



“Putting all the pieces of the establishment puzzle into place seems to have protected the OSR.”

Make space for the beneficials

Technical Battling the beetle

There's no certain return from cover, companion and trap crops, nor from dedicating areas for beneficial insects to thrive. CPM gathers the experiences of two growers who believe they're making progress.

By Tom Allen-Stevens and Rob Jones

As with many aspects of farming, there's not one solution that successfully addresses cabbage stem flea beetle, but a number of small changes that build into a bigger picture. That's certainly the case when it comes to harnessing the help of Nature's own defences. Two farms at opposite ends of England have developed their own individual approaches that appear to be paying dividends.

Whole farm approach

Introducing cover and companion crops have been pivotal aspects in overcoming cabbage stem flea beetle for David Hankey, farming in the shadow of the Angel of the North, near Newcastle. But these are just part of many changes to the whole farming system at Dunkirk Farm that have brought

multiple benefits across the 160ha he farms.

The soil is a sandy loam on sloping ground that's prone to erosion and slumping. "We noticed the land hadn't been farming as well as it did before we sold the cattle in 2002 and went all arable. It was 2012 when we had a lot of problems and realised something had to change," David recalls.

They made the switch into strip-tillage, purchasing a Claydon Hybrid drill and instantly noticed an improvement on the previous plough/power-harrow system. Cover crops were the next introduction in front of spring barley into a six-year rotation that includes winter wheat, barley, beans and oilseed rape.

"We're getting better yields and no problems with CSFB. What's more, we haven't used insecticide in six and a half years," he notes. "What we've tried to do is encourage beneficials through the natural active food web. We've given them the habitat in which to thrive and then it's just a question of being patient and they manage the pest control for you."

The farm's also introduced uncropped field margins and wildflower strips running through the middle of fields to boost the habitat for natural predators. One of the farms in Agrii's iFarm network, agronomist Robert Bowes has been monitoring progress.

"There's not a lot we're not measuring through pitfall traps, soil sampling and DNA analysis. We found an abundance of carabid

beetles in the traps next to the strips, for example," he says.

David notes these have done wonders for slugs, and he's rarely applied pellets in recent years. "Slug eggs are carabid caviar," he adds.

He's also incorporating straw (apart from barley straw) and has introduced compost, which, combined with the cover crops and reduced tillage, have raised organic matter levels to 4.5-6.0%. "Bearing in mind the soil's low clay content, that's a significantly high value," notes Robert.

So how does this work out in practice? David uses two cover crop mixes: the first is vetch, pea, buckwheat, phacelia and two types of radish. The second has the same



David Hankey (left), working with agronomist Robert Bowes, has aimed to encourage beneficials through the natural active food web.

buckwheat and phacelia, a different type of pea, vetch and radish, with added linseed. "I call the first one Jeremy, after Jeremy Clarkson, because it's all about speed and power," he says. "But the important aspect is to get the right carbon:nitrogen ratio when creating these pop-up rain forests."

Robert explains that the C:N ratio of crop cover is important for managing fertiliser usage, residue cover and nutrient cycling, and soil microbes prefer a diet of 24:1. "If there's a high C:N ratio — wheat straw is 80:1, for example — then the microbes need to find extra N to break it down, depleting reserves. A low C:N crop, such as hairy vetch (12:1) will lead to excess N used by other microbes to break down other residues, and N mineralisation."

The cover crop also acts as a trap crop. "We've found the beetle likes to colonise it — the brassica content especially gets hammered," says David. "It works best if the cover crop is establishing during main migration. If the field going into OSR is already established and further away from the field coming out of OSR, the CSFB are attracted to the younger leaves of the cover/trap crop."

OSR follows barley on Dunkirk Farm, usually harvested at the end of July with

straw removed, he continues. "We drill in two passes with the Claydon, initially drilling the companion crop that may be a four-way mix, following up with the OSR with a dose of Agrii-Start to help kick off establishment. On the first pass, the larger seed, such as vetch and buckwheat, is drilled while the smaller, berseem clover seed is broadcast with a Stocks seeder.

"We've just purchased a Horsch Avatar that could be used to establish both cash and companion crop in one pass as it has three hoppers and selective hosing options," adds David.

