BBRO ANNUAL REPORT

2023-24 www.bbro.co.uk

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Head of BBRO
Dr Vicky Foster
2023-2024

Investment

In 2023 BBRO continued to work hard to deliver against our 3-year strategy 'Delivering for our Growers' (2022-2025). With the increased levy from 14p/tonne to 18p/tonne (1st April), we were able to start several new projects; cercospora monitoring using the Spornado spore traps, beet moth pheromone traps, virus yellow control with endophyte grass, soil health and cultivations, and monitoring of carbon emissions using flux towers. You can read some of the project updates from the team in this annual report. Thankfully it was a much better year for field trials than 2022, with fewer being lost due to adverse weather. Whilst our glasshouse and growth chamber facilities help mitigate some of the risk, we only get one shot per year for field trials, so trial losses are expensive and cause delays in getting key findings out to stakeholders.

We were able to invest in some new equipment in 2023 to ensure we can deliver with better flexibility and efficiency. These included a good second-hand tractor, new weather stations for field trials with improved data loggers and sensors, a penetrologger with GPS to measure soil resistance down to 80cm and a Gasmet to measure CO_2, N_2O and CH_4 emissions and a fume cupboard for the field team to improve health and safety when handling chemicals on site.

Meeting industry needs

The virus yellows forecast for 2023 predicted that 67.5% of the crop was at risk from virus yellows. On this basis we received an emergency authorisation to use Cruiser SB which 60% of growers opted for. However, its use was only allowed in accordance with strict guidelines and a stewardship package led by BBRO, enabling us to gain a greater understanding of the effects of neonicotinoid seed treatments on soil and vegetation where Cruiser SB was used. The anticipated aphid migration did occur as predicted, and although cold northerly winds in the middle of May 2023 supressed aphid migration in East Anglia, the use of Cruiser SB and foliar sprays did help minimise the occurrence of virus yellows in the national crop, preventing financial losses.

Continued development of the team was a high priority, especially with some new faces in BBRO. We had a big push on health and safety, I even completed the IOSH certificate myself! One of the benefits of having the science team on the Norwich Research Park is the networking and collaborations across the park. Collaborating with the John Innes Centre, Earlham Institute and Quadram Institute has enabled the team to further develop diagnostic skills and capabilities in-house, e.g. for cercospora and rhizomania detection. A number of exciting new projects are also in the pipeline for 2024 as a result of *ad hoc* conversations in the canteen!

Before I sign off, I want to pay my greatest respects to Dr Simon Bowen who we lost early 2024. Our KE programme continued to evolve under Simon's leadership, and he is missed dearly by the team and wider industry.

Head of Science
Prof Mark Stevens

As Head of Science Mark oversees all BBRO internal and external research projects.

Beet Moth

In 2023, the BBRO commenced a new project to monitor and assess possible control strategies for beet moth. To date, we have limited information on its life cycle under UK conditions and its impact on UK sugar beet and so BBRO instigated a new 3-year project to monitor the adult populations and potentially identify new control strategies.

BBRO introduced commercial pheromone traps at the 12 BBRO trial sites from May until September 2023. Sites were visited regularly throughout the season and the number of moths caught on the sticky traps recorded; the pheromone lure was replaced monthly to maintain the effectiveness of the traps throughout the trapping period.

These data show that the lures attracted adult moths to the traps, although it would appear that more than one moth species was being caught. Therefore, further fine tuning of the pheromone may be required and BBRO is working with partners to evaluate alternative pheromone systems. Diagnostic methods may also be required in the future to help confirm the different micromoth species.

In early September, sporadic beet moth damage was reported by growers and agronomists across the four factory areas. In most cases, damage tended to be superficial compared to 2022 although it was possible to find several larvae in petioles and crowns. However, at the BBRO site at Fotheringhay, sufficient damage was observed to trigger an insecticide trial and one application of 12 different treatments was applied (e.g. pyrethroids, acetamiprid, garlic and diamides). No significant differences were observed.

