Cover crops for soil health

Farmer Experience 1
Summer 2016

AHDB
CEREALS & OILSEEDS

Peter Cartwright

Revesby Estate Farm

Location:
East Lincolnshire

Soil type:
Sandy clay loam and clay loam

Rotation:
WW, OSR, WW, over-winter cover crop, SBeet/SBeans/Oats

"I see my soil like a compost from a garden centre. I want that sweet friable soil that is full of life to be my topsoil. To do this, I need a balance of living and decaying matter all year round to feed a balanced ecosystem."

Why did you start including cover crops in the rotation?

I started using cover crops for soil health and as a simple way to increase organic matter levels. After one season, I quickly started to see other benefits including:

– Soil structuring

– Reduced leaching

– Improving nutrient availability in the following crop, eg phosphate

– Weed suppressant activity

I am hoping to increase the farm's productivity by reducing mechanical inputs and chemical inputs as a result of improved soil structure and improved nutrient retention and availability. Using cover crops to improve soil health will, I feel, lead to more fertile soil conditions for crop establishment, allowing them the best conditions to out-compete weeds, such as black-grass.

What are you doing?

I am using autumn-sown cover crops preceding spring-sown beans, sugar beet and vining peas. A catch cover crop was sown in June, preceding winter wheat.

In front of spring beans:

– I am using a short, stiff-strawed spring oat variety and Romaso radish as single species

– Cover crops are on 25 cm row spacing, direct-drilled into stubble using a tine drill

– A dual hopper allows drilling of a mixture or a single species depending on soil condition

– The radish is drilled where more help with soil structuring and nitrogen extraction is needed; extracting nitrogen from the soil holds it away from the bean while it establishes to encourage more nodule-fixing and a greater amount of N in the soil for the following wheat crop

– Oats are used as a means of capturing nutrients and accessing P reserves

– The oats provide good ground cover in the spring to suppress weeds during crop establishment

– Sheep are grazed on some very lush covers to remove the trash burden and stimulate a flush of black-grass prior to the desiccation of the cover

– Covers are desiccated two days before drilling

– Cost of seed: £9.68–£26.39

– In the spring, beans are drilled on 25 cm rows between the cover crop rows

In front of sugar beet:

– I am using oats, vetch and a beet cyst nematode radish

– Oats are drilled on 50 cm row spacing

– Using a strip-till machine, beet rows are stripped in the autumn while establishing vetch and beet cyst nematode (BCN) radish

– Vetch is used to maintain friability in the stripped row and to provide an extra supply of nitrogen to the following beet crop

– Oats act as a weed suppressant and help to increase organic matter

– BCN radish is used to help control BCN and to prevent the stripped row from slumping together over winter

– Covers are desiccated around four weeks before strip-tillage of the rows, prior to drilling the sugar beet as soon as the soil has dried sufficiently

– The system will be developed to allow me to drill at the same time as strip-tillage

– Cost of seed: £22.13

In front of vining peas:

– Spring oats cover crop drilled mid-September

– Desiccated in February

– Spring oats is a very useful and cheap cover

– However, I am starting to look into the many varieties of black oats available to see if one of these may be better suited to my situation

In front of winter wheat:

– Catch cover of spring oats sown in June

– Mulched in end September and left to green back

– Regrowth and weeds are desiccated with glyphosate before drilling of winter wheat

– The aim was to catch the nitrogen released by the peas while building organic matter and encouraging soil fungal hyphae[1]

– Establishing a spring oat in June after vining peas was a mistake: the cover just wanted to produce seed as soon as possible, driven by the long days and high temperatures; it did not produce the rooting or biomass I wanted

– I believe a winter oat variety would have been a wiser choice

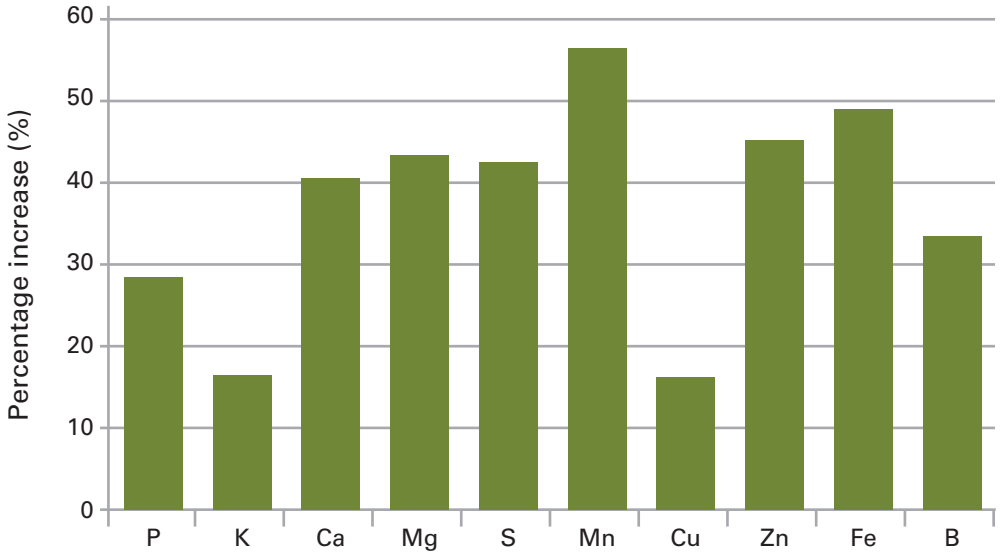
[1] **Soil fungal hyphae:** microscopic cells which push their way between soil particles and roots and provide important services including water infiltration and water holding capacity, nutrient cycling and decomposition of organic material.

Cover crop trial: radish (left), black oat (middle) and spring oats (right).

Spring oat cover crop (200 kg/ha) drilled into wheat stubble mid-September and desiccated in February before vining peas.

How are you measuring the changes?

In front of the vining peas, I had one area sown with over-winter cover crops, and another as bare ploughed soil. Before harvest of the subsequent pea crop, tissue samples were analysed. Large differences were found in percentage increases of nutrients (kg/ha). The area that had been sown with cover crops increased vining pea yields by 34%.



This year, I have carried out a 42-plot trial looking at single species with a view to determining what grows best in my situation, which is a late establishment slot, and also looking at seed rates. This will help me tailor my own mixes to suit my situation.

Soil below the black oat and radish, dug in January.

Measure tissue nutrient levels in following crop to determine the benefit of cover crop species and mixtures

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