



**BBRO**



**2022 - 2023**

# Annual Report

**A YEAR OF CONTRASTS**



# Welcome

## Dr Jon Knight - Chairman of the BBRO Stakeholder Board.

This last year has not been without its challenges, but that appears to be the norm these days whether it is the emergence of a new pest or disease, the continuing biological and regulatory challenges around crop protection products, or the capricious weather. This makes it ever more important to understand the problems, explore past, present and existing solutions, and to get that information to the industry to ensure a resilient, profitable and environmentally acceptable sugar beet crop. This is of course, the role that BBRO has, and it continues to operate in all these spaces as demonstrated by the Betasoils project, focused on a better understanding of soils which will lead to a more sustainable and productive crop whilst offering prospects of reducing damage and carbon emissions. Work on new pests and diseases such as beet moth and cercospora should develop reliable management programmes for these too.

This year brought the approval of the precision breeding bill which opens significant opportunities for the development of specific solutions to a range of problems facing sugar beet production, but this is not going to be a quick process. The rise of AI also presents new opportunities and challenges and at the time of writing this the head of the Google Brain team has resigned over his concerns for the development of AI. Should we all be worried about what the wider adoption of AI might bring, and what does this have to do with BBRO? Hopefully some of you will have read the article in the April Sugar Beet Review by Xumin Gao, one of the BBRO sponsored PhD students, on the use of AI to automatically identify sugar beet aphids in traps to improve monitoring and therefore management. Aphids represent a difficult challenge, but the technology could work for other pests too making monitoring easier, more timely and therefore better targeted and cheaper. Using AI is leading to significant improvements identifying cancer in medical imaging compared to the current human review process, so the outlook is positive. There are, however, also examples of AI being used to create very credible “alternative truths” and one of the issues will be to sort out what is true and valuable and what is false and potentially damaging. For the industry BBRO has the specialised knowledge and experience to make these sorts of assessments, as it always has done, and ensure that the information provided to the industry is of the highest quality and can be trusted and relied upon.

It is not just the BBRO team that requires the right skills and experience, the same is also true of the Stakeholder Committee. This year saw Susie Emmett reach the end of her (slightly extended) 6 year term and her valuable and perceptive comments, along with some challenges to the delivery of Knowledge Exchange by BBRO to sugar beet growers. We are grateful for her hard work and unstinting support.

I'm off to see if I can replace some of my waning human intelligence with some AI!





## Dr Vicky Foster - Head of BBRO

# Key outcomes

### 2022 saw the launch of our 'Delivering for our Growers' Strategy

Focusing on key challenges for the next three years (2022-2025), we set out our core priority areas for research, based on your ongoing feedback to us, but also our aspirations for an enhanced knowledge exchange programme to deliver more information to your fingertips. Many of the priority areas remain similar to previous years, with a big focus on pests and diseases, supporting variety development and a continued focus on soil management but with a new back drop of ever-changing legislation and environmental challenges.

Looking for long-term sustainable solutions to manage Virus yellows remains a focus activity. Although 2022 did see us obtain an Emergency Authorisation (EA) for the use of CruiserSB to control aphids (based on a risk forecast of 69% infection), looking for effective strategies for future VY control remains a number one priority for BBRO.

Whilst VY did prove an issue in 2022, a new kid on the block joined the party – the beet moth! Whilst this wasn't a new pest to the UK, the levels had never been as devastating as we saw in 2022, due to the incredibly hot and dry summer we experienced. The larvae damages the heart leaves and roots, and if significant damage occurs the plant cannot produce new growth. At BBRO we remain vigilant to new threats and responsive to look for new solutions.



The drought was also quite devastating for many across the East of England, and many crops struggled to survive this combined with pest and disease damage. The autumn, however, saw some much-needed rainfall which boosted some crops, but re-growth was limited in crops severely affected by beet moth. And then to top it all off, the frost hit the crop hard in December. What a year!

The stresses of 2022 resulted in a lower average yield across the growing area and many of you considering what crops you would put in your rotations for 2023. Fortunately, the increased crop price did lead to many of you keeping sugar beet in the rotation, and the agreement to increase the BBRO levy for crops drilled in 2023 also means we were able to develop new projects over the winter to start in spring 2023. This increase came at a time of high inflation across the board and has significantly helped BBRO to continue to develop our support for the UK sugar beet industry.

Photo right: On a lighter note the BBRO staff team are used to many challenges, but to truly understand the issues faced by growers each staff member has received 3 seeds to grow and harvest by December 2023. You'll have to wait until next year to hear who won the challenge!





