

Managing *Fusarium Solani*

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Many growers are all too familiar with *Fusarium solani* and the effect on vines. This frustrating fungus has a long history of causing havoc for passionfruit growers, combining with Passionfruit Woodiness Virus in the 1950's to decimate black passionfruit crops. Anecdotally, growers have told us it's on the rise again, in some cases wiping out entire crops.

What is it?

Fusarium solani is a soil-borne fungus which causes base rot. It can also have an aerial stage of air-borne spores from the red spheres on the stem.

As far as we know, infection occurs under wet conditions through damaged areas in the stem base or roots. Young plants with twisted and/or J-roots are predisposed to infection and waterlogged conditions exacerbate the disease. The fungus survives in soil by means of dormant spores.

We generally refer to it as a 'stress' pathogen - which means it needs a predisposing factor, which can be varied for example, waterlogging, wounding (physical or insect) or infection from another pathogen.

Fusarium solani is different to the other *Fusarium* you may have heard of in passionfruit; *Fusarium oxysporum* f.sp. *passiflorae*. For *Fusarium oxysporum* f.sp. *passiflorae* we have rootstocks which are resistant to the disease.

What happens once a vine is infected?

Vines lose vigour and young vines can collapse suddenly. A soft decay or pronounced swelling develops at the soil line leading to decay of the entire root system. Adventitious roots can develop above the damage. In conditions of high humidity, the red spores of the aerial stage may occur on stems. Cut stems exhibit a reddish-brown discolouration of vascular tissue that is generally restricted to less than 0.5 metres above soil line but occasionally up to 2 metres in ungrafted Panama varieties.

Passiflora flavicarpa rootstock itself is highly susceptible to virus diseases, and succumbs to base rot when it is below optimum health such as when vines are badly affected with virus. This is the main reason for the use of other varieties as rootstock for grafted vines, that some of them may have more vigour.

Unfortunately, once *Fusarium* is present with a predisposing factor, it nearly always kills its host plant, and there are limited fungicide options.

Note that cutting the vine down and mowing it in will simply spread the disease further through the orchard. Infected plants MUST be removed completely from the orchard and destroyed.

Risk Factors that increase the spread of *Fusarium* in some cropping systems;

- Undecayed organic amendments
- Excess fertilisation, especially urea
- Excess irrigation
- Contaminated irrigation water
- Sciarid flies (fungus gnats) and soil-borne insect pests
- Ammonium fertilisers – nitrate fertilisers can suppress disease

Non-Chemical Control

- Prompt removal of infected plants, including the roots (as best you can). It is particularly important to remove vines before new spores of the fungus are produced on the old dying vines
- Soil solarisation
- Crop rotation with other crops/biofumigant crops
- Adequate calcium in soil
- Serenade Prime, a soil ameliorant and biofungicide
- Anolyte has been successful in some settings such as nurseries



Air-borne phase of *Fusarium solani* red spores on stem tissue.
Photo credit: Department of Agriculture and Fisheries



Impact of *Fusarium solani* on roots of vines.
Photo credit: Department of Agriculture and Fisheries



Base rot on infected passionfruit vine.
Photo credit: Department of Agriculture and Fisheries



Vines severely affected.
Photo credit: Jay Anderson

Non-chemical control is not without drawbacks – soil solarisation can lead to a death of all beneficials, crop rotation may be difficult with trellising in place, and before Serenade Prime is used or calcium added, it is important to research whether these additives will be suitable for your situation.

Anolyte – Electrolysed Activated Water – has been trialled by some growers with high levels of success. Whilst the initial set up costs were high, the ongoing cost of production is in the region of 3 cents/litre.

As always, we recommend growers research their options carefully and consider a trial before making large scale commitments.

Growers can also refer back to the article on Page 12 in the Autumn 2021 edition of The Passion Vine for more information available online at:

issuu.com/janerichter/docs/the-passion_vine-aut-21

For growers that missed the *Passionfruit Australia Field Day* held in Atherton on 16 June 2023, catch up on Dr Jay Anderson's pre-recorded talk about 'Base rot of passionfruit and the fungus *Fusarium solani*' on our You Tube channel:

web youtu.be/SETSIEzj_Ew

References

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