

Can companion planting reduce allium leaf miner?

Background

Allium leaf miner (*Phytomyza gymnostoma*) was first discovered in the Midlands in 2002 and has steadily spread throughout the UK. It is a small fly that lays its eggs in allium plants during spring and autumn time. The maggots hatch out and burrow through the plant, often causing it to collapse and rot. It can cause extensive damage especially to leeks. Currently, the only organic method of controlling the pest is to cover the crop with fine mesh. As this is unsightly and adds to the amount of plastic used in gardens and allotments, gardeners would welcome alternatives.



There has been extensive work to show that crops grown amongst other plants are attacked less frequently by pests. It has been shown that the nearby companion plants reduce the chance of the pest landing on a crop plant leaf, so it will abandon egg laying and fly off somewhere else. The size and shape of the companion plants is also thought to be important, but surprisingly both unscented and scented plants are effective. You can read more about the work done by Stan Finch and Rosemary Collier at Warwick Crop Centre here: https://warwick.ac.uk/fac/sci/lifesci/wcc/research/croppests/ipm/companionplanting/biologist_jun03.pdf Much of this work has been done on brassica pests, and there has been little or no work to see if such approaches could deter allium leaf miner.

We would like to test the effects of growing 2 different shaped plants amongst leeks to see if it will work as a way of managing leaf miner. You will grow a control plot of leeks alone, one plot with leeks mixed with low growing white clover and one plot with leeks mixed with tall growing chard. You will then monitor whether they get attacked by allium leaf miner. This will improve our understanding of companion planting and may give gardeners new options for pest control.

Aims of this experiment

We would like to see if we can reduce the damage from allium leaf miner in leeks by interplanting them with a low growing (clover) or taller growing (chard) crops.

Included in this pack:

Seeds, instructions and recording sheets.

You will also need:

- Three 1 x 1 m² plots close to each other over the period March - December.
- Seed trays for growing leeks
- Seed or multipurpose peat free compost

Growing instructions

Sowing

1. Sow in early March
2. If you have a way of raising leek seedlings that you know works for you, feel free to stick to that!
3. Otherwise fill a modular seed tray with compost. You will need around 50 cells in a tray. Leeks should be sown in medium sized cells that are at least 5 cm deep, otherwise they grow very slowly. Sow a leek seed in each cell and water in. We have found that deep root trainer trays work well for leeks and reduce root disturbance.
4. In another tray sow 30 perpetual spinach (chard) plants.
5. It is advisable to keep the leek plants protected during March and April as sometimes the allium leaf miner can lay eggs in the young plants.

Plot preparation

Set aside an area with three 1m x 1m plots close to each other. Ideally there should be a small gap of half a metre between each plot. The soil should be reasonably fertile – have had compost or manure applied and weeded before the trial.

Plot layout

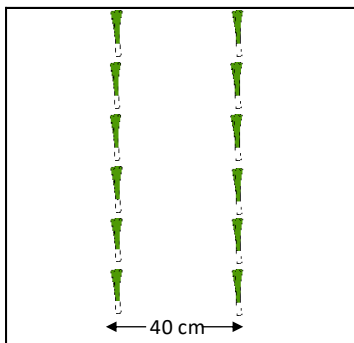
The three plots will be laid out as follows:

Plot 1 - Control plot: 2 rows of leeks

Plot 2 – Leek / chard intercrop: Alternate rows of leeks and chard

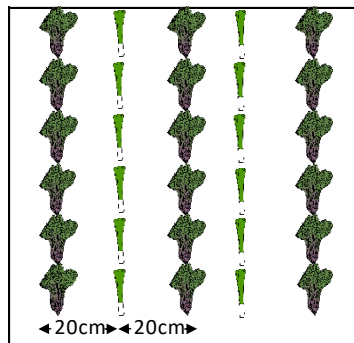
Plot 3 – Leek / clover intercrop: 2 rows of leeks planted into bed of clover

Plot 1
Leeks alone



40 cm between rows
Plant spacing 15 cm

Plot 2
Leek / chard intercrop



20 cm between rows
Plant spacing 15 cm

Plot 3
Leek / clover intercrop



40 cm between rows
Plant spacing 15 cm
Bed of clover



Transplanting Leeks – all plots

1. In mid-May, once the leek seedlings have reached the thickness of the inside of a biro and are about 15 cm tall you can transplant them out. Select the 36 best leeks, and share them out, 12 per plot.
2. In each plot make 2 rows of holes 10 cm deep, put a seedling in each hole and fill the hole with water to 'puddle' them in. Spacing 15 cm between plants, 40 cm between rows of leeks.

Transplanting Chard – plot 2

3. Select 18 of the best plants for Plot 2, transplant chard between either side of the 2 rows of leeks, and water them in. Spacing 15 cm between plants, spacing between rows: 20 cm between alternate rows chard / leeks (see diagram)

Sowing clover – plot 3

4. In Plot 3, sow the white clover seed over the entire plot and rake and water in.

Subsequent Plot care

Water the plots as needed and hand weed as necessary to keep the plots relatively weed free.

Chard:

Harvests can be taken from the chard to encourage fresh leaves to continue growing, the aim is to maintain a canopy tall growing leaves next to the leaf plants. If the plants go to flower, cut off the flower stem to maintain leafy growth.

Clover:

If the white clover grows taller than 10 cm, trim it with shears. This will encourage vigorous growth and keep down weeds.

Assessments

Damage assessment

At the end of December, harvest the leeks from the three plots. Make sure you keep the leeks from each plot separate. Cut off the roots and remove any excess soil from the base.

