Brigg Monitor Farm meeting report

Cover crops
Speaker: Phil Jarvis
Date: 15 November 2018
Venue: Gander Farm, Hibaldstow

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

Colin Chappell, Monitor Farmer

Meeting summary – key messages

- Cover crops can be grown to improve soil structure and resilience
- Different cover crops have different effects on soil structure and you can combine these effects in mixes
- Cut costs where possible by reducing seed rates
- Do your research before growing – while some cover crops can benefit the following crop some can have the opposite effect
- Look at the whole rotation – be careful not to remove beneficial effects by making mistakes further down the line

Update on Brigg Monitor Farm

Harvest

- Very difficult year
- Overall yields below average

Example of pea plant – dying off early due to dry conditions

Principles of cover cropping

Conservation agriculture – principles:

- Reduced tillage
- Wide rotation
- Continuous soil cover

Regenerative agriculture

This builds on the same three themes of conservation agriculture with the addition of livestock and a system shift (organic fusion) with the aim of building soil resilience

What is cover cropping?

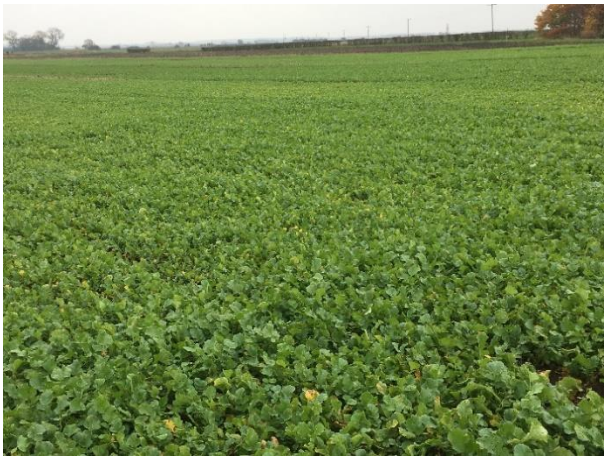
- Crops provide cover and do work below ground to improve soil
- They can be “catch” crops – i.e. grown after one crop and before the next one
- Cover crops can be volunteers – these are fine as long as we can get rid of them
- Can be a home for bees
- Reduce erosion

Companion crops

- Can be a good option but you have to be careful with timing
- Example: burseem clover grown with oilseed rape – slugs prefer to eat burseem clover

Integrated systems

- It might not be possible to make cover crops work alone to improve soils
- Solutions include bringing in livestock, mulching, green manures
- You could include grass in the rotation



Oilseed rape cover crop at Brigg Monitor Farm

Why grow cover crops?

- The aim is to build resistance in the rotation
- Increase the diversity of the rotation
- Improve soil structure
- Increase organic matter
- Improve the C:N ratio (some products have a high C:N ratio so it takes a long time for nutrients to become available)
- Lock up nutrients for the following crop
- Reduce erosion
- Availability of grazing for livestock
- Allelopathy and biofumigant effects, e.g. oil radish can help to control nematodes
- Can be used as part of a control strategy for blackgrass if you drop spring crops and grow cover crops instead
- A mustard cover crop can be used to take cabbage stem flea beetle away from oilseed rape

Choosing cover crops – Points to consider

- Some cover crops can have a negative effect on following crops through allelopathy so you might need to kill them off early
- Think about growth height and rooting depth (e.g. Cotswold Seeds' chart)
- In a cover crop mix grown at Loddington, slugs ate the oil radish but left the phacelia which is quite resilient
- Should you buy separate cover crop seed, or mixes, or make your own mixes?
- You can reduce costs further if you halve the sowing rate

Measuring effects on soil structure

- Use a spade
- Soil structures can be compared using VESS scores
- Soil texture and organic matter content – it is very difficult to increase organic matter on sandy soils; the more organic matter is produced the more microbes come along and eat, so it tends to increase in steps

Nitrogen and nutrient lock-up

- Much more N is retained in a cover crop system
- It stops the N going somewhere else, e.g. into the water supply
- You need to think about what the Government is measuring – air, water, wildlife

How to quantify cover crop effects

- You need a system that works for you
- Quiz seed breeders about effects

Costs, yields and margins

- Some mixes are expensive and you might not necessarily see a yield response but there are other advantages

- Often there is not much margin
- Ideally you should try to combine cultivation with another operation
- Example of a cheap cover crop mix – mustard and buckwheat. It doesn't need to be destroyed

