BBRO's fight against virus!

Brief update – Oct 2020

The UK sugar beet sector is currently experiencing its worst virus yellows epidemic since the mid-1970s. The withdrawal of the neonicotinoid seed treatments on sugar beet has left the UK crop exposed to the aphid-borne infection and reliant on foliar applied insecticides. In 2020 the extensive BBRO aphid monitoring network showed unprecedented number of aphids migrating into crops exceptionally early in the season when many crops were highly susceptible. Consequently, many growers have experienced widespread virus infection in 2020 despite the judicious use of aphicide sprays to help reduce infection.

This situation has been brought about by the extremely mild winter of 19/20 with unprecedented aphid numbers both surviving over wintering and migrating into the crop.

Recognising the huge challenge this presents, BBRO is doing everything possible to look for new solutions to help growers manage this problem. We have been working closely with the breeders to test new varieties for resistance & tolerance to the virus in one of the largest virus trials undertaken. We call this our Goliath trial. The work is on-going but we expect this to result in some improved varieties to in the next 2-3 years.

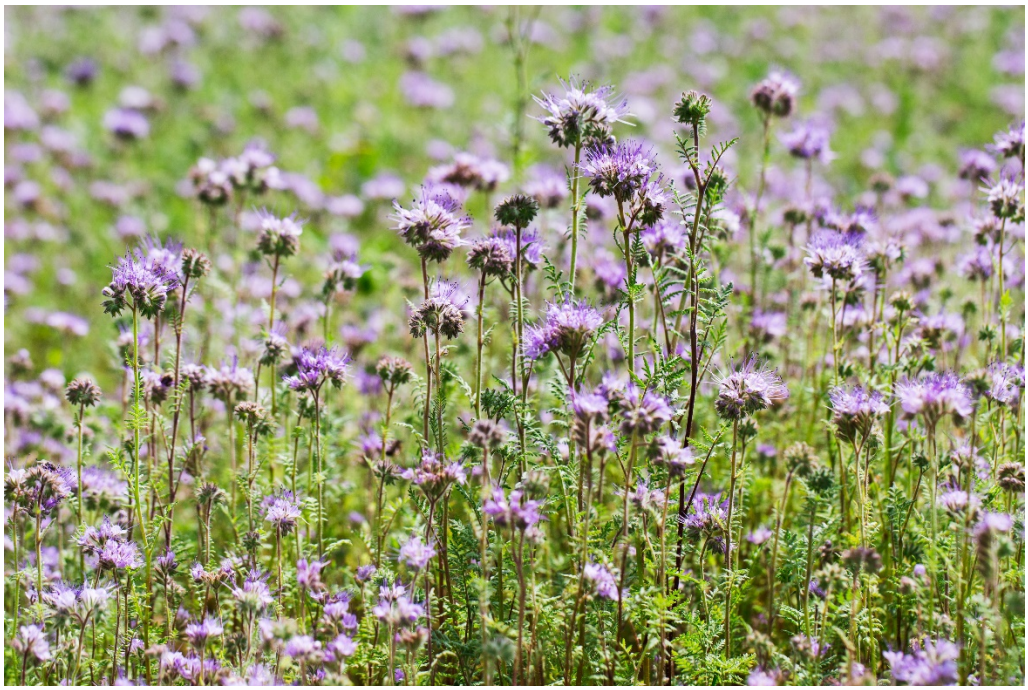
Pic 1. Goliath virus trial

Alongside our variety screening work, we have an extensive series of projects and trials looking at other aspects of virus reduction. BBRO has put aphid and virus research at the very centre of our research programmes. Some examples of new projects starting this season include:

- Looking into the effects of **undersown cover crops** to help protect the sugar beet from aphids. We are be looking into the impact of undersowing with barley which has shown some positive effects in 2020.

Pic 2. Clear impact of undersown barley shown to right of picture

- We are also looking into a range of **flowering mixes** to attract beneficial in the autumn to help boost beneficial numbers in the spring ensuring they are present in sufficient numbers at the right time.



Pic 3. Phacelia will be used as an attractant in trials

- Alongside flowering mixes, we will be looking at the use of **Brassicas** between rows to act as an attractant to aphids to pull them away from the sugar beet at the vulnerable time for infection.
- Following some interesting work in New Zealand, we are looking into the use of **Endophyte grasses** to boost natural resistance in the sugar beet crop. There has been good data to support this theory for soils borne pests and we are interested to see if this can be replicated on aphids.

- We continue to look at the use of **biofilms** to protect crops against aphids. Whilst this presents challenges on several fronts, it is worthwhile exploring this novel approach.
- We are also trying to understand more about the **infection cycle** of the plant and how this can change with different drilling and harvest dates to see if there are any local mitigation strategies that can be deployed.
- We will also continue to collaborate with the manufacturers on product testing for **new foliar insecticides and novel non-neonicotinoid seed treatments.**

In tandem with these practical approaches we are involved in two PhD projects, which have started at the University of East Anglia and Wageningen University targeting some of the underlying science around aphids and virus. These are looking at:

1) Understanding the molecular strain variability of the virus yellows complex present in the UK and how this relates to breeding programmes
2) The mechanism of how mature plant resistance is triggered in plants and whether this can be used to identify novel control strategies.

This highlights the various and wide-ranging approaches BBRO is taking to help combat virus yellows in sugar beet. There is no quick solution, but a number of complimentary activities could hold the key.

Alongside the research activities, BBRO is also in discussion with the industry and government to review options for derogations for neonicotinoid foliar and seed treatments to give growers additional protection in the short-term, whilst effective IPM solutions are being developed. Any neonicotinoid chemical approach will again be based on limited and controlled use of these projects and growers will need to follow strict guidelines on their use. Once we have further information this will be made available to the industry.