Jeff Claydon in part of the cover crop area in mid-November 2020

Cover crops show promise but need care

Jeff Claydon, CEO of crop establishment specialist Claydon, discusses cover crops on E. T. Claydon & Sons' farm in Suffolk

Cover crops have become a hot topic, although we have experimented with them for years. As third-generation farmers we wanted to assess how they might benefit our soils, while as a machinery manufacturer we needed first-hand experience to discuss with customers.

Claydon has a 40-year history of innovation, designing and producing machinery which enables farmers to operate more efficiently, reduce costs and improve soil health. Unlike most other manufacturers we are involved directly in farming and fully evaluate every new development on our Hanslope Grade 2 clay soils, which is a real advantage.

Our work with cover crops indicates that while they can have a valuable role in certain situations, careful selection, establishment, and management are required.

I discuss these with Dick Neale, Hutchinsons' technical manager, in a series of videos at www.claydondrill.com/news/open-days-2021

One was filmed in a field that we took on recently. It has a bad history of black-grass and shows how a catch crop, cover crop, stubble management and hoeing have been used to get on top of the issues. We also look at our cover crop trials, where several scenarios are being evaluated, including establishment/soil structure in unmanaged, seeded cover crop and managed cover crop situations.

In the past we have made use of natural, no-cost cover crops in the form of volunteers and weeds, using our 15m Claydon Straw Harrow after harvest to create ideal conditions for them to germinate. We then used this fast, low-cost implement to control slugs and prevent these natural cover crops from becoming too thick, before spraying them off and drilling the following crop in the spring.

Our first experience of growing specific cover crops came in 2016 when we drilled mustard, which also provided game cover. It died off and melted away after heavy frost, so drilling spring oats was no problem and the crop performed well.

> **"While cover crops can have a valuable role, careful management is required"**

In 2017, we evaluated a commercial mixture containing a high proportion of black oats and vetch. Drilled after harvest directly into moisture, it established quickly, tillered readily, generated extensive rooting, and produced 500mm-high biomass.

The area was earmarked for spring oats, so we left it over-winter and our Claydon Hybrid had no problems drilling the following crop, but it did not establish as hoped because the green cover held moisture and stopped frosts from breaking down the heavy clay.

Black oats produce large amounts of biomass and more mineral nitrogen than other cover crops like rye. They work well in a brassica/vegetable rotation but are a difficult option where cereals are grown. The wheat which followed the spring oats performed well, but the OSR that came after was decimated by slugs where the original mustard cover crop had been grown because it had not been possible to carry out any stubble management.

Clearly, that approach did not fit our cereals/OSR rotation, so it was necessary to identify more viable alternatives. We did not

grow any cover crops for two years and ocntinued to research.

New approach for 2020

In 2020 we worked with Mr Neale to identify the best approach to growing cover crops, which ultimately had to strike a commercial balance between costs and benefits.

Ideally, we want the cover crop in the ground long enough to gain maximum advantage from the rooting structures, but not so long so that it generated excessive stick-like biomass. Some that we drilled early April for demonstration purposes did just that, requiring extra work and cost to deal with them, so that approach was not repeated. Experience showed that we should avoid any cover crop containing mustard on our heavy clays, as it tends to become sticky and makes drilling more difficult.

Where OSR is grown it is important not to include too high a proportion of seeds from the brassica family, such as radish, as these can encourage slugs.

We selected Hutchinsons MaxiCover, containing linseed (28.5%), buckwheat (8%), phacelia (11%), daikon radish (2.5%), fodder radish (5.5%), brown mustard (13%), hairy vetch (7%) and crimson clover (24.5%). This provides sufficient canopy to create good soil armour and weather protection, whilst further improving soil condition. Costing £35/ha, it develops good rooting structures which penetrate vertically and horizontally, helping to structure the soil and improve drainage.

The high calcium base of our heavy calcareous clay soils means that they lock up phosphate, but the buckwheat in MaxiCover produces acids which release it, helping to achieve a correct soil nutrient balance.

Trials continue in 2021

Last autumn, we drilled cover crops on parts of 55ha destined for spring oats in 2021, the aim being to see if, and by how much, they improve yield and overall margin from the following crops. If spending around £100/ha on seeds and establishment, then having to spray it off, we need clear agronomic and financial benefits, so yield from each area will be measured at harvest.

Hutchinsons MaxiCover was drilled using a Claydon Hybrid with the Opti-Till System's standard set-up

The aim is not for cover crops to create massive amounts of biomass but maximise rooting to release vital nutrients in the rhizosphere. When choosing a mix, it is important to take various factors into account: from how much time it will have to grow, to whether a cultivator-type drill will be available to cut through the mass of roots.

Hutchinsons MaxiCover was drilled behind wheat into chopped straw at 12.5kg/ha on August 9, 2020 using our 3m Claydon Hybrid test drill to evaluate three approaches. In one area we used the standard Opti-Till set-up comprising the Claydon leading tine which relieves compaction and aerates the soil, followed by a seeding tine with a 180mm A-share. In another we used the leading tine followed by our twin-tine kit, while the third was drilled with the new lower-disturbance 'LD' twin-tine kit preceded by double front cutting discs which reduce power requirement and minimise soil disturbance.

Early on when the soil was dry, the lower-disturbance option did a good job, so for some farms with healthy soils and suitable conditions it might be the best choice. For us, the standard Opti-Till set-up produced the best results, with much higher levels of roots due to soil stimulation in the rooting zone.

In the last two years our rotation has changed from winter wheat and OSR to more spring-sown and break crops. The aim is to use land destined for spring drilling to reduce the weed burden and seed bank using Opti-Till stubble management techniques and full-rate glyphosate before drilling.

Our soil is in excellent condition after 20 years of using Opti-Till but was still noticeably tighter and blockier on the no-till plot. This was clearly seen early on when the soil was drier, but was less evident later in the cover crops as the soils wetted up,

We felt it important to allow wetting and drying of our soils to take place so that we could drill the following crop directly in the spring. The intention was to spray the cover crops off at the end of November then leave those areas until the spring oats went in. However, in a couple of areas we decided to experiment.

When the cover crop was 600-700mm high some was grazed by sheep, while some was Cambridge-rolled during frosty weather to break and flatten the larger plants' brittle stems. The cold weather degraded most of the biomass, preventing it from shielding any grass weeds from the glyphosate in the spring, so consequentially we had no problems sowing spring oats into the heavy soil, which can remain wet and cold if there is too much green cover. Establishment was identical and as of mid-June 2021 our drone images highlight no visual differences.

However, I don't see a place for commercial catch crops on our heavy land, because there's not enough time after harvest to get them established and growing quickly enough to produce meaningful results before they are sprayed off and autumn-sown crops drilled. However, we will evaluate companion crops, which can be established accurately and economically using the Claydon NutriSeeder that delivers small seeds/microgranules to three different outlets on our Hybrid drills.

When used in combination with an effective stubble management programme, cover crops can provide significant agronomic, economic, and ecological benefits. Cover crops can alsoharness nutrients and suppress weeds. However, they are not a miracle cure for deficiencies in poorly managed land.

Our soils are in exceptional condition, so cover crops are potentially of less benefit here than they might be. We will have to wait until harvest to see whether they generate sufficient improvements in crop yield or quality to justify their cost, which – ironically – is exactly why I developed the Yield-o-Meter 40 years ago.