



PEST & DISEASE MANAGEMENT

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POTATO SPINDLE TUBER VIROID

The biggest risk for Australian greenhouse growers from imported NZ tomatoes is the Potato Spindle Tuber Viroid (pstvD). If this virus gets into the green waste in Australia, it will be impossible to eradicate.

This exotic viroid can cause serious effects in three crops - potato, tomato and eggplant. Severe strains in tomatoes can result in a 50% reduction in yield. It has already been detected previously in Australia on three occasions and fortunately has been successfully eradicated. The most recent detection was March 2004 in a glasshouse of hydroponic tomatoes in Western Australia.

What to look for and where to look

Detecting this viroid is not easy. Symptoms can be confused with those of nutrient imbalance, spray damage, insect damage or other plant diseases. Mild and severe strains of this viroid are difficult to detect with symptoms usually more pronounced in warm conditions and under high light intensity.

On tomatoes

It is believed that the incidence of Potato Spindle Tuber Viroid in tomato seed is low. The symptoms in mature tomato plants infected with severe strains include purpling and yellowing of the leaflets, shortening of leaflet internodes resulting in a 'bunchy top' effect, leaf brittleness, leaflet down curling and twisting and general plant stunting. Old leaves become dark green, thickened and brittle. The whole plant can develop a narrow tubular appearance. Spindly shoot growth can occur, flowers may abort and fruit can be dark green in appearance. Yield is reduced and fruit becomes small and hard, and ripens erratically. As with potato, some strains of this viroid can cause mild versions of the above symptoms or no symptoms at all.

How does it spread?

Potato Spindle Tuber Viroid in tomato crops may occur from infected seed. The disease is highly transferable. It can spread rapidly from one infected plant through the transmission of plant sap by direct handling of plants, the use of cutting or pruning tools, contaminated machinery, animals, clothes or footwear.

What to do on your farm

There is no chemical treatment for this viroid. Control of initial infection is through farm hygiene. If the disease is detected, infected plants have to be destroyed and strict farm hygiene practices must be implemented to prevent reinfection. Vinyl or latex gloves should be worn when handling infected plants and gloves must be dipped in a 10% solution of sodium

hypochlorite to decontaminate them and prevent possible spread of the disease. Always work in clean areas first then move to infected areas. Remember that plants may be infected but not showing symptoms. When moving from infected areas into clean areas, clothes and shoes should be changed. The use of healthy planting material is recommended.

What to do with suspect plants

If you find plants potentially infected with this viroid, please contact your nearest Department of Primary Industries for information on how to collect a sample and submit it for diagnosis. Mark the collection site in some way so it can be found easily later.

*For more information on symptoms, spread and control of PSTVd contact:
Mike Cole, Dept. of Agriculture, Fisheries and Forestry
Ph: (02) 6272-5399*

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LETTUCE APHID

Horticulture Australia Ltd (HAL) and Ausveg leafy group representatives have decided on industry priorities for lettuce aphid (*Nasonovia ribis-nigri*) research. There was a general consensus that an IPM approach should be taken to manage this new pest. Projects will look at developing long-term resistance management strategies that integrate cultural, chemical and natural predator control of aphids. Cultural strategies include using resistant varieties, controlling weeds around the farm and destroying old crops.

Lettuce aphid, also known as currant aphid, was detected on lettuce properties in Tasmania in early 2004. It is a significant pest in Europe and some areas of the USA, and since 2002 it has devastated the New Zealand lettuce industry. The aphid pest is thought to have hitched a ride to Tasmania on strong winds from NZ that occurred earlier in the year. It took several more weeks before lettuce aphid symptoms became visible. So far, there have been no reports of *Nasonovia ribis-nigri* on mainland Australia.

What effect does it have on lettuce?

