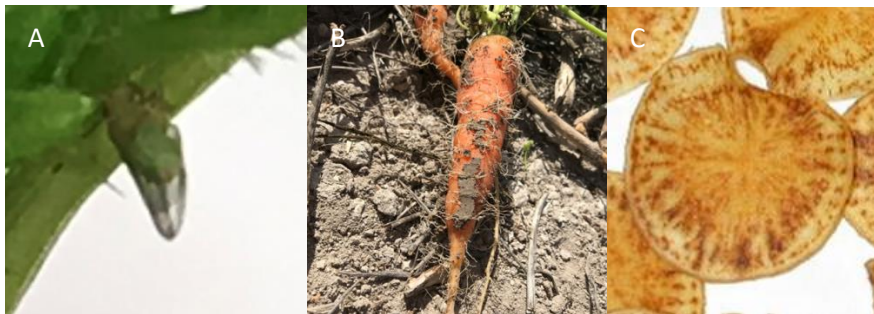


Candidatus Liberibacter solanacearum (Lso)

Status

- Full name *Candidatus* Liberibacter solanacearum
- Lso is an emerging threat to a range of crops, most notably potato, tomato, carrot and celery
- Currently there are 7 described Lso haplotypes (genetic variants).
- Haplotype A is present in Central America, North America and New Zealand and haplotype B in Mexico and North America. A and B haplotypes are transmitted by *Bactericera cockerelli* to solanaceous crops as is the more recently described haplotype F in Oregon USA.
- Haplotypes A and B and their vector *B. cockerelli* are A1 pests under EPPO Annex II.
- Haplotype C, transmitted by *Trioza apicalis* was first reported in carrot crops in Finland and subsequently found to occur more widely in northern Europe including the UK.
- Haplotypes D and E are associated with carrot and other apiaceous crops in South Europe and the Mediterranean basin and are transmitted by the psyllid *B. trigonica*.
- Potato was found to be infected with haplotype E in Spain and haplotype C in Finland.
- There are multiple new haplotypes globally, including two in Scotland, which have been identified in the past 12 months.
- **Haplotype C has been found in Scottish carrot crops together with the potential vector *T. anthrisci*.**



A: Adult *T. anthrisci* on cow parsley.
B: Root proliferation in infected carrots
C: Zebra chip symptoms in potato

Knowledge Gaps

- Confirmation of the vector potential of *T. anthrisci* and other psyllid species.
- Determination of the prevalence of Lso in carrot fields and surrounding environment.
- An understand the geographic distribution of Lso haplotypes.
- Sequence Lso haplotype C and compare to other European Isolates.
- Understand the susceptibility of carrot and potato to Scottish Lso haplotypes.
- Understand migratory patterns of psyllid vectors at a field level, focusing on spring migrations and intra-host species movement.

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- Establish a unified haplotype characterization methodology and naming convention.
- Understand the potential threat posed by the introduction of *B. cockerelli*.

PHC Perspective

Lso has the potential to cause significant losses in Scottish carrot crops and reputational damage to the Scottish seed potato industry should even low level infection be identified. The introduction and establishment of an effective vector (*B. cockerelli*) would have devastating impact of the seed potato sector should the New Zealand scenario be replicated. While significant research investment is required to address some of the knowledge gaps detailed above (possibly by the SG supported BBSRC coordinated bacterial pathogens call) the PHC has already funded essential underpinning research in its 'Assessment of the potential of the psyllid *Trioza anthrisci* to vector 'Candidatus Liberibacter solanacearum' (Lso) in Scotland' project. This has provided baseline data confirming the occurrence of *T. anthrisci* in the Elgin area but undetected elsewhere, and its appearance relatively late in the carrot season, with corresponding implications on the potential for Lso proliferation in the crop. Allied to this was the establishment of a viable *T. anthrisci* / Lso haplotype C colony at SASA that can be utilized in future transmission studies addressing several of the knowledge gaps listed above. The project has also provided an opportunity for collaboration and capacity building between Entomology teams at SASA, JHI and FR consolidated by a taxonomy workshop.

Key Priorities and Recommendations

- Identify current levels of crop infection.
- Determine susceptibility of key crop groups to Scottish Lso haplotypes.
- Understand efficiency of *T. anthrisci* and other potential vector species.
- Potential mitigation strategies in the event of the introduction of *B. cockerelli*.
- Engage with international scientists working on Lso to enable our understanding of disease management strategies.

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