

The can as last option

“The environment is even more important than it's ever been.”

Technical Agronomist Conference

The 2019 AHDB Agronomists Conference was billed as ‘the conference that would change the way delegates thought about agronomy’. CPM was there to find out if it will.

By Lucy de la Pasture

Integrated Pest Management (IPM) is a concept that's been around for a couple of decades but embracing it fully has probably never been more important to British agriculture than it is now, was the view of arable farmer and chair of the NFU combinable crops board, Tom Bradshaw, who was speaking at AHDB's annual Agronomists Conference, held in Leicester last Dec.

He told delegates that the challenges facing agriculture were very real — with continuing loss of active ingredients, increasing resistance and the public perception of plant protection products all to contend with.

“Looking at data from the Pesticide Usage Survey (PUS), the area being treated with pesticides is on the rise. The weight of pesticide applied has fallen dramatically and continued to trend downwards. But if you take out sulphuric acid, which was lost in the 2000's, then it can be seen that pesticide

use is beginning to rise in recent years.”

So why is this significant? Tom points out that the PUS data is the only statistic available, and a rise in pesticide use is difficult to defend politically. He suggested a change of mindset when agronomists are making spray decisions, especially marginal ones, challenging them ‘not to become a statistic’.

Green Brexit

The political backdrop in the UK is changing, with a ‘Green Brexit’ on the cards, he said. The landscape is going to be shaped by a new 25-year Environment Plan, a review of the National Action Plan, the EU review of how Member States are implementing the Sustainable Use Directive (which has IPM at its core) and an increasingly precautionary approach from Defra, ECP and CRD.

“All of this means the environment is even more important than it's ever been. There's an opportunity for agriculture to tell our story but we have to be able to proudly demonstrate to the public how food is grown, with nothing to hide.”

“We need to be on the front foot. For the registration of plant protection products, the populist view has become the driver rather than science. NGO's are very effective lobbyists, so we need to learn from them and be proactive rather than wait for Defra to lead the way.”

Tom believes key balancers to the debate surrounding plant protection products will be farm assurance, the Voluntary Initiative (VI),

transparency, science and IPM. “New breeding techniques are critical to IPM and there's a lot we can learn from the organic sector. We need to be able to demonstrate that the can is the last piece of the jigsaw,” he commented.

“We have to get much better at evidencing the use of IPM on our farms. We're already doing a lot of the thought processes required by IPM but we're not recording it as part of the narrative of growing crops.”

Illustrating this, Tom points out that when asked how a crop of wheat is grown, most growers would probably describe the inputs to the crop instead of starting at the beginning, which would likely have been ▶



Tom Bradshaw told delegates that we have to be able to proudly demonstrate to the public how food is grown.

Getting cover crop destruction right

With no second chance and some species much harder to kill than others, winter cover destruction needs to be right first time to avoid compromising spring crop establishment and performance.

Spray-off Early

Winter covers should be sprayed-off 4-6 weeks ahead of spring drilling to give time for the biomass to reliably die back.

Match Rates to Species

Glyphosate rates should be geared to the hardest-to-kill components of the mix – particularly brassicas and legumes.

Use the Most Active Formulations

Modern formulations proven to work effectively under colder conditions and least affected by rainfall should be a priority.

Employ the Best Spraying Practice

Water volumes, nozzles, pressures and forward speeds should be geared to the most effective penetration of canopies.

Prioritise Early Grassweed Control

An approved glyphosate with the pre-em should be considered to deal with grassweeds emerging after cover removal.

TRAFFIC LIGHT GUIDE TO COVER CROP CONTROLLABILITY

	EARLY SPRING	MID SPRING
Yellow Trefoil	Red	Red
Sainfoin	Red	Red
Winter vetch	Yellow	Red
Lucerne	Yellow	Red
Spring vetch	Yellow	Yellow
Chicory	Yellow	Yellow
Leafy turnip	Green	Yellow
Oil radish	Green	Yellow
Stubble turnips	Green	Yellow
Winter oats	Green	Green
Winter rye	Green	Green
Triticale	Green	Green
Westerwolds	Green	Green
Buckwheat	Green	Green
Mustard	Green	Green
Phacelia	Green	Green
Borage	Green	Green
Rocket	Green	Green
Diakon tillage radish	Green	Green
Smart radish	Green	Green
Linseed	Green	Green
Berseem clover	Green	Green

From 4 years of trials (2014-2018) with modern Roundup glyphosates under wide range of establishment and winter conditions

STEWARDSHIP

Where any grassweeds survive cover crop destruction, the ground should be cultivated before further glyphosate treatment to minimise the risk of resistance development.

