Growers guide to the Management of the Tomato/Potato Psyllid in Greenhouse Tomato and Capsicum Crops

to be read in association with

New Zealand Code of Practice for the Management of the Tomato/Potato Psyllid in Greenhouse Tomato and Capsicum Crops

Sources of additional information:
The Potato and Tomato Psyllid Poster and set of four descriptive cards
http://www.biosecurity.govt.nz/pests-diseases/plants/potato-tomato-psyllid/photos.htm
http://www.biosecurity.govt.nz/pests-diseases/plants/potato-tomato-psyllid.htm
http://www.tomatoesnz.co.nz/research_reports_public.htm
http://www.freshvegetables.co.nz/research/reports_public.html

Background

Tomato / potato psyllid looks like a miniature cicada about 3mm in length. This pest can vector 'psyllid yellows' disease which is caused by Candidatus Liberibacter. All greenhouse staff should be familiar with tomato/potato psyllid and the symptoms of psyllid yellows. Monitoring for the psyllid, psyllid sugars, and Liberibacter symptoms should be performed each week, and all staff working the crops should be trained to recognise the psyllid and report any infestation.

This guide is a summary of information provided in the New Zealand Code of Practice for the Management of the Tomato/Potato Psyllid in Greenhouse Tomato and Capsicum crops. Growers are encouraged to read the full Code of Practice and refer to it for detail of information provided in this guide.

Objective

Determine when the crop is at risk from adult psyllid infestation through weekly monitoring.

At the first sign of adults pysllids being present in the crop, undertake physical methods to disturb the adults and prevent them from laying eggs.

EARLY OBSERVATION IS THE KEY TO SUCCESSFUL CONTROL

Opportunities for control

1 Pre-planting – ensure seedlings are free from psyllid. Check that your seedling provider is implementing control measures.

2 Planting – check seedlings for signs of pests. Destroy infected seedlings before they enter the greenhouse.

Pysllid control on seedlings

Psyllid control on young plants can be achieved by spraying or drenching with an IPM compatible insecticide. Abamectin or spinosad sprays are options. For drenching, Calypso (Thiacloprid) in the irrigation water at a rate of 20ml per 1000 plants has been effective.

3 During the growing season – maintain good greenhouse hygiene to prevent pests from entering. Remove host plants from all areas around greenhouses (Refer to Appendix 2 of the Code of Practice). Apply a strict crop monitoring and response programme – see below.

4 Post-season – crop removal between cropping cycles. Before the removal of the crop, contain all pests within the building and apply a high volume pesticide spray e.g. Abamectin. Keep greenhouse closed for 24 hours before removal of all plant material including weeds and volunteers. Check that all insects have been eradicated by hanging yellow sticking traps (at least 10 traps / ha) and inspecting daily. Apply further insecticide if necessary.

Crop Monitoring

Aim to monitor at least one plant in 60 – this is the approximate number of plants in a 4 x 8 metre glasshouse bay.

- Monitoring should be performed weekly or more often under high pest pressure.
- Sample 1 row per 8 metre bay each time, and rotate the row which is sampled.
- In each row to be sampled, select the plant between the poles showing psyllid sugars or select a plant at random if no sugars are present.
- Using this method, approx. 1 in 60 plants should be examined each time.
- Concentrate on monitoring the top section of capsicum plants and middle section of tomato plants.
- Inspect the selected plant in each row for the presence of pysllids and Liberibacter symptoms.

Key point

Ensure you and your staff are familiar with what the psyllid looks like and pysllid yellows symptoms – review the photos provided by Horticulture NZ and MAF Biosecurity.

For each plant inspected record the infestation (refer to Appendix 3 in the Code of Practice):

- score the psyllid infestation as follows:
  1 no psyllids present;
  2 adults only;
  3 adults and eggs (if psyllid sugars present);
  4 adults, eggs, and nymphs on 1-5 leaves;
  5 adults, eggs, and nymphs on >5 leaves;
  6 psyllid infestation on adjacent plants.
- Estimate the percentage of the plant that is infected with pysllids (0 – 100%).
- Inspect the plants for Liberibacter disease symptoms – if in doubt, remove any plant showing yellowing symptoms.

- At the conclusion of each monitoring session, calculate;
  - Average psyllid infestation score
  - Average percentage of the plant that is infested.

  For example:
  You have inspected 45 plants, add up the pysllid infestation scores from all plants and divide by 45 to get an average infestation score across all plants inspected. Do the same for the percentage and get the average infestation percentage per plant.
- You may want to use yellow sticky traps to assist in monitoring effectiveness of control but these should not replace plant monitoring. Information is not yet available to relate trap catches to control thresholds.

Action thresholds

- After each monitoring session, take the average infestation score and percentage and use the table below to work out what action is required.
- In general you should take the action that applies to the highest of the value or percentage. For example, if the percentage value is <1% but the level of infestation is >1.8, then a full insecticide application should be made.

Percentage of sample infested with psyllids	Value indicating level of psyllid infestation	Action
0	0	No action
<1%	<1.5	Remove infected leaves
1-2%	1.5-1.8	Spot spray insecticides to infected area
>2%	>1.8	Full insecticide application to whole greenhouse

Control methods

You should use a range of the following methods to reduce or eliminate pysllid populations.

