

Mitigating emerging threats

“The most important aspect is avoiding going back-to-back with the same product.”

PROFESSOR MARK STEVENS

Trials to unlock greater understanding about cercospora and beet moth should help growers with control of the two threats in future years. CPM reports.

By Mike Abram

In a season that’s proving challenging for sugar beet growers, pest and disease pressure are ramping up to add to the difficulties from the drought-like conditions experienced during the past three months.

A small silver lining, is that it should help BBRO to gain further knowledge and understanding about two emerging threats – cercospora leaf spot and beet moth.

This year, the first signs of powdery mildew and rust were found in beet crops in the second week of July, with cercospora expected to follow ‘imminently’, according to Professor Mark Stevens, BBRO’s head of science.

“These [hot and dry] conditions are potentially favourable for cercospora, but, we do know it requires moisture as well as warmth. The two go hand-in-hand for it to be of consequence,” he says.

Perhaps ironically, this could mean growers who’ve been fortunate enough to catch showers in the past few weeks, could be more at risk from the disease than those who haven’t, he suggests.

This is because the latest research suggests that spores require free water to germinate and to infect plants, rather than just high relative humidity. Consequently, even some heavy dews which become more likely in August and September could potentially help to trigger infection, along with increasing the threat from rust.

INVESTING IN RESEARCH

With early intervention through effective fungicide use crucial to controlling infection, BBRO is investing levy payers’ funds into two systems to help monitor and forecast cercospora, along with new trials testing varietal resistance.

Dr Alistair Wright, BBRO crop

protection scientist, highlights that monitoring has been taking place since April. During this, cercospora spores were found by the end of June at five sites – Bungay in Suffolk on 17 June, Corby Glen in Lincolnshire the following week, and East Ruston on



Monitoring work

It’s too early to say whether the cercospora fungus is adapting to a different environment in the UK, says BBRO’s Dr Alistair Wright.



New trial work

Levy payers' funds are being invested in two systems to help monitor and forecast cercospora, one which involves using 'Spornados'.

the northeast Norfolk coast, Morley in central Norfolk and Fotheringhay near Peterborough on 30 June.

"Spores on the air don't necessarily mean infection – cercospora

requires temperatures in the high 20s and prolonged periods of free water," explains Alistair.

Monitoring is through a network of 20 CropWatch sites covering the sugar beet growing area. Spores are collected at each location using a solar energy-powered 'Spornado' vacuum system, hoovering the air for small particles that are collected on a fine mesh. The cartridge is changed every Monday, with the used cartridge sent to BBRO for analysis.

"The spores are then germinated on the mesh for about 24 hours to bulk up the amount of DNA in the sample," adds Alistair. "Using diagnostics such as qPCR, we can detect the presence or absence of cercospora spores."

Each site is also assessed for symptoms of active lesions, with both results posted onto a map on BBRO's CropWatch spore monitoring webpage. "We're also collecting weather data – canopy and air temperature and humidity – because we think

there'll be a difference between the two in terms of rainfall, leaf wetness and incoming light," says Alistair.

"The plan is to then refine our forecasting model on predicting disease so that it's more UK specific."

Currently, the prediction model being used was developed by researchers from North Dakota in the US, looking for periods of humidity over 90% and high temperatures. A matrix then calculates daily infection values during a 48-hour period, based on the number of hours in a day that relative humidity is above 90%, and the temperature.

Higher temperatures and longer periods of high relative humidity increase the daily infection value, with a score of seven or more meaning there's a high risk of infection.

It's too early to say whether the cercospora fungus is adapting to a different environment in the UK, or whether the model can be improved, for example, by using leaf wetness or another parameter, points out Alistair.

Emergency authorisation granted for beet moth insecticide

An emergency authorisation for a single application of Coragen, the diamide chlorantraniliprole, has been granted for use against beet moth

Dry weather in June and July has raised the threat of beet moth infections, with increasing fears of a repeat of 2022 when infections from a second generation caused widespread damage.

In-season rain helps beet to develop an erect, turgid canopy, which acts as a barrier for beet moth, highlights BBRO's Professor Mark Stevens. "Rain also suppresses moth activity."

In contrast, a flat, wilted crop is attractive to beet moth, exposing the sugar beet crown for the moth to lay its eggs. "Weather patterns like we've had this year are why we've applied for an emergency authorisation."

The only alternative available is to use pyrethroid insecticides, but doing so comes with some drawbacks, he says. "We get very nervous about the use of pyrethroids because of the impact on beneficial insects."

BBRO monitoring using pheromone lures found incidences of beet moth in crops, while aphids which could transmit virus yellows were

still present, he adds. "Applying pyrethroids will wipe out all the beneficials, and as our trials data has shown again this year, subsequently, aphid numbers go through the roof."

Deciding when to spray Coragen is not straightforward, acknowledges Mark. Thresholds aren't well-developed, with perhaps the most realistic being 10% of damage, as suggested by French researchers.

