

Allium leaf miner survey

Headline findings

- Allium leaf miner is spreading around the UK at a steady rate with clusters of infestation around the Midlands and London.
- The pest is most likely to cause problems in leeks where it can wipe out an entire crop
- September to December is the time when most damage is caused in leek crops.
- It will be necessary to cover leeks from late August to late December to protect them if you are growing in a problem area
- People who currently took no action against this pest will cover their leeks in the future, now they are aware of what it is
- More needs to be done to raise awareness so that people are able to identify and prevent this pest

Introduction to Allium leaf miner

Allium leaf miner is a serious pest that affects all allium crops. It first arrived in the Midlands in 2002, and since then, has rapidly spread around the country. Garden Organic last did a survey of allium leaf miner with the Organic Growers' Alliance in 2011. 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 suspected that it has spread much further now, so have repeated the survey to find out which areas it is now affecting.

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, which are small grey flies, that only spend enough time on the plant to lay eggs.



Allium leaf miner maggot

Symptoms

The first obvious symptoms are 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 leaves maggots and pupae in large enough numbers to render parts of the crop inedible. Most infestations will result in significant losses and it is possible to lose the entire crop.

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.

What crops does it affect?

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

What can be done to avoid it?

The only 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.

Results from 2017 survey

Growers from 176 sites took part in the survey. We asked them questions about the incidence and severity of allium leaf miner at their site generally and also about specific problems in leek, onion, garlic, shallots, spring onions and chives. In this survey, leeks were the most popular crop grown, followed by onions and garlic. Leeks may have been over-represented in this survey as they are most likely to succumb to allium leaf miner, so people were keen to report it (Table 1).

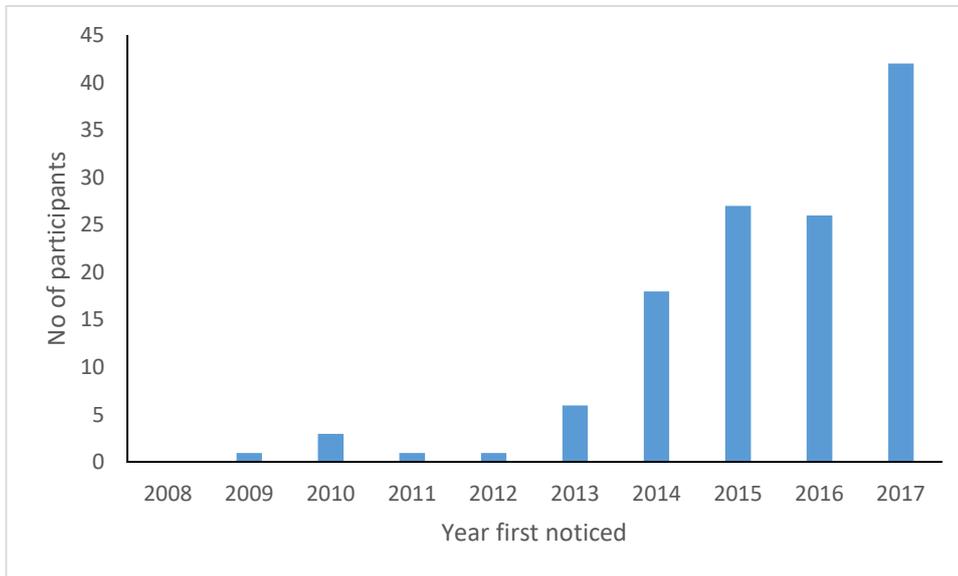
Table 1 Crops grown by participants

Crop	Leeks	Onions	Garlic	Shallots	Spring onions	Chives
Number of people growing	123	96	84	58	47	64

When was the pest first noticed?

People were asked the year when they first noticed the pest (Figure 1). There were low levels of the pest until 2013. After then, a much larger number of people reported that they first noticed the pest at their site. It is clear that there has been a rapid increase in the incidence of this pest over the last five years. Increased awareness of this pest and its symptoms could have also played a part in increased citing in later years.

Figure 1 Year the people first noticed allium leaf miner



Where was the pest first noticed?

