PROTECTING THE SUGAR BEET CROP

VIRUS YELLOWS PATHWAY UPDATE

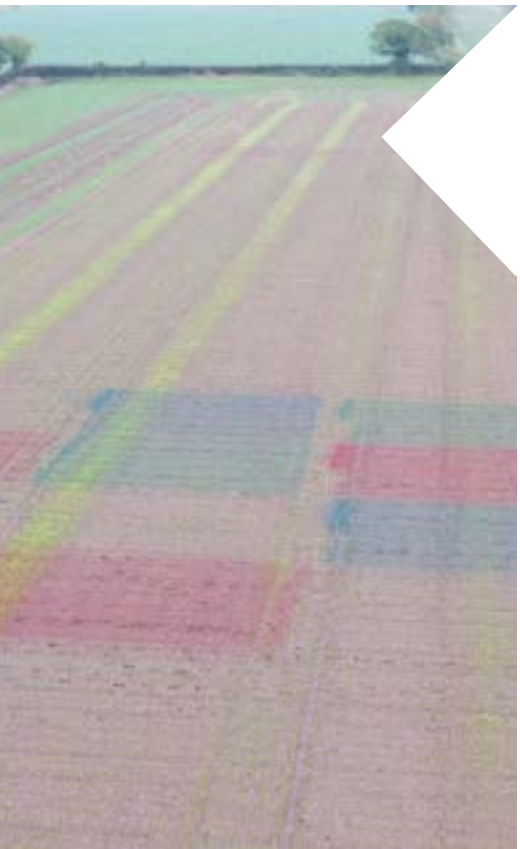
VERSION FOUR - MARCH 2026

STATE OF PLAY: THE VIRUS YELLOWS CHALLENGE

The British sugar beet crop continues to be threatened by Virus Yellows disease. In recent years, the disease has caused crop losses of up to 80%. With the impact of climate change bringing warmer and wetter winters, this is providing a breeding ground for aphids over the winter months, enabling earlier spread and infection of spring-sown sugar beet crops.

The UK sugar beet industry continues to pursue its broad portfolio of work, led by the Virus Yellows Taskforce, to develop long-term, sustainable solutions to the threat posed by Virus Yellows. This work, outlined in the Virus Yellows Pathway, involves exploring solutions in gene editing, seed breeding, integrated pest management (IPM), and sustainable spray programmes.

We welcome the Government's adoption of implementing legislation which will bring the opportunities presented by precision breeding one step closer from the lab to the field. Our work alongside the UK's world leading biotechnology sector to develop a viable transformation platform remains key. With strong cross-industry collaboration, and positive signs across the breadth of the Pathway, we remain hopeful that solutions to Virus Yellows disease will be available in the coming years.



FINDING SOLUTIONS - UPDATE

Enhancing grower practices

The Virus Yellows Taskforce has been working on trials to explore novel integrated pest management (IPM) practices and their impact on the sugar beet crop, alongside seed germination and speed of establishment.

Trials which have shown potential to reduce Virus Yellows incidence include:

- Application of coloured dyes, masking the colour distinction between plant and soil relied upon by aphids in flight to recognise a host crop.
- AgriOdor™ pellets which repel aphids through scent.
- Over-sowing endophyte grasses, which produce alkaloids to protect its host, transferring the protective benefits into the sugar beet.
- Use of companion crops, beneficial hosts (wildflowers), camouflage and deterrents.

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An integrated approach to Virus Yellows control will be important moving forward with stacked IPM controls supporting genetic tolerance/resistance and aphicide sprays to mitigate the threat posed by the disease.

Progress in breeding

Breeders continue to make progress through traditional breeding techniques - identifying tolerance and resistance from wild species and crossing these resistance genes into commercial lines. The 2027 Recommended List for sugar beet seed features four varieties with partial tolerance to Virus Yellows. Significantly, new tolerant varieties also yield better than first generation disease-tolerant varieties in the absence of disease.

Sustainable spray programme

Work continues in trials to test new aphicides for the sugar beet crop, with the aim to work towards full approval of a 3-5 established sustainable spray programme from 2027 onwards. Next-generation aphicides are integral to a sustainable control programme moving forward.

GENE EDITING RESEARCH - UPDATE

British Sugar is collaborating with the agriculture biotechnology company Tropic, to explore how to genetically edit sugar beet to confer resistance to the three yellowing viruses that make up Virus Yellows disease complex.

The project, now in its third year, makes use of Tropic's Gene Editing induced Gene Silencing (GEiGS®) technology platform, to make minimal and precise gene edits in sugar beet enabling durable resistance to Virus Yellows.

Work to date has focussed on developing the sugar beet transformation platform at world-leading plant science institute The John Innes Centre (JIC), successfully generating gene edited DNA solutions (GEiGS®) and testing their efficiency in cells. Multiple solutions with high silencing efficiencies are now available for testing in plants. This work, scheduled to begin later this year, will determine a shortlist of solutions to take forward for the generation of plants later in the project.

WHAT IS GENE EDITING?

Gene editing sees precision plant breeding techniques used to change a selected, very specific sequence within the genome of a crop.

It is different from genetic modification because no new genes from other species are incorporated into the plant; instead, changes are made to the plant's own DNA. This process can and does happen in nature, but gene editing speeds up the process to deliver results faster.

In February 2026, the project secured an additional £1.1m of grant funding from Innovate UK's Farming Futures R&D Fund, building on the £660,000 recieved in 2024 at the initial stages of the research. This was jointly awarded to British Sugar, Tropic and JIC. The British Beet Research Organisation (BBRO) continues to support the projects.

The latest funding will allow the project team to advance research towards ensuring that precision bred solutions can be implemented across commercially relevant sugar beet varieties, conferring resistance to the most damaging and hard to target beet yellows virus (BYV).

By the end of the decade, it is hoped that the project team will have confirmation of Virus Yellows resistance in gene edited plants in the lab, which can then be assessed in field trials.

FURTHER INFORMATION

To find out more about the specific industry strategies for the control of Virus Yellows in sugar beet, please see our pathway document here.

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