



# Emerging Pest Insect Problems – Swede Midge and Cabbage Stem Flea Beetle

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*Brassica & Leafy Salad Conference, 25<sup>th</sup> October 2022*



## Swede midge

- Flagged up in 2019 by growers as a possible increasing problem for brassica crops
- Main impact is blindness/distortion of growing point
- European native – always been around
- A major and fairly recent problem in North America - first detected about 20 years ago and has spread. Arrived from Europe!
- Spread in North America may be due as much to movement of transplants as flight – as midges do not fly long distances



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### SWEDE MIDGE

Information Center for the U.S.

Swede Midge damage to Red Cabbage

- Home
- About This Site
- Insect Distribution
- Biology
- Damage Symptoms
- Monitoring & Detection
- Management
- Resources
- Contact Us

#### Swede Midge Information Resources

- [Swede Midge Fact Sheet](#)
- [Swede Midge Best Management Practices Guide \(2019\)](#)
- [Swede Midge Reference List \(1926 to 2014\)](#)

#### Training Materials

- [Narrated Powerpoint Presentation \(Flash\)](#)

Powerpoint files available for educators to use:

- [Swede Midge Insect Distribution in North America](#)
- [Swede Midge Damage and Biology](#)
- [Swede Midge Scouting Tips](#)
- [Best Management Practices](#)

#### Links to other websites

- [On-line Swede Midge DEC certified pesticide applicator Recertification Course](#)
- [Center for Invasive Species and Ecosystem Health](#)
- [Canadian Food Inspection Agency](#)
- [Fact Sheet Ontario Ministry of Agriculture Food and Rural Affairs](#)
- [Cornell Integrated Crop and Pest Management Guidelines for Vegetable Crops](#)





## UK monitoring 2020 & 2021

- AHDB set up a collaborative monitoring project
- Aim was to increase our understanding of the problem
- AHDB funded provision of pheromone traps and identification
- Thank you to all who monitored midges!
- Comprehensive sets of information from pheromone traps:

- Scotland
- Lancashire
- Nottinghamshire
- Warwickshire
- Worcestershire
- Sussex
- Ireland



Warwick's swede midge web page: [Swede midge \(warwick.ac.uk\)](https://warwick.ac.uk/swede-midge)



