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Beet moth: has summer 2022 introduced a new threat to the UK crop?

When the first samples of 'beet black heart' arrived at the BBRO Plant Clinic in May 2022, the initial reaction was that it was due to downy mildew or boron deficiency, but as the long hot summer continued it became increasingly apparent some of these early samples were more likely to have been the first signs of beet moth damage.

Although not a new problem (several isolated cases were recorded in commercial beet during 2020), the extent of the issue and the widespread impact on the crop took many by surprise. In this article we highlight some of the challenges caused by this pest and reflect on what the industry can do to limit its impact in the future.



Fig. 1. Beet developed black hearts, deeper investigations revealed the culprit. Photo supplied by Thomas Coulter

Description

The beet moth (*Scrobipalpa ocellatella*) is not regarded as a regular pest in the UK, but adult moths are trapped and reported by UK entomologists. It is known to be more problematic in Mediterranean areas and across Eastern Europe/Asia where its incidence and reports of damage are usually associated with warmer and drier climates. Unfortunately, to date, we have limited information on its life cycle in relation to UK conditions and our sugar beet crops.

It is likely that adults can both over-winter within root fragments after harvest and/or sea beet growing around the coast, as well as migrating into crops in the spring from mainland Europe (similar to silver-Y moth). After depositing eggs in the crown of plants, caterpillars (larvae) will hatch and feed on the leaves and crown. These will pupate and emerge as adults (small brown unassuming moths!) and produce further generations, but again, it is not clear how many generations are completed, although this will be affected by weather (particularly the impact of any rain events on larval survival).

Symptoms and symptom progression

Symptoms begin as the caterpillars start to feed and develop within the central heart leaves of the beet and these symptoms can resemble boron deficiency or downy mildew. On closer inspection the caterpillars (in various colours) can be found within the damaged area of the heart leaves. The adult moths may also be seen in amongst the canopy.

The caterpillars will continue to cause further damage although as the autumn progresses the caterpillars may become increasingly hard to find. The extent of the damage will also depend on the number of caterpillars per plant and in many cases, plants will continue to produce new leaves. However, where damage is more severe, the affected crown may die and secondary growing points stimulated to produce leaves, resulting in multi-crowning.

Unfortunately, in some cases all the growing points may be affected, and any resulting regrowth could be small, deformed and distorted. These stressed leaves can often be red in colour too.



Fig. 2. The beet moth is a small brown unassuming moth, that in high numbers can wreak havoc in sugar beet crops



Fig. 3a. Regrowth can often be red in colour



Fig. 3b. Some crops were heavily infested, causing multi crowning as the beet tried to recover

In 2022 as the damage progressed, further generations developed causing additional damage to the heart leaves and crown as well as the surface layer of the taproot. This was particularly the case in the Bury St Edmunds factory area.

2022 Incidence

The initial affected area was confined along the A14 corridor between Cambridge and Stowmarket. However, from late July/August onwards beet moth damage extended from this zone and affected most of East Anglia. Sporadic caterpillar damage was seen as far north as Sutton Bonington, Leicestershire, and although no caterpillar damage was observed at the BBRO trials site at Bracebridge, Lincolnshire, by mid-September, several adult moths were observed in the canopy.