Fungicide strategies

BBRO has previously studied the value of fungicides and has demonstrated their value for disease control, canopy retention, early frost protection of the crown and ultimately yield gain. With recent changes to commercial products available and a desire to compare these as either single applications or within programmes, especially as diseases and their prevalence change, BBRO undertook an evaluation of their effectiveness and value.

Positive yield responses were observed across all fungicide treatments, with up to a 10 adjusted tonne benefit from a one spray strategy and up to a 20 adjusted tonne gain from a two or three spray approach. There was no clear benefit from using three sprays in this trial, but previously positive benefits have been observed especially for beet lifted after Christmas. The use of one or two sprays was more influential than product choice, although using alternative products in a fungicide programme, especially now with the availability of SDHI chemistry for the sugar beet crop, helps disease resistance issues developing, which is crucial given the increasing threat from cercospora strains; a topic of ongoing BBRO research.

Crop Protection Scientist

Dr Alistair Wright

Alistair is involved in more than 12 projects relating to crop production. His biggest two projects are featured below.

Monitoring Cercospora Leaf Spot

The newest major foliar disease to the UK is Cercospora Leaf Spot (CLS). This aggressive pathogen can completely strip crops of their canopy and cause harsh yield losses as a result.

Getting a grip on CLS is a major priority for BBRO and we are busy devising strategies to understand more about this disease. Part of this is our expanded crop monitoring network which now covers 17 sites across the growing-area. From here we are now tracking the development of CLS through the season. We start by using the Spornado air samplers to track when spores first appear in the air. Samples are submitted to our lab and where spores are detected, we test for latent disease infection using leaf samples. We then track how long it takes before spots appear on the leaf. Combining all of these data will allow us to build more accurate and UK-specific prediction of CLS infection and allow for more targeted and earlier control of CLS.

Goliath

Undoubtedly new genetics are going to be a major part of an integrated approach to virus yellows management. BBRO is supporting the colossal efforts of the breeders across Europe by continuing to put these new varieties through their paces under virus pressure.

We test a range of varieties every year through our Project Goliath pipeline. This involves establishing intricate field trials and hand inoculating thousands of plants every year with aphids carrying either Beet Chlorosis Virus, Beet Mild Yellowing Virus or Beet Yellows Virus.

Important insights into the new varieties are captured each year using BBRO's multi-spectral camera system mounted on our Drone. From this, we can now identify the strongest candidates each season, months ahead of harvest. Using this vital data we can then feedback to the breeding companies to help fast-track their introduction to the UK and, ultimately, into your fields.

Since the start of the Project in 2019, we have inoculated over 140,000 plants with virus, testing over 90 different entries and hope that the next generation of VY tolerant varieties will appear by 2026.

Applied Crop Scientist

Dr Georgina Barratt

Georgina is involved in 7 different projects relating to soil resilience and production, two of which are featured below.

Optimising sugar beet tillage and harvesting practices to maximise soil health

The 2023/24 tillage trial was conducted in partnership Holkham Farming Company. It was expected that there would be larger differences between the tillage treatments which varied from minimal disturbance through to ploughing to 30cm. However, the weed beet brought up by the plough reduced the biomass of the sugar beet which led to a reduced yield compared to the other six treatments.

The CO_2 emissions data, coupled with the operating costs recorded by Holkham for each tillage approach will result in a useful data set to help show that reduced tillage can work in sugar beet. However, more years of these trials are needed, especially as 2023 was a wet year so the differences in tillage were less likely to be apparent.

In 2024 the tillage trial will consist of less treatments so that they can be replicated three times, making the trial more scientifically robust. The treatments will be the Carrier at 5cm, Allrounder at 20cm, Cultus at 30cm and a strip till approach.

Optimising management practices to reduce greenhouse gas emissions

As part of BBROs efforts to train future scientists for the industry a new PhD project has started in partnership with Iain Gould and the team at the University of Lincoln. The project has three main aspects which will be the focus of student Abhishek Tanwer:

1. Rooting Properties. To assess how much root is left in soil after beet harvest, how long it could potentially stay in the soil, and whether certain management aspects (tillage depth) might influence this.