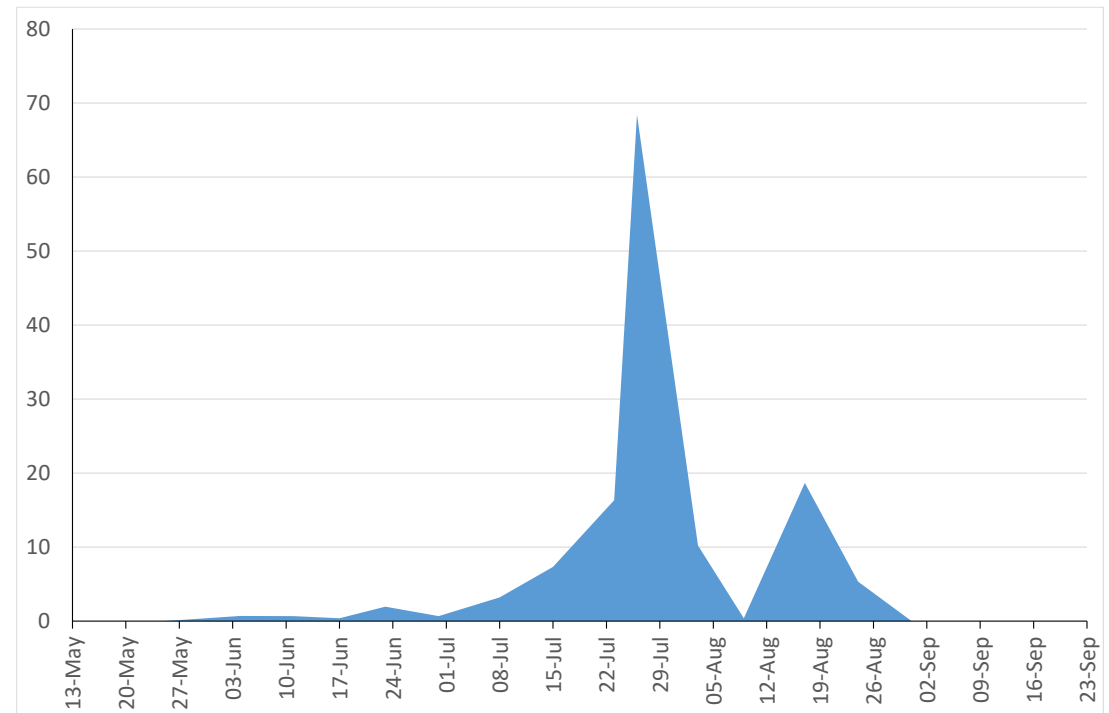
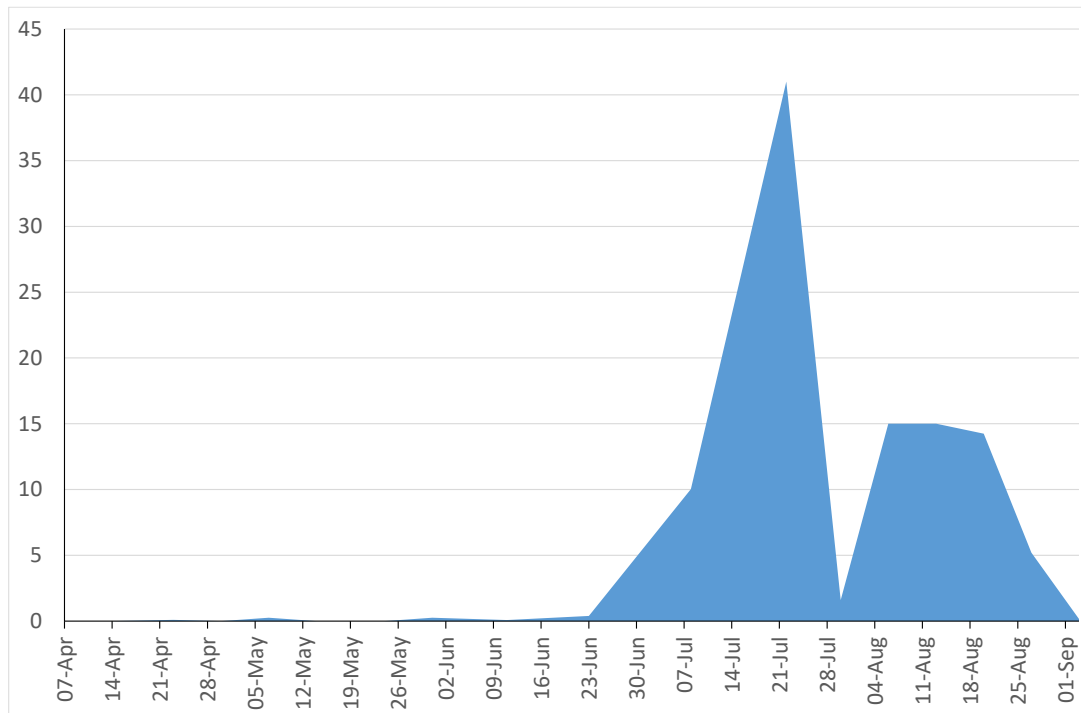
## Conclusions from monitoring 2020 & 2021

- Midges are very small and impossible to 'guess' identity without microscope.
- Even with microscope there is scope for mis-identification.
- A few midges were caught before June but numbers were more significant from June onwards. Peaks in infested crops were in July and August.
- Most fields had a very low 'background' population – so one or two per trap per week.
- Some fields had larger infestations e.g. >50 midges per trap per week.
- I think this will be linked with rotation/spatial separation (lack of it) and possibly also reduced pesticide use (organic).