Agronomist Conference



Jenna Ross described what she'd gleaned from her recent Nuffield Scholarship studying slug control.

- ▶ selecting a variety with good disease resistance and the crop rotation.
- "Making a success of IPM will require further research and development into IPM solutions but most of all we need pioneers, growers who aren't afraid of making mistakes because it's from mistakes that valuable information can be gleaned."
- Throughout the first day of the conference, speakers highlighted the importance of understanding a pest or disease when considering an IPM solution to the problem.

Dr Alan Dewar described BYDV as a disease which hasn't had much of an IPM focus because chemistry was, until recently, available to control it. The loss of neonicotinoid seed treatment, Deter (clothianidin), and the development of pyrethroid resistance has changed this.

BYDV infection

The first step in an IPM strategy is to understand the problem, explained Alan. "BYDV infection is caused by several strains (some would say 'species') of a luteovirus that are all transmitted by aphids. The most common strains in the UK include PAV, MAV and RPV.

"The aphid species mostly responsible for BYDV are bird cherry oat aphids (*Rhopalosiphum padi*) and grain aphids (*Sitobion avenae*). The former carries PAV and RPV and is generally well-controlled by pyrethroids, though a pyrethroid resistant/tolerant clone has recently been recorded in Ireland."

Aphids can reproduce by asexual and sexual reproduction, with asexual forms being mostly responsible for the spread of BYDV infection in crop in the UK. Sexual reproduction of the bird cherry oat aphid is affected by latitude, so is more prevalent in



In practice, growers and agronomists assume that the only good aphid is a dead one, but this needs to change, said Alan Dewar.

Scotland than in southern England, he added, hence less risk of BYDV up there.

"Grain aphids are the more dangerous of the two species, even though numbers are lower, as they can remain in cereal crops throughout their lifecycle. They carry MAV and PAV strains, and, in recent years, pyrethroid resistance has become an increasing problem, with circa 50% of the



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southern English population containing the resistance genes.”

According to PUS statistics, aphids are the biggest target for insecticides in winter cereal crops, accounting for 95% of applications in winter wheat and 99% in winter barley. Alan stressed that the approach to spraying for aphid control needed to change, but that in order for that to be possible better information is needed.

“Thresholds to suppress BYDV are variable and there’s a lack of data to underpin their accuracy e.g. 10% of plants infested. So, in practice, growers and agronomists assume that the only good aphid is a dead one. Therefore, in the absence of seed treatments, sprays are often applied when the first aphid is seen.

“To change this approach there needs to be better information on the threat of virus infection, including infectivity indices for each region in the country using trap data. This in turn requires information on the proportion of those aphids carrying viruses and the proportion of those aphids that are resistant to pyrethroids to guide the choice of insecticides. We have the technology. We just need to apply it,” concluded Alan.

Nuffield scholar Dr Jenna Ross brought

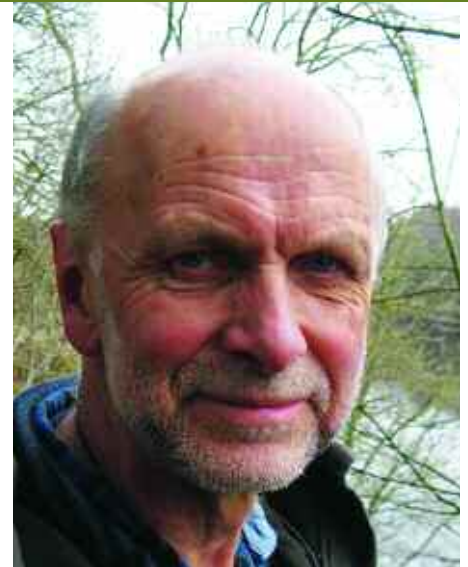
a breath of fresh air in her presentation ‘riding the slime wave.’ She was prompted to apply for a Nuffield Scholarship after returning to the UK after a period working overseas.

Nuffield scholarship

“I realised nothing had changed in UK slug control for years. So a Nuffield scholarship enabled me to travel to 18 countries over six months to visit researchers, growers, academics and industry, gathering information about the future of slug control.”

One of Jenna’s key conclusions was that an IPM pyramid should be tailored to each field. “It needs to consider the agronomic impact of slugs and any cultural control opportunities, with focus on monitoring and reviewing threshold levels. Each field requires record keeping and forecasting of slug threats for up to three years in advance.