Earthworm numbers

- In trials these were compared for 3 systems: min till, light till and ploughing
- Worm counts were done in November
- Results showed no difference in worm numbers between light and min till but they were lower with ploughing in all 5 fields
- Conclusions – worms thrive as long as you are not munching them up with cultivations
- Worm numbers also vary with type of cover crop

Cover crop management

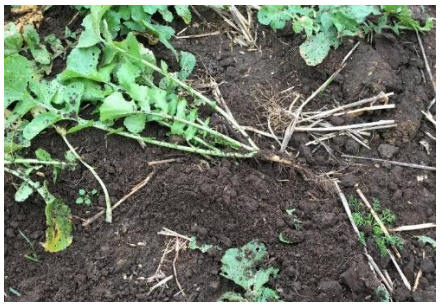
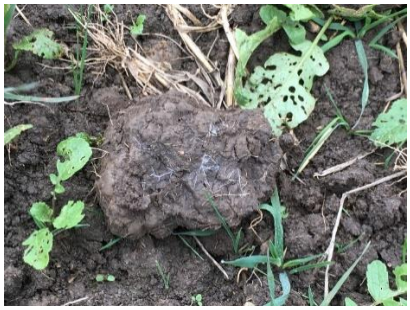
- More challenging in heavier soils
- You can sow directly into a standing crop on sandy soils
- Sow as soon as you can
- Later sowings result in decreased biomass
- Reduced tillage and lighter machinery reduce the depth of soil compaction
- Drill with tines or discs

Cover crops at Brigg Monitor Farm

- Five mixes drilled in early September
- This section outlines the soil structures compared simply by digging spade holes and a few of the additional points discussed

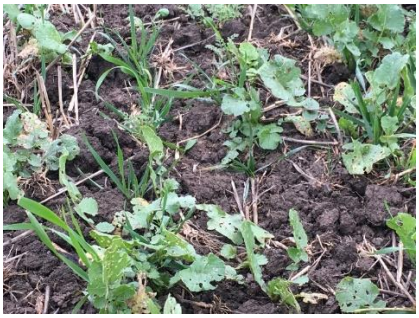
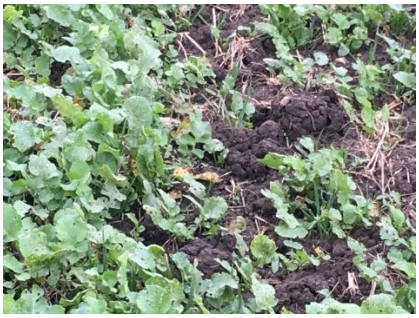
1. Oilseed rape at high seed rate

- Cultivation: dragged, ploughed, power harrow
- Soil structure good
- Straight roots

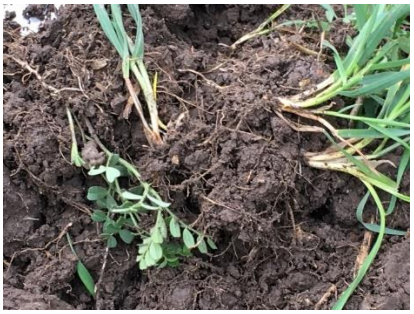
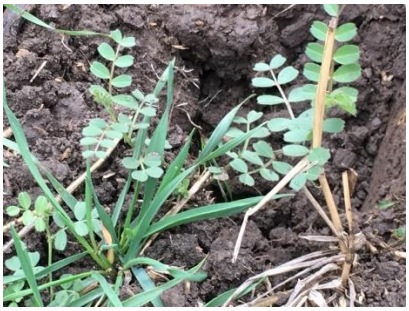
2. *Oilseed rape + oats (4%)*

- Soil near surface forms a ball, not falling apart
- Deeper it is blockier
- Root growth at the top is good but then they get to the block
- Friable soil at bottom of hole and a lot of worm holes going deep
- Overall soil structure not bad

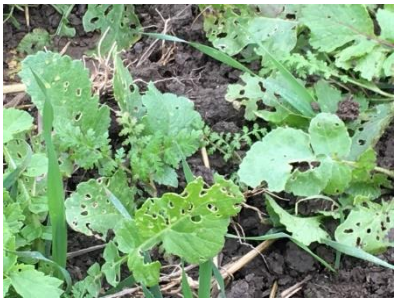



3. *Rye + vetch*

- Disadvantages of rye:
- negative allelopathic effect on spring wheat
- not very deep rooting
- disease carryover – could be a bridge for take-all
- Grazing cover crops
- Sheep will eat anything but prefer some, such as stubble turnips. However they graze everything including black-grass so you need to be careful with spraying in case the black-grass is too small; similarly if you put deep tines through it can mix black-grass through the profile and come through later