"But if you look at literature, the best way to achieve efficacy from diamides or any other insecticides, is at egg hatch, before the larvae burrow into the midribs," says Mark. "Otherwise, how do you get efficacy if you're lost your target?"

Timing is further complicated by the eggs being difficult to see on leaves because of their minute size, he adds. "It's difficult, but our best advice currently is to apply when damage reaches 10% akin to the French recommendation, but further work is required."

While undesirable, an outbreak



Increased threat of beet moth infections

According to Professor Mark Stevens, weather patterns as experienced this year are why BBRO has applied for an emergency authorisation for Coragen.

of beet moth would allow BBRO to carry out field trials to obtain more information about control measures, given during the previous two seasons, low incidence hasn't allowed for much investigation, explains Mark.

"Alan Dewar is contracted to undertake some sequential insecticide trials. We've been doing some pot studies, used the pheromone traps, and are working with British Sugar to get grower experiences using strips to see what the benefit of using diamides is."

Forging a future

Five-year strategy for BBRO in development

A new five-year strategy for the future direction of BBRO will be in place by this autumn, states new managing director, Stephen Swainston.

This follows the previous three-year 'Delivering for our growers' strategy, which covered 2022 through to this year, he adds. "The new strategy is still a work in progress, but once it's agreed by the BBRO executive board, we'll communicate it clearly. I'd like that to happen by September."

One area that's likely to be a focus is the development of new tools, he says. "A significant part will be the development of a new website with new usable functions, where growers can put in their own farm details and

get answers, calculations or values out.

"That could be for helping to understand what chemistry to use, pest or disease mapping, or water applications. We'll also improve our website to improve search functionality and usability."

He says the bigger picture is making sure the sector is both profitable and sustainable. "BBRO is very much involved in helping to achieve that, particularly doing the trials, tests and science that validate what people believe is best practice.

"That should help to provide the data to affect change and ensure the long-term sustainability of sugar beet growing in the UK," concludes Stephen.



Broader thinking

BBRO's Stephen Swainston says the bigger strategic picture is making sure the sector is both profitable and sustainable.

► "We have data from four sites last year too, but it'll be a case of constant checking; if cercospora mutates significantly, we can adjust."

Where BBRO is able to check for mutations is around the sensitivity of cercospora to fungicides, and especially whether spores are resistant to strobilurin fungicides. "We're catching mixtures of sensitive and resistant isolates to strobilurins, as found in products such as Priori Gold and Angle (azoxystrobin+ difenoconazole).

"We've seen a pattern during the past two seasons that with the first flush, most are sensitive, and then when you apply a strobilurin, you wipe out the sensitive population and leave behind the resistant ones."

That kind of knowledge highlights the importance of rotating actives, says Mark. "The most important aspect is avoiding going back-to-back with the same product."

As well as the strobilurin-containing products, other options include azole and SDHI fungicide co-formulations Revystar (mefentrifluconazole+ fluxapyroxad) and Caligula (fluopyram+ prothioconazole). The latter is restricted to one application after 1 September, while the former can be used twice in a programme.

Growers will have their own views about which to use and in what order, believes Mark. "But from all of the work we've done, we do see good disease control. One spray tends to give an uplift of around seven adjusted t/ha,

and that doubles or even nearly trebles with two sprays in some seasons, so there's a value to disease control.

"What I don't want to happen is a problem with resistance – that's the importance of the work we are doing because ultimately, we want to be able to fine-tune information to help growers appreciate what's in their crops."

VARIETY SCREENING

The other project BBRO is undertaking this season is a screen with 18 varieties for performance against cercospora. A site at Sutton Bonington, on the edge of the beet growing area, is being inoculated with cercospora grown in the BBRO laboratories in Norwich.

"It's a new technique – usually you'd inoculate using dried leaves, but this year we're trying a method where we'll spray live spores."

To try to ensure success with the application, the trials team at the University of Nottingham will inoculate on a day with a high temperature and spray water regularly through the day after, to keep relative humidity and moisture high, adds Alistair.

The trial uses eight replicates – four inoculated with cercospora, while four will be left with natural infection and receive a full fungicide programme.

Yield data will be taken to compare with disease scores from Recommended List trials. Alistair says he wants to know how the yield response compares with visual disease scores in trials where there's often very low levels of cercospora.

He adds that's particularly important with the first variety with tolerance to cercospora, KWS Chyma, now available in the UK, with others likely to follow, he concludes. ●

On the beet

Whether it's virus yellows, cercospora, beet moth or diseases transmitted by leafhoppers, the agronomic challenges to growing sugar beet require just as much technical expertise and knowledge as ever.

Add in other factors such as reducing the carbon footprint of beet growing, and this makes a timely series of articles – sponsored by BBRO – exploring how research is helping UK growers to maximise yields, quality and the profitability of their crops.

CPM would like to thank BBRO for providing expert insight and knowledge, and for the privileged access to the individuals involved.

British Beet
BBRO
Research Organisation