## BBRO's involvement in the IIRB

The International Institute of Sugar Beet Research (IIRB) is an international, non-governmental and non-profit organisation, focussing on networking and knowledge transfer between scientists and specialists in sugar beet cultivation to advance sugar beet production. BBRO has a very active presence in the IIRB with a seat on the Advisory Council, Scientific Committee and several themed working groups. In 2022, the biennial IIRB Congress took place in Mons, Belgium, with over 320 delegates from 20 different countries, and the BBRO team had a significant presence on both the platform and poster sessions. This demonstrates our scientific knowledge and credibility to other countries and also helps us to bring new scientific approaches and technologies back to the UK to benefit you! The UK currently has 20 members in the IIRB and this membership is facilitated by BBRO.

## Sugar beet focus

# Research programme

# MS

**PROF. MARK STEVENS**  
**HEAD OF SCIENCE**

Clearly research into integrated pest management (IPM) for the control of aphids and Virus yellows remains at the forefront of BBRO research activities to prevent future virus epidemics. In May 2022, our Goliath and Verde virus trial plots were inoculated with either BMVYV, BYV and, for the first time in this trial series BChV too, to assess the performance of both the current RL as well as future virus-resistant varieties. In addition, further alternative approaches were evaluated for control and interesting insights were gained using endophytes and the use of colour dyes to 'camouflage' beet from aphids; the latter which captured much attention in the national and international press! All these trials will be repeated in 2023 as initial findings were encouraging.

However, it's not all about virus research and the challenges of climate change are ensuring that BBRO must be flexible in its approach to limit the impact of new issues such as beet moth or developing issues such as cercospora leaf spot. With this in mind Dr Alistair Wright travelled to North Dakota State University and the USDA last year to see first-hand how they tackle this disease and to bring back research methods and ideas to develop here in the UK to limit this problem in the future.



# SB

DR SIMON BOWEN

HEAD OF KNOWLEDGE  
EXCHANGE

2023 was marked by some exceptional seasonal impacts on the crop most noticeably, a severe summer drought, beet moth and frost damage. A very reactive and responsive BBRO team drew widely on previous experience and in the case of Beet moth, knowledge from outside the organisation to keep growers informed, providing the best guidance possible via the Advisory Bulletin and articles on our website and in Sugar Beet Review. Our well-attended BeetTech Conference provided another opportunity to share knowledge, and we were grateful to Prof. Rosemary Collier from Warwick University to help with matters relating to the relatively unknown Beet moth.

An IPM approach sits at the very core of our messaging and our cercospora early warning system is an exemplar of the importance of monitoring as a vital component of IPM. A paper presented at the 78th IIRB Conference in Belgium in June 2022 allowed us to 'compare and contrast' our system to cercospora management in Europe, demonstrating some remarkably similar approaches being used. BBRO's expanding crop monitoring programme is key to future IPM.

As healthy plants tend to be more resilient against pests and diseases, integrating improved soil health as part of an IPM continues to gain recognition. Our messaging in 2022 drew on results from the recently completed 5-year 'Soil biology and soil health partnership' project. Higher soil health scorecards were associated with improved crop health, yield, and financial returns. Key areas of soil management focus were identified as soil pH, increasing soil biological activity and soil structure.



# GB

DR GEORGINA BARRATT  
APPLIED CROP SCIENTIST



With the BBRO and AHDB GreatSoils project coming to a close the past year has been an opportunity to reflect on key findings and identify areas of soils research going forward. This has resulted in the development of a soils focused research program called Betasoils. Betasoils has started with a focus on sugar beet greenhouse gas emissions to support the industry with robust data. The first project started in 2022 in collaboration with the Centre for Ecology and Hydrology and TMAF who funded two flux towers and sites to host them at Morley Farms. These systems are located in neighbouring fields and will generate data on CO<sub>2</sub> emissions and how management practices influence this as each field will be managed differently. Betasoils will expand in 2023 with a project looking at the effect of tillage depth on crop performance and greenhouse gas emissions.

The drought trial did not take place in 2022 as there was a need to review the approach to growing beet in a field scale polytunnel. In 2021 they were grown in large boxes but this resulted in the plants being difficult to manage as a tractor could not be used for drilling or spraying. For 2023 the BBRO field team have devised an approach that will enable a commercial drill to be used and a small, mounted sprayer will be able to drive through the tunnels to make spraying more accurate and reliable. In addition to this the trial will be replicated outside the polytunnels so that if it is a dry year more data can be collected to support the findings of the trial in the polytunnel.

Looking ahead 2023 will involve delivering the first year of the flux tower project as well as the initial year of the reduced tillage research as part of Betasoils. There is also an ambition to design and recruit for a PhD project to dig deeper into the Betasoils projects. In addition to this there will be the drought trial as discussed above. This year it is supported by some of the breeders who have supplied varieties with known drought tolerance. It will be interesting to see how they perform compared to the RL varieties in the trial.





