

Managing Botrytis in chickpeas in 2021

Testing of chickpea seed from the 2020 harvest and earlier years has detected levels of Botrytis that may lead to disease issues in 2021 crops.

This guide outlines a management package to help growers minimise the impact of Botrytis on their 2021 crops.

Key points

- *Botrytis cinerea* causes both botrytis grey mould and botrytis seedling disease.
- Visual symptoms and control of the two forms of the disease are different.
- **Botrytis seedling disease is only seed borne.**
- Seed tested from 2020 and earlier crops has detected levels of Botrytis that could lead to botrytis seedling disease if seed is not treated properly.
- There is no in-crop control for botrytis seedling disease.
- Botrytis seedling disease can be controlled by fungicide seed dressings, such as thiram, commonly used by many growers for Ascochyta management.
- Fungicides and canopy management can be used to control or limit botrytis grey mould.
- Test your seed.

Botrytis in 2020

Crop inspections in early-mid spring 2020 detected no serious botrytis grey mould (BGM) but the fungus was observed sporulating on fallen leaves in the lower canopy and on the ground. This meant inoculum was building up and would pose a threat of BGM later in the season if conditions became favourable. This happened in isolated crops, particularly in the Macquarie and Lachlan valleys, allowing Botrytis to infect the seed even though there was minimal impact on yield in 2020.



Botrytis grey mould: on chickpea stem.
Photo: Natalie Moore

Tests on seed lots harvested in 2020 (presented below) indicate significant levels of botrytis (up to 34.5%) on the seed.

Facts about botrytis

The fungus

Botrytis cinerea is ubiquitous in the environment, with a wide host range in excess of 70 botanical families. It grows on dead tissue of a range of plants, in many of which it does not cause serious disease eg sorghum and cotton. The fungus can also survive as sclerotia in soil leading to direct infection of plants or production of airborne spores.

Inoculum is always present and if conditions favour BGM, it will occur irrespective of what has happened earlier in the growing season. Botrytis remains viable as sclerotia or colonised plant tissues in or on soil.

Whilst the same fungus causes BSD and BGM, they are very different diseases and require different management.

Botrytis seedling disease

BSD is seed borne only – it is a threat to crops only if seed is not treated with fungicide. BSD can occur at any temperature and in any location. It does not need the wet, humid conditions that favour BGM.

BSD causes pre- and post-emergent seedling death when chickpea seed infected with *Botrytis cinerea* is used for sowing. Seed becomes infected in the previous season when the fungus colonises the pods.

BSD is readily controlled with fungicide seed dressing. If the seed is not treated or coverage is poor, the risk of disease is high and significant damage to seedling chickpea plants is likely.

BSD does not increase the risk of BGM, although infected seedlings can lead to infection of the roots of neighbouring, healthy plants resulting in root and collar rot. The symptoms can look similar to phytophthora root rot.



Collar rot: caused by BSD in chickpea seedling. Treating BSD infected seed with the correct seed treatment will control the disease. If the seed is incorrectly treated or not treated at all, the disease could pose issues. Photo: Kevin Moore.

2020 harvested seed: tested for Botrytis at the Tamworth Agricultural Institute, December 2020 – February 2021.

| Variety | Location | Seed size (g/100 seeds) | Germination (%) | Seeds with Botrytis detected (%) |
|---------------------------|-----------|-------------------------|-----------------|----------------------------------|
| PBA HatTrick [®] | Warren | 21.3 | 86 | 19.5 |
| /PBA Seamer [®] | | | | |
| PBA HatTrick [®] | Grafton | 22.4 | 82 | 34.5 |
| PBA Seamer [®] | Narromine | 21.9 | 99 | 1.0 |
| PBA Seamer [®] | Narromine | 23.6 | 90 | 10.0 |
| PBA Seamer [®] | Trangie | – | – | 22.5 |
| PBA Seamer [®] | Forbes | 24.3 | 96 | 4.5 |
| PBA Seamer [®] | Forbes | 22.7 | 92 | 4.5 |
| PBA HatTrick [®] | Dubbo | 20.5 | 94 | 10.0 |
| PBA Seamer [®] | Dubbo | 24.8 | 89 | 6.0 |
| PBA HatTrick [®] | Gilgandra | 20.6 | 98 | 5.0 |
| PBA HatTrick [®] | Coonamble | 20.7 | 96 | 0.0 |
| PBA Seamer [®] | Coonamble | 22.6 | 99 | 3.0 |
| PBA Seamer [®] | Coonamble | – | – | 15.0 |



Chickpea seed: with botrytis grey mould. Photo: Kevin Moore.

Botrytis grey mould

Botrytis grey mould (BGM) is an air-borne foliar disease most active when temperatures exceed 15 °C and is favoured by temperatures in the range 20–25 °C. It can be controlled with foliar fungicides, but this is challenging when conditions are conducive for disease development. Seed treatment is ineffective against BGM.

Symptoms of BGM include fluffy grey mould. BGM produces diffuse, white fungal growth, which later turns grey due to the production of a huge number of spores. Over 10 million spores can be produced on a single 2 cm-long lesion on a chickpea stem.

