

MINI GUIDE - SELECTED WARM WEATHER PESTS AND DISEASES

During the Australian summer, potatoes are susceptible to various pests and diseases that can thrive in the warm and humid conditions. Common pests include the potato tuber moth and the African black beetle, as well as the disease vectors - aphids and thrips. Diseases to watch include early blight and the Potato spindle tuber viroid (PSTvd) which can both thrive during the summer months.

PESTS

AFRICAN BLACK BEETLE

Heteronychus arator

Description

Egg: Small, round, white, laid into the soil.

Larva: Whitish C-shaped grub up to 30mm long with light brown head and six legs. The rear end sometimes has a dark grey tinge.

Pupa: Golden to reddish brown, strongly indented and shaped, found in the soil.

Adult: Shiny, reddish to black, stout-bodied beetle around 10-15mm long. Legs are adapted for digging. A strong flyer - adults undertake mass dispersal flights, sometimes in spring but more commonly late March-April.

Damage

Most damage is caused by adults feeding on the underground stems of young plants, often killing growing points so that the central shoots wither and the plants become dead-hearted.

Older plants usually survive but remain weak. Beetles are often found near the base of damaged plants. Damaged young plants usually produce suckers. Soil sampling will indicate the presence of beetles.

Transmission/spread

Beetles crawl on the soil or pasture surface at night. Large scale flights are sporadic and may be localised within a district, making them difficult to predict. Although the triggers for flight are not known, weather conditions associated with summer thunderstorms seem to promote swarming flights of beetles and most flight activity occurs in late summer-autumn, which coincides with the emergence of the new generation of adults.

Distribution

Queensland, New South Wales, Victoria, ACT, South Australia, Western Australia.



African black beetle, larvae (top, J. Ekman) and adult (left, PADIL)

APHIDS (GREEN PEACH)

Myzus persicae

Description

Nymph: Semitranslucent, varying from yellowish to green with dark red eyes.

Adult: Wingless adults resemble nymphs and are approximately 2mm long. Winged females have black heads with dark red eyes and patterned bodies. Can disperse long distances, especially if wind assisted. Infestations can therefore spread rapidly.

Damage

Cause leaf distortion through feeding and contaminates the product. Large infestations can kill young plants. They are a vector of virus included PVY.

Transmission/spread

Winged aphids migrating from weeds start colonies in autumn. Populations peak in late winter and early spring; development rates are particularly favoured when daily maximum temperatures reach 20–25°C.

Distribution

Australia wide except Northern Territory.



Green peach aphids, nymphs and adults (J. Ekman)



Cluster caterpillar, adult (top, J. Ekman) and pupa (bottom, T. Klompaker)

CLUSTER CATERPILLAR

Spodoptera litura

Description

Egg: Laid in a large mass, usually covered with fluffy light brown material.

Pupa: Reddish brown, found in the soil.

Caterpillar: initially grey-green and feed in a group, but separate as they grow. Smoothed bodied caterpillars are distinctively patterned with thin yellow stripes and conspicuous dark spots and triangles, reaching up to 50mm long when mature. Tends to curl into a ball if disturbed

Adult: Moth with brown, cream and grey patterned forewings held in a tent over the body. Cream hind wings.

Damage

Caterpillars skeletonise the leaves.

Transmission/spread

The moths are strong fliers and can invade crops any time from emergence through to harvest.

Distribution

Found in the Australian Capital Territory and limited distribution in New South Wales, Queensland and Western Australia.

POTATO TUBER MOTH

Phthorimaea operculella

Description

A small moth, measuring about 10mm in length when at rest, coloured pale brown with darker marbling. Wingspan 15–17mm. The head and chest are pale brown. The front wings are pale brown with small blotches of mid-brown, and hind wings are pale grey.

Damage

Leaves: Leaf mines show the presence of larvae, and the stem is weakened or broken.

Tubers: Detection is more difficult without them being cut open when larvae will be apparent within the potatoes.

Transmission/spread

Adults disperse via short flights near the ground. Moths can move up to 250m to infest plants or tubers, although observations indicate that they do not move from potato fields unless the field is harvested. The moths can be dispersed over long distances via potato tubers, which has facilitated the spread of the moth around the globe.

Distribution

Australia wide except Northern Territory.



Potato tuber moth, adult (top, P. Horne), leaf mine (bottom left, P. Horne), larvae on potato tuber (bottom right, SI Rondon).



THRIPS (WESTERN FLOWER)

Frankliniella occidentalis

Description

Nymph: Cream to yellowish, wingless, generally less than 1mm long.

Adult: Light to dark brown with thin bodies about 1 to 2mm long. Narrow transparent wings are held along their backs

Eggs are laid in slits in leaves and growing points. Nymphs and adults feed in flowers and growing tips.

Damage

Caterpillars skeletonise the leaves.

Transmission/spread

Infested crops can be damaged directly through feeding, which leads to leaf discoloration, deformed new growth and buds, and spotted foliage. However, the transmission of Tomato Spotted Wilt Virus causes the greatest impact on vegetable crops.

Distribution

All states.

WF Thrips, on flower (top, J. Rorabaugh), single adult (bottom, C. Maureira)

DISEASES

TOMATO SPOTTED WILT VIRUS

Tomato spotted wilt virus (TSWV) is widespread throughout Australia, affecting around 500 species including potatoes.