Figure 2 Locations where allium leaf miner was first noticed



- First seen before 2011
- First seen 2012 - 2016
- First seen 2017

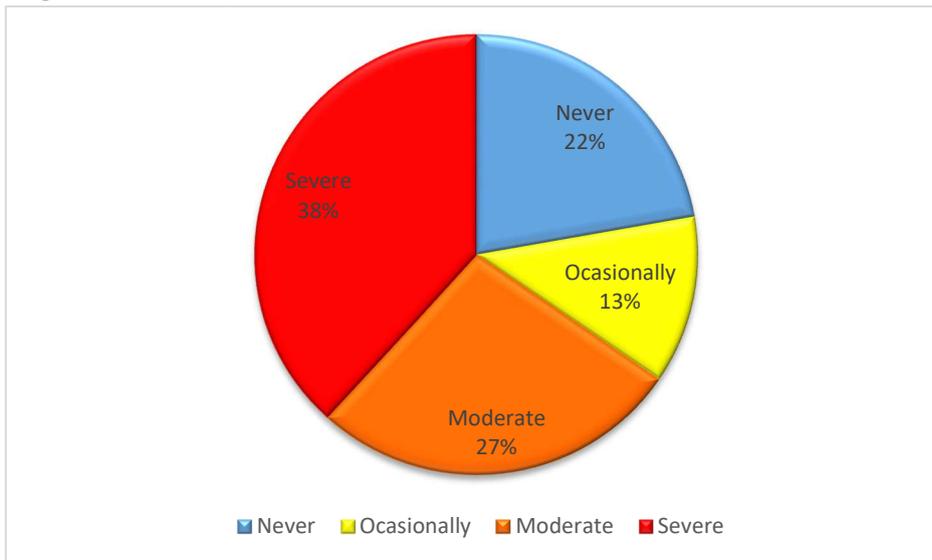
Historically, allium leaf miner was first identified on leeks growing in a garden in Wolverhampton in 2003. We tracked the locations of where people first noticed allium leaf miner (Figure 2). Many of the earlier citations (2012 – 2016) were clustered around the Midlands close to the original site. There was also a distinct cluster around London. In 2017, more

people reported the pest in areas between these two centres, suggesting that the pest was moving outwards from these two centres.

How severe is the problem?

The majority (78%) of the sites that took part in the survey had a problem with the allium leaf miner (Figure 3). 38% of the sites said that they had a severe problem.

Figure 3 Severity of allium leaf miner



This shows that allium leaf miner is widespread and a severe problem on many sites. It should be born in mind, that, as with all surveys, sites that are completely free from the pest tend to be underrepresented as they are less likely to take part.

Where is allium leaf miner a problem now?

The areas stating that allium leaf miner was a severe problem, still centred around the Midlands and London (Figure 4). Those stating that it was only an occasional problem tended to be in the areas between these two centres. This suggests that the pest is gradually spreading outwards from these two centres.

It was interesting that all sites north of Manchester that took part, stated that they never had a problem with the pest. This is consistent with the survey in 2011. The pest may not have reached these areas yet, and may also thrive less well in cooler conditions. It will be interesting to track its movement in the future.

Growers from Wales were underrepresented, and although none of them reported having a problem, reports from elsewhere suggest that allium leaf miner is a problem in Wales.

Figure 4 Areas where allium leaf miner is a problem in 2017

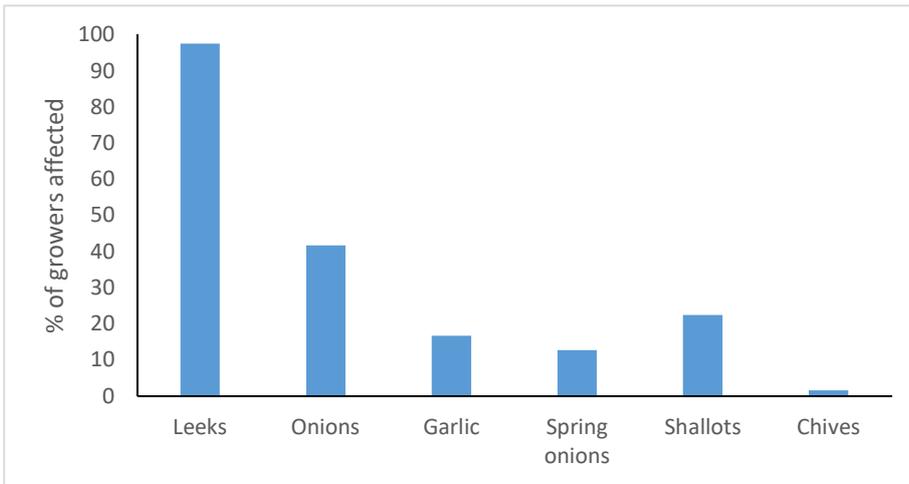


- Frequently a problem
- Occasionally a problem
- Never a problem

Which crops were worst affected?