“IPM strategies should consider physical barriers to slug entry into crops, as well as biological (such as nematodes) and biorationale controls, such as peppermint and clove oils. The last consideration in the IPM pyramid is slug pellets, though ferric phosphate can also be considered a biorationale product.”



Gordon Port said the thing to remember about slug pellets is that they’re not very effective.

Dr Gordon Port, researcher at Newcastle University, went on to explain that slug pellets were actually fairly inefficient because of the way slugs feed.

“On average it takes four hours for a slug to find a pellet in arena trials, with only about 60% of slugs being killed in a field application.”

IPM strategies begin with avoidance of ▶

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Jonathan Blake advocated an IPM strategy using mixtures and alternations of fungicides with different modes of action, from different fungicide groups.

▶ the pest by assessing risk factors, such as previous cropping and cultivations, he said. "Long term forecasting isn't reliable, but you can monitor, especially just before the risk period. Having a good understanding of conditions when slugs are active, when the soil surface is moist and temperature above 5°C, optimises trapping or treating the pest.

"Be aware of the limitations of slug pellets

and always keep interventions at levels that are necessary, which means considering reduced doses and only treating hotspots in fields."

ADAS principal research scientist, Jonathan Blake, gave an overview of the IPM considerations when making fungicide choices in cereals and oilseed rape. He advised matching fungicides to the primary disease risk, which depends mainly on variety, sowing date, location and local weather conditions.

Fungicide resistance

"Mixtures and alternations of fungicides with different modes of action, from different fungicide groups, are often most effective and reduce the likelihood of fungicide resistance developing in pathogens.

"Resistance poses a significant threat to the ongoing performance of fungicides. It's essential to take resistance management into account when planning fungicide programmes," he commented.

Jonathan went on to present the fungicide performance update for key active ingredients in wheat. "The results for azoles indicate that we've now reached the point where there's been little further evolution in the septoria population, according to the results of Rothamsted Research early

season monitoring in 2019, with a possible plateau in the 'older' azole activity now reached."

In the SDHIs there was a smaller shift in sensitivity of the septoria population than in the previous season, in spite of the increased disease pressure observed in the field in 2019. He noted that the performance of Ascra XPro (bixafen+ fluopyram+




Grain aphids are the more dangerous of the two species that carry BYDV as they can remain in cereal crops throughout their lifecycle.

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Agronomists listened to speakers highlighting the importance of understanding a pest or disease when considering an IPM solution to the problem.

prothioconazole) looked to be holding better than some of the other SDHIs, tracking much closer to the best performing fungicide, which was new approval Revystar (mefentrifluconazole+ fluxapyroxad).

A workshop session with Dr Roma Gwynn, a biopesticide strategist at BioRationale, put the IPM credentials of attendees to the test by asking them to put together a winter wheat crop protection programme using only IPM principles and registered biopesticide products.

“More than 40% of plant protection products are now biopesticides and it’s a market that’s growing very fast. IPM has been compulsory under the Sustainable Use Directive since 2014 and increasingly biological technology is best practice.”

Roma is very clear that for a product to have biopesticide properties, it must have a MAPP number. “There’s a flood of biostimulants products on the market making various claims but it’s illegal to use a product that isn’t registered as a biopesticide for anything other than alleviating abiotic stress,” she said.

The room full of agronomy veterans could have easily turned out a conventional input strategy but took a while to warm to the task of growing a cereal crop without the usual armoury of pesticides to fall back on and, for most, only a vague knowledge of the biological alternatives.

The outcome of the exercise showed applying IPM principles was something the agronomists

were doing anyway, using cultural strategies such as variety selection and delayed drilling, but it also highlighted that thinking through the entire growing cycle of the crop with an IPM mindset could make a meaningful contribution towards reducing the dependence on conventional inputs.

Roma has put these strategies to the test in the Crop Health North project, which has conducted replicated trials over three years at sites in Nafferton, Cockle Park and Stockbridge Technology Centre. The aim has been to see how an IPM and a 100% biological programme would stack up against a conventional input programme, she explained.

“In 2017 and 2018 there were no significant yield differences between treatments. In 2019 there were small differences in treatments, which also included high and low nitrogen regimes, and higher quality where the biologicals were used.

Roma believes the results underline the potential for biologicals in the arable sector. “We used already-approved UK biological technology products from horticulture — not ones developed specifically for wheat pests and diseases. What would results have been if we had product especially designed for wheat?”

Given the changing landscape of crop production, it’s an interesting question given the parity of performance from a biological approach in these trials, over three very different seasons. ■



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