TSWV impacts the marketable and total yield of crops and causes a general reduction in tuber size. In some cases, necrotic spots occur internally on tubers. These can extend to the skin as concentric rings.

Symptoms of TSWV on potato plants include

- Necrotic leaf spots. These can have concentric rings, sometimes leading to a misdiagnosis as target spot, a fungal disease caused by *Alternaria* species.
- Severely affected stems and even whole plants can die.
- Plants grown from infected tubers are often most severely affected, with stunted growth in the form of a rosette.

Symptoms of TSWV on potato tubers include

- Potato tubers can grow normally after infection, but may be small and distorted sunken, black necrotic spots.
- These spots may appear as concentric rings and be visible through the skin
- Some infected tubers show no external symptoms.

Transmission

- Infected tubers
- Thrips which thrive in warmer conditions



Symptoms on leaves (Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org 4)

Clockwise from top left:

Diseased plant (Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org 3); damage on leaves (Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org 5); infected tubers, (Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org 6); infected tubers cut (Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org 2)



EARLY BLIGHT (TARGET SPOT)

Early blight is caused by the fungus *Alternaria solani* and is one of the most common diseases attacking leaves and stems of potatoes.

It can cause losses if outbreaks occur early in the season, or in late maturing crops. The disease attacks plants that lack vigour and often spreads towards the end of the season when the plants have stopped growing.

Symptoms on plants

- Small circular to oval dark brown to black spots (6-12mm) on leaves and stems that become oval to angular and are normally confined within the main veins of the leaflets.
- Leaves can look leathery.
- In sever cases, spots can unite and cause an upward rolling of the leaf tips and death of leaves.

Symptoms on tubers

- Small dark, slightly sunken, circular to irregular-shaped lesions (10mm to 20mm in diameter), with slightly raised margins.
- A brownish, corky dry rot up to 6mm deep develops in the tissue beneath the lesion.
- Affected tubers are prone to attack from other soil fungi, which can cause complete rotting of the tuber

Transmission

In spring, spores can spread by wind, rain, and insects. Spores fall on potato leaves, remaining there until conditions are favourable. They then germinate and penetrate the plant, causing an outbreak of disease.



Symptoms of early blight on potato leaves (top, J. Ekman; bottom, R. Hall)

POTATO SPINDLE TUBER VIROID (PSTVD)

Potato spindle tuber viroid (Pospiviroid; PSTVd) is a pathogen that poses a threat to potato, tomato, and eggplant crops in Australia. Symptom development is dependent on the strain of the viroid in conjunction with the host species and stage of development. Symptoms can be mild at first but will become more severe with each successive generation.

PSTVd symptoms can sometimes be confused with nutrient deficiency or toxicity, spray damage, insect damage or plant viruses.

Symptoms on plants

- A reduction in leaf size
- Altered development of stem to a more upright manner
- An increase in the length of the internodes (stem regions between the leaves)

Symptoms on tubers

- Infected tubers have pointy ends and are often smaller than healthy ones

Transmission

PSTVd is a highly contagious disease, transmitted between plants by touch. The use of cutting or pruning tools, contaminated machinery or any form of physical contact between plants can result in disease transmission. PSTVd can also be transmitted by green peach aphid from plants that are co-infected with potato leafroll virus. In potatoes, infected seed potatoes cause the most spread.

Distribution in Australia

Reported in Queensland and Western Australia.



Symptoms of PSTVD on potato plants (top, R.P. Singh, Bugwood.org) and infected tubers (bottom, William M. Brown Jr., Bugwood.org 1st)

PVY

Potato virus Y (PVY) is an aphid-borne virus that also infects other solanaceous crops including tomato and capsicum. The infection occurs in most potato growing areas in Australia and overseas.

Symptoms on plants

- Symptoms of infection vary with cultivar, plant age, environmental conditions, and PVY strain.
- Leaf symptoms can range from mild to severe mosaic or mottling.
- In severe cases, leaf drop can occur. Infected plants are often stunted.

Symptoms on tubers

- Tubers from infected plants are often small and can have necrotic or dead rings on the skin.

Transmission

PVY is primarily spread by aphids, including green peach (*Myzus persicae*) and potato (*Macrosiphum euphorbiae*) aphids.

An aphid can pick up and transmit the virus within 1-2 seconds of feeding. After the aphid has probed one or two healthy plants, the virus is lost until it probes another infected plant. Due to the rapid transmission, a small number of aphids can spread the virus to a large number of plants quickly.

PVY is also readily spread via machinery.

SOURCES

- Potato Growers' Biosecurity Manual, Version 1.0 May 2018 (PHA and AUSVEG)
- Potato Spindle Tuber Viroid Factsheet, August 2015 (Plant Health Australia)
- Tomato spotted wilt virus in potatoes, Agriculture Victoria (<https://agriculture.vic.gov.au/biosecurity/plant-diseases/vegetable-diseases/tomato-spotted-wilt-virus-in-potatoes>). Accessed December 2023



EXPLORE THE TOPIC FURTHER



Factsheet: Potato tuber moth



Webinar: Early blight and brown spot



Webinar: NSW advisor workshop: Early blight



Webinar: Controlling pests in potatoes



Article: Potato Virus Y



Symptoms of PVY (left variety Marfona 2, right variety Charlotte 1, from the Scottish seed demonstration site; J. Ekman)