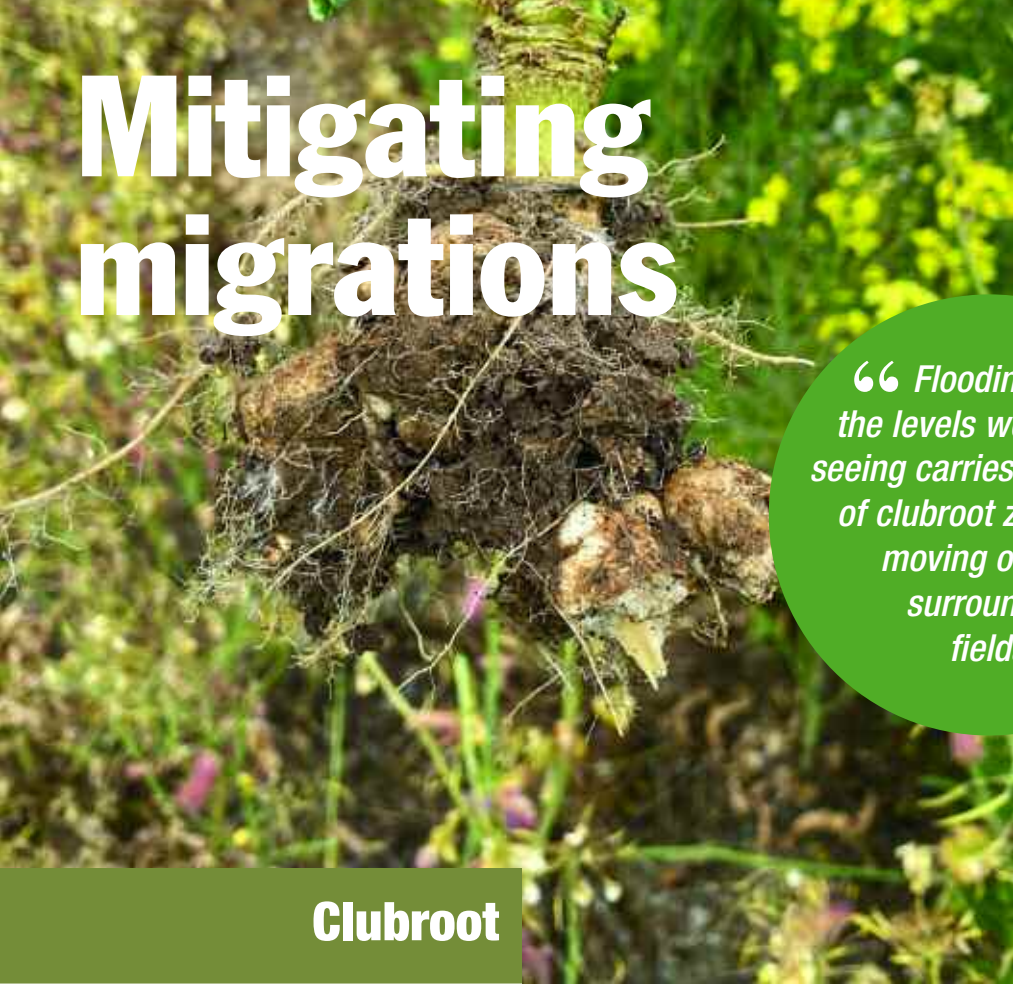


Mitigating migrations



Clubroot

With wet weather and flooding commonplace during the past few months, clubroot zoospores are at high risk of migration. CPM looks at the importance of crop husbandry and on-farm hygiene in preventing the spread of the disease and how this can work hand-in-hand with genetics.

By Janine Adamson

It's a scientific fact that clubroot zoospores move through soil water, and of course, what's been in abundance during the past six months? — soil water.

SRUC's Professor Fiona Burnett says although there's been little development of the pathogen genetically-speaking recently, what makes this year especially challenging is the conditions. "A warmer, wetter autumn certainly favours clubroot, which is also a time when there's so much going on for oilseed rape in terms of establishment," she explains.

“ Flooding at the levels we've been seeing carries a high risk of clubroot zoospores moving out into surrounding fields.”

"But equally, flooding at the levels we've been seeing carries a high risk of clubroot zoospores moving out into surrounding fields. Clubroot is always with us — it's not particularly novel — but it remains devastating."

Current disease status

Originally perceived as a problem for Scottish OSR growers, where 10 years ago it was understood 50% of land carried clubroot infection, the disease still occurs for the first time in new fields each year.

Frontier's northern combinable crop production specialist, Ben Frost, says clubroot has indeed become a prevalent topic of discussion among growers. "Although there's not a lot that we can do about flooding, there are plenty of clubroot management techniques which can be implemented. And, it's important to remember that these aren't just about clubroot control, they're simply good farming."

Acknowledging growers are unable to control the weather, Ben explains that during a more usual season, optimising field drainage would be an obvious means of minimising zoospore soil water migration; there's also the role of soil pH.

"Agricultural lime decreases the chances of infection because clubroot prefers acidic soils — aim for pH 6.5 and above," he says. "Another important in-field action is early control of host crop weeds and volunteers. This includes cruciferous species such as

charlock and shepherd's purse, and not forgetting volunteer OSR."

A positive which Fiona highlights is that most farmers have already taken onboard the importance of widening rotations.

"The clubroot pathogen has a half-life of around 3.5 years.

We've seen growers extend their rotations in response to this, which will certainly be helping to keep a lid on the problem," she says.

