Take cover

Cover crops may be something of a hot topic this winter, but for many they remain an unknown quantity. Agrii's **David Wild** explores the benefits they have to offer.

WITH INPUT costs continuing to rise, the latest round of CAP reform focusing even harder on farming's environmental performance and the weather throwing everything but the kitchen sink at growers, interest in the potential benefits of winter cover crops has been on the rise.

So much so, in fact, that a second farm walk on the subject – organised by the local Campaign for the Farmed Environment (CFE) team – saw members turning out in force to find out more. Questions came thick and fast – highlighting the fact that despite high levels of interest, cover crops remain something of an unknown quantity to many.

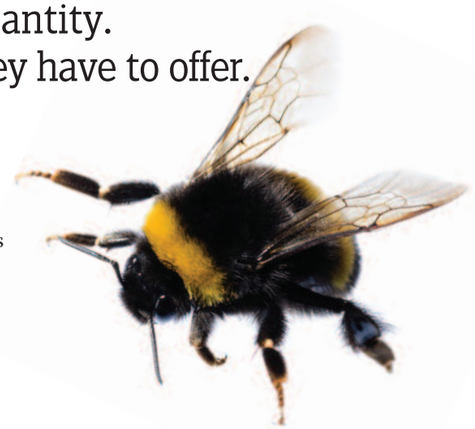
Designed to look in depth at the issue and give members a practical insight into how to successfully introduce cover crops into their rotation, the farm walk was kindly hosted by regional crops board member, Richard Bramley on his farm at Kelfield near York.

Richard has grown a variety of cover crops for several years – providing me with an excellent opportunity to highlight the potential benefits available to growers with different soil types and production systems.

So, do cover crops offer more than just ground cover?

The answer is most definitely 'yes'. Cover crops offer a wide range of benefits for the environment, farmland birds, wildlife and of course the soil. Just some of the specifics include:

- preventing soil erosion from either wind blow or surface water run-off;
- reducing the level of nutrients lost down the soil profile (mainly nitrogen) and also through surface water run-off;
- providing seed as an important overwinter food source for birds; and
- improving the soil structure by increasing levels of organic matter and encouraging earthworm activity.



Soil erosion and nutrient loss

The potential to help prevent soil erosion and nutrient loss was highlighted by recent research which, comparing fields with and without cover crops, demonstrated that an 80 per cent reduction in soil erosion and an 85 per cent reduction in the loss of phosphate was entirely possible. (Remember that phosphate does not leach to any appreciable extent on moderate index soils, so the main route for phosphate into watercourses is by soil run-off.)

The other major plant nutrient that cover crops help retain is nitrogen – which is lost from soils as nitrate (the form of nitrogen used by plants). Highly soluble, it is readily leached through the soil profile and from here may progress to both surface watercourses and groundwater where it can contribute to overall pollutant levels. Cover crops can reduce nitrogen leaching by up to 30-40 kg/ha/year.

Indeed, it is the combination of these two major plant nutrients (phosphate and nitrogen) that combine to cause eutrophication. This is when algae in the water explode into rapid growth in the summer months as a result of high nutrient levels in the water, strong sunlight and high water temperatures. When the algae die back in autumn, as the water temperature drops, the decaying algae strip oxygen out of the water, causing fish death.

Carbon sequestration

Another benefit provided by cover crops is that of carbon sequestration or carbon capture. Cover crops increase the amount of carbon trapped in soils, by adding organic matter where the greenhouse gas is stored. This in turn improves the soil structure and contributes significantly to crop rooting and health, drainage, etc.

All growing crops remove carbon dioxide (CO_2) from the atmosphere during the process of photosynthesis that converts sunlight to energy. This carbon is then trapped in the soil as crop and organic matter decay.

Nitrogen capture

A key benefit of retaining more nitrogen in the soil – other than the very obvious cost saving – is the broader environmental benefit that accrues from a reduced need for nitrogen fertiliser applications. This in turn reduces the level of nitrous oxide (N_2O) losses from the soil prior to crop uptake and also reduces the N_2O emissions, which are produced during fertiliser manufacture.

Nitrous oxide is the most potent greenhouse gas produced within agriculture, having over 300 times the pollution value of carbon dioxide. Methane – the other 'agricultural' greenhouse gas – has more than 20 times the pollutant value of CO_2.

It should be noted that even the latest manufacturing methods still produce in the region of three tonnes of carbon dioxide (equivalent) per tonne of ammonium nitrate fertiliser manufactured. Where older manufacturing methods are used this can rise to as much as eight tonnes of CO_2.

Cost benefit analysis

Although it is obvious that cover crops do have a financial cost attached to them including seed purchases, sowing, and maybe some basic cultivations, it is clear that the benefits would far outweigh these costs. This is especially true when you take into account new work that is exploring the extent to which crop establishment is improved after a cover crop, and the benefits of weed and especially nematode control offered by some cover crop mixtures.

On farm application

Yorkshire CFE chairman Richard Bramley, who hosted the cover crops event has grown them for the last six to seven years but has increased the area in the last three years.

This year he is growing 18ha of cover crops including Anaconda oil radish and vetch as well as trial areas of buckwheat and quinoa as a late sown winter bird feed. In the past he has tried mustard, brown mustard, fodder raddish, stubble turnips (as a mix) and general wild bird seed mixes. Here he answers some basic questions about his experiences:

How do they fit into your rotation?
It was important for any option not to affect crop rotation or farm output, so it fits in well.

What are the benefits of cover crops?
They are numerous. Biodiversity, N capture, P capture, increase in organic matter, increased drought tolerance and improvements to soil fauna and soil structure.

How do you establish and look after the crops?
I have done everything from spread on top and rolled to cultivate from the surface and drill. The better job you make, the better the results. But with moisture and brassicas, spreading and rolling has worked well.

Brassicas need 30-40kg N as early as possible and I spray for volunteers (propaquizafop) as the cover crops follow mainly winter barley or wheat.

Up until this year I have been growing them before sugar beet and potatoes on sandy loams in the Vale of York, however, this winter I have a trial area on some heavy land due to be sown with spring barley.

It is probably not going to be ploughed in until the end of January/early February because of the wet weather we have had but the soil looks in good condition if you dig down. It is going to be interesting to see the results.

What would you say to other farmers who were considering growing cover crops but are not quite sure?
Consider how to make it fit in on the farm and have a go on a small area first. Different cover crops have different strengths, so maybe seek some advice if you are unsure.

I am hopeful that cover crops will feature under CAP greening/EFA requirements so this will make them an interesting option. They offer so many potential benefits it would be mad for them not to feature as an option.

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