



# A place for pyrethroids?

## OSR pest control

The questions around applying pyrethroid-based insecticides aren't new, with many feeling their use is severely limited and, in some cases, detrimental. *CPM* discovers whether they still have a place on farm.

*By Melanie Jenkins and Rob Jones*

**A lot of debate has circulated among agronomists as to whether or not to apply pyrethroids, with many opting to explore other forms of integrated pest management (IPM). Although their use against key species such as cabbage stem flea beetle (CSFB) is severely limited due to resistance, could such insecticides still have a place against other pests such as rape winter stem weevil (RWSW)?**

According to Agrii's David Leaper, there's been a lot of discussion in the industry about what to do because of the insecticides' failure to target adult CSFB. "Many have moved away from pyrethroids in favour of other options, but there might still be some instances where growers

want to apply them."

On most of her farms, agronomist Alison Hardesty of ProCam tries to avoid using pyrethroids unless the farmer really wants to. This is due to their limited effectiveness and the harm they can do to beneficial insects. "When an oilseed rape crop is being decimated by CSFB it's really difficult to sit back and do nothing, so it often conspires that growers will apply them as an act of desperation."

### Creative tactics

Alison says she's experienced instances where two or three pyrethroid sprays have been applied to try to tackle CSFB, but she doesn't believe this has much, if any, benefit. "Growers are exploring all sorts of different tactics to improve the effectiveness of pyrethroids, from spraying at night to using different adjuvants, to try and increase efficacy.

"But in most cases, we don't know what the level of resistance is and we're just damaging the local population of beneficial insects," she stresses. "In my opinion, it's pretty pointless applying pyrethroids against CSFB."

Alison's advice for those who are worried about their OSR surviving CSFB adults might not be what most expect. "When you're concerned about a crop and feel like it's disappearing, there's a temptation to go and look at it every day. But once you've made the decision to avoid using pyrethroids it's better that you ▶

*“ In my opinion, it's pretty pointless applying pyrethroids against CSFB. ”*



*When an oilseed rape crop is being decimated by cabbage stem flea beetle it's really difficult to sit back and do nothing, says Alison Hardesty.*

▶ don't keep looking at the crop or you may feel the urge to spray.

"Leave it longer before going to see what's happening in a dry spell, because if you get some rain and the growing conditions improve, the plant can quickly pick up and grow away without intervention."

Although Alison hasn't experienced large issues with RWSW on many farms, she'll employ pyrethroids to try and target the pest when it is present. "But I don't think every farm has to spray for that particular pest, only those with a history of problems."

The egg laying period of RWSW starts in September and can extend into November, or further depending on how mild the winter is, meaning a later spray

could target this period, says David. He feels that with RWSW, there might still be an opportunity to spray the crop later, but it's arbitrary as to when this is. "If growers are intending to go over crops, in some instances it might be worth adding a pyrethroid into the tank."

But because of the lack of data on the pest, it's difficult to know exactly when to time a spray, says Alison. "If you know the pest has previously been an issue on farm, then it might be worth applying a pyrethroid with your autumn fungicide, but don't do it prophylactically."

"The pest can be sporadic and it seems to be worse where plants are already stressed from another issue. I see more instances of it in compacted areas,

gateways and on headlands. I don't believe there is any known resistance to pyrethroids but I think there could be a timing issue," says Alison.

Like with CSFB, the opportunity to tackle RWSW could be in cultural control methods rather than chemical solutions. David feels a lot of growers are already turning to alternatives such as companion crops, leaving straw and delaying drilling.

To that effect, Alison says bigger stemmed plants cope better with CSFB than thinner stemmed ones, and it could be same with RWSW. "Early drilling may be beneficial, allowing the plants to establish before the main migration. And plants with wider stem collars going into the autumn may have less larvae in the ▶

## Resistance status



*Dr Steve Foster has identified a north-south divide in CSFB resistance to pyrethroids, with insects in England resistant to pyrethroids, whereas samples from Scotland weren't.*

One of the first questions that should be asked when considering applying a pyrethroid spray is whether there's resistance to it and how widespread this is, according to Sacha White of ADAS. "We know that resistance in CSFB is so widespread and common now that growers are really lucky if a spray is affective at all.

