

Cover crops in a no-tillage system

Farmer Experience 7
Summer 2016

AHDB
CEREALS & OILSEEDS



Jake Freestone

Overbury Farms

Location:
Gloucestershire/
Worcestershire border

Soil type:
Hill land: typical Cotswold limestone brash (Aberford and Elmton series)
Vale land: varies from lias clay (Evesham series) to medium sandy loam over sand (Badsey series) with drainage and some irrigation

Rotation:
Cotswold limestone brash: SBarley, WBarley, OSR, cover crop, wheat, cover crop, peas, wheat

Lias clay: WW, WOSR, cover crop, WWheat, cover crop, SPeas, wheat, cover crop, linseed, wheat

Medium sandy loam over sand: salad potatoes and onions, wheat, SBarley, WBarley, WBeans, peas

“ On thin and sloping land, we want the cover crop to create above-ground bulk to intercept rainfall and reduce surface compaction. ”

Why did you start including cover crops in the rotation?

We've been using cover crops for about 20 years, with stubble turnips as an overwinter sheep feed. As a result of my Nuffield Scholarship in 2013, 90% of the farm was switched to zero-till. To make zero-till work, we need to include cover crops in the rotation and we're now trying to do more with them, with a wider range of species.

The farm is on a hill and one of the main reasons for cover cropping is for soil stabilisation and to reduce soil erosion. Other reasons include:

- to remove compaction and improve soil structure
- to increase soil biology: we are trying to get our soils to be more fungal-dominated
- as an extra livestock feed
- to reduce overall costs through increased soil biological activity

My aspiration is for cover crops to improve soil structure and to reduce soil erosion. I want to capture available nutrients and prevent them from leaching out of the system. I also want cover crops to create all the cultivations for the subsequent crop, which will eliminate the cultivation costs and increase the organic matter of the soil.

In a zero-till scenario, we want the cover crops to create a good environment for the subsequent crop to be drilled into. If we have compaction, we want to alleviate that by using a cover crop with a powerful root system to break up the soil.

We also want the cover crop to create organic matter for the bugs and worms in the soil, to increase soil life and increase organic matter across the field.

What are you doing?

We include both short-term (5–6 weeks) summer and overwinter cover crops in the rotation and use slightly different species in the different mixes.

Short-term mixes:

- Grown between first and second wheats and between wheat and winter barley
- Faster-growing species: radish, mustard, phacelia, buckwheat and linseed (but not when we have this as a cash crop in the rotation)
- Seed cost: £25/ha
- Drilling cost: £45/ha

Over-winter mixes:

- Winter rye, spring oats, winter vetch, linseed, buckwheat and stubble turnips
- Seed cost: £35/ha


We drill them and place a small amount of fertiliser (5–10 kg N/ha) to get them established. We use an imported zero-till drill and drill straight into the chopped straw. To destroy the crop, we use glyphosate immediately (24 hours) before or after drilling, depending on the label.

The cost of the cover crops is spread across a whole rotation. On the hill, we have a six-year rotation with two cover crops, so we spread the cost of each cover crop over three years. This is because the cover crop is capturing nutrients and we don't know when they are released into the rotation – but, realistically, the majority are not available to the cash crop directly following the cover crop. The majority of the captured nutrients will be available in years two and three post-cover crop.

How are you measuring the changes?

The main measure is through yield. We have not used any control strips. We are also looking at quality: we grow milling wheat and malting barley, so we're looking at grain N and protein. We also take soil mineral nitrogen and organic matter measurements in the spring in the different rotations and on different soil types and we can use this to measure changes over time.

We are also in the second year of a cover crop trial with NIAB TAG, Kellogg's and Kings. This involves field-scale plots with different cover crop species and following the effects through to yields. Within this project, they are measuring soil bulk density, worm numbers, soil mineral nitrogen, soil organic matter and the amount of above-ground biomass as dry matter compared with a fallow plot in the same field.



Treat the cover crop like a cash crop.

What has worked well?

Cover crops have been good for black-grass control. They've encouraged black-grass germination when planting and then shading the black-grass out.

The other positive is the extra livestock feed that cover crops can provide us with.

What's really worked for us is treating cover crops like a crop – drilling it properly, rolling if necessary and putting some slug pellets on, if needed.

What hasn't worked?

Initially, we tried spinning before the combine but this gave patchy results.

What hasn't worked so well for us is when we've had a delayed harvest and cover crops go in at the beginning of September. In an ideal world, they need to be planted in August to get the greatest return in organic matter. Having said that, even with a small plant it's amazing how much root growth can take place, which will be feeding the soil – so it's better to have something than nothing.

While the Agriculture and Horticulture Development Board seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law, the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

Reference herein to trade names and proprietary products without stating that they are protected does not imply that they may be regarded as unprotected and thus free for general use. No endorsement of named products is intended, nor is any criticism implied of other alternative but unnamed products.

AHDB Cereals & Oilseeds is a part of the Agriculture and Horticulture Development Board (AHDB).