

Farm scale use of endophyte grasses and strip tillage for resilient sugar beet

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Project Summary

Bans of neonicotinoid seed treatments in recent years have resulted in sugar beet crops being exposed to a greater level of risk from pests. Grasses which contain a beneficial and symbiotic endophyte fungus are popular in countries like New Zealand for their ability limit damage from insect pests. As the grass grows, the endophyte fungus produces alkaloids which deter insects from feeding, reducing the need for chemical control.

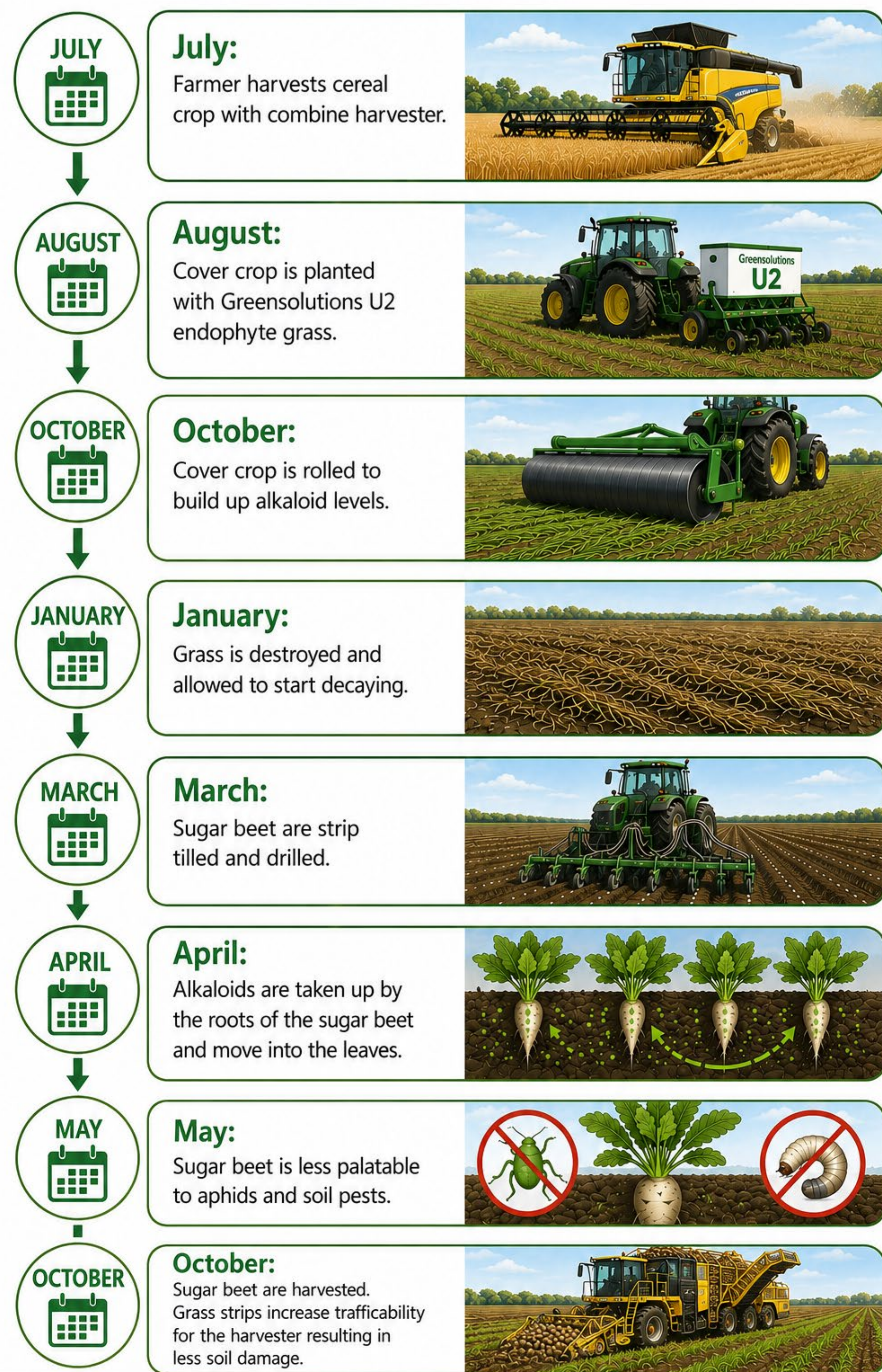
One such grass variety is Barrier meadow fescue (*Festolium loliaceum*) from CropMark seeds which contains their GrubOUT®U2 endophyte (*Epichloë uncinata*). This fungus produces lolines, water-soluble alkaloids which allow uptake by nearby plants through their roots.

