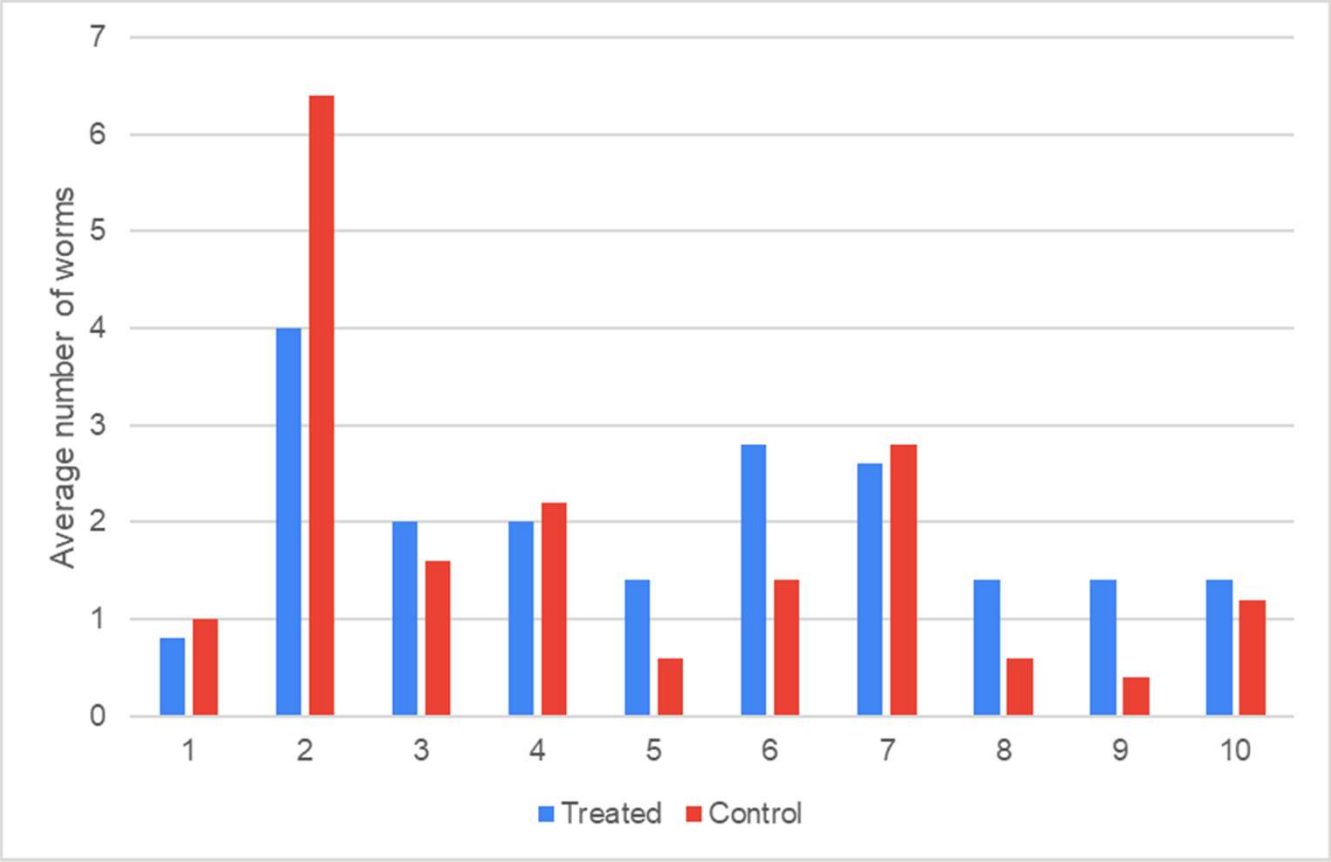


VESS bottom (15-30cm)

What do the stats say?

There is a significant difference in the VESS score between the gypsum and the control plots with the gypsum plots having a lower VESS (better structure) than control.

