A survey of allium leaf miner in 2024

Summary

- Allium leaf miner is a pest that is spreading around the UK. It is a small maggot that causes leeks and other alliums to rot and collapse. The pest lays its eggs in spring and autumn and is most noticed when harvesting leeks in the winter.
- We last surveyed the pest in 2017 and wanted to see how much it had spread since then.
- Allium leaf miner had spread slowly further since 2017, but its spread northwards was limited, and there were still no cases reported in Scotland.
- Leeks were by far the worst affected crop – this crop has a long growing season that spans through spring and autumn which are both periods when the pest lays its eggs.
- Most of the participants had first noticed the pest within the last 5 years. However, there was a cluster of people who had first spotted the pest before 2011 around the Midlands – the area where it was first found.
- More people were covering their crops with mesh to protect against the pest than in the 2017 survey. This suggests a greater awareness of allium leaf miner and a more proactive approach.

Introduction

Appearance

You are most likely to notice the larvae of the allium leaf miner as a small creamy maggot burrowing into the plants. You may also notice the pupae which are shiny brown and about the size of a grain of rice. Be careful not to confuse with the leek moth caterpillar which has a brown head and distinct legs. You are less likely to notice the adults. These are small grey flies, the size of a house fly and only spend enough time on the plant to lay eggs.

Allium leaf miner maggot

Symptoms

The first symptoms are clusters of white spots on the leaves where the female has laid its eggs. This is followed by a very pronounced twisting of the leaves. Later, the stems start to split, then eventually disintegrate, and the crop is often rotten before harvesting time.

Distorted onion plants

Damage

Allium leaf miner causes the stems to collapse and rot as the maggots tunnel through the tissue. Even mild infestations leave maggots and pupae in large enough numbers to render much of the crop inedible. Most infestations will result in significant losses and it is possible to lose the entire crop (Spasić and Mihajlović 1997).

When is it a problem?

The flies have two main egg laying periods, one in March and another in September to October. Damage will start to be noticed a few weeks after eggs have been laid.

History

Allium leaf miner is a serious pest that affects all allium crops. Its first siting in Europe was as early as 1988, on some leek crops on the outskirts of Budapest (Darvas, Szarukán, and Papp 1988). It later made its way to the UK, when it was found on allotment in Wolverhampton (Agallou and Collins 2004)

Since then, it has rapidly spread around the country. Garden Organic has carried out surveys of allium leaf miner in 2011 (with the Organic Growers' Alliance) and again in 2017. The survey showed that there were many siting's around the Midlands but it had spread to other areas of the UK as well. We wanted to repeat the survey to see if it has spread further.

Crops affected

Allium leaf miner will affect all allium crops, including leeks, onions, garlic, shallots, spring onions and chives. It causes the most damage in leeks, and can cause large losses in spring onions and chives. Garlic seems to be less affected.

Damaged leeks with pupae

Managing allium leaf miner

The most common non-chemical means way of controlling it is to cover the crop with fine mesh at the times of egg laying (see above). Allow at least a few extra weeks either way to take account of regional weather variations. When growing leeks, it may be necessary to cover the transplants in the trays as eggs can be laid in them, which means the crop is infected as it is being planted into the

ground. It is important to grow alliums in a different place each year, as pupae can remain in the soil over winter and carry over into the next crop.
More recently there have been a number of studies to investigate alternative methods of control. Laznik et al. (2012) searched for species that would attract the allium leaf miner away from leeks. Their work showed that the pest showed a preference for chives and from this observation, they claimed that this would make a suitable trap crop. However, when tested in the field in another study (Cornell Agritech 2024) they found that this was not sufficient to reduce allium leaf miner damage.

A number of other studies have also tested the use of reflective mulches ((Lai et al. 2024, Cornell Agritech 2024) to deter the pest, managing to achieve a reduction in the pest by 40% in one case (Lai et al. 2024)

Lastly, a field trial study in Slovenia (Laznik et al. 2012) attempted to test the effects of intercropping on the pest with three different herbs, Rosemary, Oregano and Lavender grown amongst leeks. Unfortunately, the results were inconclusive, as there were only low levels of the pest during the field trials.

• 2017 or after • 2012 – 2016 • 2011 or before

Figure 1 Map showing when participants first noticed allium leaf miner

Results

First siting of the pest

The majority of people spotted the pest after 2017 (Figure 1). This may be not only due to an increase in the incidence of the pest, but also an increasing awareness of what the problem was. It is also possible that the problem may have been incorrectly attributed to leek moth by some people in the past, as some of the damage symptoms appear similar There was a cluster of people who had first spotted the pest before 2011 (blue dots) around the Midlands which is consistent with the pest first being spotted in this area.

