

Growers gripped by beetle bother



*from theory
to field*

As growers prepare for the first oilseed rape crop without neonicotinoid seed dressings, a call goes out for samples to help gather data on cabbage stem flea beetle. CPM gets an update on research currently underway.

By Tom Allen-Stevens

Perhaps the biggest unknown facing oilseed rape growers this autumn is the threat from cabbage stem flea beetle (CSFB). There's been a dearth of research into the pest for at least 10 years, but in the same time, the OSR landscape has changed significantly, notes Caroline Nicholls of HGCA.

"There are thresholds for treatment, but so much has changed since that work was carried out. The national crop has doubled in size for starters, and the thresholds don't take into account the restriction on neonicotinoid seed treatments that'll kick in this autumn."

A desktop assessment of the likely impact of the restriction showed the beetle affects 67% of the national OSR crop, but causes

on average just a 1% yield loss in untreated crops. "But on some farms in some years we know CSFB can wipe out the entire crop."

Since the restriction was announced, HGCA has moved fast to address the knowledge gaps and update existing best practice advice (see panel on p33), and a call has now gone out to growers to send in samples of live beetles. "A key priority is to establish the efficacy of pyrethroids. We know resistance has been found in CSFB in Germany — there've been reports of control failures in the UK, although to date no resistant beetles have been confirmed."

Pyrethroid efficacy

Two short studies are aiming to provide more information on CSFB control. Results from the first, run by ADAS, should be available for growers in time for establishment of the OSR crop this autumn. "This has looked at the efficacy of pyrethroids, and the good news from preliminary assessments is that they are effective against CSFB.

"But it's also a question of knowing whether crops are vulnerable, so the project has looked at the level of damage OSR seedlings can withstand. There's good news here too because it appears crops are more resilient than current thresholds suggest. But we have only very limited data and there are still many unknowns," she notes.

A new project, led by Rothamsted Research, has just been agreed that'll look to assess the level of pyrethroid resistance in

“On some farms in some years we know CSFB can wipe out the entire crop.”

UK CSFB populations. "Here we're looking for growers to help — we're calling for samples to be sent in for analysis."

The projects are only short, so what credible information can they yield? "These are, targeted projects designed to bring quick results. We can then review the work, identify further gaps and target resources going forward. Long-term aims have to be balanced with the short-term need for reliable data growers can use now seed treatments are unavailable."

And this change of approach is a key consideration for the autumn, she notes. "It's a statutory requirement for growers to follow an Integrated Pest Management (IPM) approach to control pests, disease and weeds. For CSFB control, seed treatments helped to fulfil the IPM requirement, but now they can no longer be used, growers must show they've taken threshold values and risks into account before applying pyrethroid sprays."

The other key pest-related concern is turnip yellows virus (TuYV), transferred to OSR by *Myzus persicae* aphids. Approximately 60% of the OSR area in the UK is affected by TuYV, with the average yield loss in untreated crops being 15%, although this can be as high as 30%, she points out.

"The chief difference between losses is that CSFB is often localised, while TuYV ►



Projects are underway to correct a recent dearth of research into CSFB, notes Caroline Nicholls.

► damage tends to be more consistent over different years and regions.”

Resistance in *M. persicae* has reached a level at which pyrethroids are practically ineffective, leaving growers with very limited options for control. Part of the new project underway at Rothamsted will be to develop

a rapid test for aphids to see if they're carrying the virus, and this'll help growers target treatments accordingly, points out Caroline Nicholls.

“The approval for pymetrozine (as in Plenum) has changed and it can now be used in the autumn, but can only be applied once and it lasts for just two weeks. So we strongly advise growers to sign up to the AHDB Aphid News bulletins to stay abreast of aphid migrations. These now include data from Fera's yellow water-trap network, making the information even more robust.”

Potential worry

The level of pyrethroid use this autumn is a potential worry, according to Dr Steve Ellis of ADAS, who's leading the CSFB project. “With the loss of neonics, they're the only option to control CSFB. If there was any resistance to pyrethroids in UK populations, this could escalate quickly with widespread use. So the overall aim of the project is to help growers use pyrethroids in a more rational manner.”

Current thresholds were drawn up over ten years ago, he points out. “The work was primarily concerned with the control of larvae.”

Adult CSFB migrate into OSR in Aug and Sept, feeding on leaves, which causes the

classic shot-holing damage. If present at emergence, they can also nip through the shoot, killing the seedling. They lay their eggs in the young crop and the larvae will hatch and start to feed in Oct. “It's rare that the larvae cause significant damage. This project is concerned only with control of adult beetle,” he notes.

“Initially we wanted to establish whether pyrethroids are still effective, and how they compare as a form of control with neonicotinoid seed treatments. We set up a very simple field experiment at a site in N Yorks known to have problems from CSFB in the past. An untreated area was compared with OSR protected with neonics and a crop treated with a pyrethroid.”