## Trap captures 2021 – locations with high numbers

*Graphs show midges per trap per week – averaged over fields*





## IPM for swede midge (North America)

Incorporates as many strategies as possible and should minimally include:

- Use of clean transplants
- 2- to 3-year rotation to non-brassica crops – structure of rotation depends on life-cycle of crop versus life-cycle of pest - which may fly 0.5 km or more
- Post-harvest crop destruction
- Weeds can be hosts e.g. Shepherd's purse. Same applies to brassicaceous cover crops and oil seed rape.
- Swede midge detection and monitoring
- Insecticide applications as needed



# Insecticidal control

- Probably, most of the insecticides applied to brassicas have some sort of impact on swede midge. This plus impacts of rotation may be the reason why the ‘background’ population in most crops is low.
- Work in North America on insecticidal control. Neonicotinoids/systemic insecticides shown to be effective. Acetamiprid shown to kill adults and eggs. Recommended insecticides have been *imidacloprid*, *acetamiprid*, *spirotetramat*, *lambda-cyhalothrin* (NY State).
- Examples of North American action thresholds
  - Cabbage - action threshold of 5-10 males per trap per day (with monitoring every 2-4 days).
  - For broccoli, in regions of low swede midge populations, 1 male per trap per day.
  - For broccoli in areas with high swede midge populations, 1-5 males per trap per day but has not been proven to be more effective than weekly calendar sprays.
- Most of the British sites monitored in 2020 and 2021 had less midges than these thresholds...

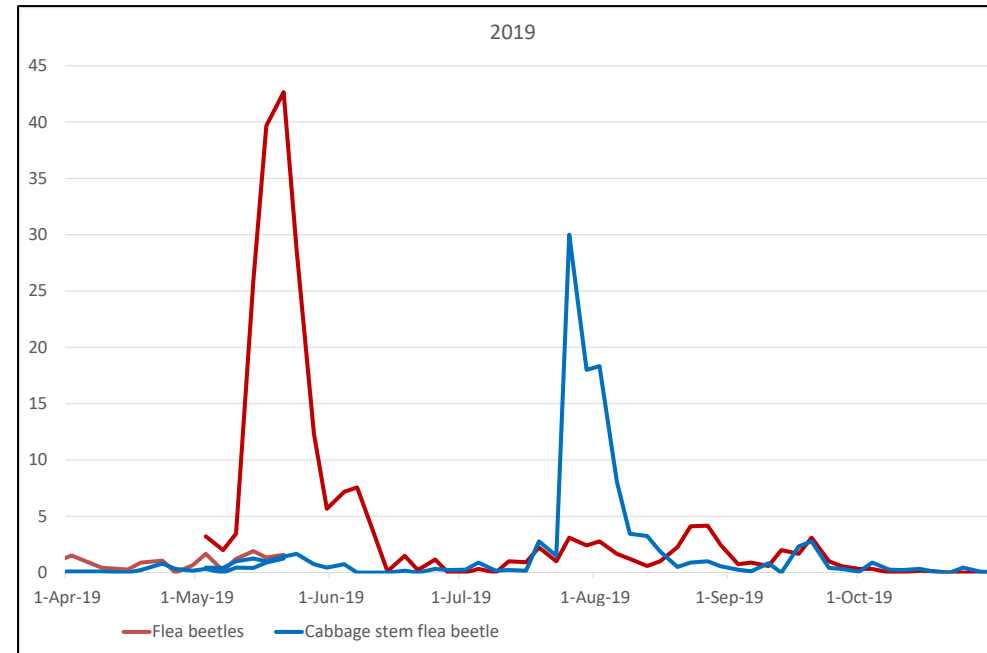




# Flea beetles

## Flea beetles – *Phyllotreta* species

- 8 species feed on brassicaceous crops and weeds - tend to be considered together.
- Older literature says that the period of greatest activity is **10<sup>th</sup> April – 20<sup>th</sup> May** – but damage appears to occur over a longer period now.
- Huge infestation at Wellesbourne in early August this year.



