Pests of carrot with a focus on aphids and virus

Rosemary Collier
Pest insects in carrot

• Carrot fly

• Aphids – virus

• Cutworms – turnip moth

• Some control methods will assist with management of all of these – but timing is key
• Climate change UK?

• Will late second/third generation egg-laying become more important?

• 20 years ago, last ‘new’ larvae of the year were found at end of September
2021 - Teagasc Carrot Fly Webinar - Teagasc Agriculture and Food Development Authority – presentations by Rosemary Collier and Colin Noble
Aphids and virus -2020

- Large numbers of willow-carrot aphid and peach-potato aphid
- Wet 2019 autumn and winter resulted in very large areas unharvested and unstrawed carrots leading into the spring - possible reservoir for aphids overwintering on carrot
- 2nd year without neonicotinoid seed treatment
- Worse virus year in some regions since 2015
- Yield reductions of up to 30% because of virus

Howard Hinds for AHDB aphids event
Four species of aphid infest carrot

Suction trap captures

- **C. aegopodii** – willow-carrot aphid
- **C. theobaldi** – willow-parsnip aphid
- **C. pastinacae** – willow-umbellifer aphid
- **M. persicae** – peach-potato aphid
AHDB Project FV 460 - Investigating the timing of transmission of carrot viruses to improve management strategies – led by Adrian Fox

• When is virus transmitted to carrot crops?
• Which species of aphid is the main vector?
• Can the peak time of virus transmission be predicted?
• Can treatment programmes be targeted?
Mainly carrot red leaf virus (CtRLV) – small amount of yellow leaf virus (CVLV)
2021 Wellesbourne – Year 2 of FV 460

PERCENT VIRUS
APHID NUMBERS
C. aegopodii  M. persicae  C. pastinacae  C. theobaldi  Total virus %
Conclusions – FV 460 field trials 2019 and 2021

• Minimal virus transmission at York site (data not presented here)
  • Difficult to draw any conclusions
• Greater virus transmission and aphid numbers at Wellesbourne in 2021 than 2019
  • As in 2019, virus transmission at Wellesbourne in 2021 tracked aphid numbers well for first half of the trial
  • Majority of first aphid peak was *C. aegopodii*
  • From late June aphid numbers appeared to fall, but virus transmission had a second peak
  • Second peak may be related to *C. pastinacae*
Field trial 2022 - Wellesbourne

• Insecticide programmes – developed with BCGA members
• Assessment of plots for virus symptoms
• Leaf samples to assess virus
• Monitoring aphids

• Winter has been quite warm – at this point the main impact is on aphids that overwinter in active stages – *Myzus persicae* and some willow-carrot aphid
• Spring temperatures will determine when willow-carrot aphids that have overwintered as eggs on willow move into crops – day-degree forecast
Willow-carrot aphid – monitoring: suction trap, water traps, plants

Day-degree predictions for start: 23 April 2019 and 9 May 2021
Aphid forecasting 2021

- *C. aegopodii* – day-degree forecast works pretty well

- *M. persicae* – Rothamsted long range forecast

The general message is that, if spring does not throw any abnormal conditions at us, aphids will be flying around 3 weeks earlier in Scotland and 2 weeks earlier over much of England (except a couple of sites in the south) compared with when they would be expected to historically. [Aphid Forecast | Insect Survey](ahdbdigital.org.uk)
Lingering question - where does the virus spend the winter?

- Virus overwinters in wild host plants and is picked up in spring by winged aphids from willow?
- Virus overwinters in aphids? i.e. those that overwinter as adults and nymphs on herbaceous hosts rather than as eggs on willow?
- Virus overwinters in carrot crops and is then picked up by aphids that have also overwintered on those crops or from those that have overwintered on willow?
Thank you!

- AHDB
- British Carrot Growers’ Association, growers and agronomists
- Adrian Fox and colleagues at Fera
- Rothamsted Insect Survey
- Andrew Jukes and Marian Elliott
- Other colleagues at Warwick