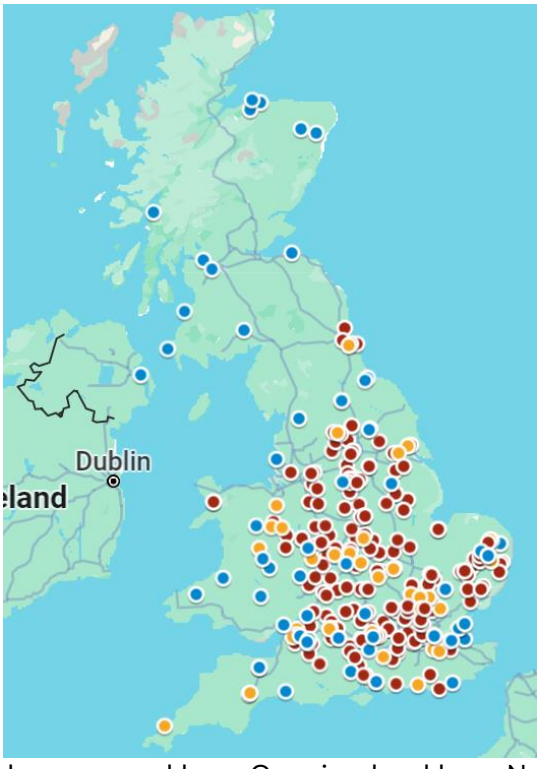
Location

Past surveys

Garden Organic's first survey of allium leaf miner in 2011 showed that most of the cases were centred around the Midlands, with also a large number of cases around London. The later survey in 2017 showed that although cases were still centred around the Midlands and London, there more sitings in other areas too. The 2017 survey also showed that there were no reported cases of allium leaf miner north of Manchester or in Scotland and Wales (Figure 2).

2024

Over the last seven years allium leaf miner has shown a continued slow spread outside the regions of the Midlands and London and there were still few sitings reported in Wales or the North of the UK. With the exception of a cluster of cases around Newcastle, there was very little North of Harrogate and no reported cases in Scotland.



• Regular severe problem • Occasional problem • Never a problem

Figure 2 Maps showing location of allium leaf miner

The slow progress of this pest northwards may be due to lower temperatures, although there is some work in the US that showed the pest will continue to develop at

temperatures above a threshold of 3°C (Lingbeek et al. 2021) that would suggest that this is unlikely to be a limiting factor.

Severity

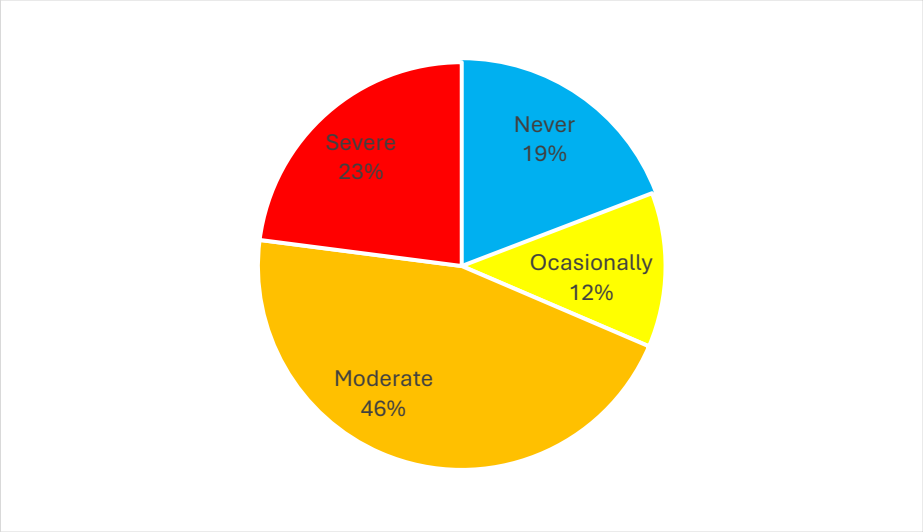


Figure 3 Severity of damage from pest

In both the surveys in 2017 and 2024, around two thirds of the respondents reported having a moderate or severe problem with the pest (Figure 3). In 2017, 38% of reported a regular severe problem whereas in 2024, only 26% reported the problem as being severe. A moderate infestation of this pest can quickly turn into a severe problem as the crop damage progresses rapidly.