4. *Soil vitality mix (phacelia, clover, oats, radish, vetch)*

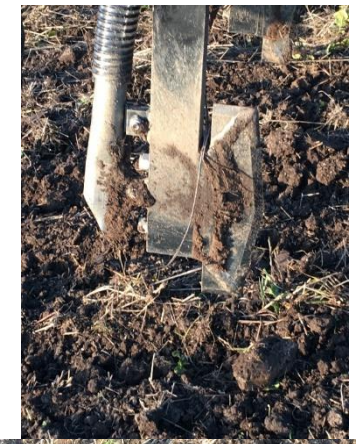


- Important to sow early
- Here there is enough room for black-grass to come through
- Radish will do the structuring
- Oats form fibrous roots
- Phacelia will keep flowering and spreading seed
- For rooting structure linseed is a good option but it isn't seen in mixes because it struggles to compete
- Mycorrhizal fungi extend the roots' ability to mine things out of the soil but their overall effect is small
- You can put them into the soil to kick start the system but they are expensive
- You have to decide what you need – e.g. it is important to avoid destroying the fungi in a different part of the rotation

5. *Soil structure mix (tillage radish, oil radish, kale, oats, phacelia, vetch)*

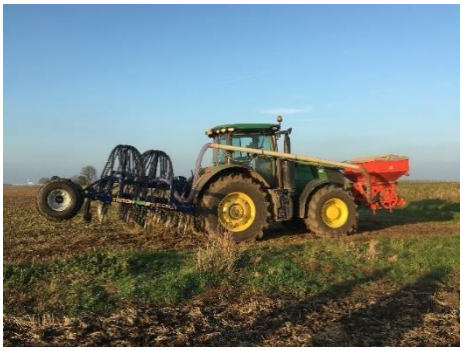
- Again you need to get this in early
- The shallow rooting of phacelia has produced a friable crumb structure

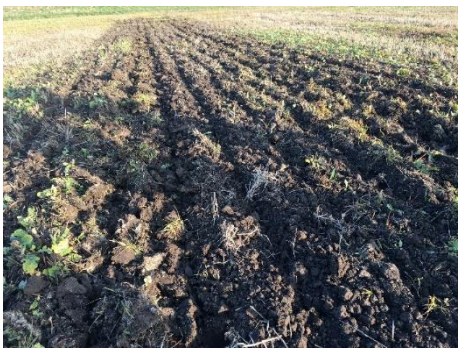
Seed drilling demonstration

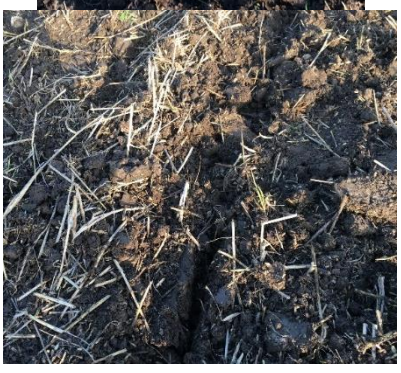


- Triton direct drill
- Results shown below
- Seed is placed in a slot with a drainage channel
- Seed placement (wheat) was assessed
- To be revisited at a later meeting

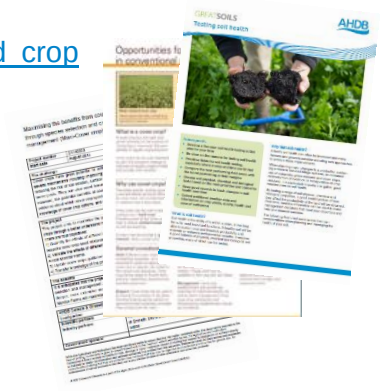
Triton drill.MOV







Find out more – Links to AHDB information sheets or research



[Cover crops – Farmer experiences]
[Maximising the benefits from cover crops through species selection and crop management (Maxi-Cover crop)]
[Healthy grassland soils]
[Testing soil health]
[How to count earthworms]
[Measuring and managing soil organic matter]
[Cover crops, drainage and targeted cultivation for improved soil structure]
[Soil assessment methods]
[GREATsoils]
[Soil biology and soil health partnership]

Next meeting

Date: 20 December 2018
Topic: Economic sprayer washings management
Time: 10.00
Location: Hibaldstow Village Hall, Station Rd, Hibaldstow, Brigg, North Lincolnshire DN20 9DY

For more information or to find out more about Farmbench, AHDB's benchmarking tool, contact: Judith Stafford
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