2. Rotational Impacts. Rotational management may hold the key to improve soil carbon and mitigating harvest damage under sugar beet. The project will sample from a range of farms with/without a history of organic amendments (e.g. manures, cover crops, grass leys) in order to see any rotational benefits to soils.

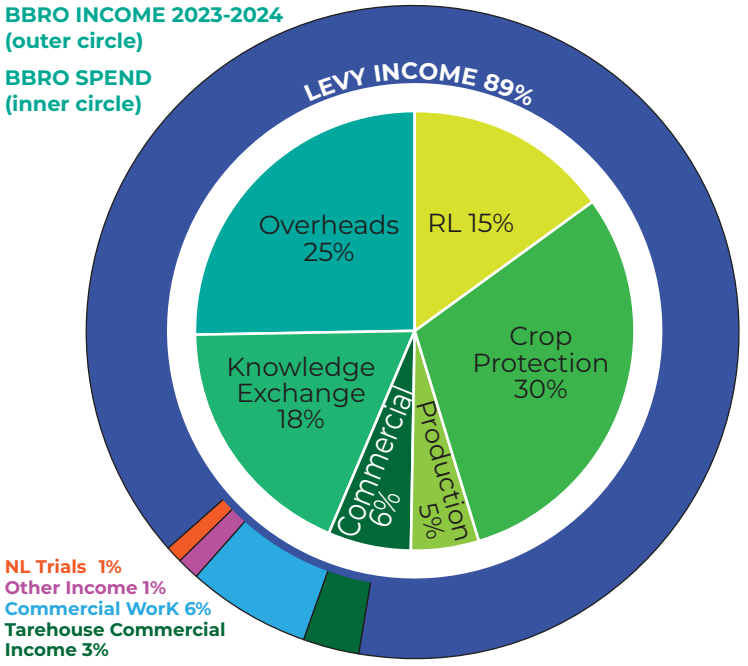
3. Sugar Beet Top Management. The impact of top incorporation to soils remains unknown, however it could provide a valuable carbon source for soils following beet. The project will undertake a trial to quantify the benefits of this.

Investment Summary
The total income for the year ending 31 March 2024 was £3.0m (£2.7m from the levy).

An increase in the levy on 1st April 2023 from 14p/tonne to 18p/tonne along with the crop returning back to levels seen in 2021-22, in spite of wet harvesting conditions, led to a surplus in 2023-24 of £492,218. The surplus for the year reinstated the reserves to the level held in 2021-22, which was reduced by a deficit in the 2022-23 campaign of £472k as a result of a severe cold spell.