# SA

**STEPHEN ALDIS**  
**HEAD OF FIELD OPERATIONS**

As I progress through my fourth season within the BBRO trials team, I think it's safe to say we haven't had two seasons the same. Last year proved challenging again with a dry spring leading into an even drier summer. Fortunately, few trials were lost to the growing conditions, and our trial harvesting program had to be tightly condensed to deal with the spells of wet weather. Thankfully only one trial was left to lift as the cold weather set in which was later harvested as soon as the frost lifted. A great result due to the continued effort of the trials team, to get all trials lifted and processed through the Tarehouse in less than favourable conditions.

We continue to invest and adapt to the weather challenges alongside the many changing variables in which we operate. 2022 saw the first full season for our new plot harvester M6. The machine is very similar to our existing Garford harvester, bringing together very gentle harvesting with the addition of a split roller table helping to manage soil tare. With additional modification in the plot building, soil tare hasn't been an issue for a second season running even when harvesting conditions haven't been optimal.

The protracted drilling window of 2023 would justify our latest investment (a second hand John Deere 6135R), however, its purchase isn't primarily driven by the weather but more to reduce our reliance on hire machines and the increased hire costs of longer drilling and harvesting seasons. The machine will certainly earn its keep drilling, hoeing and harvesting.

# MM

**MICHELLE MCKNESPIEY**  
**HEAD OF FINANCE & HR**

## Investment summary

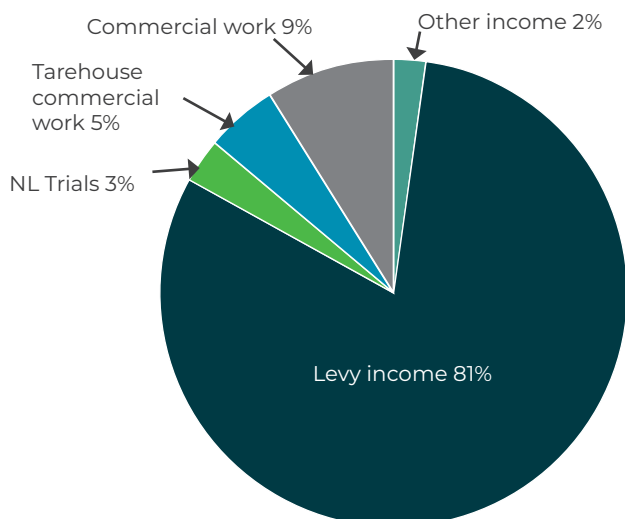
The total income for the year ending 31st March 2023 was £1.95m (£1.57m from the levy). The 2022- 23 campaign presented some challenging conditions. A dry start to the season and a severe cold spell towards the end of the campaign along with the impact of Virus yellows and, for some, Beet moth resulted in a lower than predicted levy income of £300k.

A significant cost incurred in 2022/23 was for the stewardship work associated with the Cruiser SB EA (£142k), which focussed on a programme of soil, vegetation, and pollen sampling from a number of Cruiser SB treated fields. This industry stewardship will be undertaken each time a derogation is granted for this seed treatment.

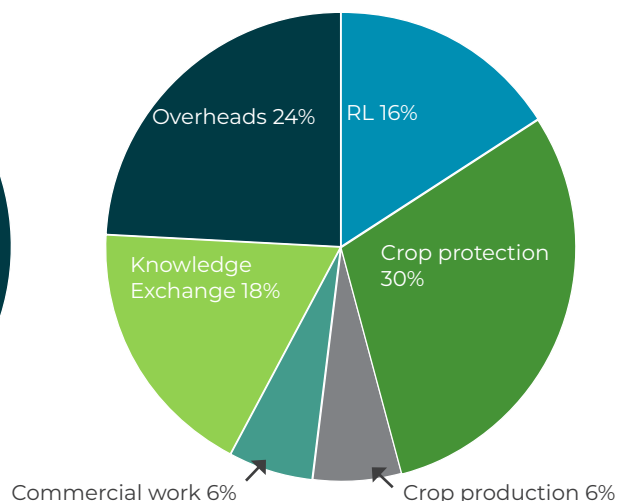
The impact of lower-than-expected income and increased costs resulted in a deficit of £472,207 for the year. A good reserves policy has meant that the deficit was tolerated and did not impact planned work for 2023/24.