Worms

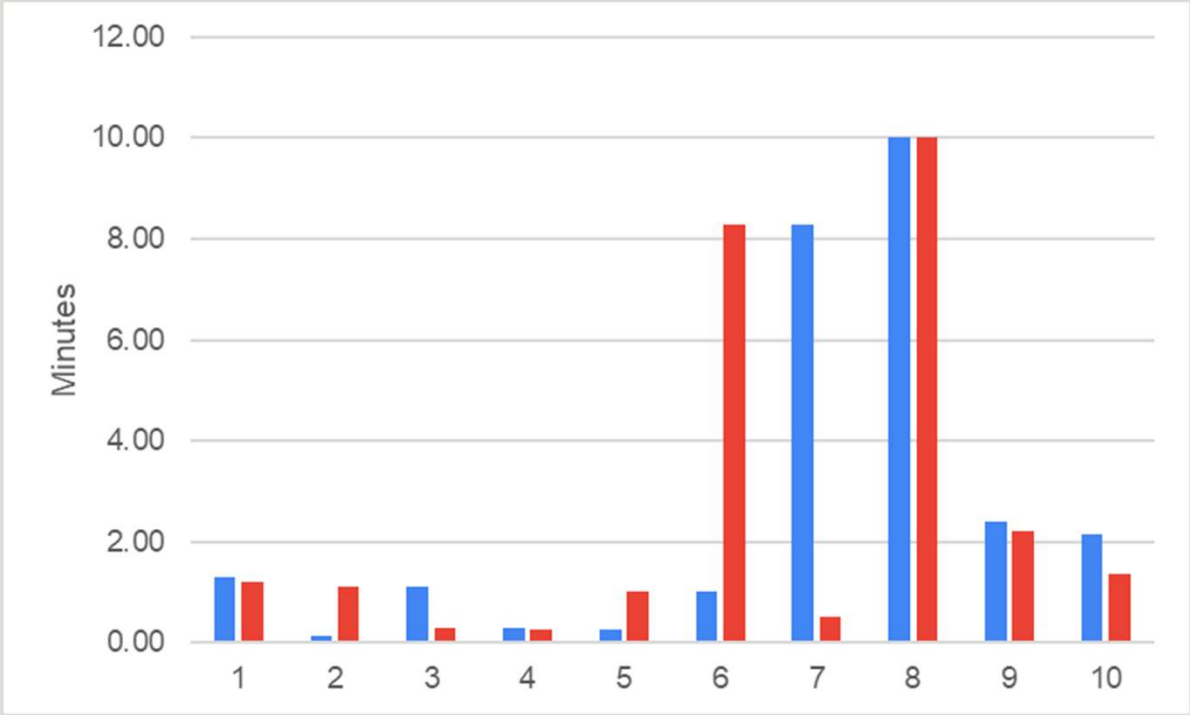


Counted from each soil observational pit across treated and control.

No significant difference between treated and untreated areas.

Low number of earthworms generally but could be season, time of year.

Infiltration



Infiltration ring is hammered into the soil and a set volume of water is poured in. The time taken for the water to infiltrate is measured. If the water is still there after 10 minutes, the trial is stopped.

What do the stats say? No significant difference between gypsum and control.

