Department of
Primary Industries and
Regional Development

GOVERNMENT OF
WESTERN AUSTRALIA

Tomato potato psyllid

Research and development preliminary results

Factsheet

About Tomato potato psyllid (TPP)

Tomato potato psyllid (*Bactericera cockerelli*) was detected in Perth, Western Australia in February 2017.

TPP is a tiny sap-sucking insect which attacks a range of cultivated crops in the Solanaceae family including potato, tomato, eggplant, capsicum, chilli and tamarillo and weeds such as nightshade.

TPP damages plants by directly feeding on fruits with attached green material and leaves, and causes the disease psyllid yellows which can result in yellowing and stunting in tomato and potato plants.

TPP has also been identified as the vector of *Candidatus* Liberibacter solanacearum (CLso), the putative causal agent of Zebra Chip disease in potato. CLso has not been detected in Australia.

L–R: Tomato potato psyllid adults and nymphs on the back of a leaf. Mature adult TPP in comparison to a 5 cent coin.

TPP research and development

The Western Australian Department of Primary Industries and Regional Development (DPIRD) has completed a series of laboratory and glasshouse trials on the performance of insecticides and Biological Control Agents (BCA) on TPP.

An overview of preliminary trial results are outlined in this factsheet. Further research results are available in the TPP biological control and chemical control factsheets.

An Integrated Pest Management strategy (IPM) is recommended for the effective control of TPP.

What is IPM?

IPM is an approach to crop production and protection that combines the use of insecticides with other management techniques including chemical control, biological control, cultural control and physical control.

IPM provides benefits such as reduced risk of pesticide contamination, decreased production costs, reduced risk of insecticide resistance and helps preserve naturally occurring beneficials.

Monitoring and treatment decisions

- Yellow sticky traps placed at field edges near the tops of plants can be used as an indicator of psyllid movement in areas where TPP occurs.
- If adults are caught on traps, the leaves of host plants on the field edges should be examined for eggs and nymphs.
- If all life stages are present, an insecticide treatment may be warranted.
- It is recommended growers select insecticides that are compatible for use in IPM programs.
- To prevent insecticide resistance from developing in TPP populations, insecticides from different chemical classes need to be used in rotation.
- Growers should contact their chemical advisors to talk through an appropriate Insecticide Resistance Management strategy for their business.
- Insecticides are only effective against TPP and do not prevent the spread of the CLso bacterium.

Preliminary research and development results

Biological control

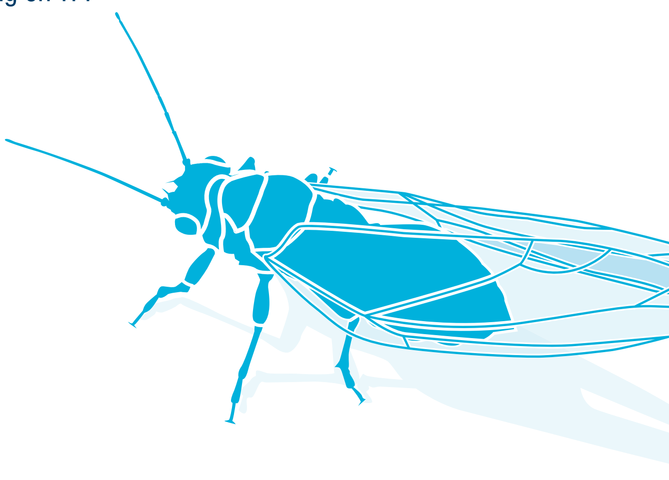
- In laboratory and glasshouse trials, several commercially-available BCA's were assessed for their performance against TPP in tomato, capsicum and potato.
- All BCAs tested are generalist predators and occur naturally in some commercial crops and regions.
- The efficiency of predators against TPP varied with host crop type.
- In laboratory trials, adult ladybird beetles *Harmonia conformis*, *Cryptolaemus montrouzieri*, and the larval stage of the green lacewing (*Mallada signata*), were most efficient predators of TPP in tomato, capsicum and potato.
- On capsicum, ladybird beetle species *H. variegata*, *H. octomaculata* and *Chlocorus circumdatus* were also effective predators of TPP.
- Three releases (at 21 day intervals) of the mirid bug *Nesidiocoris tenuis* effectively suppressed TPP populations in a glasshouse trial in tomato.

Figure 1. Most efficient predators of TPP in tomato, capsicum and potato, in laboratory trials: (A) *H. conformis* feeding on TPP eggs and foraging on capsicum leaf. (B) *C. montrouzieri* feeding on TPP nymph. (C) *M. signata* larva.

Chemical control

- Thirty insecticides from 11 chemical classes have been identified for use in Australia.
- These chemicals are registered in Australia for use against other sucking insect pests, but not currently registered for control of TPP.

  Please note: some insecticides have been made available through emergency permits for use in host crops and nursery stock.
- Resistance to imidacloprid, a neonicotinoid, and abamectin has been observed in populations of TPP in Texas and Mexico. However, resistance to these insecticides was not observed in laboratory and glasshouse trials in WA.
- Insecticides are only effective against TPP and do not prevent the spread of the CLso bacterium, associated with TPP in other parts of the world.



Insecticide toxicity — laboratory trials

- The toxicity of 15 pre-harvest insecticides with various modes of action were screened in capsicum, tomato and potato.
- Abamectin, spinetoram, methidathion, methomyl, chlorpyrifos, cyantraniliprole, DC-164 (experimental chemical) and sulfoxaflor caused 100% mortality to all life stages of TPP.
- Imidacloprid applied as a soil drench was toxic to TPP life stages causing significant mortality for up to 10 days post-drenching.

Insecticide efficacy — glasshouse trials

- In the glasshouse trial, three applications (at 21 day intervals) of abamectin, cyantraniliprole, and spirotetramat in capsicum, tomato and potato, and flonicamid in tomato, effectively suppressed TPP populations.
- Pymetrozine failed to suppress TPP populations in glasshouse trials in capsicum, tomato and potato.

Organically acceptable alternatives

- Azadirachtin, eco-oil, agri-50 and paraffinic oil were evaluated against TPP eggs, nymphs and adults.
- In lab trials, all plant-based derivatives (azadirachtin, eco-oil, agri-50 and paraffinic oil) were least toxic to TPP mature nymphs (3rd – 5th instar).
- Azadiractin was very toxic to TPP adults. Paraffinic oil, agri-50 and eco-oil in potato and capsicum were less toxic to TPP adults.
- Egg laying was observed with azadirachtin, agri-50, eco-oil, and paraffinic oil, though none hatched after 7 days.
- Of 13 chemicals tested against eggs, hatching was observed with spirotetramat, abamectin, methomyl, chlorpyrifos, eco-oil, paraffinic oil and azadirachtin, but none developed to adult.

SCIENTIFIC R&D IS CRITICAL TO IMPROVING OUR UNDERSTANDING OF TPP IN AUSTRALIA AND INCREASING MANAGEMENT OPTIONS AVAILABLE TO GROWERS.

Transition to management

TPP was detected in Western Australia in February 2017, prompting a comprehensive biosecurity response.

Following national agreement TPP could not be eradicated, a Transition to management plan was developed which aimed to improve the capacity of industry and growers to manage this pest and build confidence around the status of the CLso bacterium.

The TPP R&D program was a major component of the Transition to management plan.

Visit **agric.wa.gov.au/tpp** for more information on the signs and symptoms of TPP.

This factsheet is an initiative of the national TPP Transition to Management Plan.

STOP. CHECK. PROTECT.
Help limit the spread of the Tomato potato psyllid

agric.wa.gov.au/tpp