Leeks were by far the worst affected crop, with 97% of people who grew leeks reporting a problem. The leek is the most vulnerable of alliums as it has plenty of leafy material exposed from September to December, when the allium leaf miner is laying its eggs.

Figure 5 Crops affected by allium leaf miner



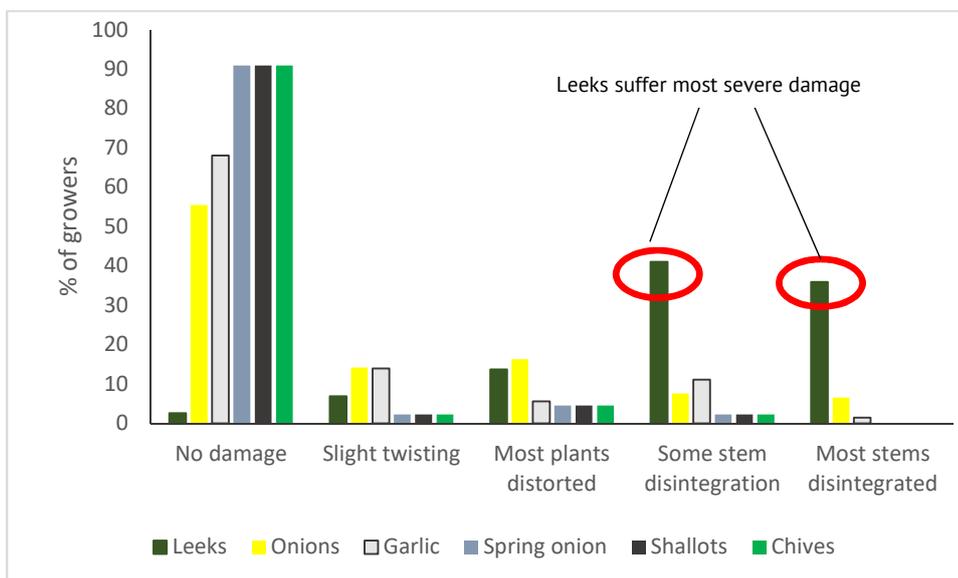
Other crops suffered less. Overwintered onions or autumn sown shallots could also be attacked in the late autumn but would have less leaf material to attract the pest at this time. The pest also lays eggs in March, which could affect these crops. Spring onions and chives are quick growing crops that could be grown between March and September to avoid the egg laying period completely.

Damage caused

The damage of allium leaf miners is first noticed as slight twisting of the leaves, followed by plant distortion as the maggots tunnel through the flesh. In badly affected crops, the stems will disintegrate completely.

Leeks were not only the most frequently infested crop (Figure 6), but also showed the worst damage with a high proportion of crops show some or complete stem disintegration. The levels of damage were far less in other crops, with a high proportion of spring onions, shallots and chives being completely damage free.

