

Candidatus Liberibacter solanacearum

Candidatus Liberibacter solanacearum is a bacterium which infects capsicums, carrots, celery, parsley, potatoes and tomatoes.

This plant disease is not known to occur in Australia. Early detection and reporting of *Candidatus Liberibacter solanacearum* will help protect the Australian horticulture industry.

WHAT PLANTS ARE AFFECTED?

Candidatus Liberibacter solanacearum bacteria are grouped into five gene groups or haplotypes. Each haplotype infects different vegetable crops. Haplotypes A and B infect Solanaceous plant family members like capsicum, potato and tomato, while haplotypes C, D and E infect Apiaceous plant family crops such as carrot, celery and parsley. Haplotype E can also infect potatoes.



Carrot plants infected by *Candidatus Liberibacter solanacearum*
 Courtesy: J.E. Munyaneza, USDA-ARS, Konnowac Pass (US)



Potato plants infected by *Candidatus Liberibacter solanacearum*
 Courtesy: J.E. Munyaneza, USDA-ARS, Konnowac Pass (US)

HOW IS IT SPREAD?

Candidatus Liberibacter solanacearum is primarily spread by insects. Haplotypes A and B are transmitted by the tomato potato psyllid (*Bactericera cockerelli*), haplotype C is spread by the carrot psyllid (*Trioza apicalis*) and haplotypes D and E are transmitted by the *Bactericera trigonica* psyllid.

Tomato potato psyllid spreads *Candidatus Liberibacter solanacearum* by feeding on infected plants or via intergenerational transmission of the bacteria through its offspring.

Infected psyllids can fly between host plants or be moved as eggs, nymphs or adults on plant material. They are also dispersed by aircraft, shipping containers, farm machinery and vehicles.

Haplotypes A and B are also spread by infected seed potatoes. Haplotypes D and E are spread by infected carrot, parsley and parsnip seed or infected carrot, celery and parsnip tissue cultures. All haplotypes are transmitted from infected plants by plant grafting and vegetative propagation.

WHERE IS IT FOUND?

Candidatus Liberibacter solanacearum was first found in potatoes in Mexico and Central America in the 1990's. Haplotypes A and B were spread to Solanaceous crops in the United States and New Zealand by tomato potato psyllids.

Candidatus Liberibacter solanacearum was first found in carrots in Finland in 2010. Haplotypes C, D and E have been detected in carrots in Finland, France, Germany, Morocco, Norway, Spain and Sweden, celery in Spain, parsley in the United Kingdom and parsnips and potatoes in Spain.

Tomato potato psyllid (TPP) is found in Central and North America, Australia and New Zealand. The carrot psyllid lives in northern Europe, while the *Bactericera trigonica* psyllid inhabits the Mediterranean regions. Carrot psyllid lives in temperate and sub-arctic climates, while TPP and *Bactericera trigonica* psyllids live in the temperate and sub-tropical climate zones.

WHAT TO LOOK FOR?

Candidatus Liberibacter solanacearum symptoms associated with solanaceous crops

- General plant disease symptoms include plant stunting, erectness of new foliage, upward leaf curling, leaf purpling and chlorosis, shortened and swollen terminal internodes resulting in leaf rosettes, enlarged nodes, axillary branches or aerial tubers and many small, misshapen fruit.
- In potato, the below-ground symptoms include collapsed stolons, browning of vascular tissue concomitant with necrotic flecking of internal tissues and streaking of the medullary ray tissues, all of which can affect the entire tuber. Upon frying, these symptoms become more pronounced and chips or fries processed from affected tubers show dark blotches, stripes or streaks, rendering them commercially unacceptable. The symptoms in potato tubers have led to the disease being named 'zebra chip'
- Infected tomatoes show stunting, leaf curling, leaf chlorosis or mottling and have deformed fruit.
- Infected capsicums display plant stunting, leaf curling, pale green or chlorotic leaves, sharply tapered leaves, shortened leaf internodes and flower abortion.

Candidatus Liberibacter solanacearum symptoms associated with apiaceous crops

- Although parsley could be a major host for haplotypes D and E, the lack of reported disease problems with parsley may suggest that symptoms are not obvious in this plant.
- The bacterium can cause serious damage to carrot, celery, chervil, fennel, and parsnip.
- Disease symptoms in infected carrots include leaf curling; yellowish, bronze and purplish discoloration of leaves; stunting of the carrot shoots and roots; and proliferation of secondary roots.
- Diseased celery plants show an abnormal number of shoots, stem curling and yellowing.
- Disease symptoms in infected parsley and parsnip plants include yellowing, proliferation and redness of leaves.

WHAT TO DO?

Growers can put on-farm biosecurity measures in place to reduce the chance of pests and disease getting onto their properties.

These include:

- using pest-free propagation material and seedlings, sourced from a reputable supplier
- monitor host crops with sticky traps to detect psyllid insects
- remove host weeds from crops and adjacent areas to reduce psyllid infestation

- control psyllids in crops and adjacent areas to reduce disease transmission
- putting up farm biosecurity signs on gates and fences to manage visitors coming onto your property
- teaching farm workers on-farm hygiene practices, what to look for and how to report unusual pests and diseases.

REPORTING

Candidatus Liberibacter solanacearum is a declared pest in South Australia.

Quick reporting can prevent a major outbreak.

If you suspect a disease or pest you can report by calling the
Emergency Plant Pest Hotline on 1800 084 881