## Year ending 31st March

### BBRO Income

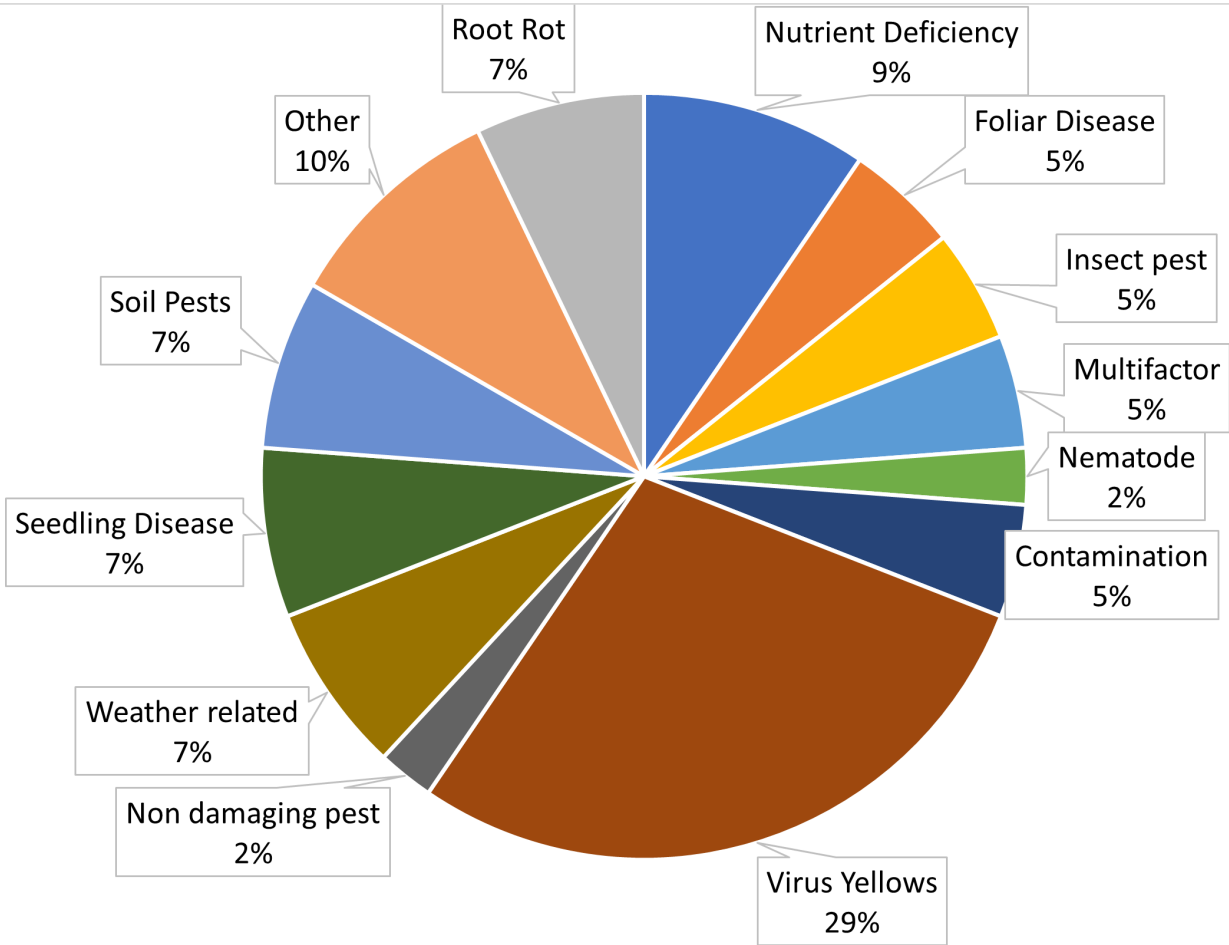


### BBRO Expenditure



# Plant Clinic

The majority of plant clinic cases received into the BBRO laboratories in 2022-23 related to either nutrient deficiencies or pest and virus issues. Low pH levels were also highlighted in a number of cases. Generally BBRO received a high level of enquiries regarding Beet moth and frost damage although these were not submitted for diagnostics by the plant clinic team.



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## BBRO CORE VALUES



**APPROACHABLE**



**TRUSTED**



**INNOVATIVE**



**INDUSTRY-LEADING**

## **W**EBSITE

The BBRO website underwent development in 2022 to improve accessibility to information, with more direct click through to timely updates, and also provide more background detail to our work including over 100 past project reports. We also listened to growers and have removed the password security of the BBROPlus area, thus giving growers and agronomists direct and quick access to the aphid survey information.

## **R**EFERENCE BOOK

A supplement to the Reference Book was released in January 2023, providing growers with the latest sugar beet news and easy to follow guidance regarding chemical use. Over 4,500 copies were produced and distributed.

## **E**VENTS

The BBRO team delivered over 40 events throughout the year, direct engagement with over 1200 individuals, including growers, agronomists, students, industry partners and international sugar beet research colleagues.

## **A**DVISORY BULLETIN

26 bulletins were released in the 2022-23 season with an average of 1253 people accessing each edition. During May - July this included weekly updates to cover aphid migration, virus incidence, drought and beet moth.

## **P**ODCAST

BBRO BeetCast is released monthly, featuring interviews with growers, agronomists, sugar beet industry members and of course BBRO staff. Average listener audience now reaches 400 + per episode.