Figure 6 Damage caused by allium leaf miner

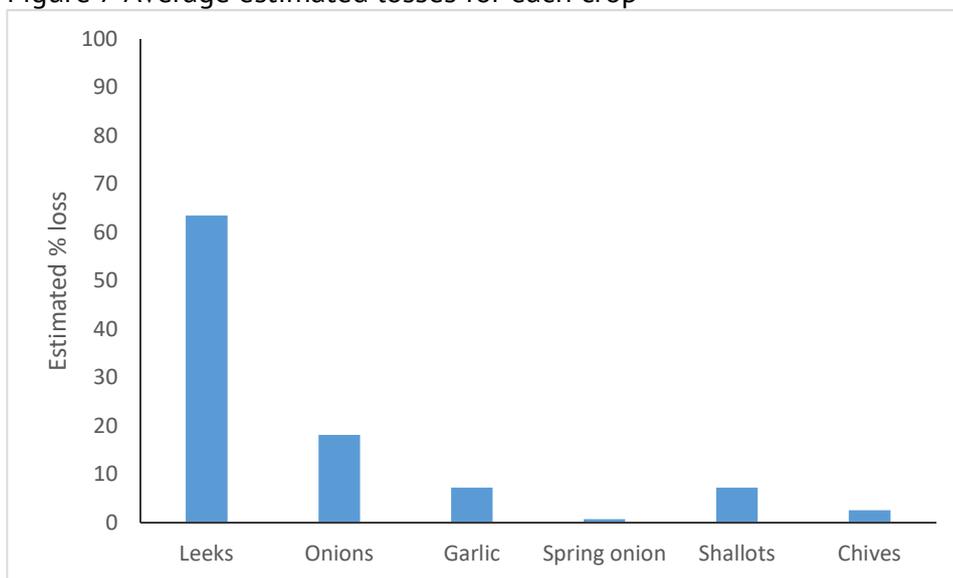


Losses

We also asked people to estimate the average losses from their crops (Figure 7). This was difficult to estimate accurately, but it gave an indication as to how much people were losing due to the pest.

Again, leeks suffered the worst losses ranging from no losses to 100% loss, with 60% of the crop being lost on average. Often this crop is rendered inedible as the flesh, although intact is littered with maggots and pupae.

Figure 7 Average estimated losses for each crop



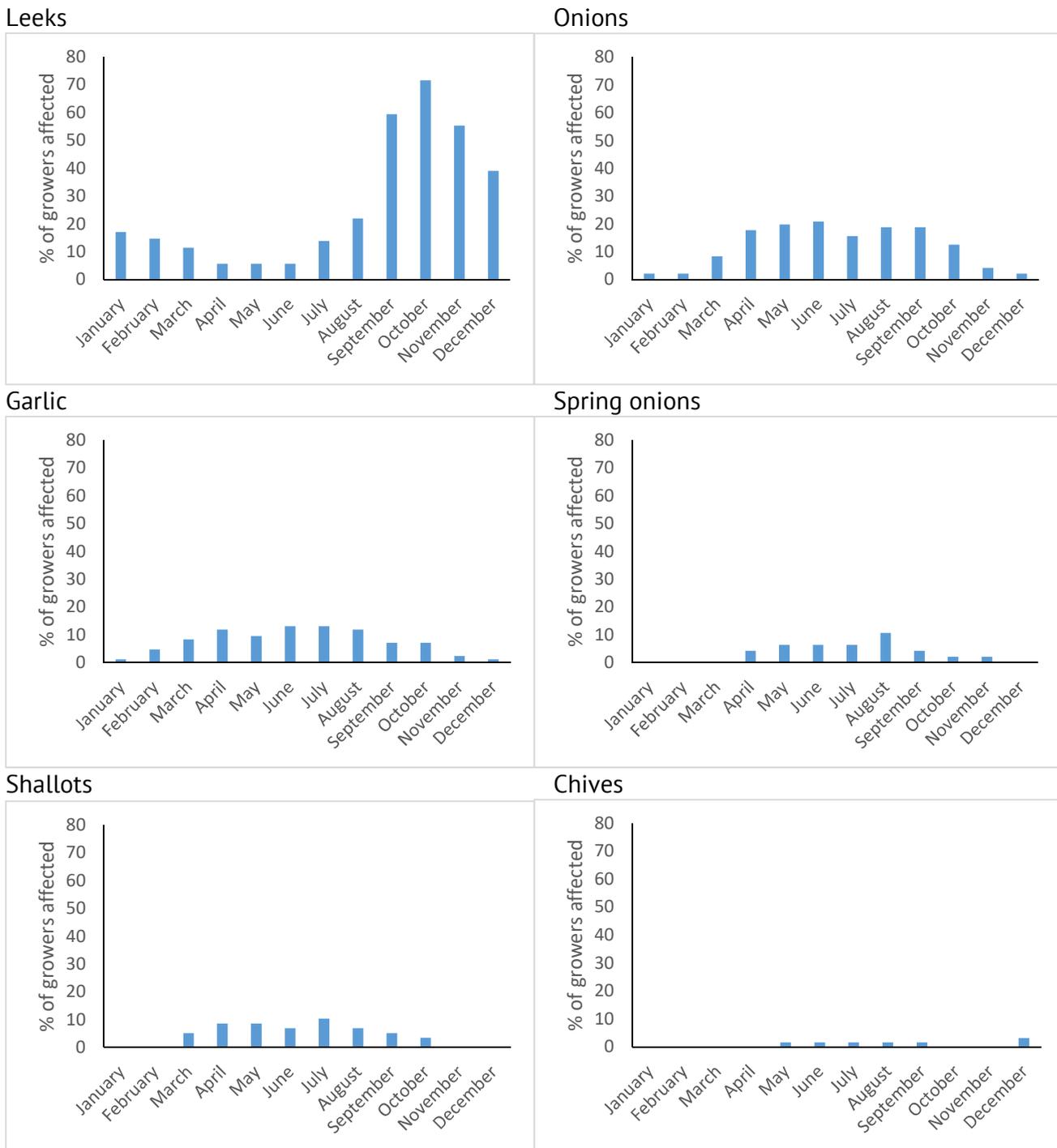
When is the pest a problem?

