

Chickpea: *Ascochyta* Blight Management

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Background

Ascochyta blight, caused by the fungus *Ascochyta rabiei* (recently renamed *Phoma rabiei*), is a serious disease of chickpeas in Australia. The fungus can infect all above ground parts of the plant and is most prevalent in areas where cool, cloudy and humid weather occurs during the crop season.

Ascochyta rabiei first caused widespread damage to chickpeas in northern New South Wales and southern Queensland in 1998 when extremely wet conditions favoured disease development and spread. *Ascochyta* blight is now considered to be endemic in all growing regions with the exception of central Queensland. Unlike some insect control strategies, there is no economic threshold for *ascochyta*. Management strategies are aimed at preventing the occurrence of disease and limiting its spread.

Ascochyta blight is managed through crop rotation, hygiene, seed treatment, prophylactic fungicide application and growing varieties with improved resistance (Table 1).

All growers and advisors need to be regularly inspecting their crops from emergence through flowering right up to plant maturity. Inspections should be undertaken 10-14 days after rain events, when new infections will be clearly evident as lesions on plant parts.

Identification and Visual Symptoms of *Ascochyta* blight

For detailed images refer to:

[Pulse Australia - Northern Pulse Bulletin; '*Ascochyta* blight in Chickpea. Symptoms and Identification'](#)

Ascochyta rabiei infects the leaves, stems and pods of chickpea plants, causing tan/brown, rounded lesions on affected plant parts.

Symptoms become visible in 4-5 days as a pale green/yellow discolouration on leaves, often referred to as 'ghosting' (Figure 1).

Toward the centre of the lesion, small, black fruiting bodies called pycnidia develop in 7-10 days, often in concentric rings (Figure 2). Spores ooze out of pycnidia and are spread by rain-splash upwards within the plant and sideways to nearby healthy plants.

Lesions often girdle the stems of the plant, causing them to weaken and subsequently break off, making later detection difficult. Circular "hot spots" or "foci" consisting of plants with severe infection can appear in crops' but by this stage considerable damage has occurred. Seeds can become infected after lesions develop on pods.



Figure 1: Leaf ghosting.

Figure 2: Concentric rings of pycnidia.

Photos: Gordon Cumming

Biology and epidemiology

Ascochyta rabiei causes economic losses only on chickpea. There are no other known hosts of the pathogen in Australia, but different *Ascochyta* species infect faba beans, lentils and field peas. *A. rabiei* survives between seasons on infected plant residues, on infected or contaminated seeds and on infected volunteer chickpea plants.

A. rabiei infected stubble blown about during and after harvest is a major cause of short to medium distance dispersal (metres to kilometres) along with movement of infected trash by water, machinery or animals. Spores of the fungus can survive a short time on skin, clothing and machinery.

A. rabiei can increase rapidly on volunteer chickpeas, if wet weather occurs during spring-summer-autumn. Paddocks with chickpea stubble should be regarded as a source of inoculum even if *ascochyta* blight was not observed in last season's chickpea crop.

A. rabiei can develop over a wide range of temperatures (5-30°C) and needs only 3 hrs of leaf wetness to infect. However, the disease develops fastest when temperatures are between 15-25°C and relative humidity is high (the longer the Relative Humidity is high, the more severe will be the infection).

Subsequent in-crop infection occurs when spores are moved higher in the canopy or to surrounding plants by rain splash during wet weather. Multiple cycles of infection will occur during the growing season whenever environmental conditions are favourable.

Determining your ascochyta blight risk

The northern GRDC region has three levels of ascochyta blight risk, determined by:

- Proximity to infection source.
- Seed infection and treatment.
- Variety grown.
- Likelihood of rain.

Ascochyta blight management strategies vary accordingly and are strongly influenced by weather conditions. The key to achieving cost effective management of ascochyta blight is to assess the risk level for each paddock, and then manage accordingly.

Chickpea growing areas of the northern region are classified as having a Low, Moderate or High ascochyta blight risk. Assessment should however be done on a paddock-by-paddock basis and not on a regional basis. For example, even though you might be in a western, drier area (which at the regional level carries a Moderate risk) you could have a high ascochyta risk if you have been growing chickpeas for many years, have sown a susceptible variety and are subject to seasonal conditions that favour the disease.

Low ascochyta blight risk situations

The only region that currently can be considered Low Risk is central Queensland (Central Highlands and the Dawson Callide). Ascochyta blight was identified for the first time in central Queensland in spring 2008. If ascochyta becomes endemic in central Queensland, the industry will face considerable managerial and financial costs.