However, Ben raises the potential conflict of cover crops, which have become commonplace across many farms due to their soil health benefits. "Although many farmers

have moved to wider rotations, the caveat is that these often come with cover crops in the mix. That means being conscious to avoid cruciferous species such as mustard, if there's a clubroot problem, will be essential."

Despite representing the plant breeding industry, promoting good crop husbandry and cultural control techniques is something that Chris Guest champions.

Chris, managing director of LS Plant Breeding (soon to be NPZ UK), says best practice not only helps to keep clubroot in control, but also preserves varietal traits.

"At the moment, all existing clubroot-resistant varieties are based on the Mendel gene, but recently there have been reports of differing pathogen strains overcoming certain elements of the Mendel resistance.

"Work continues to bring new material to the UK based on an alternative resistance mechanism, but in the meantime, we have to ensure the combination of cultural controls and correct use of resistant varieties to preserve those remaining sources of Mendel ▶



Although many farmers have moved to wider rotations, the caveat is that these often come with cover crops in the mix, says Ben Frost.



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Jim Knightbraid doesn't believe growers have speculatively drilled clubroot varieties without good evidence of a clubroot threat.

► resistance," he explains.

Frequent use of resistant varieties or use in heavily infected soil increases the risk of genetic break-down as seen with hybrid OSR, Cracker, says Fiona. "A variety can't solve a clubroot problem alone. If you do have a problem, a resistant variety can help but you have to keep up

with the standard cultural control techniques," she adds.

Frontier's seed business development manager Jim Knightbraid says the promise of new resistance genes will provide considerable reassurance for growers. "There is evidence we're putting the Mendel gene under pressure so we have to safeguard what we have available — really understand how, when and where we're drilling clubroot tolerant varieties.

"That said, I don't believe growers have speculatively drilled clubroot varieties without good evidence of a clubroot threat— it's not a decision which they would take lightly due to the historic yield penalty of clubroot tolerant varieties. We're simply seeing more clubroot in the field," he adds.

But in the meantime while breeders are busy refining a new resistance mechanism, where does that leave growers? Jim says due to genetic advances in

Keeping clean

SRUC's Professor Fiona Burnett says although it might sound obvious, having increased contractors on farm whether that's for agricultural purposes or not, means field hygiene could take a back-seat.

"Clubroot and PCN go hand-in-hand — the control of both relies on good field hygiene. Having a conversation and reminding contractors to adhere to best practice could prove worthwhile this season," she stresses.

Whether it's laying pipes, updating pylons or conducting standard field operations, all machinery should be thoroughly cleaned on hard standing, she adds.

The aim is to minimise movement of infected soil and organic material both within and between fields. This is because according to the AHDB, on average, farm equipment transfers 250kg of soil, most of which is deposited close to



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gateways and field entrances.

"A combine can easily carry half a tonne of soil and whereas some contractors use good field hygiene, not everyone is aware of the full implications," she concludes.

double low OSR hybrids (low erucic acid glucosinolate content), a yield gap has developed which leaves clubroot-resistant varieties lagging behind. However, a new Mendel-based OSR is on the horizon which could change the game.

“The two leading hybrid OSR varieties with clubroot resistance came to the market with very competitive yields, but that was some time ago and they now find themselves 5-6% lower yielding than most double low hybrid varieties. It does feel as though it’s time to have a new clubroot variety which can keep up the pace.”

Candidate variety

Jim believes this is offered in candidate variety Crusoe — a new clubroot-tolerant hybrid OSR which offers a competitive yield — 105% gross output. “In the first two years of Recommended List variety trials, in the East and West region, Crusoe’s yield was on a par with many of the leading double low varieties.

“And relative to the existing clubroot-resistant varieties, Crusoe is a strong all-rounder particularly in its stem canker resistance score (8) which is a considerable improvement in this space,” says Jim. “Furthermore, Crusoe boasts TuYV resistance which has almost become a prerequisite of the double low varieties.”

According to Chris, Crusoe is a step change for LSPB’s clubroot offer. “It’s a game-changer because it comes without compromise on the disease scores or yield, which is where clubroot-resistant varieties have fallen short in the past. With that in mind, it’s even more crucial that we look after Crusoe to preserve its future,” he says.

But where the variety has really impressed is with its growth habit, suggests Jim. “Rather than planting OSR early to overcome cabbage steam flea beetle pressure, some growers are opting to drill around the second week of September, after the



Work continues to bring new material to the UK based on an alternative resistance mechanism, says Chris Guest.

main CSFB migration.

“Evidence suggests that Crusoe’s growth habit suits this scenario and our early on farm experience supports this. Equally, later drilling is one of the techniques which helps to minimise clubroot pressure,” he adds.

Having received an early release of Crusoe seed for testing and evaluation purposes, both Jim and Ben believe it shows genuine promise. “Of the limited seed which was available, six growers were willing to try Crusoe despite it being some way off the OSR RL,” says Jim. “This suggests there’d be little issue in terms of uptake when Crusoe receives a wider release.”

Chris says ultimately, OSR growers require access to the best genetics for their particular situation, in this case, clubroot-resistance. “But this has to be joined by strong agronomic characteristics which give the crop the best possible chance, to support OSR in its role as an important break crop within farm rotations.”

Ben confirms OSR’s importance: “It’s earning potential remains good and the opportunity for grassweed control as a result of growing OSR is fundamental in some areas of the country. Although admittedly, CSFB remains the biggest problem at hand for most,” he concludes. ■



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