## Cabbage stem flea beetle

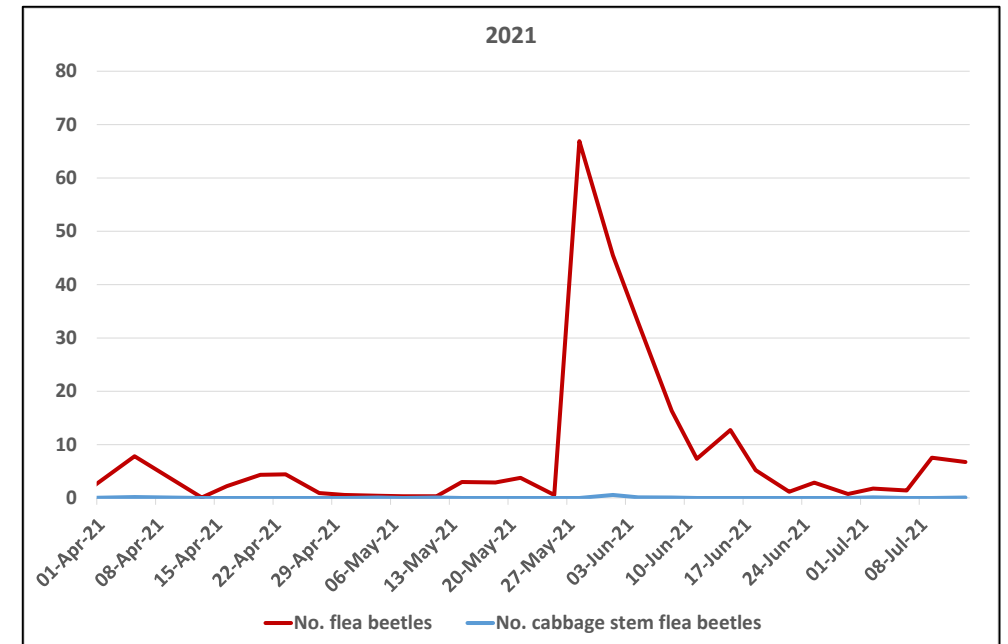
- Since withdrawal of neonicotinoid seed treatments has been major pest of oil seed rape (OSR)
- Not sure what impact this has had on background population
- Captured in suction traps



