



# Potato psyllid control

Experience from the 2008 / 09 New Zealand potato season suggests that the only effective way to minimize the impacts of the potato psyllid / Liberibacter / Phytoplasma complex is the careful application of well timed agrichemical sprays. The key is to strictly control the psyllid which transmits Liberibacter and is thought to transmit Phytoplasma.

Because the psyllid appeared so recently, at the time of printing there are only two agrichemicals specifically registered for its control on potatoes in New Zealand – these are Oberon® and Movento®. It is important to note that Oberon® can only be used in accordance with the special emergency provisions relating to the use of the product on psyllids. Contact Potatoes NZ for further information. Potatoes NZ has also identified a number of products which are registered for the control of other pests in potatoes in New Zealand as potentially useful for psyllid control. All products must be applied in accordance with New Zealand label directions and withholding periods must be observed.

## Resistance management

A resistance management strategy must be adhered to because the potato psyllid can quickly develop resistance to insecticides. It is believed that the psyllid has developed resistance to some agrichemicals in the past few years in the USA so this is a real threat.

The key feature of the resistance management strategy is to rotate the use of different mode of action groups, so even if a particular agrichemical is very effective at killing the psyllid it must not be used repeatedly or resistance will develop. It is also important to bear in mind that different products will target the different life stages of

the psyllid – the best products to use early in the season may not be the best products to use later.

- Eliminate alternative psyllid hosts and volunteer potatoes.
- Monitor the crop regularly to identify pest problems and determine the optimal spray timing.
- Limit the use of insecticides – apply agrichemicals only when their use is justified, and apply at the recommended rate to ensure good coverage.
- Use selective insecticides early in the season to conserve natural enemies.
- Use different mode of action products on different generations of the psyllid.
- Rotate insecticides over the season.

See Table 1 for a recommended rotation strategy.

### Key issues

- Remove alternative hosts including volunteer potatoes and weeds
- Use in furrow treatments for early season control until emergence
- Monitor the crop regularly
- Resistance management is vital - the key is to rotate different mode of action products over the season
- Use sufficient water rates and newer spray technologies (e.g. angled nozzles, air assist booms) to ensure thorough spray coverage of plants
- For the latest advice on psyllid control speak with your crop care advisor or agrichemical supplier, check the Potatoes NZ website, and read the information which Potatoes NZ publishes

**Table 1:** Preliminary insecticide rotation strategy for insect pests in potatoes to conserve beneficial insects and rotate modes of action (MoA) to manage the development of resistance. Divisions between early and late windows may differ between regions.

Potato crop season	Target pests	Insecticide chemical group	Active ingredient (plus trade name, if label claim for potato psyllid control in New Zealand)
<b>Early window</b> Planting: spring to end December	Aphids*	Chloronicotinyl	Thiamethoxam Imidacloprid
	Aphids*	Pyridine azomethine	Pymetrozine
	Aphids <sup>1</sup>	Carbamate	Pirimicarb
	<b>Potato psyllid</b>	Lipid biosynthesis inhibitors	Spiromesifen (Oberon®) Spirotetramat (Movento®)
If an insecticide is required for potato tuber moth, or caterpillar pests, change to products below			
<b>Late window</b> January to autumn	Potato tuber moth* / Heliothis	Spinosyn	Spinosad
	Aphids <sup>1</sup> / potato tuber moth* / Heliothis	Organophosphates	Various (see Table 2)
	Potato tuber moth* <sup>1</sup> / Heliothis <sup>1</sup>	Pyrethroids	Various (see Table 2)
	Potato tuber moth	Carbamates	Carbaryl <sup>2</sup>

\* Product has a label claim for control of potato psyllid overseas

<sup>1</sup> Resistance known in some populations

<sup>2</sup> Take care when considering the use of carbamates – overseas, soil-applied carbamates not only failed to control potato psyllid but caused higher populations to occur on foliage

For the latest advice on compounds for potato psyllid control, speak with your crop care advisor or agrichemical supplier, check for new information on the Potatoes NZ website ([www.potatoesnz.co.nz/psyllid.html](http://www.potatoesnz.co.nz/psyllid.html)), and read the information which Potatoes NZ publishes over the course of the season.

## Application of agrichemicals

One of the most important factors in psyllid control is ensuring thorough coverage of the plants. Potato psyllids are usually found at the base of the plant, and often on the undersides

of leaves. This means that it can be difficult for agrichemicals to reach the psyllid on mature crops.

Growers are advised to use sufficient water rates and newer spray technologies (e.g. angled nozzles, air assist booms) to ensure thorough spray coverage of plants. The addition of adjuvants and the use of products with trans-laminar properties (i.e. products which spread through the leaf) should help to achieve control. It is also important to check the pH of the tank water to ensure agrichemicals do not lose activity due to hydrolysis.



Two potato psyllid adults. Image courtesy of Joseph E. Munyaneza, USDA

## Psyllid control before planting

Before planting a potato crop it is essential to remove volunteer potatoes and any weeds that are potato psyllid hosts. The list of weeds which can host the psyllid includes black nightshade, cape gooseberry, common morning glory, and field bindweed – see the article "Weed hosts of the potato / tomato psyllid" in the December 2008 issue of The Grower (this can be downloaded from [http://thegrower.co.nz/magazine\\_pdf/112/Grower%20Dec%2008\\_Web.pdf](http://thegrower.co.nz/magazine_pdf/112/Grower%20Dec%2008_Web.pdf)) and the fact sheet "Alternative hosts of the potato psyllid". If these hosts are not removed from the field before planting they can provide a source of psyllid infestation.