While the hot dry climate of central Queensland is less conducive to ascochyta than southern areas, the region is not immune, cool, wet winter conditions will favour the pathogen's development and spread.

Now that an incursion has occurred, growers in the region need to prioritise management of ascochyta to reduce the risk of the disease spreading within the region.

Primary (initial) infections result from infected seed or from infected crop residue. Seed must be sourced from within this region and treated with a registered fungicide seed dressing.

Always check the origin of your seed prior to delivery and ensure that machinery, especially contract harvesters, entering the region has been thoroughly cleaned.

Chickpea varieties currently grown in central (& coastal) Queensland are all very susceptible to ascochyta blight.

For additional detailed information refer to:

Pulse Australia - Northern Pulse Bulletin:
['Central & Coastal Qld Ascochyta Management'](#)



*Stem lesions causing girdling and breakage.
Photos: Gordon Cumming*



*Pod lesions are similar in appearance to leaf lesions.
Photo: Gordon Cumming*

Moderate ascochyta blight risk situations

These occur when:

- Chickpeas are sown at least 2 km away from inoculum sources, i.e. paddocks that had chickpeas or volunteers during the previous 2 seasons, and
- Seed has come from crops where ascochyta was not detected and has been treated with a registered fungicide seed dressing.

Many crops in the western areas often meet these criteria i.e. west of the Darling Downs in Qld and west of the Newell highway in NSW.

However, under favourable conditions and on susceptible varieties, ascochyta can build-up quickly and may reach epidemic levels.

High ascochyta blight risk situations

Disease epidemics can develop rapidly in situations where chickpeas are grown within a 2 km radius of previous chickpea.

Most of the more intensively farmed areas such as the Darling Downs and east of the Newell highway in NSW are in this High risk category. Paddocks tend to be smaller, making it difficult to stay 2 km away from infected chickpea crop residue and these areas are in higher rainfall zones.

A number of crops in the western areas are potentially in this category, if they are sown within 2 km of paddocks that had chickpeas or volunteers during the previous 2 seasons.

Management options

Follow the principles of Integrated Disease Management (IDM) which include:

- Crop rotation and paddock selection.
- Clean seed and fungicide seed dressings.
- Regular crop monitoring.
- Strict hygiene on and off farm.
- Strategic use of foliar fungicides.

Note: Chickpea seed dressings (Table 2) only protect the emerging seedling from seed borne ascochyta, seed borne botrytis. Seed dressings will not protect the emerged seedling from rain-drop splashed ascochyta or wind borne botrytis.

For additional detailed information refer to:

Pulse Australia - Northern Pulse Bulletin; ['Chickpea: Integrated Disease Management'](#)

Foliar fungicide programs

Differing spray programs have been developed based on each variety's ascochyta rating (Table 1).

Chickpea ascochyta fungicides are protectants only – unlike wheat stripe rust fungicides, they have no systemic or kick-back action, and they will not eradicate an existing infection. To be effective they must be applied before infection i.e. before rain. The key to a successful ascochyta spray program is regular monitoring combined with timely application of registered fungicides (Table 3).

Note: Observations in 2010 Tamworth trials indicated that the natural resistance all plants have to pathogens and pests is compromised when plants are stressed from waterlogging and that this reduced the ability to manage ascochyta with a fungicide strategy that worked in less stressed plots.

Resistant (R) (e.g. Genesis™ 090, Genesis™ 425)

Fungicide sprays are unlikely to be required before podding. Despite good foliar resistance to ascochyta, the flowers and pods of Resistant varieties can be infected which can result in poor quality, discoloured seed or seed abortion and, in extreme situations, yield loss.

Monitor the crop 10-14 days after each rain event.

If ascochyta is detected, apply a registered fungicide at early podding prior to rain. In high rainfall or high risk situations and where there is an extended pod filling period, further applications may be required.

Moderately Resistant to Resistant (MR/R)

(e.g. PBA HatTrick[®])

In most seasons, disease development will be slow and there will be no or minimal yield loss. In such seasons there is no cost benefit in applying a fungicide during the vegetative stage. Despite good foliar resistance to ascochyta, the flowers and pods of MR/R rated varieties can be infected which can result in poor quality, discoloured seed or seed abortion and yield loss in severe situations.

However, under high disease pressure, a reactive foliar fungicide strategy may be warranted during the vegetative period of the crop.

Monitor the crop 10-14 days after each rain event.

If ascochyta is present in the crop apply a registered fungicide at early podding prior to rain to ensure pods are protected, and high quality, disease free seed is produced.