Mine phosphate from soil

Buckwheat has proved to be one of the most effective for CSFB control, says Robert. "It also helps mine phosphate from the soil, which helps establishment. Most of the companion crops die out over the winter or can be taken out with Astrokerb (aminopyralid+ propyzamide) and make their N available to the crop — we've found we can reduce N applications by at least 50kgN/ha."

DK Exsteel is in the ground this year — the second season with the variety. "It's a good northern variety, with plenty of vigour to get it out of the ground. It has decent



Buckwheat gives rapid early cover from the companion crop at Dunkirk Farm and also helps mine phosphate from the soil, which helps establishment.

disease ratings which gives it a good all-round package," comments David.

It's the agronomics and certainty of establishment that's more important than yield, he says. Last year a yield of 3.2t/ha wasn't great, but good given the circumstances. Normally it's in the 3.8-4.5t/ha range.

"We've had DK varieties for a while, although we did venture once into the dark side with a conventional and found we couldn't direct-combine it. The only questions for us are when to drill and at what seed rate."

The current crop was drilled on 12 Aug at 40 seeds/m². "We raised it from last year's 34 seeds/m², but it's too thick. I think ▶



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Battling the beetle



Jim Farquharson has a clear set of establishment improvement imperatives.

► we'll aim for 25 seeds/m² this autumn," reasons David.

"But it's not one aspect that'll deliver a good crop — it's the whole system working together with a strong IPM strategy."

OSR faith restored

Putting all the pieces of a well-researched oilseed rape establishment jigsaw in place has paid handsome dividends for Jim Farquharson and his Agrii agronomist, Todd Jex at Eastbury Estates near Blandford, Dorset this season.

Unlike 2019 when only 33ha of the 70ha OSR planted survived to harvest, all 92ha of

the 2020 plantings have established strongly. Indeed, they came into the spring with some of the most even headland-to-headland stands ever. And, thanks to relatively late drilling, without excessive canopy growth or significant CSFB larval burdens.

"Last season wasn't pretty," recalls Jim who runs the family's 400ha arable business. "As well as losing over half our crop, the fields we harvested averaged just 3.3t/ha. Excluding the badly-damaged areas, though, they did 3.9t/ha despite the appallingly wet winter and bone-dry spring — about what we normally average.

"This convinced us the crop was worth sticking with, providing we could get it established reliably. It's long been our preferred cereal break and best entry for wheat. On top of which, alternatives like peas are completely out, with our level of downland flints, and beans were a disaster last year."

Increasing their OSR area by almost a third after last season's experience wasn't a decision the team took lightly. So they did so with a clear set of establishment improvement imperatives:

- Leave a long enough barley stubble.
- Establish a strong buckwheat companion ahead of the crop.
- Minimise soil disturbance at drilling.
- Place a specialist starter fertiliser with the seed.



Todd Jex is learning a lot from local trials together with the work of research colleagues on other sites across the country.

- Use a proven fast-developing as well as vigorous hybrid.
- Drill into moisture after the middle of August.
- Minimise other inputs until the crop is securely established.

"As part of the iFarm network we've learnt a lot from the local trials we've been involved in together with the work of my research colleagues on other sites across the country," says Todd. "There were a lot of things we got right last year. But we didn't put enough of the pieces of the jigsaw in place to deal with the 'double whammy' of intense flea beetle pressure and serious lack

The predatory potential of parasitoid populations

Carabid beetles, rove beetles, spiders and parasitic wasps all have an important role to play in the more integrated management of cabbage stem flea beetle essential to the future of UK oilseed rape growing, believes senior Rothamsted Research scientist, Dr Sam Cook. But only if they have the right conditions in modern rotations to survive and thrive.

Sam and her colleagues have been developing a valuable understanding of the biology and behaviour of a surprising range of natural CSFB enemies in recent years. In addition to a large number of generalist ground predators of cabbage stem flea beetle eggs and larvae, their work extends to both adult and larval parasitoids offering useful potential for biological control.

Their growing knowledge of these and other beneficials leads the Rothamsted researchers to recommend five management pointers to making the very most of their value in beating the beetle:

1. Avoid insecticide spraying wherever possible — certainly in the autumn when there is no OSR canopy to protect predators or adult parasitic wasps but also in the spring and in following crops.