## SCEPTREplus trial 2021 – Wellesbourne

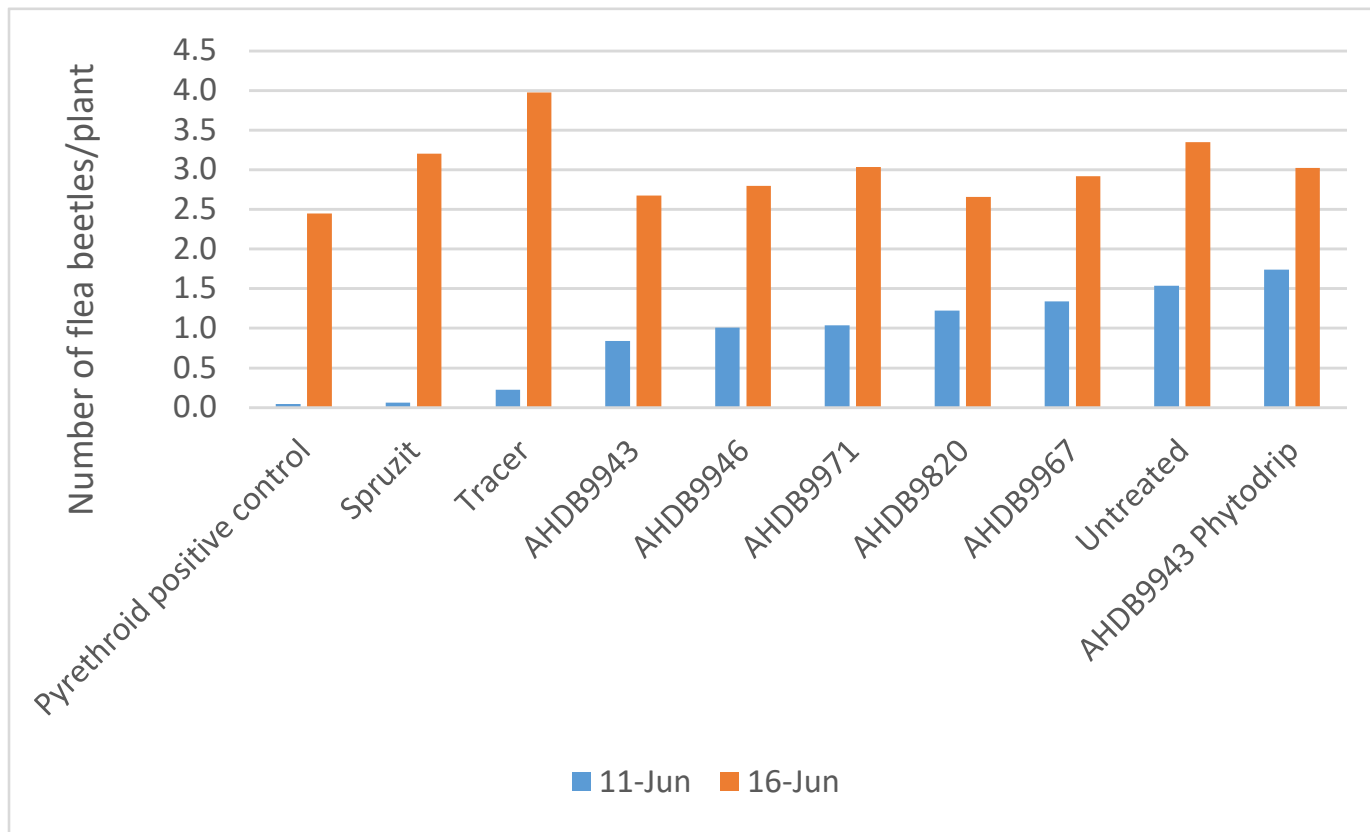
*Phyllotreta* species

Pak Choi: sown 24 April and planted 19 May





## Beetle counts after second spray on 11<sup>th</sup> June



- Adults susceptible to pyrethroids and Tracer
- Issue is short persistence of contact treatments



# Cabbage stem flea beetle (CSFB)



[©Udo Schmidt](#)



[©Gilles San Martin](#)



# Cabbage stem flea beetle

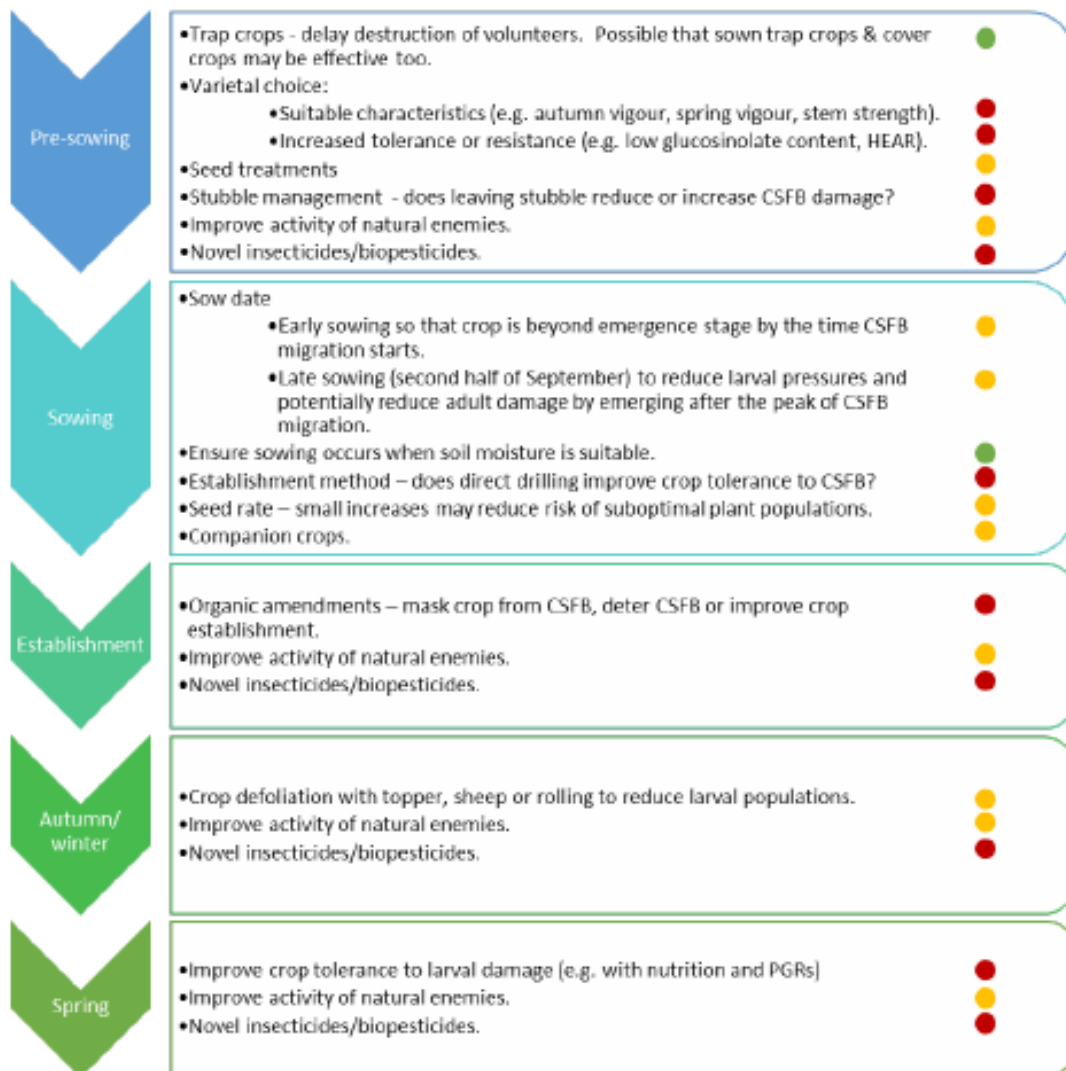
- Susceptible horticultural crops include spring greens/Pak Choi – few insecticides approved
- CSFB is resistant to pyrethroids in many areas
- Much ongoing work on management in OSR – funded by AHDB and others
- Taking a broad approach – IPM strategy
- Emphasis on yield rather than physical appearance of plant





