

Brigg Monitor Farm meeting report

Soil Health – Organic matter management

Speakers: Anne Bhogal (ADAS); Ben Treadgold, (Agronomist, monitor farm steering group)
Date: 24 January 2019
Venue: Hibaldstow Village Hall



For more information, visit: cereals.ahdb.org.uk/brigg

Meeting summary

Key points

- Soils with high soil organic matter are easier to work, more resilient and perform better
- Grass/clover leys, livestock manure and compost are all good for increasing soil organic matter over time
- The quality of the organic matter you are adding is more important than quantity

Monitor Farm update

Colin Chappell

Drill demonstration (seen at November meeting)

- Drilled with one pass, not rolled
- No visual difference in black-grass
- Not a great drill but good at cultivating

Assessment of soil samples

Ben Treadgold

- Assessment of soil samples taken with soil auger which goes well down into the soil profile
- This soil “Isn’t great below 30 cm”
- Importance of pH – effect on trace element availability

- Organic matter content is good and not an issue here

Sample (1)

- Acidic and blocky
- Needs a tine down to 30 cm
- A lot of iron at 35 cm indicating the soil here has been wet for some time
- Probably caused by cultivating over time and/or compaction – the plough pan is stopping free drainage and entry of air
- Best time to look is Autumn/Winter

Soil health – organic matter management

Anne Bhogal

Soil health

- Now focuses more on biology
- Properties of soil:
 - Inherent – those features you can't change
 - Dynamic – can be manipulated

What is organic matter?

- Comes from a living thing and contains carbon
- Fuel for the soil
- Holds on to nutrient ions
- It is very difficult to quantify

Organic matter and soil management

- Most soil management is about enhancing soil organic matter (SOM)
- SOM drives nutrient cycling and how soils aggregate (stick together) through roots, chemicals they produce and release etc.
- It increases water availability in the topsoil
- Soils with high SOM are easier to work, more resilient and perform better

Is there a critical level of soil organic matter?

- It depends on clay content and where you are in the country
- You can say what is typical for your soil
- In soils with more clay you would expect higher SOM levels
- Research is underway to develop a traffic light system to tell you if you need to increase SOM

Visual soil assessment

- Drop it three times then examine
- Get a lab test done every four years

Maintaining and increasing SOM

- Cultivation aerates the soil and leads to loss of SOM through oxidation
- Increasing SOM is a very slow process
- Also it is difficult to measure the impacts of management

How to increase SOM

- Long term field trials comparing different sources of organic matter indicate the beneficial effect of:
 - Grass/clover ley: results in a large increase in SOM and has other benefits, e.g. as a break crop
 - Cattle manure – compared with other manures gives the biggest return of SOM to the soil
 - Compost – long term application produces a large effect
 - Livestock – manure from grazing animals returned directly to soil
- For quantifiable effects on SOM it might take at least three years

Organic matter and worms

- Green compost contains a lot of lignin which is hard to break down so the material stays around for longer
- Chopped straw has a high carbon content – a lot of energy is needed to break it down and it takes a long time to increase SOM through straw incorporation
- Worms like physical material so if you add straw you get more worms
- Grazing sheep on stubble turnips also leads to more worms

Quality vs. quantity

- The quality of organic matter added is more important than the quantity
- The lower the bulk density (measure of compaction) the better – bulky organic materials are best
- Unlike compost (high lignin) FYM is rapidly decomposed and does not remain in the soil for long so frequent applications are needed but it supports higher biomass and has greater impact on soil physical functioning
- Compost is resistant to degradation in the soil so it has lower turnover rates, higher retention and a larger impact on bulk SOM – it improves biological and physical functioning of the soil but less than FYM
- FYM decreases it the most
- Biological activity is better in FYM than in compost
- Putting material through an animal first is a good idea because it starts the breakdown process

Cover crops

- Trials show limited evidence of a benefit to SOM although this could be because the soils already contained a lot
- In the Maxi Cover Crop trial the only effect was when Phacelia was used

Reduced tillage

- The effect on C was quite small – in zero till it is in the top 5-10 cm whereas in plough based it is spread through the profile
- Zero tillage gives a better structure at the top
- This means a difference would not be seen unless you only sampled the top

Find out more – Links to AHDB information sheets or research

[How to count earthworms](#)

[Soil assessment methods](#)

[Measuring and managing soil organic matter](#)

[Biological testing for soil health](#)

[Testing soil health](#)

[Opportunities for cover crops in conventional arable rotations](#)

[Maxi cover crop research project](#)

[Machinery cost calculator](#)

For more information or to find out more about Farmbench, AHDB's benchmarking tool,

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