

Soil Down To A Science

metagen^{AUS}

IMPROVING ONION CANOPY DISEASE CONTROL IN THE LOCKYER VALLEY

Integrated Crop Management

Summary

Stemphylium Leaf Blight has become a major problem in onion production in SEQ. Metagen, in conjunction with Lockyer Valley Vegie Growers, Ausveg, Hort Innovation and Elders Lockyer, have pulled together available information to implement a strategy to improve outcomes in 2025. Multi-disciplined control options will enhance the functionality of fungicides. Contact us at Metagen if you would like more information.

Background

Until recent years, *Stemphylium vesicarium* (Stemphylium Leaf Blight; SLB) was a known, low priority disease that was generally considered a secondary infection of onion canopy in Australia. Disease control programs focused on Downey Mildew and Purple Blotch. For the last few seasons there appeared to be increased difficulty in controlling Downey Mildew into October and November. Downey mildew infection is inhibited by more than 2 hrs above 29° C, meaning by mid-September infection should decrease. Elders' senior agronomist Greg Teske noticed unusual symptoms in line with increasing disease in the hotter months and delivered samples to the Metagen research team. The diagnosis of high levels of SLB in the Lockyer by the Metagen lab in 2024 along with the persistence into hotter periods indicates that the disease has likely become resistant to current control measures, which could explain the increasing canopy decline. SLB is highly active in the USA and Canada, New Zealand and Europe with reports indicating high SLB incidence, associated with increased control measure evasion including host resistance and reduced fungicide efficacy (Hay *et al* 2021). SLB is currently the major onion canopy pathogen internationally. Early identification of the pathogen could improve outcomes and improve fungicide efficacy for the Australian onion industry.

An integrated approach is required to maintain control of the disease and protect any remaining fungicides from resistance. This means identifying and controlling alternate hosts, identifying which disease is prominent at each time of the year, identifying and rotating effective chemistry targeted at each pathogen, digesting crop residues as fast as possible and improving soil and plant health in terms of soil nutrients and biology. Published trials highlight that increased thrips feeding is associated with increases in SLB infection (up to 2.9-fold), where leaf cuticle damage makes the onion leaf easier to infect (Leach *et al* 2020).

Climate and Epidemiology

SLB, has two main types of spores, ascospores which are ejected into the air and conidia which may travel in water or air. Ascospores are generally produced in the cooler months and decline in temperatures over 15°C (Gossen *et al* 2021). Ascospores are generally the primary source of infection. This initial infection is generally low density and may not be noticed in some cases. Conidia spores are mass produced secondarily and their production ramps up once the average temperature reaches 18°C. This means that by mid to late September the disease sites infected earlier with ascospores become obvious and devastating.



Greg Hauser of Wickham farms is working with Greg Teske of Elders Gatton and Metagen adjusting his onion program in order to obtain better control of Stemphylium.

Meetings between LVVG, Hort innovation, Ausveg and Metagen resulted in a small Ausveg funded survey being conducted across growers who had various levels of disease problems in the 2024 season. This was conducted in November 2024, when most of the crop had been harvested. The objective of the survey was to collect as much information as possible to determine important variables common between higher and lower disease outcomes. Soil chemistry, in particular calcium (Ca) and boron (B) levels, have been demonstrated to relate to increased disease resistance in plants including tomato, turnip, banana and even forestry (*Fitzgerald et al 2003*). Chloride (Cl) assists in calcium uptake, and while in dryer seasons chloride excess can be a problem in the Lockyer, wetter years result in levels below optimum. Soil chemistry samples were collected from 5 onion paddocks in the Lockyer and Fassifern, tissue was collected where it was still available, and disease was isolated where possible. Canopy disease caused crop loss in 4 of the 5 farms surveyed and did not appear to respond to conventional fungicide programs. Loss assessment was qualitative only as the study was conducted retrospectively. On several farms weather events disrupted the fungicide program which likely contributed to disease incidence. Soil tests showed that all sampled farms were outside of recommended guidelines for one or more of the three ions required to maximise cell wall integrity, Ca, B and Cl. However, the only property with no crop lost to disease had the highest Ca levels in both, tissue and soil samples, and the second highest soil B levels. High rainfall increases fungal disease activity and often limits fungicide use; however, wet weather also leaches B and Cl from the soil profile, reducing Ca availability and uptake. Given these factors, high precipitation is likely to increase disease severity and impair available control mechanisms.

LVVG are working with Ausveg and Horticulture Australia to fund development of qPCR primers for SLB and Purple Blotch. A Downey mildew primer already exists and is available at the Metagen lab.

How to get a better result in 2025

Better control can be achieved by integrated disease control, adding a range of cultural controls and plant health options to the fungicide program, including:

- Improving soil organic matter processing, which has the potential to reduce over-winter soilborne spores of both SLB and Downey Mildew.
- Using qPCR technology for better disease identification and fungicide efficacy in paddock assessment as this technology becomes available.
- Measuring fungicide efficacy initially with invitro testing on SLB and Purple Blotch in the Metagen lab. Paddock testing will be facilitated when the qPCR primers are available for SLB and Purple Blotch. Then rotating to protect the most effective fungicides on each disease when these individual diseases are most active.
- Monitoring and adjusting soil chemistry to maximise cell wall integrity and disease resistance. Particularly after heavy rainfall to replenish leached ions.
- Controlling thrips populations.
- Identifying and controlling alternate weed host.

Gossen, B. D., Tayviah, C. S., and McDonald, M. R. 2021. The role of ascospores and conidia, in relation to weather variables, in the epidemiology of *Stemphylium* leaf blight of onion. *Plant Dis.* 105:1912-1918

Hay, F., Stricker, S., Gossen, B. D., McDonald, M. R., Heck, D., Hoepting, C., Sharma, S., and Pethybridge, S. 2021. *Stemphylium* leaf blight: A re-emerging threat to onion production in Eastern North America. *Plant Dis.* 105:3780-3794.

Leach, A., Hay, F., Harding, R., Damann, K. C., Nault, B. 2020. Relationship between onion thrips (*Thrips tabaci*) and *Stemphylium vesicarium* in the development of *Stemphylium* leaf blight in onion. *Ann Appl Biol.* 176:55–64. DOI: 10.1111/aab.12558

Fitzgerald S. M., White S. D., Dickinson A. A., Goldman B. 2003. A survey of Sigatoka leaf disease (*Mycosphaerella musicola* Leach) of banana and soil calcium levels in North Queensland. *Australian Journal of Experimental Agriculture* **43**, 1157-1161. <https://doi.org/10.1071/EA02094>.

What problems do you encounter in your paddock?

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info@metagen.com.au or simply reply to this email.

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