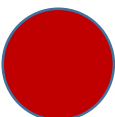


## Life cycle

- Adults emerge from pupae and feed on foliage (Jun–Jul).
- Adults ‘rest’ in moist, sheltered places (Aug).
- **Adults migrate into crops, feed on leaves and mate (Aug–Sep).**
- Adults lay eggs and feed on leaves (Sep–Dec).
- Eggs hatch and larvae feed, if temperatures are 3°C or warmer (Oct–Feb).
- Larvae feed on main stem behind the growing point (Mar–Apr).
- Larvae drop to the soil and pupate (May).
  
- OSR sowing date key! Crops drilled between mid-August and mid-September tend to be at greatest risk from adult CSFB, especially those drilled from the end of August to early September, due to alignment between beetle migration peak and the most susceptible crop growth stages.
  
- Trap crops may help – have used volunteer OSR – large areas needed but may protect from mid-August – also turnip rape tried. Anecdotally, volunteer OSR seems to have worked at Wellesbourne.
  
- Companion crops may also have potential
  
- UK and EU-funded work focuses on non-insecticidal approaches



## Potential components of an IPM strategy for cabbage stem flea beetle

- 
Reliable control – possibly with some further research needed
- 
Moderate control with further research needed
- 
Control not proven and significant further research needed



## Research on biopesticides

- Harper Adams – Claire Hoarau PhD
- Lab trials – promise from:
  - Nematode – *Heterorhabditis* spp.
  - Fungal biopesticide – *Beauveria bassiana*
  - FLiPPER
- Field trial in 2021 – not conclusive
- Second field trial in 2022





# AHDB trial 2022 – main target is cabbage stem flea beetle on Pak Choi

- 8 treatments
- Untreated control
- 5 conventional insecticides
- 2 biopesticides