Fig. 4. Map depicting the spread from the initial outbreak

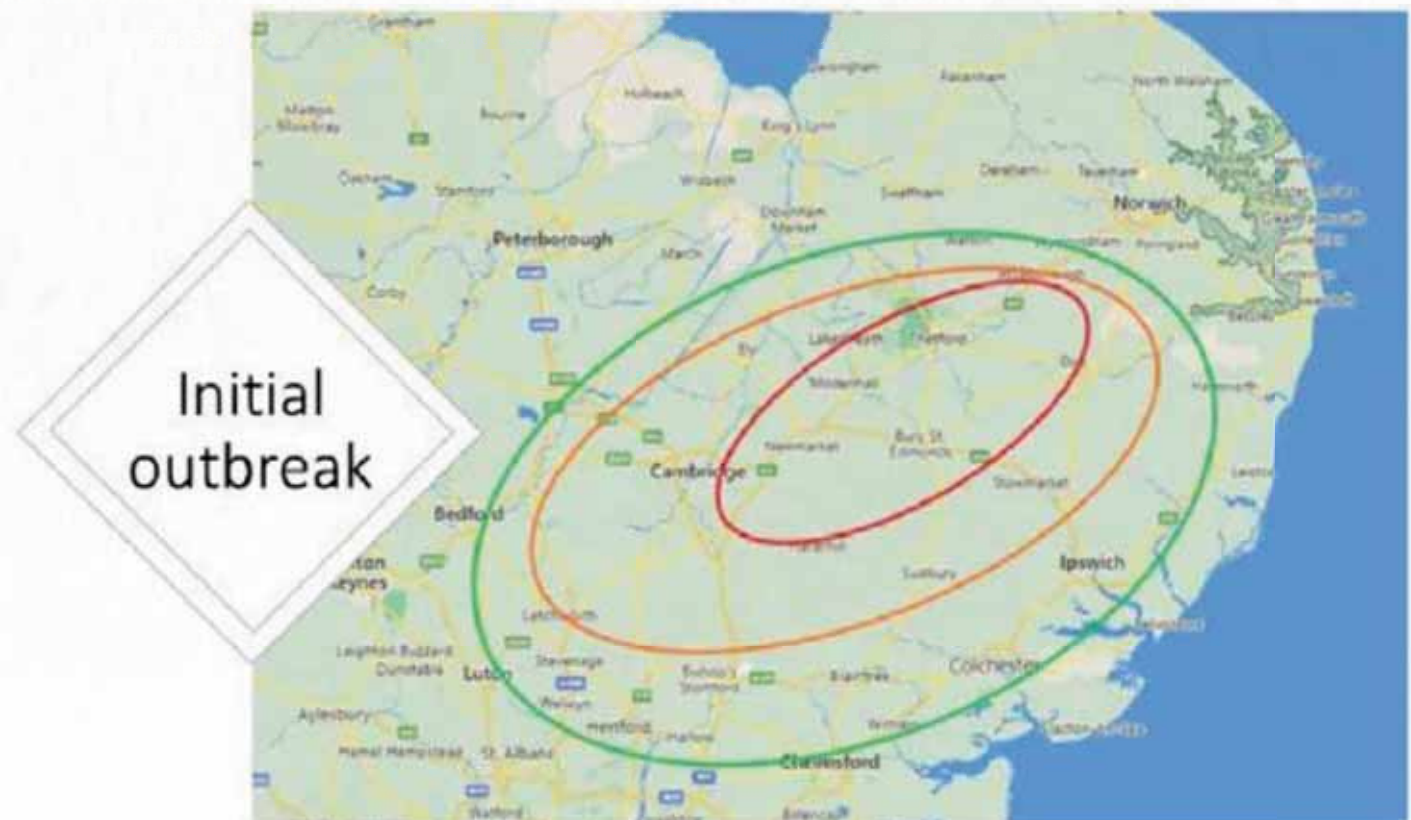




Fig. 5. Damaged roots, these should be lifted to avoid secondary infections and root rot

Risk Factors

Continued warm dry conditions throughout late spring until early autumn benefit the spread and development of the moth. A wet, unsettled period during the summer and/or a cool, damp autumn will help hinder the development of the pest. However, if the tap root is damaged this could result in infection by secondary pathogens and further deterioration of the tap root leading to localised rotting. There is also the risk that a hollow crown (results from earlier attack) could lead to further tap root damage from frost or water freezing in the hollow later in the winter.

Management and Mitigation Cool, wet weather usually deters beet moth development, and heavy rain events and/or irrigation usually drowns the caterpillars.

Ploughing down beet remnants that have been impacted by beet moth may well help to decrease the risk for 2023.

Any clamp areas will also need closely monitoring during the winter for late beet moth larvae activity.

There is the potential for a foliar applied insecticide to be used but this will require large water volumes to penetrate the canopy (up to 1,000

litres/hectare). Therefore, results may well be variable as it is the caterpillar within the heart leaves that the insecticide needs to target. Experiences with pyrethroids in the UK in 2022 were variable and limited; this re-enforces comments from Europe too. Remember too that the use of pyrethroids will also impact any beneficial insects.

There are several products (e.g., Cythrin) that have general caterpillar control on their label for sugar beet and it is important that specific recommendations are followed on these labels. In many cases, this includes the use of high-water volumes. As highlighted above. It is important to keep all remaining and future leaves as green and healthy as possible for as long as possible to mitigate the impact of beet moth damage and maximise autumn yield potential.

Limited or late damage on early lifted crops should have little impact on yield, although more serious damage, or those affected crops planned for later lifting, could potentially become increasingly at risk of yield and quality damage. Therefore, liaise with your British Sugar Account Manager to aid with decision making and planning with any affected crops in the future.

Recent warmer/drier than average summer/autumn periods are extending the northern boundaries of certain insect species and therefore introducing new pest threats to sugar beet production across Europe.

As a consequence, BBRO will closely monitor the risk of beet moth in the UK during 2023, but encourage everyone to pay close attention to crops, especially within East Anglia, once temperatures are regularly above 15°C as this is when adult moths usually start to fly.

The BBRO Plant Clinic is available to help with any early identification or to assess damage within the crop and the industry is planning to undertake future research in the following areas:

- How well do larvae overwinter in root fragments?
- Evaluation of control options for UK conditions – insecticides, appropriate water volumes and/or wetting agents
- Realtime monitoring of adults using pheromone traps
- Can we predict future moth epidemics?

The topic of emerging pest threats will be discussed further at BeetTech23, by guest speaker Prof Rosemary Collier, University of Warwick. See page 28 for details.