2. Till the ground as shallowly as you can in the rotation — to avoid burying parasitic wasp pupae too deeply and disrupting ground predator foraging.
3. Provide diverse field margin habitats to support the richest insect populations — including tussocky grasses favoured by ground beetles and pollen/nectar resources that may be valuable for other species.
4. Consider improving the micro-climate and diversity within the establishing OSR crop with long stubbles or nurse cropping — to encourage greater predator activity and better protection from birds.
5. Look more holistically across the farm and rotation to activities that build the most diverse

and robust insect populations — including the value of well-managed hedgerow, tree and other non-cropped habitats.

"In developing the most sustainable IPM strategies there's a lot more we need to understand about the dynamics of pest, predator and parasitoid populations," concludes Sam.

"But with what we know already there's plenty we can do to help redress an ecological balance that can do much to improve the consistency of OSR performance. And the more we learn through fresh approaches like those being developed in the EcoStack project and the Rothamsted Large Scale Rotation Experiment (LSRE) now underway at Harpenden and Brooms Barn, the more successful we will be in doing so."

Three key CSFB predators and parasitoids

<i>Trechus quadristriatus</i>	Carabid beetle	Eating CSFB eggs and larvae from the ground
<i>Microctonus brassicae</i>	Parasitic wasp	Injecting eggs directly in CSFB adults migrating into the crop
<i>Tersilochus microgaster</i>	Parasitic wasp	Injecting eggs into CSFB larvae through OSR stems

of September moisture.

“For instance, we used a buckwheat companion but sowed it with the crop. We left a reasonable cereal stubble but disturbed too much of it at drilling. And we used a starter fertiliser but didn’t have the ability to place it with the seed.

“This autumn we air-seeded the buckwheat into our barley before harvest so it was well enough established to shelter the OSR we drilled three weeks later in the last week of August.

“Then we used Dutch coulters on the newly-acquired Horsch Sprinter to minimise soil movement while GPS ensured the seed was drilled accurately between the rows of good length stubble, leaving them standing well. The new drill also enabled us to place a specially-formulated fertiliser giving 30kg/ha of nitrogen, protected phosphate and added boron just below it for the best possible early growth.

“We also made sure to use only a hybrid proven to be fast-developing in the autumn as well as vigorous,” Jim adds. “I made the mistake of trying a new variety touted as having ‘excellent vigour’ as part of our mix last year and it showed itself to have nothing of the sort in practice.

“Even though we had enough moisture, we deliberately held off this season’s drilling until the end of August to reduce the risk of problems with flea beetle larvae associated with earlier sowings. Nor were we tempted to increase sowing rates from the 50 seeds/m² we’ve long found give us the most productive canopies.”

Todd admits that much of the success this season has come from more favourable early growing conditions. But it was only once they’d achieved the start they wanted from their enhanced establishment approach, that he and Jim were happy to really invest in the crop to take advantage of its potential.

Unlike many crops sown earlier and at higher seed rates, their OSR wasn’t too



By December, the DK Exsteel within the companion crop at Dunkirk Farm had survived the flea beetle attack well.

Battling the beetle

Building on our well-received 2020 series with leading UK researchers and advisers, CPM and Bayer are working together again this season to share the latest experience in combatting cabbage stem flea beetle — this time with growers up and down the country who are successfully doing so.

This is part of Bayer’s role in providing trusted support to OSR growers and their agronomists that goes well beyond the most robust and

dependable varieties that have always been the Dekalb trademark. We hope this helps everyone take advantage of the opportunities offering them the greatest value.

By doing so we are confident the UK can effectively minimise the threat CSFB presents, restoring faith in winter OSR as the best cereal break even amongst those who have been worst hit by the pest.



growthy. So, they didn’t have to use an autumn PGR and now have a strong, thick-stemmed canopy they can manage most productively to harvest, notes Jim.

“Interestingly, putting all the pieces of the establishment puzzle into place seems to

have protected the OSR as effectively from the partridges on our shoot as it has from the flea beetle,” he reflects. “There’s plenty of water to go under the bridge yet, but this season is really beginning to restore our faith in the crop.” ■