## Psyllid control at planting

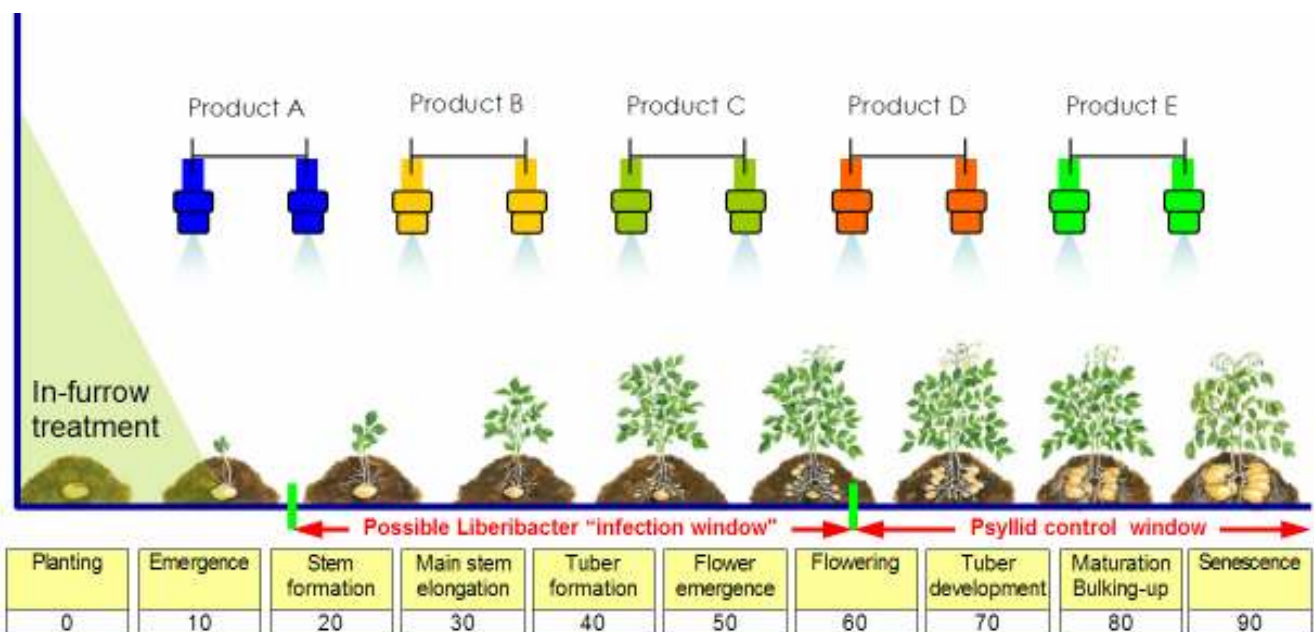
Applying in furrow treatments appears to have been an effective early season control option in the 2008 / 09 season. In furrow treatments cannot be relied on to give ongoing control of the psyllid after emergence so growers must monitor for potato psyllids in the crop from this

point on and apply other foliar insecticides as required. Growers need to manage insecticide resistance by rotating the use of different mode of action groups after emergence, ensuring that products with the same modes of action are not applied back to back.

## Psyllid control during plant growth

Products with a physical mode of action such as horticultural oils suffocate the potato psyllid and prevent egg laying, and can be used in combination with other crop protection products. Products such as alginates or sucrose are sticky, acting like fly-paper, and can be used on their own between other crop protection products to help with resistance management. These products may be most effective if they are focused on the headlands in early crop stages as this can stop the first few psyllids which reach the crop from reproducing and causing a serious outbreak. Full coverage of plants is vital – if the undersides of leaves are not covered these products will not be effective.

**Figure 1:** In furrow treatments provide protection up to emergence only. After this time it is important to apply foliar sprays as required over the remainder of the growing season (shown as 90 days below, though this will vary). The key is to rotate the sprays applied, ensuring that products with the same modes of action are not applied back to back. Note that the "infection window" shown in this figure is based in grower experience in the USA but has not been proven. Image is courtesy of Bayer Crop Science.



Insecticides can give effective knockdown against psyllid, but some are more effective than others, and growers must remember to rotate the products they use over the season. It is also important to consider whether the products being used are selective, as biological control agents and bees may be killed by some sprays. Growers should refer to the November 2008 resistance guide which was published and distributed by Potatoes NZ.

Potatoes NZ is undertaking efficacy trials to determine the most effective programme for New Zealand conditions, and to assist with the registration process for key products. This work is in conjunction with agricultural companies. More information will be made available to growers as results become available.

Table 2 lists products which may be useful for potato psyllid control. The first (left hand) column lists the insecticide / mode of action group, such as organophosphates, while the second column lists resistance management recommendations for each of the insecticide groups, and the third column lists specific active ingredients. It is important to rotate between insecticide / mode of action groups, ensuring that products with the same modes of action are not applied back to back – it is not enough to rotate only between a number of organophosphates, for example. The final (right hand) column notes whether the products listed have label claims for psyllid control overseas as this may suggest whether they will also control the potato psyllid in New Zealand.

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Potato psyllid nymph (left) and adult (right). Images courtesy of Joseph E. Munyaneza, USDA

Front page header image courtesy of Joseph E. Munyaneza, USDA

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