We asked growers to list which months they suffered the heaviest losses (Figure 8).

Leeks suffered heaviest losses from September – December, which corresponds with the main egg laying period for the pest. This emphasises the importance of covering leek crops with fine mesh during this period.

No other crops showed these levels of pest infestations, and the problems were spread more evenly over the growing season rather than clustered around a distinct period.

Figure 8 Times of year when allium leaf miner is a problem



Control measures against the pest

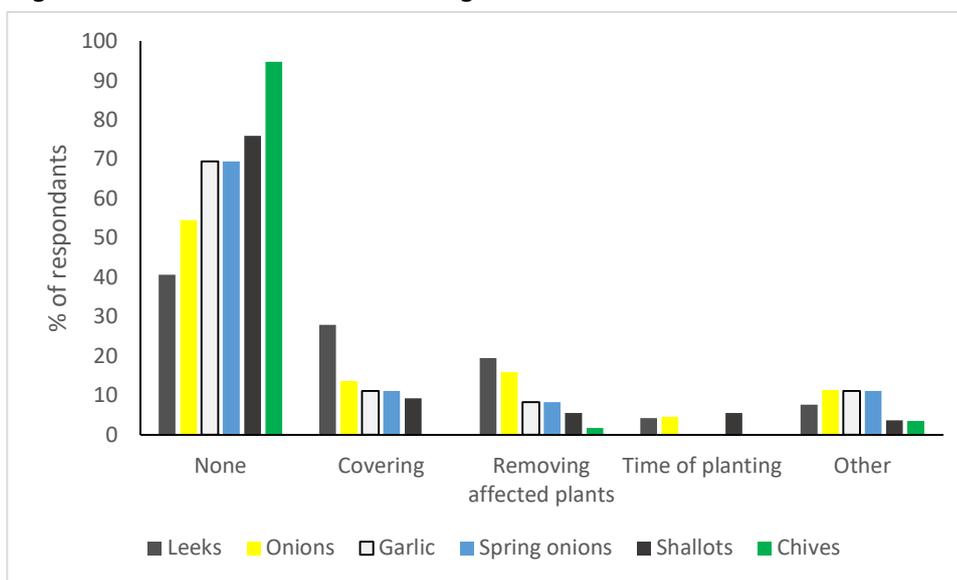
Covering the crop with fine mesh is the main preventative treatment for the organic grower to prevent the fly laying eggs. It is also important to dispose of infected plants and rotate between crops, as any eggs laid on infected debris will infect plants in subsequent seasons.

There are currently no insecticides available for amateur gardeners that will work against this pest, although commercial growers may use them.

Not surprisingly, growers were more likely to cover leek crops than other crops (Figure 9). Despite this crop being vulnerable to the pest, currently, only 27% of people growing leeks covered their crops. However, a number of respondents who currently took no action against the pest, stated that they would cover their crops in the future now that they knew what the problem was. A small number of people growing leeks said they had now given up growing them because of the pest.

Only small numbers of people covered other crops, as they probably did not deem it necessary.

Figure 9 Control measures taken against allium leaf miner



Conclusions

This survey shows that allium leaf miner is a highly damaging pest, particularly in leek crops and is spreading slowly but surely across the UK. Anybody who knows that it is a problem in their area should take action to prevent it by covering their crops with fine mesh, from late summer to early winter.

Not everybody is aware of this pest, so it is important that people are given reliable information as to how to identify and prevent it. Some people who currently took no action against allium leaf miner stated that they would cover their crops in the future, so raising awareness plays an important role.