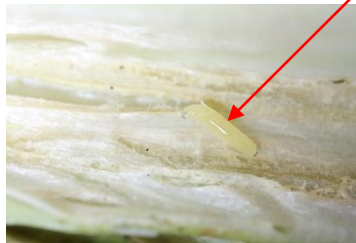
For each plot divide the leeks into 3 piles:

- 1 - No damage
- 2 - Moderate damage: twisting of leaves, distorted growth
- 3 - Severe damage: base of plant starting to collapse and rot

For each plot record the number and weight of plants in each category.

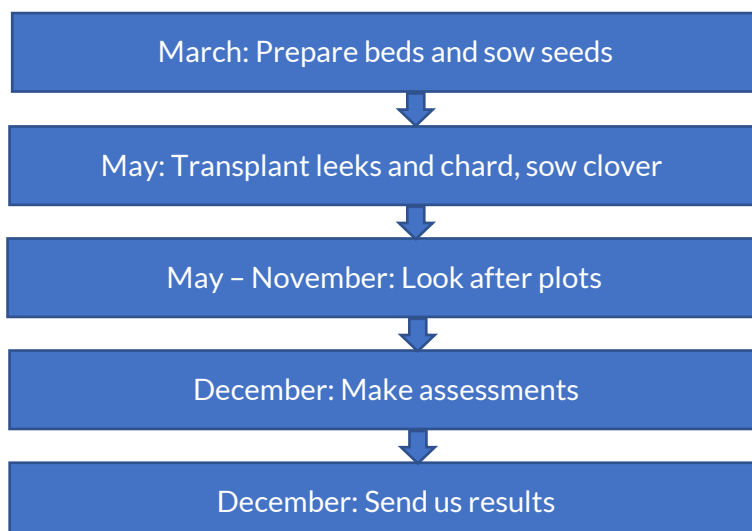
Number of larvae and pupae

For each plot, take 5 leek plants. Peel back the leaves and count the total number of allium leaf miner pupae and larvae on the five plants taken from that plot. The larvae are white maggots, a few mm long with no distinct head or legs.



The pupae are brown and hard, about the size of a grain of rice.

Monthly timeline from March - December



Data recording

Allium leaf miner at your site

1. What is your postcode?
<input type="text"/>

2. Is allium leaf miner a problem at your site			
Never a problem <input type="checkbox"/>	Occasional light damage <input type="checkbox"/>	Regular moderate damage <input type="checkbox"/>	Regular severe damage <input type="checkbox"/>

3. Which of the following do you grow regularly?					
Leeks <input type="checkbox"/>	Onions <input type="checkbox"/>	Garlic <input type="checkbox"/>	Shallots <input type="checkbox"/>	Spring onions <input type="checkbox"/>	Chives <input type="checkbox"/>

4. In which of the following have you seen allium leaf miner damage? (tick all that apply)					
Leeks <input type="checkbox"/>	Onions <input type="checkbox"/>	Garlic <input type="checkbox"/>	Shallots <input type="checkbox"/>	Spring onions <input type="checkbox"/>	Chives <input type="checkbox"/>

5. If possible, please give the year that you first noticed allium leaf miner at your site
<input type="text"/>

6. What measures do you use against it? (Tick all that apply)			
Mesh or fleece <input type="checkbox"/>	Time of planting <input type="checkbox"/>	Removing affected plants <input type="checkbox"/>	None <input type="checkbox"/>
Other (please specify): <input type="text"/>			

Growing records:

7. Sowing date leeks
<input type="text"/>

8. Sowing date chard
<input type="text"/>

9. Transplanting date of leeks and chard
<input type="text"/>

10. Sowing date clover
<input type="text"/>

11. Any other comments on growth of plants

Damage assessment

12. Damage categories – for each plot separate the plants out into 3 categories in each plot. then record the number and weight in each.			
	Plot 1 control, leeks alone	Plot 2 chard and leeks	Plot 3 clover and leeks
Undamaged plants			
Number			
Weight (g)			
Moderate damage: twisting of leaves, distorted growth			
Number			
Weight (g)			
Severe damage: base of plant starting to collapse and rot			
Number			
Weight (g)			

13. Count the total number of pupae and maggots from 5 leeks in each plot		
Plot 1 control, leeks alone	Plot 2 chard and leeks	Plot 3 clover and leeks

Please answer the following questions about this Members' Experiment

Please tick which of the boxes you think applied to your experience of taking part in this Members' Experiment.					
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I enjoyed taking part in this experiment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt I learnt something new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt I was contributing to something useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am likely to take part again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other comments					
Any suggestions for future Members' Experiments:					

Submitting results

By far the easiest way to send the data is to enter it online. The links to the forms are on this page.

<https://www.gardenorganic.org.uk/what-we-do/citizen-science-and-research/members-experiments/companion-planting-experiment-2024>

You can now store results on the form as you go – it will email you a link, which you can then use to resume entering results. Please keep this email in a safe place so that you can retrieve the results. If you do lose it, then you will need to email (experiments@gardenorganic.org.uk) and ask for a new link.

or

you can return the record sheets to us by **15 January 2025** at the following address:

Members' Experiment Coordinator,
Garden Organic,
Ryton on Dunsmore,
Coventry.
CV8 3LG.

Electronic versions of these instructions are available in the Members' Experiment section of our website: www.gardenorganic.org.uk/members-experiments.

We welcome good quality photos. The best ones may be published in our magazine and on social media.

Please send photos to experiments@gardenorganic.org.uk. Unfortunately, we are unable to use hard copy prints.