The spores can be blown many kilometres, and if deposited on chickpea plants they can remain dormant until conditions favour fungal activation.

Lesions and the grey 'fuzz' are evident 5–7 days after infection under ideal conditions.

Often, the first symptom of BGM infection in a crop is drooping of the terminal branches. If groups of plants are infected, these may appear as yellow patches in the crop.



BGM infection: appears as a yellow patch when a group of plants are infected. Photo: Phil Davies.

Whilst the fungus is found everywhere, the disease is more prevalent in the humid, warmer regions of northern NSW and QLD, where significant crop losses can occur when these conditions prevail.

A combination of canopy closure, frequent rainfall events and overcast weather results in high humidity within the canopy and rapid leaf death.

Fungicide programs for ascochyta blight may help reduce BGM, with one of the newer chemicals registered for Ascochyta also registered for BGM management. See Table on next page.

Varieties with improved resistance to ascochyta blight might still require a fungicide program specifically for BGM as all current varieties are equally susceptible.

2021 – reducing risk

Test your seed

Free seed testing is available from NSW DPI. This test also measures germination and vigour. Send your samples to Kevin Moore (details below).

Paddock selection

As for ascochyta blight, chickpeas should not be sown in paddocks adjacent to paddocks sown with chickpeas in the previous year. Chickpeas should be sown as far away from paddocks where BGM was a problem the previous year, be this chickpea or other broadleaf crops that also host botrytis.

When conditions favour disease, paddock selection will not guarantee crops will remain BGM-free due to the botrytis pathogen's:

- wide host range
- ability to colonise dead plant tissue; and
- airborne spores.

Fungicide seed dressings

Chickpea seed should always be treated to control Ascochyta, Botrytis and other soil-borne diseases.

Research has shown that P-Pickel T® (thiram plus thiabendazole) and products containing thiram only (e.g. Thiram® 600) are equally effective against Ascochyta or Botrytis. Additionally, applying metalaxyl could be warranted if there is a risk of phytophthora root rot in a paddock. Seed treatment with metalaxyl only provides protection for 6–8 weeks from sowing.

Experiments conducted by Dr Kevin Moore in 2011 used two lots of commercially graded, 2010-grown botrytis infected seed to determine the effects on crop establishment and yield. Fungicide treated seed was compared to nil treatment control. Establishment and yield were significantly higher when seed was treated.

| Seed treatment | Establishment (plants/m ²) | Plants (%) with BSD symptoms | Grain yield (t/ha) |
|----------------|--|------------------------------|--------------------|
| Nil control | 12 | 20.4 | 2.12 |
| Thiram® 600 | 29 | 0.7 | 2.73 |
| P Pickel-T® | 30 | 0.0 | 2.89 |

Delay sowing

If long-term weather forecasts suggest a wetter than normal season, consider sowing in the later part of the sowing window as this will reduce biomass – dense canopies favour BGM development.

Fungicides: *preventative fungicides registered for use in chickpeas.*

| Commercial name | Active ingredient (concentration) | Rate | Disease(s) controlled | Withholding period |
|-----------------------|---|--------------------|--|--------------------|
| Seed dressings | | | | |
| Thiragranz | Thiram (800 g/L) | 150 g/100 kg seed | seed borne botrytis, ascochyta | |
| P-PickleT® | Thiram (360 g/L) + thiabendazole (200 g/L) | 200 ml/100 kg seed | seed borne botrytis, ascochyta, seedling root rots | |
| Thiram 600 Flowable | Thiram (800 g/L) | 200 ml/100 kg seed | seed borne botrytis, ascochyta | |
| Foliar sprays | | | | |
| SpinFlo® | Carbedazin (500 g/L) | 500 ml/ha | botrytis grey mould | 28 days |
| Dithane® | Mancozeb (750 g/L) | 1.0–2.2 kg/ha | botrytis grey mould, ascochyta, rust | 28 days |
| Veritas® | Tebuconazole (200 g/L) + azoxystrobin (120 g/L) | 0.75–1.0 L/ha | botrytis grey mould, ascochyta | 28 days |

Plant on wider rows

Wide rows (66 cm or greater) improve airflow through the crop leading to more rapid drying after rain or dew. Canopy closure can also be delayed, which will improve fungicide penetration.

Foliar fungicide

In the majority of seasons and chickpea growing regions a foliar fungicide targeting BGM is not required. However, in seasons and situations favourable to BGM, a preventative fungicide application just before canopy closure, with a followup application two weeks later may help minimise disease development.

During flowering or pod fill, a foliar fungicide should be applied before a rain event. None of the fungicides currently registered for BGM will *eradicate established infections*. Consequently, timely and thorough application is critical.

Veritas® (see table above) is now registered for the management of Ascochyta and BGM in chickpeas.

Other resources

Chickpea seed treatment improves crop establishment and increases yields – 2011 trials using seed from 2010 crops. <https://www.nga.org.au/index.php/results-and-publications/download/137/grdc-update-papers-diseases/botrytis-seedling-blight-in-chickpeas/grdc-adviser-update-paper-goondiwindi-march-2012.pdf>

Further information

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**Department of
Primary Industries**

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