- Cultural practices – healthy crops have a higher resistance to pests and diseases.
- Hygiene – prevent the pysllid from entering the crop and control host plants in a buffer zone around the glasshouse.
- Biological control agents – where spraying is needed, identify the least damaging spray on beneficial insects (See Appendix 4 of the Code of Practice.
- Physical exclusion – Use yellow sticky traps at doorways and vents to prevent migration.
- Physical methods – Certain spray options with a contact mode of action should be considered whenever possible to prevent pests from visiting plants and/or laying eggs. For example soaps, compounds that are sticky or have deterrent properties (spreader / sticker adjuvants), essential oils (e.g. cedar wood and neem). Care should be taken when trialling oils as many are phytotoxic.
- Chemicals – Table 1 lists the chemicals that could be used to control pysllid populations if monitoring proves populations are above action thresholds.
  - Select chemicals that cause minimal damage to beneficial pests.
  - Limit use of the same chemical to reduce resistance issues.
  - Consult crop protection specialists for advice.
  - Adhere to the label claim and always ensure compliance with NZ Maximum Residue Limit regulations.
- When spot spraying is required, additional monitoring of plants around the area may be required to identify the section of the greenhouse that requires spot spraying.

Table 1: Spray Options Information Summary

Group	Active Ingredient	Chemical Trade Name	Mode of Action	NZ Registration (MRL) *	Pre-harvest Interval
1A	Methomyl	Lannate L	Contact and Ingestion	Tom (0.3 mg/kg) Cap (0.3 mg/kg)	Tom – 2 days Caps – 2 days
1A	Oxamyl	Vydate L	Contact Ingestion Plant systemic	Not Registered (0.1 mg/kg)	Unknown
1A	Pirimicarb	Pirimax 500 Pirimor 50 Pirimisect Prohive™	Contact Fumigant Trans laminar	Tom (1.0 mg/kg) Cap (1.0 mg/kg)	Tom – 3 days Caps – unknown
1B	Diazinon	Dew 500 Diazinon 800/W Diazonyl 60 EC	Contact Ingestion Respiratory	Tom (0.5 mg/kg) Cap (0.5 mg/kg)	Tom – 3 days Caps – 14 days
1B	Dichlorvos	Dichlorvos	Contact Ingestion Fumigant	Tom (2.0 mg/kg) Cap (2.0 mg/kg)	Tom – 3 days Caps – 3 days
1B	Malathion	Maldison	Contact Ingestion	Tom (8.0 mg/kg) Cap (8.0 mg/kg)	Tom – 3 days Caps – 3 days
1B	Methamidophos	Metafort 60 SL Monitor Tamaron	Contact Ingestion Plant systemic	Tom (0.1 mg/kg) Cap (0.2 mg/kg)	Tom – 3 days Caps – unknown
1B	Pirimiphos methyl	Actellic SG	Contact Ingestion Fumigant	Tom (1.0 mg/kg) Cap (1.0 mg/kg)	Tom – 3 days Caps – 3 days
3A	Alpha-cypermethrin	Bestseller 100EC Cypher Dominex 100 Fastac	Contact Ingestion	Tom (0.1 mg/kg)	Tom – 3 days
3A	Deltamethrin	Ballistic Decis Forte Deltaphar 25 EC Cislin	Contact Ingestion	Tom – outdoor (0.05 mg/kg)	Tom – 3 days
3A	Lambda-cyalothrin	Karate-Zeon	Contact Ingestion	Tom – outdoor (0.1 mg/kg)	Tom – 3 days Caps – unknown
3A	Taufluvalinate	Mavrik	Contact Ingestion	Tom – outdoor (0.2 mg/kg)	Tom – 3 days Caps – unknown
4A	Imidacloripid	Confidor	Contact Ingestion Plant systemic	Not Registered (0.1 mg/kg)	Tom – unknown Caps – unknown
4A	Thiacloprid	Calypso	Contact Ingestion Plant systemic	Not Registered (0.1 mg/kg)	Tom – unknown Caps – unknown
4A	Thiamethoxam	Actara, Cruiser	Contact Ingestion Plant systemic	Not Registered (0.1 mg/kg)	Tom – unknown Caps – unknown
5	Spinetoram		Contact Ingestion	Not Registered (0.1 mg/kg)	Tom – unknown Caps – unknown
5	Spinosad	Success Naturalyte	Contact Ingestion	Tom – Outdoor (0.01mg/kg) Cap – not registered (0.1 mg/kg)	Tom – 3 days Caps – unknown
6A	Abamectin	Abamax Apostle Avid Verdex	Contact Ingestion	Tom (0.1 mg/kg)	Tom – 3 days Caps – unknown
9A	Pymetrozine	Chess WG	Feeding inhibitor	Tom (0.5 mg/kg)	Tom – 3 days
15	Novaluron	Rimon	Chitin Inhibitor	Not registered (0.1 mg/kg)	Tom – unknown Caps – unknown
17A	Buprofezin	Mortar Ovation 50WDG Pilan	Insect growth regulator	Tom (0.5 mg/kg) Cap (0.5 mg/kg)	Tom – 3 days Caps – 3 days
21A	Fenpyroximate	Fenamite	Contact	Not registered	Tom – unknown Caps – unknown
23	Spiromesifen	Oberon	Inhibits development and fecundity. Ovicidal	Tom (0.5 mg/kg) Cap (1.0 mg/kg)	Tom – 1 day Caps – 1 day
23	Spirotetramat	Movento	Inhibition of lipid production	Not registered (0.1 mg/kg)	Tom – unknown Caps – unknown
28	Chlorantraniliprole	Coragen	Nerve & muscle action	Not registered (0.1 mg/kg)	Tom – unknown Caps – unknown