Why: Weather also plays a large role in infiltration

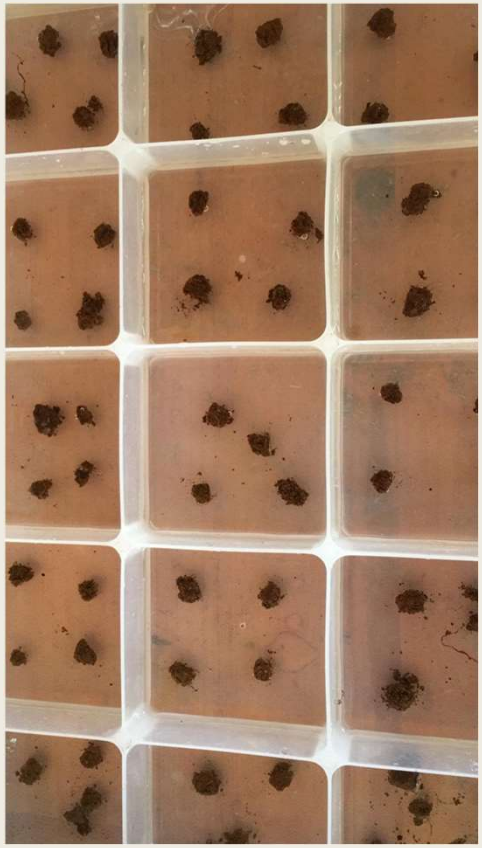
Aggregate stability – Slake Test

Aggregate stability or the slake test is a useful test to assess soil structure and the ability of the soil to hold together protecting the soil particles, carbon and nutrients that bind to soil (for example phosphorus). A sample of soil is collected from each observation pit, dried and then submerged in water. Aggregates are scored after 5 minutes and then after 2 hours.

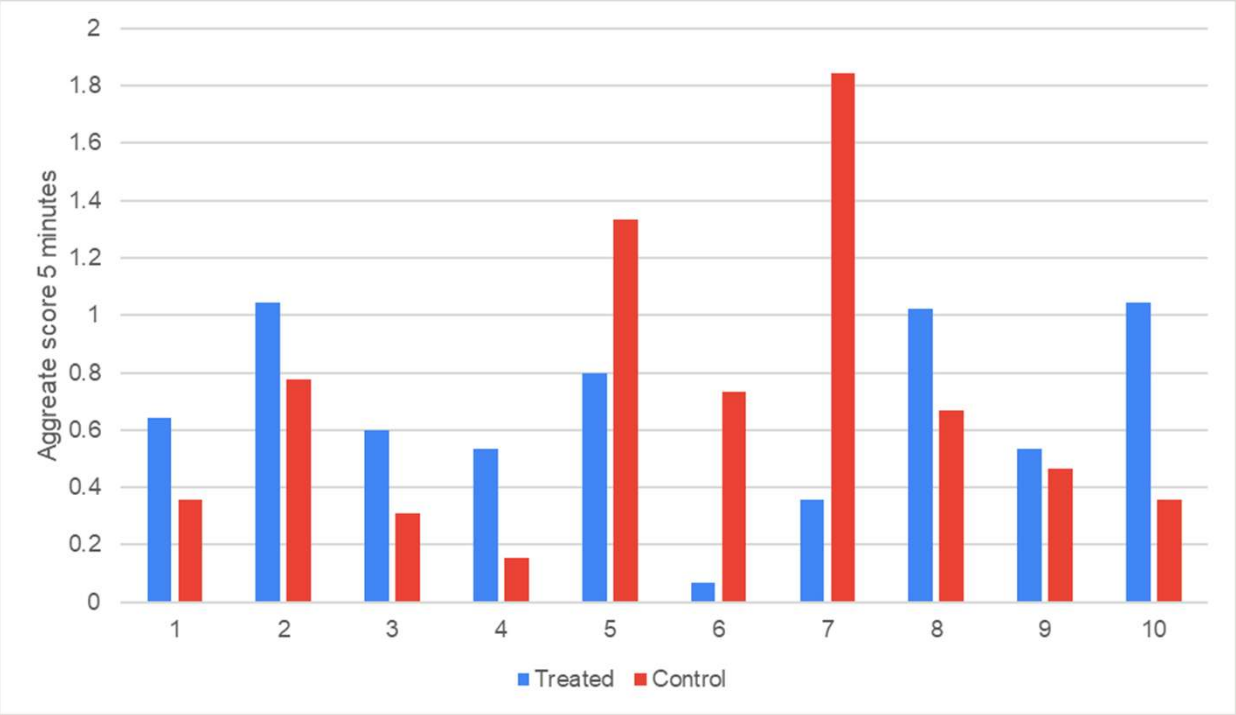
Scores:

0: the aggregate remains intact (showing good aggregation)

4: the aggregate is completely broken down (showing bad aggregation).