Growers are being asked to collect samples of cabbage stem flea beetle at harvest and send them in to test for pyrethroid resistance.



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OSR plants appear to be very resilient to loss of leaf area, Steve Ellis has found.

Results for this site confirmed pyrethroids are still an effective form of control, with noticeably fewer signs of shot-holing damage in both the pyrethroid-treated area and the crop protected with a seed treatment (see figure on p32).

“What was less certain, however, was whether that crop was worth treating at all. There wasn’t a particularly significant infestation, and there was little difference in the level of damage between treatments — it’s doubtful there’ll even be a difference in yield.”

So seedling assessments were set up in a glasshouse to simulate CSFB damage and

assess at what level of damage an OSR crop could actually suffer. “We focused on the cotyledons, leaf one and leaf two. In each case, we subjected them to slight loss of leaf (20%), moderate (50%) or severe damage (100%) where the entire leaf was removed.”

Previous work

Although a relatively small study, it builds on previous work funded by Chemicals Regulation Directorate (CRD) to assess the resilience of OSR and cereals to slug damage, points out Steve Ellis. “Preliminary results show OSR plants appear to be very resilient to loss of leaf area. In fact, later green leaf area for some pruning treatments was greater than for the unpruned control. Although the plant may look ragged, it can tolerate damage well and is readily able to compensate.”

Thresholds will be reconsidered once the data has been fully analysed, but Steve Ellis reckons these will be higher than the current 25% damage at 1-2 leaf stage and 50% damage at 3-4 leaf stage.

“One thing that concerns me, though, is that you can’t anticipate what level of infestation you’ll have. It would be useful to have a monitoring scheme, similar to the one



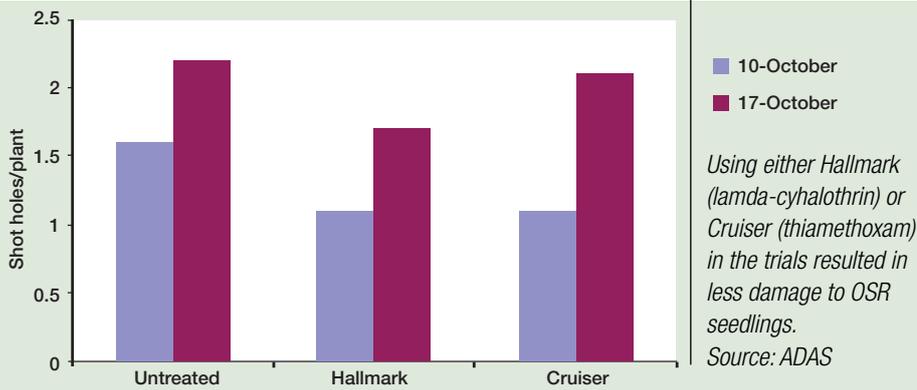
Adult CSFB migrate into OSR in Aug and Sept, feeding on leaves, which causes the classic shot-holing damage.

set up for wheat bulb fly. This area needs more research, as it’s often not until a crop fails to emerge that a grower has any idea there’s a problem.”

One tip that would give growers an indication is to inspect the OSR crop at harvest, he advises. “You’ll often see them hopping about on grain trailers, which may indicate a high potential burden in the following crop. You can also put water traps in fields prior to drilling. But just be warned if you do — these can pick up a whole raft of pests so you need to know how to identify CSFB.” ▶

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CSFB damage to OSR seedlings



► Harvest is the ideal time to collect CSFB samples — growers who suspect they have resistance are being asked to send live beetles to Rothamsted Research for resistance analysis. The call has gone out following reports of knock-down resistance (kdr) to pyrethroids in CSFB in Germany and suggestions from UK growers that pyrethroids are failing against CSFB in the UK.

“We’re looking to see if the kdr mutation is present in UK CSFB populations and, assuming it is, we’ll then work to quantify resistance levels,” says Rothamsted’s Dr Steve Foster.

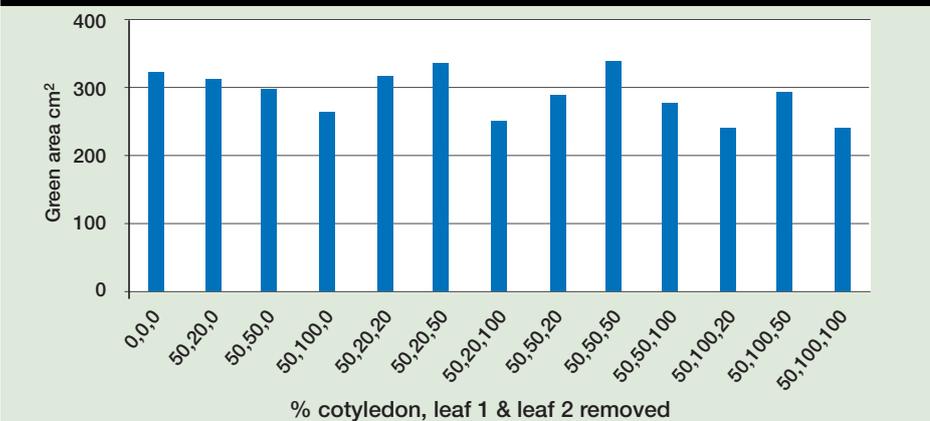
“As we need good samples with a high number of live beetles, we’re asking growers to sample around harvest because beetles are found in large numbers at this time.”