The aphid is a sap-sucking insect that feeds on lettuce leaves. Generally, direct damage to the lettuce is limited, with the more serious consequence being that the presence of aphids makes lettuce unacceptable to some consumers and subsequently unsaleable. Unlike other aphids, this aphid can get right into the head of the lettuce, making it difficult to see and control. Adult aphids are green with black stripes and juveniles lack the stripes.

How does it spread?

The spread of the aphid is generally by winged adults, which can also be carried by the wind, making the potential for spread very high. The aphid can also be spread by infested lettuce due to them being difficult to detect when they are right inside the head of the lettuce. It is most likely to spread naturally on flower stems and heads of the weed, Smooth Hawks-beard (*Crepis* spp.). A weed survey in Tasmania also recorded the pest on Nipplewort (*Lapsana* spp.) and Hawkbit (*Leontodon taraxacoides*). Lettuce aphid monitoring and survey work is ongoing.

What effect is it having on lettuce growers?

Initially, major lettuce growers voluntarily destroyed infested crops to assist in the management of the pest. The Department of Primary Industries, Water and Environment supervised experiments in early April 2004 to demonstrate that there was no risk of aphids being carried on washed lettuce leaves in salad packs to mainland states. Export of salad packs resumed after a brief interruption. However, whole head lettuce cannot be exported.

Movement of lettuce

A moratorium on the export of Tasmanian loose leaf lettuce was imposed in March 2004, but lifted the following month. The lifting of the moratorium followed national agreement on a stringent lettuce handling quality assurance protocol that can certify lettuce product exported from Tasmania is free of the aphid pest. Each consignment of loose-leaf lettuce exported interstate by local producer Houstons, is accompanied by a health certificate from Quarantine Tasmania to confirm the consignment has been cleared. Consignments are consolidated in Victoria for dispatch to other states, a process agreed to by all other States and Territories.

Through joint industry DPI discussions it was agreed that in the event that a Currant Lettuce aphid detection occurs in Victoria then the pest effectively becomes a none quarantine issue with regards to Victoria and trade to the Melbourne market would not be regulated. Industries view is that market pressures will force individual growers to adopt and implement control options to reduce the impact the pest is having on production and consumer expectation.

What do you do if you have lettuce aphid?

Although the aphid is a major pest of lettuce, it does the plant little harm and it is still safe for human consumption. If you find an aphid on your lettuce it can easily be washed off with cold running water.

What to do with suspect plants

If you detect lettuce aphid, clearly mark the collection site and contact your local Industry Development Officer (IDO), Dept. of Agriculture/Primary Industries in your State, or ring the Exotic Pet Hotline: Freecall: 1800 084-881

Email: andrew.creek@agric.nsw.gov.au

Website: www.agric.nsw.gov.au/reader/vegetables

More information on this pest can be found on the Australian Government Department of Agriculture, Fisheries and Forestry website: www.affa.gov.au

The latest media releases from Minister Steven Kons can be found on the Tasmanian Government Media Releases website: www.mediatas.gov.au

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WESTERN FLOWER THRIPS

Once WFT have been identified on your property a number of management options are available.

Because of WFT ability to develop resistance to insecticides, it is strongly recommended that growers adopt an integrated pest management or IPM strategy. Insecticides alone are not a solution for WFT. Cultural controls and monitoring, together with the recommended spray program, are needed.

Monitoring for WFT

The two most popular ways of monitoring for WFT is with sticky traps and crop inspections.

Sticky traps are a simple way to check for WFT numbers in a crop. It is important to hang traps just above the plant canopy - this will mean you will have to keep adjusting the height of the traps as your plants grow.

Sticky traps should be changed every 2-4 weeks. Check them weekly to ensure they are still hanging at the correct height and not covered in dirt or insects.

The number of traps you hang on your property can vary. A suggested starting level is 3 traps per hectare outdoors or 1 trap per 200 square meters in a glasshouse.

Growers can also check for thrips by walking through the crop with a sticky trap or white container. Tap flowers and leaves over trap or container - thrips should fall out.