After several promising trials with this endophyte; BBRO, Morley Farms and Niab led an application to Defra's ADOPT funding, which promotes on-farm demonstration and trialling of new farming methods and technologies.

A field at Morley, Norfolk was selected to grow wide strips of the endophyte grass. This was planted as a cover crop in August 2025 ahead of sugar beet in 2026. This grass was sprayed with glyphosate prior to being strip tilled and drilled in March 2026. Growth of the sugar beet has since been measured and compared to the farm standard treatment in adjacent strips. One particular focus has been on aphid control. Counts were made of the plants on 28th May and a significant reduction of aphids was seen on the endophyte treated sugar beet compared to the farm standard

The ADOPT project runs until Autumn 2027 and will continue to gain insights of the influence of the grass upon the sugar beet and soil health, including quantifying any benefit to the following spring barley crop.

Partner farms are looking at other aspects of growing and utilising the endophyte grass. Lugden Hill farm are hosting on-farm strip trials looking at the influence of the grass on plant parasitic nematodes which cause Docking disorder. A third farm (Brettenham, Norfolk) is growing a trial crop for seed to assess the yield, endophyte infection and alkaloid levels and investigate the viability of producing seed of this grass in the UK.



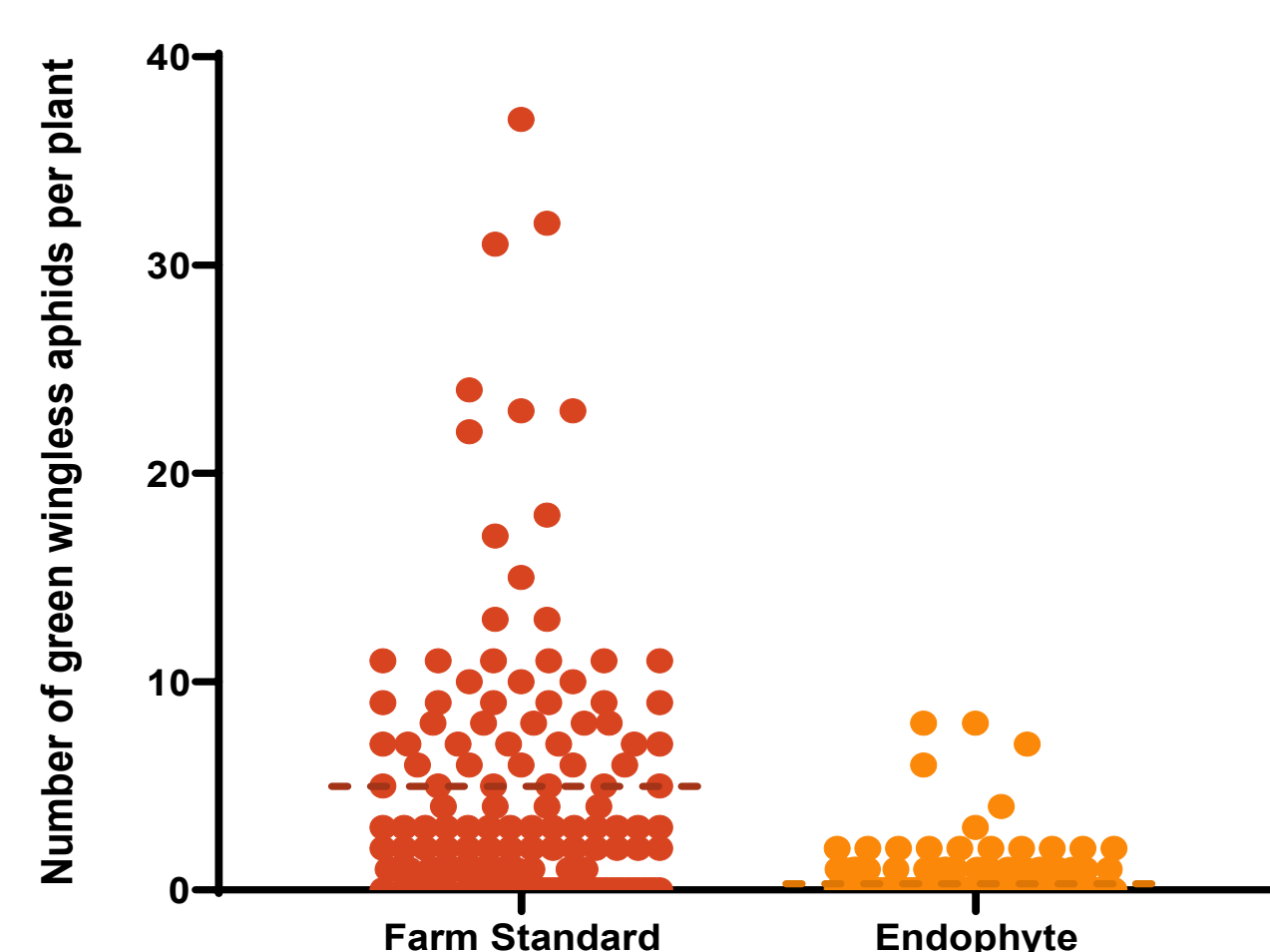
Aphid Control & Harvest Trafficability

Strip tillage was used to maintain some of the grass cover at drilling, with approximately 60% of the grass left undisturbed. As this decayed it is expected that the alkaloids in the roots and leaves leached into the soil and were absorbed by the growing sugar beet. Samples have been collected to confirm this, and the project partners have been monitoring the impact on the sugar beet.