"So I'd advise checking resistance status before applying anything, and then look at treatment thresholds to help inform decisions."

Rothamsted's Dr Steve Foster works on a range of pests and has recently focused on the resistance status of those that affect cereals and OSR. "CSFB has featured highly in my testing and I've performed a lot of bioassays on live adults, using coated glass vials to expose the pest to a pyrethroid at the equivalent of a full rate field spray, to observe how they respond."

Although this year, testing won't be carried out until the autumn, last year's work demonstrated a

significant north-south divide in resistance. "The samples we collected in England all contained beetles resistant to pyrethroids, meaning if growers were applying the insecticide, it wouldn't have worked.

"However, a few samples from Scotland contained no resistant beetles — as we've seen previously. Based on this limited sample number, if any growers north of the border had to use pyrethroids, they might work."

Steve has also conducted testing on the peach potato aphid and pollen beetle, where he again identified resistance to pyrethroids. "So all three of the main pests are displaying resistance, meaning that it's still present in the UK.

"With this in mind, I wouldn't advise adding pyrethroids into the tank mix just because you're spraying, as it then becomes a prophylactic. There's still a place for this chemistry, but it's very much painted into a corner because of the evolving resistance in more and more insect pests."

This is because insects don't just become resistant to insecticides in one way. "Pests can develop a metabolic resistance, where enzymes in the insect interact with the insecticide before it reaches the target site. They can also develop mutations which alter the target site, which the sodium channel in the insect's nervous system, which means the insecticide won't bind and work. In the case of CSFB and pollen beetle, we think that we mostly have metabolic resistance in the UK, but in peach potato aphids it's target-site resistance."

Because of the widespread resistance to pyrethroids, Sacha feels more could be done to explore other options. "Parasitoids, such as parasitic wasps and ground beetles, are very little studied, but these are potential predators to pests such as CSFB adults and larvae.



*Sacha White notes that one possible reason for the increase in RWSW is because pyrethroids are potentially being used less.*

"We're at a stage where there's a real change of status in how we deal with pests and it's becoming more important that we understand them," he adds.

One pest that Steve hasn't yet tested for its resistance to pyrethroids is RWSW. "It would be really interesting if we can acquire some live samples to put the pest through the same tests we've already conducted on insects such as CSFB. If growers or agronomists identify RWSW adults that appear resistant to pyrethroids, they can get in touch through Rothamsted's website."

Sacha notes that one possible reason for the increase in RWSW is because pyrethroids are potentially being used less. "It could well be that when pyrethroids were being used against CSFB, they were having some control of RWSW which we were unaware of. Equally, the overuse of pyrethroids may have wiped out natural enemies, which were otherwise controlling RWSW."

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*Instances of rape winter stem weevil can be sporadic and it seems to be worse where plants are already stressed from another issue.*

► stem later and are better placed to cope with an infestation.”

### Back to basics

As well as selecting varieties with good autumn vigour, she suggests focusing on nutrition, making sure the soil pH is correct, and areas of compaction have been dealt with, so the plant has the best opportunity to establish well. “And not forgetting waiting until there’s moisture to drill to allow the crop to grow up straight away. This season, the conditions have been really favourable, allowing growers to plant OSR into good moist seedbeds.”

In other cases, growers may

have opted to up their seed rate to achieve more plants/m<sup>2</sup>, but Alison feels this can have a negative effect on yield as plants don’t branch as well. This can result in a lot of plants with thin stems which are more vulnerable to attack. “The thinner stems will die prematurely, whereas thicker stems can cope with some level of infestation.

“Greater branching from plants drilled at lower seed rates may also be beneficial as there’s less likelihood of larvae travelling down the leaf petiole and making it into the main stem. Where there are less plants, so long as they’re healthy, they’ll grow to take

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## Identifying pests

Confusion surrounding insect damage to OSR has led to Agrii establishing a project aimed at identifying pests, their numbers and behaviours.

