

# A survey of beet leaf miner in the UK

## Summary

Beet leaf miner (*Pegomya hyoscyami*) is a pest that causes unsightly trails on chard or beetroot leaves. In the past, it has been considered a nuisance that occasionally causes low level damage to chard or spinach. However, in recent years, it's been associated with causing higher levels of spoilage.

Garden Organic carried out a UK survey of beet leaf miner from March to November 2024. The aim was to identify where it was a problem, and which times of year, so gardeners had a better idea of when to take protective action such as covering their crops.

The key findings of the project were:

- Around 25% of participants reported they had a moderate or severe problem with this pest.
- As a general trend, there was more pest damage in the South-West and less in the North East and Scotland. Previous work has suggested the pest is more prevalent in the sugar beet growing areas of Suffolk and Norfolk, but we didn't have enough data to show whether this still held true.
- Participants observed egg laying and damage to the crops between the period of April to September.
- If the problem is severe, we would recommend covering the crops with fine mesh between April and September, but in many cases, this would not be necessary. For milder cases, removing the affected leaves will help reduce the problem.
- It's recommended to put leaves in the green waste bin as home composting will not get hot enough to kill off the pest. The pest pupates over winter, so you risk spreading the pest further in following years by putting affected leaves in compost.
- We would recommend repeating the survey in future years with a larger group of participants to improve on geographic specific information.
- The methods of gathering data worked well, and sending monthly reminders to participants helped to achieve a good response rate of 71%.

## Background

Beet leaf miner (*Pegomya hyoscyami*) is a small fly that lays its eggs on chard, beetroot or sugar beet. You're most likely to notice the pale blotches and winding trails on the leaves as the small maggot tunnels around.

Leaf beet miner has been a relatively minor pest of sugar beet until recently when a large increase in the pest was observed in 2015-2016<sup>1</sup>. It's thought that mild winters, which have allowed the pupae to overwinter in the soil, have contributed to this increase.<sup>2</sup> The pest has principally been restricted to areas of East Anglia that grow sugar beet but more recently it has spread to other areas of the UK including the North East<sup>3</sup>. Although the area of sugar beet affected was estimated to be small, where the pest did occur, it could cause up to 50 – 70% of the leaf canopy to be damaged.<sup>4</sup>



Figure 1 Typical damage symptoms

In veg crops such as chard or spinach, until recently, it was just an occasional pest, causing minor blemishes on a few leaves but over the last couple of years, pest numbers have risen leading to extensive leaf spoilage<sup>5</sup>. More recent work has also shown that what was once thought to be one pest, actually consists of a number of species. It was suggested that different species might be attracted to different host plants with one species attracted to sugar beet and another to chard and spinach.<sup>6</sup>

Adult flies are dull grey brown and around 7mm in length. In April-May, adults lay the eggs on the undersides of leaves. Eggs are cylindrical and white and a few millimetres long. They hatch in early summer and the larva enters the leaf, then eats and tunnels between the upper and lower surfaces. The larva is grey green, almost translucent, and has no defined head. When they are inbetween the leaf laminae, they are protected from attack by predators, although there are some parasitoids that can still attack them<sup>6</sup>. After a few weeks, it falls off the leaf and pupates in the soil. In the UK, there can be several generations spanning into October.<sup>5</sup>

### Aims of this experiment

The aims of this experiment were to build up a map of when and where this pest occurred. The damage severity was recorded each month allowing us to build up a picture of when and where this pest is active. The aim was to improve understanding leading to improved advice to growers.

## Methodology

### General damage

Participants were asked to rate their general incidence of allium leaf miner at their site, using the following Likert scale:

1. Never a problem
2. Occasional light damage
3. Regular moderate damage
4. Regular severe damage

### Monthly damage in 2024

Participants took observations once a month between March and November to evaluate crop damage and egg laying. Assessments were carried out once a month on a patch of chard or leaf beet.

The crop damage was scored visually on a 1-5 Likert Scale:

1. No damage – leaf completely clean.
2. One or two small trails visible on leaves.
3. Moderate sized blisters occupying some leaves.
4. Around half of leaves are spoilt by blisters.
5. Majority of leaves covered in blotches and spoilt.

### Egg counts



Eggs were counted once a month. Five leaves were selected at random and the number of beet leaf miner eggs on the underside of the leaf were counted. The eggs are a few millimetres long and are white and cylindrical. They're usually laid in clusters of two to ten eggs. (see picture)