Ag stability after 5 minutes

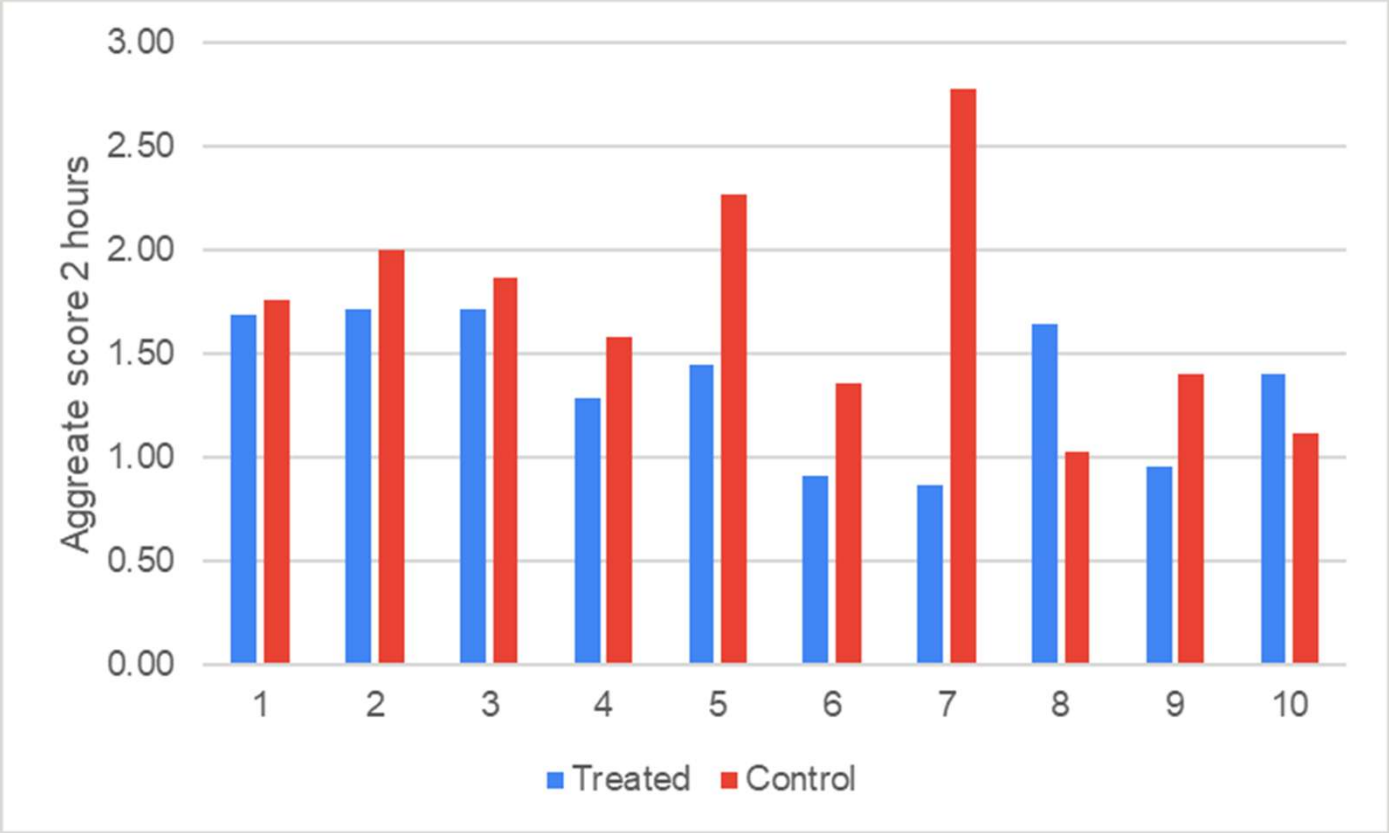


Remember: A lower score is better here!

What do the stats say?

No significant difference across the farm cohort between treated and untreated gypsum

Ag stability after 2 hours



A lower score is better.

What do the stats say?

There is a significant difference between ag scores at 2 hours between gypsum and control. Showing that the gypsum fields have better aggregation.

So what?

Analysis suggests differences in soil health parameters from applying gypsum in soil structure between 15-30 cm and soil aggregation over the longer term.

Important to also include any impact on crop performance.

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Thank you for listening!

www.farmcarbontoolkit.org.uk