Aphids: A reduction in aphid numbers was recorded when compared to the sugar beet following the standard cover crop. Impacts on virus yellows and yield will be made later in the year



Previous trial with the Barrier U2 Grass at Morley in 2022. Encouraging results were seen in both virus yellows and beet moth control from the use of the endophyte grass cover-crop



Aphid counts at Morley on 28th May 2026 on plants grown after the farm standard cover crop (mean = 5 n=135) and endophyte grass (mean = 0.3 n=270) P<0.0001.

Trafficability: The clay-loam soil at Morley is susceptible to compaction and damage if harvest conditions are wet. It is hoped that the strips of grass, and any improvement on soil quality, will mitigate the impact of harvest and this will be monitored and measured as part of the project.

Challenges: Further refinements are needed to mitigate the reduction in canopy growth which was seen this spring. Applying some of the fertiliser at drilling is likely to help as well as additional passes with the strip till machine but early results are encouraging.

Nematode Management

Another aspect of the project is to investigate field-scale use of the Barrier grass to mitigate crop losses to the complex of stubby-root and needle nematodes which cause Docking disorder.

Soil samples have been sent for analysis of nematode levels in the soil and will be compared against other cover crops which are reported to reduce stubby root nematode levels as well as the farm standard cover crop mixture and a fallow control



Seed crops of the Barrier U2 meadow fescue at flowering (front) and a commercial perennial ryegrass (back).

UK Seed Production

Yield, purity and endophyte data will be analysed after harvest, and a cost-benefit analysis prepared to compare both crops.

If yields of Barrier are high enough to produce seed commercially, it may open other options of using the technology such as hay crops and seed meals to provide alternative and targeted options of applying the alkaloids to sugar beet