“We had a lot of queries this year from people asking what pests were actually causing damage to their crops,” explains the firm’s Dr Ruth Mann. “There’s a bit of uncertainty when it comes to identifying certain pests, especially CSFB and RWSW larvae. So we decided to try catching adults to identify and count them, to hopefully determine what instances of CSFB we’re getting and what might be cabbage stem weevil or RWSW.”

The project has started to be rolled out across a number of Agrii’s iFarms up and down the

country, with the aim of operating on 20-25 in total. At all sites, yellow traps will be used and monitored manually, but on two of the sites Magic Traps from Bayer will be installed which capture images of the insects and identify them using AI.

Ruth hopes that by understanding insect species, numbers and behaviour this may help growers with their IPM and chemical applications in future. “When applying pyrethroids a lot can be down to timing. So especially now, with the Sustainable Farming Incentive offering payments for growers to not use insecticides, it’ll hopefully allow you insight into when larvae are entering the plants and aid decision-making regarding this.”

up the space. Some of my best crops have been those that looked the thinnest in the spring.

"Insecticides really should be the last resort once all other management techniques have been employed," she adds. ■

## Cover crops: a financial alternative?

In instances where an OSR crop doesn't survive, rather than waiting until spring to get a crop in, cover crops can provide ground cover, at the same time as helping enrich soils and build organic matter.

Improved understanding of the benefits cover crops can bring to soils means more growers are adopting them into their cropping systems, explains Agreeena's Ed Reynolds. "This new discipline comes with certain requirements to avoid problems, including a collaborative approach with agronomy advisors, graziers and the drill operator, to increase the chances of success."

The cost of growing cover crops doesn't just involve the seed and drilling costs, but it also requires planning a new operation directly after harvest that hasn't been part of traditional farming practices in the past, he says. "Done well, the benefits are significant and should be viewed as an investment in soils."

The planning of catch and cover crops should be done based around what the grower is trying to achieve, says Ed. "For example, the species mix can help with compaction busting or shading out annual weeds. Specific mixes should be planned to avoid antagonism with following cash crops, and to work for specific soil types and dates they'll be drilled.

"Top growth, digestibility and frost hardiness are key traits for graziers, but management of above ground biomass is key to avoid negatively affecting the establishment of the next cash crop."

The termination methods used to destroy cover crop have recently been discovered to be directly related to the availability of nutrients held in the plant for the following cash crop, he explains. "The carbon-to-nitrogen (C:N) ratio of the selected cover crop mix and



*Done well, the benefits of cover crops can be significant and should be viewed as an investment in soils, according to Ed Reynolds.*

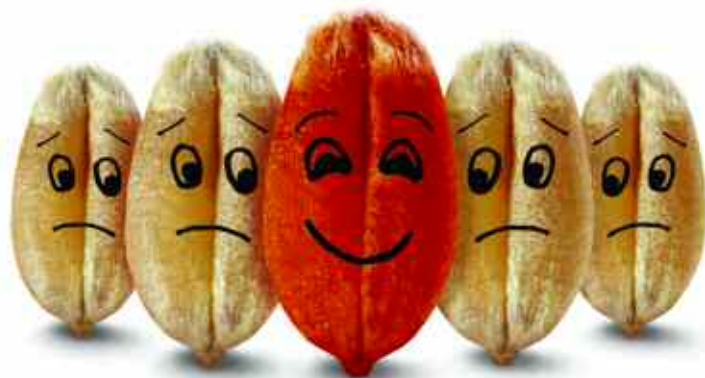
the growth stage at termination, are also big factors to avoid the starvation of nitrogen to the new cash crop — known as immobilisation."

As part of the new landscape of financial recognition for farmers growing cover crops which benefit soil, water and air, this can generate monetary income, says Ed. "The AgreeenaCarbon soil carbon programme is designed to recognise catch and cover crops as one of the key management practices that affect the removals of carbon from the atmosphere into farmers' soils. There are three different categories within the programme which are selected based on date of termination, and the cover crop mixes have to be deliberately established."

Conventional growers are increasingly looking at the benefits of cover cropping, such as reducing the leaching of nitrates, reducing the risk of soil erosion and keeping a living root in the soil to feed soil microbes, he adds. "These benefits can now be backed up with financial income from programmes that offer a new income stream."



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