Rothamsted has prepared sampling guidelines, along with a form to print off and include with the samples. “Live beetles

Growers must show they’ve taken threshold values and risks into account before applying pyrethroid sprays.



Established green leaf area of OSR following pruning treatments



The green leaf area for some pruning treatments actually improved, compared with the unpruned control.
Source: ADAS

Disappearing crop shows need for more research

Witnessing their oilseed rape crop disappear as it emerges is an experience Dr David Ellerton of Hutchinsons hopes few growers will experience this autumn. It’s something he saw in a few fields in Cambs last year, and to this day the exact cause remains a mystery.

“There were a few fields that were just hammered by cabbage stem flea beetle. They were sprayed, but in some places the crop was completely obliterated. Whether there was too much pressure from a large population coming into the crop, or whether the beetles were resistant to the pyrethroids applied to it, is just not clear.”

It was definitely caused by CSFB, he says. “You could see them jumping around on the surface. The field was bone dry and the crop was slow to emerge, which left it vulnerable. It was treated seed, but I suspect it was too dry for the dressing to be activated. The beetles stopped the crop in its tracks and in places, it didn’t even establish at all — the applied pyrethroid certainly didn’t seem to do very much.”

Thankfully it was a somewhat isolated incident. “One or two colleagues in the area reported something similar, but for the most part, very few growers had any issues with CSFB last year. However, it’s the severity of the damage, and the fact the crop didn’t even come through the ground in places that’s of real concern.”

This makes it very difficult to know whether a pyrethroid treatment is necessary, he points out. “We need reliable threshold levels — these will be a good place to start. But in a way, it’s a bit like pollen beetle in that they’re very tricky to apply in a field situation. What’s more, although we know OSR can take a hammering, when the crop comes under relentless pressure, it’s soon at risk of being lost altogether.”

He advises growers to monitor crops right from the start. “The field in Cambs was surrounded by fields that had been in OSR the previous year, and that could be where the high population originated. Achieving the right seedbed and field conditions for a quick emergence is also crucial. But close monitoring is



David Ellerton had a few fields last year that were hammered by cabbage stem flea beetle.

the key from the moment it’s drilled.”

He believes future research should be channelled towards field-testing thresholds and ensuring guidelines on when to treat are clarified. “The resistance work is absolutely crucial, and I’m pleased to see sampling is now under way. It’s critical that Rothamsted receives plenty of samples from across the UK and that we understand what level of resistance we face.”



Steve Foster will be looking to see if the *kdr* mutation is present in UK CSFB populations.

We're hoping for a good representation from across the UK."

The new project will also seek to develop an assay that can be used on peach-potato aphids to assess whether they carry the TuYV virus, explains Steve Foster. "We can then use this on aphids trapped as part of the Rothamsted Insect Survey and give growers a very clear indication of the risk of infection through the regular bulletins."

The sampling guidelines and further information are available from www.hgca.com/neonics ■

should be trapped in a crush-proof container and placed in a padded envelope. Information on insecticide used on the OSR crop throughout the season will inform whether the beetles have been exposed to pyrethroids," he adds.

"A small margarine tub with holes pricked in it may make a good container — it's important the beetles are alive when they reach us. An ideal number would be about 50 beetles per sample, but certainly more than 10.

The aim with TuYV is to provide growers with a very clear indication of the risk of infection through the regular AHDB aphid bulletins.



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Research round-up

HGCA project 2140009,

Maximising control of cabbage stem flea beetles (CSFB) without neonicotinoid seed treatments, runs from Sept 2013 to Oct 2014. It aims to identify levels of CSFB control achievable without the use of neonicotinoids, evaluate if there's an issue with pyrethroid efficacy and assess tolerance of OSR seedlings to damage. Carried out by ADAS and funded by HGCA, its cost is £11,810.

HGCA project 2140019,

Investigating pyrethroid resistance in UK CSFB populations and developing a PCR-based assay for detecting turnip yellows virus (TuYV) in aphids, runs from July to Dec 2014. It aims to assess levels of *kdr* mutation in UK CSFB

populations, and develop a PCR-based diagnostic assay for detecting TuYV in individual peach-potato aphid samples. Carried out by Rothamsted Research and funded by HGCA, its cost is £8000.

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Information Sheet 32,

Controlling aphids and virus diseases in cereals and oilseed rape has been updated for autumn 2014 and can be downloaded at www.hgca.com/pests