*Figure 2 Beet leaf miner eggs*

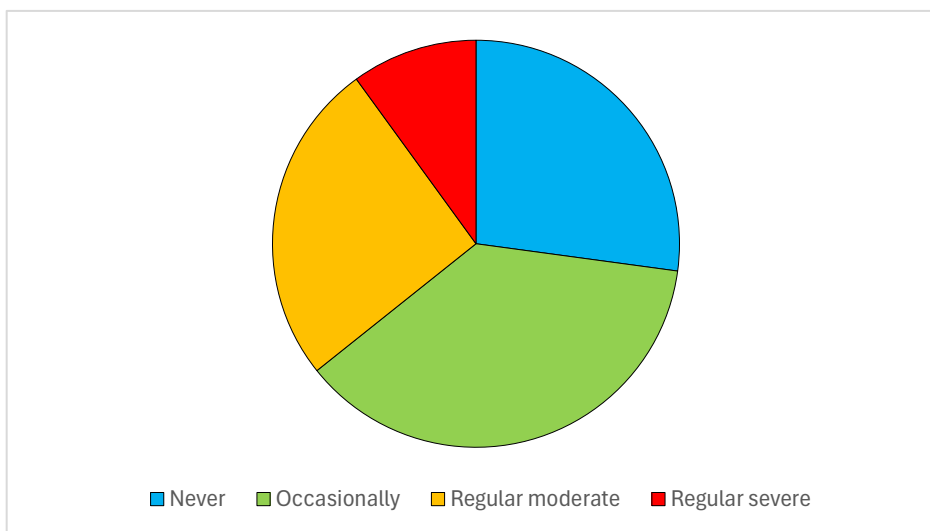
## Results

### Response

A total of 99 people signed up to take part. Of these 71 sent back results. This is a marked improvement on previous surveys that typically had a 30-50% response rate. This is the first year that participants were sent an email reminder each month to take measurements, and it's likely this intervention paid off.

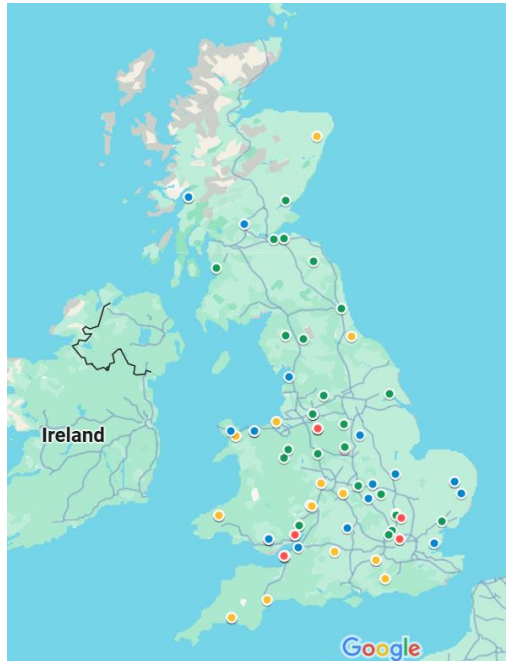
### General damage

We asked people what their current level of problems were in their locality. 27% said they were never affected by the pest, 37% occasionally affected, 26% regularly experienced moderate damage and 10% regularly experienced severe damage.



*Figure 3 Damage regularly experienced by participants*

Just over one third of participants regularly experienced moderate or severe damage. This suggests that although it isn't a universal problem, the pest is causing significant damage in parts of the UK.

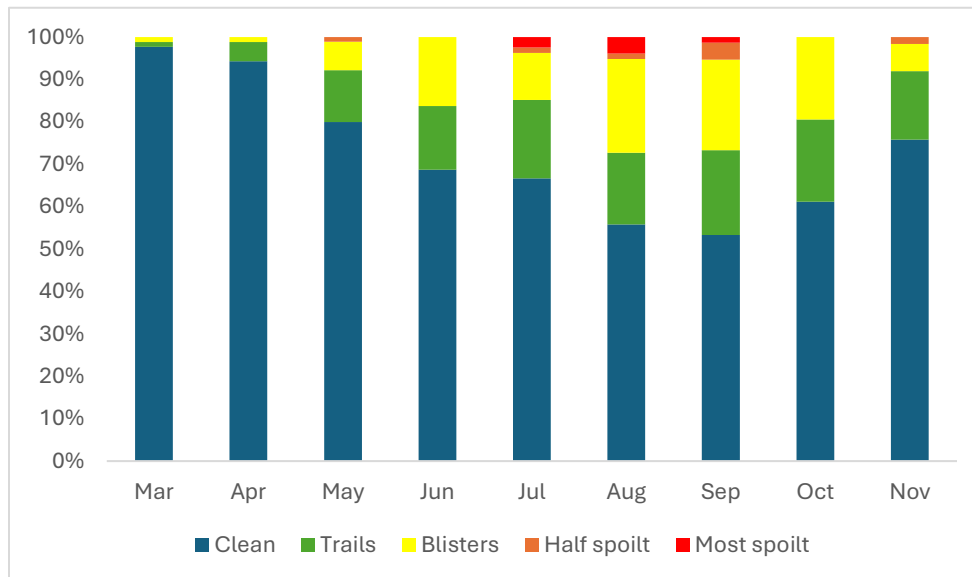


We plotted the postcodes on a map so we could see which locations experienced different levels of severity. Although, with the limited number of data points, it was difficult to draw definite conclusions. There was a trend for there to be more sites with moderate or severe damage in South West regions of the UK and more sites with low levels or no damage in the North and Scotland. There didn't appear to be a higher incidence of cases in the sugar beet growing regions of East Anglia, but the sample was too small to be able to determine whether this was true or not.