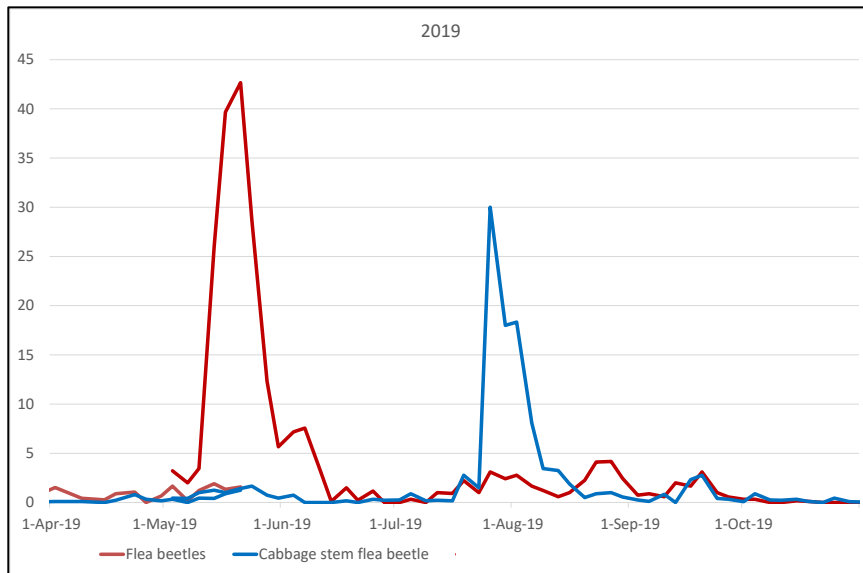
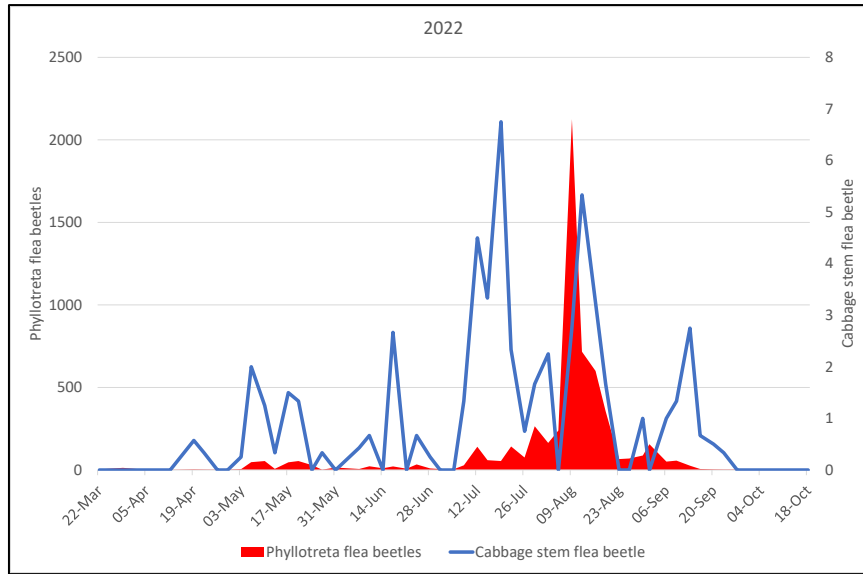


PhD 'Investigating insecticide resistance in UK populations of the cabbage stem flea beetle, *Psylliodes chrysocephala*'

**Caitlin Willis**

*Screened a wide range of conventional insecticides*

# Flea beetles 2022 - Wellesbourne



ROTHAMSTED RESEARCH Insect Survey

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RIS Remarks  
Issue 25  
30 September 2022

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This is a report on the presence of certain agriculturally important insects caught in the Rothamsted suction-trap network that are not reported on the Aphid Bulletin. Comments are given on qualitative changes in populations when caught in high numbers.

Field reports on pest insects in your area would be gratefully received and can be sent to: [alex.greenslade@rothamsted.ac.uk](mailto:alex.greenslade@rothamsted.ac.uk).

Cabbage stem flea beetle (*Psylliodes chrysocephala*) was recorded from all sites except Silwood Park this week and reached double figures at Hereford and Wellesbourne. There were large numbers of lacewings (Neuroptera) from Broom's Barn, Rothamsted and Silwood Park. The other species reported upon were mainly found in single figures. Spotted-wing drosophila (*Drosophila suzukii*) was found from eight sites this week.



## Thank you:

- AHDB
- British Growers Association and Crop Associations
- Andy Richardson
- Our team at Wellesbourne
- Swede midge monitorers
- Peter Waldock, John Chapman and growers
- Agrochemical/biopesticide and seed companies



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