Moderately Resistant (MR) (i.e. Flipper[®])

In most seasons of low to moderate disease pressure, there is no cost benefit in applying a fungicide until after ascochyta blight is detected.

Monitor the crop 10-14 days after each rain event and if ascochyta is detected apply a registered fungicide just before the next likely rain event.

Continue monitoring and spray again if weather and disease levels indicate ascochyta is likely to spread.

Moderately Susceptible to Moderately Resistant (MS/MR) (e.g. Yorker[®], Almaz)

For all situations apply a registered fungicide before the first rain event after crop emergence, or three weeks after emergence or at the three branch stage of development, whichever occurs first.

Monitor the crop 10-14 days after each rain event.

If ascochyta is found, apply a registered fungicide just before the next rain event.

Continue monitoring and spray again if weather and disease levels indicate ascochyta blight is spreading.

Susceptible (S) varieties (e.g. Jimbour, Kyabra[®])

In seasons (e.g. 2011) following an Ascochyta epidemic (e.g. 2010), assume that susceptible varieties will be at high risk. If the season favours ascochyta, regular fungicide sprays will be needed from emergence until 4 weeks before maturity. Do not wait until you find the disease.

Timing of the first two sprays is critical, because control is difficult or impossible after the disease has taken hold. The first spray must be applied before the first post emergent rain event, or three weeks after emergence or at the three leaf stage whichever occurs first. The second spray should be applied three weeks after the first spray. However, apply the second spray if two weeks have elapsed since the first spray and rain is forecast.

Mancozeb is often the preferred fungicide for these first two applications as it can be applied with a Group A grass herbicide.

Continue monitoring the crop 10-14 days after each rain event. If ascochyta is found additional sprays will be required. If it has been two weeks or longer since the last application, spray again just before the next rain event.

Table 1: Resistance ratings[#] of some northern region varieties to *Ascochyta*, *Phytophthora* and *Botrytis*.

Variety	Ascochyta	Phytophthora	Botrytis
PBA HatTrick [Ⓛ]	MR/R	MR	S
Flipper [Ⓛ]	MR	MS	S
Yorker [Ⓛ]	MS/MR	MR	S
Howzat	S	MS	MS
Jimbour	S	MS/MR	S
Kyabra [Ⓛ]	S	MS	S
Moti [Ⓛ]	VS	MS	MS
Genesis [™] 090	R	VS	S
Genesis [™] 425	R	MS	S
Almaz	MS/MR	VS	S

Resistance ratings are for low-moderate disease pressure situations.

In a season such as 2010 when repeated cycles of infection occur, even MR varieties can have yield-reducing levels of disease

Table 2: Seed dressings registered for the control of seed borne *Ascochyta* blight and *Botrytis* Grey Mould.

Active Ingredient	Example trade name	Rate (per 100 kg seed)
thiram (600 g/L)	Thiraflo [®]	200 mL
thiram (800 g/kg)	Thiragranz [®]	150 g
thiram + thiabendazole (360 + 200 g/L)	P-Pickel T [®]	200 mL

Refer to the current product label for complete 'Direction For Use' prior to application.

Table 3: Foliar fungicides for the control of *ascochyta* blight and *botrytis* grey mould.

Active Ingredient	Example trade name	Rate	
		Ascochyta blight	Botrytis Grey Mould
Chlorothalonil (720 g/L)	Crop Care Barrack [®] 720 [#] Barrack Betterstick ^{®#} Nufarm Unite [®] 720 [#]	1.0 – 2.0 L/ha	Not Registered
Mancozeb (750 g/kg)	Dithane [™] Rainshield [™]	1.0 – 2.2 kg/ha	1.0 – 2.2 kg/ha
Mancozeb (420 g/L)	Penncozeb [®] SC	1.8 – 3.95 L/ha	Not Registered
Carbendazim (500 g/L)	Spin Flo [®]	Not Registered	500 mL/ha

These are the only registered chlorothalonil products. It is an offence to use any other product.

Refer to the current product label for complete 'Direction For Use' prior to application.

Further reading

Pulse Australia – Northern Pulse Bulletins:

- [Chickpea: Sourcing High Quality Seed](#)
- [Chickpea: Effective Crop Establishment](#)
- [Chickpea: Integrated Disease Management](#)
- [Ascochyta blight in Chickpea, Symptoms and Identification](#)
- [Chickpea: Botrytis Grey Mould Management](#)
- [Chickpea: Phytophthora Root Rot Management](#)
- [Central & Coastal Qld Ascochyta Management](#)

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