Crops affected

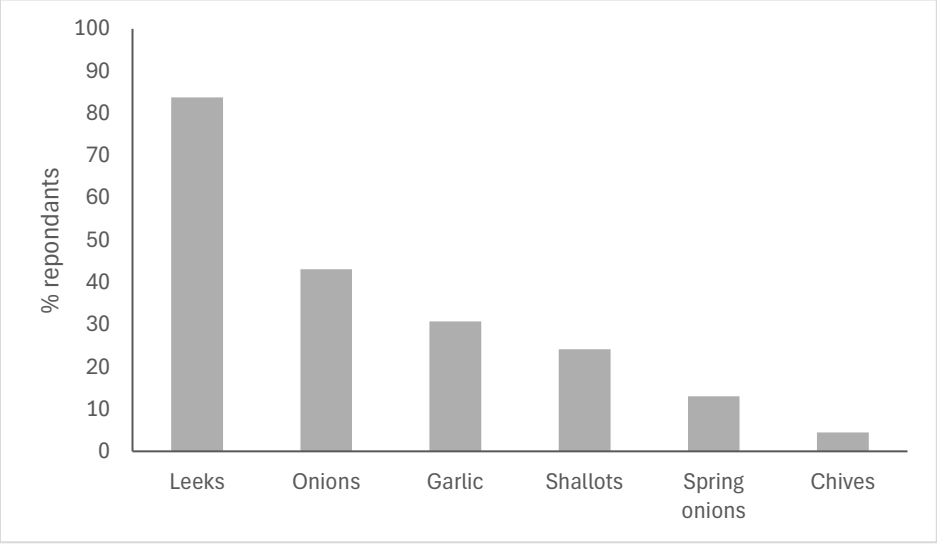


Figure 4 Crops affected

Leeks were by far the most affected crop with 84% of crops affected (Figure 4). The growing cycle of a leek makes it more vulnerable to attack than other allium crops as it has a long growing season that spans both the first and second generations of egg laying in spring (Mar – Apr) and autumn (Sep – Nov). The autumn generation is also at a time when the leeks have a lot of green material to attract the pest and is also shortly before harvest time, so the damage is very apparent.

Onions and garlic were also frequently attacked with 43% of onions and 31% of garlic. Both of these are exposed to the spring generation of allium leaf miner, which is smaller than the autumn generation.

Managing allium leaf miner

There are a number of non-chemical methods of managing the allium leaf miner. The measures adopted by our participants are shown in below in Figure 5.

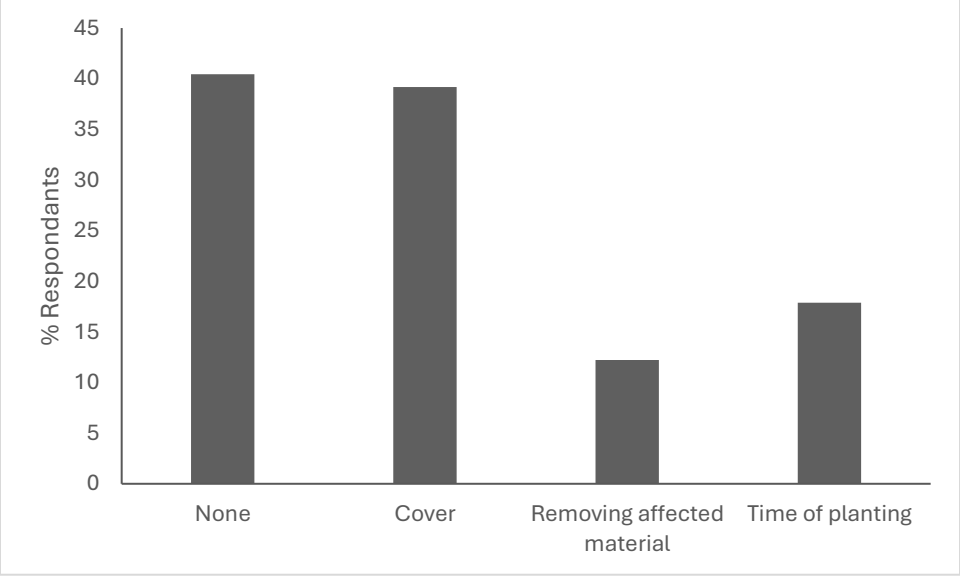


Figure 5 Control measures used by participants

Although around 40% of respondents did nothing to prevent allium leaf miner, a similar number also covered their crops with fleece or mesh to prevent the pest from laying its eggs. This is an increase on the 2017 survey when 9-27% (depending on crop type) covered their crops and reflects an increased awareness of the pest. In the survey in 2017, a number of growers stated that although they didn't currently cover their crops, they would start using this as a method of control now that they knew what the pest was. The

crop only needs to be covered from March – April and September to November to avoid the main egg laying periods (AHDB 2024).

Removing affected material is also important as they can pupate in allium debris and it is advised not to compost it (Coman and Roșca 2011).

Timing of planting is another possibility for some crops. For the crops with a short life cycle such as spring onions and chives, they can be planted to avoid the two egg laying periods in the spring and autumn. Garlic can also be planted in late November, after the more intense egg laying period in the autumn, although it might need to be covered to avoid the spring attack. Spring planted onions can avoid both generations if they are planted late, but this is likely to cause a significant decrease in yield. There is little that can be done with the timing of planting of leeks to avoid the pest.

Conclusion

From the 2017 and 2024 maps it appears that although the pest has appeared in some areas not found before, it has still left some areas of the UK untouched, especially Scotland. Leeks were by far the most affected crop.
It is clear that there is a greater awareness of the pest than before and more people are taking measures such as covering their crops, to prevent damage.

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