To encourage thrips to come out of flowers, it sometimes helps to breathe gently into the flowers.

While walking through the crop keep a look out for signs of feeding damage or TSWV infection.

Cultural Controls

Weeds

Control weeds within and around the crop. Weeds can be reservoirs for WFT and TSWV.

Thrips feed on and reproduce in weeds, especially when there are no crops being grown.

When a new crop is planted the thrips move off the weeds and onto the new crop.

Try to keep a weed free area around the crop of 10m. This can be bare ground, closely mown grass, concrete, stones or some other hard surface.

Try to avoid flowering weeds at all times as these are particularly attractive to WFT. If you use cover crops use a species that is not a host of WFT or TSWV.

Be careful if you spray herbicide on weeds. As they die off any thrips may move off the weeds onto your crop. Treat any thrips at the same time.

Crop Waste

Remove crop and weed trash from the greenhouse or field between crops as thrips can live and breed on this material until the new crop is planted. Waste should be removed and burnt, or ploughed in. If the waste is not destroyed all the thrips, including the eggs in the plants, will survive and transfer into the next crop.

Plant and People Movement

Don't bring WFT infested plants onto your property. Inspect incoming plant material thoroughly.

Remember, WFT are small and may be hidden in buds or flowers. Eggs are laid in the plant tissue and are not easily visible. Pupae are hidden in the soil.

If possible hold plants in a monitored "quarantine" area for up to two weeks to allow all eggs and pupae to hatch before introducing into the greenhouse or field.

It is also a good idea to check with suppliers that they monitor for WFT and TSWV and that the plants are free of WFT when sold.

Don't leave transplants sitting next to weeds or other plants where they can become infested with WFT.

Never move from an infested field or greenhouse to a clean field or greenhouse.

WFT can easily be transported on tools and clothes. Be careful what colours you wear when working in your crop. WFT are particularly attracted to yellow, white and blue.

Greenhouse growers can use thrips proof netting to help prevent an infestation of WFT. Cover all vents and doorways with thrips proof netting whenever possible. As screening reduces airflow in a greenhouse extra venting may be required to compensate. Trials have indicated that the maximum hole size allowable for the exclusion of WFT is 0.192mm.

It is suggested that you sanitise all greenhouses between crops. Fumigate or steam the soil to kill pupae and fumigate the greenhouse to kill adults. Alternately keep the greenhouse hot, dry and empty for at least one week or longer in cold weather. Any thrips in egg or pupal stages will hatch and subsequently die. Sticky traps should be placed in the empty greenhouse to attract many of the remaining adult thrips. It is important the greenhouse contains no plant material for this to work.

Chemical Controls

Chemical spray timing

The WFT lifecycle is mostly continuous and all stages of thrips can be found year-round. A female WFT lives from 30 to 45 days and can produce 150 to 300 eggs in this time.

Spray applications are only effective when WFT are actively feeding as larvae or adults. The application of a series of pesticide sprays increases the likelihood of larvae and adults coming into contact with the chemical.

The rate WFT grow through their lifecycle depends on the temperature; higher temperatures and the thrips grow faster, requiring a shorter length of time between sprays.

Resistance

Thrips have been a horticultural pest for over one hundred years but were relatively easy to control with the use of pesticides. The WFT are a pesticide resistant strain that have recently developed and are now established in Australia.

WFT can develop resistance to chemicals very quickly. Some WFT are resistant to only one or two chemicals, some are resistant to many. Most thrips populations are resistant to a variety of chemicals.

Mixing of insecticides is not recommended because;

- Insecticides you wish to mix may not be compatible. This can cause phytotoxic effects to the crop and can be dangerous to your health.
- Mixing chemicals is most likely to increase the levels of resistance in a thrips population.

For further information about managing WFT and TSWV (Tomato Spotted Wilt Virus), go to the Victorian Department of Primary Industries: <http://www.dpi.vic.gov.au/dpi/index.htm>

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