FINANCE

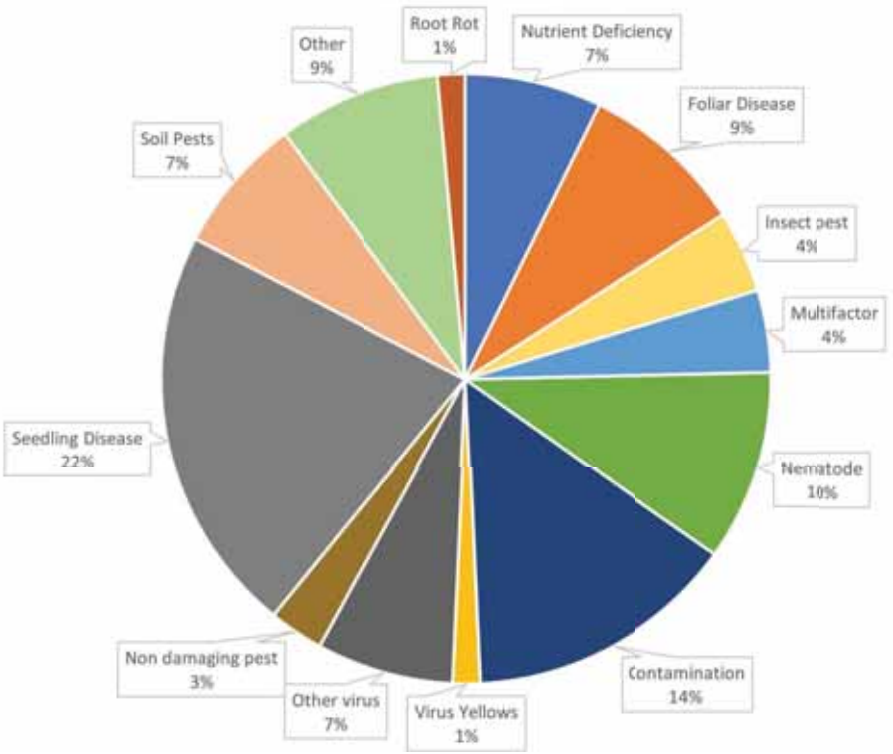
Michelle McKnespiey



Stewardship work associated with the Cruiser SB EA consisting of a programme of soil, vegetation, and pollen sampling from a number of Cruiser SB treated fields continued in 2023-24 at a cost of £183k to BBRO (2022-23 - £142k). This industry stewardship will be undertaken each time a derogation is granted for this seed treatment.

Plant Clinic 2023

There were no major pest or disease issues in 2023-2024.



DR KATE ORMAN
RESEARCH ASSISTANT

ELEANOR TOWLER
CROP TRIAL TECHNICIAN

SUZANNAH HARDER
APPLIED CROP PROTECTION SCIENTIST

FIELD TEAM

STEPHEN ALDIS

HEAD OF OPERATIONS

It's always interesting to revisit my comments from last year when writing the annual report. This year's commentary picks up on a familiar thread of coping with extreme weather, with a late start and constant rain delays, we experienced one of the longest drilling seasons we have ever had; as many of you did commercially.

A similar story can be told for the harvest campaign which started in some great conditions but as we rushed to finish our second site before storm Babet hit, the tone had been set for the rest of the campaign. There were a lot of logistical challenges to get trials lifted in the brief weather windows that presented themselves, including lifting two sites 130mile apart in 1 day, or 4 sites in a week. Fortunately, all trials were successfully lifted thanks to the willingness of the staff and cooperation of the host growers and hauliers.

Even with our best efforts and the new harvester coping well, our season did run into December and January, which is longer than we planned. Getting wrapped up in January was important for our maintenance program with some major work scheduled for the Plot building at Wissington. With nearly a decade of plots processed, the washer drums were very worn with no adjustment left and were ready to be replaced. We also took the opportunity to upgrade the dirty scale system, this will hopefully bring improved efficiency and accuracy to the plot building whilst also facilitating potential soil tare comparisons going forward.

Building on capability to improve both quality and efficiency is something we constantly review. Weather pressures and a huge focus on virus and aphid control trials has made our hoeing window busier than ever. All plot harvested trials require an element of hoeing as to divide up plots, perpendicular cross-headlands are required to define the plot area. Having two tractors and hoes ready to go this year could not have come soon enough, again with limited dry weather available and beet growing quickly often both machines were out at the same time.

GINA GOULD
TRIALS TECHNICAL MANAGER

RICHARD HASTINGS
FIELD TRIALS SITE MANAGER

OLLY HAMMOND
FIELD TRIALS SITE MANAGER

JOSH MCLEOD
FIELD TRIALS OPERATOR

Submit your plant clinic enquiry using this QR Code or https://bit.ly/BBROplantclinic

BBRO Plant Clinic is a free service to sugar beet growers. Initial response to enquiries within 48 hours.

KNOWLEDGE EXCHANGE

Dr Simon Bowen & Francesca Broom

It was with sadness that we announced the passing of Dr Simon Bowen (KE Lead) in this year. Simon was instrumental in many of BBRO KE activities and will be sorely missed by colleagues, growers and industry.

20 Advisory Bulletins issued

76 Drill operators trained

16 Videos released

154 Articles or mentions in the press

11% Growth in BeetCast listeners

- 127 people listened to the January BeetCast - 'What's happened to my sugars?' on the day of release.
- 187 people listened to the March edition 'Drilling into the detail in the first week.
- 214 people on average listened to a BeetCast episode per month.

Farmers Guide
Midland Farmer
British Farmer & Grower
Farmers Weekly
Crop Production Magazine
Actuarial Post
Farming UK
Farmers Guardian
Farming Online
Eastern Daily Press

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