**Figure 4** Damage locations

### Monthly damage in 2025

We also asked participants to score their chard or beet plants for damage on a monthly basis in 2025, using the five point Likert scale described in the methods.



**Figure 5** Damage on a monthly basis in 2025

This graph showed damage first started to appear in April at very low levels, then showed a larger increase in May and June. This continued to increase until September. The damage levels were generally moderate: around 20% of sites experienced blisters on their chard but less than 5%

suffering from a loss that impacted half or more of their crop. Just over 40% suffered no loss at all. It's also encouraging that the damage levels decreased markedly after October, so there should be plenty of chard available during the winter, to harvest as a leafy crop.

After October, visible damage levels decreased, as the pest inflicted less damage, and older damaged leaves were replaced by newer younger growth. We looked at the possibility of dividing the damage scores into different regions of the country, but there was an insufficient number of sites to draw meaningful conclusions.

The damage was visible as the grubs ate the layers between the lamina of the leaves. The laminae could be peeled apart to reveal the grubs which were creamy maggots, around 5 mm in length.



a) Eggs



b) Beet leaf miner grub



c) Damage

*Figure 6 Damage stages on chard leaf*

Participants also counted the numbers of eggs laid. These were visible as clusters of white cylindrical eggs underneath the leaf. Egg laying was first observed in April and increased in May sustaining an average of two eggs per five leaves throughout the months until the end of September. Other work on this pest suggests that there are two to three generations per year, with the first generation laid in April and the second in July-August<sup>7</sup>. The large peak in egg laying observed in August may correspond to the second generation of egg laying. It's encouraging that egg laying trailed off in September, as this implies there will be less new damage in the winter months.



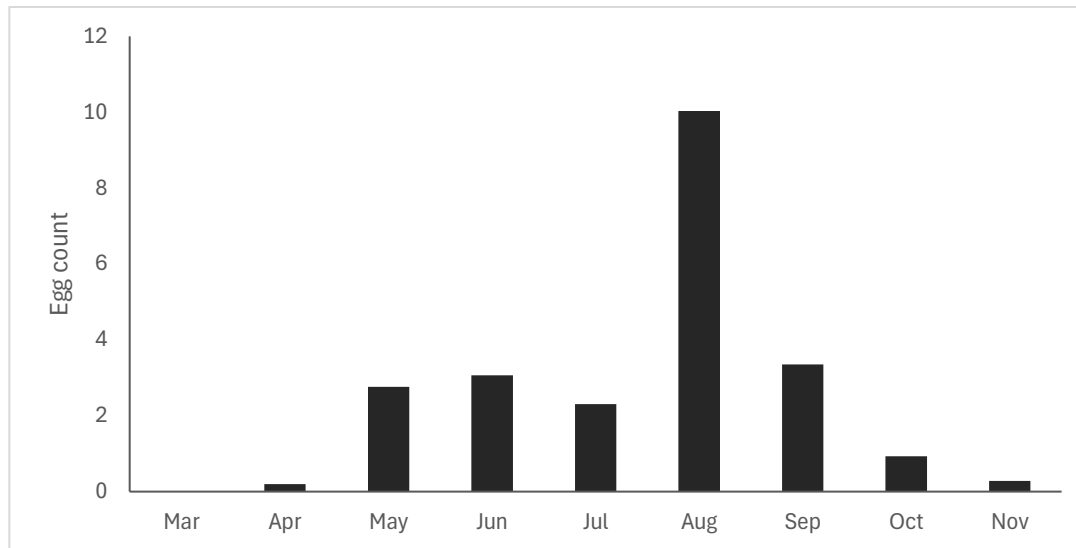


Figure 7 Eggs found on leaves in 2025

## Conclusions

The pest remained most active between April and September with signs of damage and egg laying between these months. This is in agreement with the AHDB who also observed this pest is active and has a number of generations between these months <sup>5</sup>.

Although a sizeable minority of just over one third reported moderate or severe damage on a regular basis by the pest, in 2025 only 20% of participants experienced moderate damage, and this was limited to a few blisters on a few to the leaves. However, our experience and anecdotal reports from other growers suggest this pest is increasing and can cause significant damage when it does occur.

If the pest is a severe problem at your site, we would suggest covering the crop with a fine mesh between May and September to reduce the amount of egg laying. However, as the pest damage decreased markedly after September, you may choose to ignore the damage and just remove the damaged leaves as they appear throughout the summer. This will allow the chard to produce 'miner free' plants throughout the winter, providing a supply of leaves at a time when there is less other produce available. The general advice is not to put affected leaves on a domestic compost heap, which are generally not hot enough to kill off the pest. This advice appears to be based on experiences of gardeners rather than scientific research <sup>8</sup>, and there does not appear to be research recommending what temperature is needed to kill off the beet leaf miner.

Although we were able to obtain a rough picture of the locations of where people experienced problems, generally, we needed more participants in order to be able to look at different locations on a month-by-month basis. It would therefore be useful to repeat the trial in the future with a larger number of participants. The methodology worked well, and the monthly reminders proved highly effective at increasing the participation rate.

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