

Setting your crop up for success in 2023

Introduction

The 2022 cropping season will go down as one of the most challenging in recent times. Record or near record rainfall was recorded for most districts, with the season ending with floods and substantial rainfall at harvest. This rain destroyed or downgraded crops, created huge compaction issues from paddock traffic and bogged machinery created a raft of challenges for growers in 2023.

However, the record wet and prolonged cool conditions during grain fill in 2022 should be kept in perspective. High input strategies economical in 2022 might not be in 2023.

Considerations for 2023

What diseases will be on my farm after high rainfall and/or flooding?

- Stubble-borne pathogen levels are likely to be elevated due to high cereal stubble loads e.g. fusarium crown rot (FCR), yellow leaf spot, ascochyta blight (AB) and chocolate spot.
- Leaf disease pressure, especially stripe rust, is likely to be high again in 2023. Early season management needs to be supported with plans responsive to spring conditions.
- Fusarium crown rot risk is extreme across much of the northern grain region, especially for durum.
- A bad sclerotinia year, such as 2022, will have a legacy effect for following broadleaf crops as the sclerotia can survive in soil for many years.
- Despite the wet 2022, seedling infection levels and upper canopy infection levels of blackleg in canola were not severe and blackleg management advice in 2023 will not change from that in 2022.

Will retained seed be affected by seasonal conditions at the end of 2022?

- All planting seed, whether retained or purchased, should be tested for germination and vigour, especially where it was rain affected before harvest, as rain-affected seed is likely to have reduced germination rate and vigour.
- Seed retained from any crop where fusarium head blight (FHB) or white grains were evident in 2022 must be tested for fusarium infection levels as it negatively affects germination and vigour.
- Mould was a major issue in canola in 2022. If retaining seed, test for germination and vigour.

Test your seed.

Test your soil.

Test your stubble.

Stubble-borne pathogen levels are likely to be elevated due to high cereal stubble loads.



How has high rainfall and/or flooding affected soil?

- Waterlogging might have resulted in significant soil denitrification.
- Beneficial microbe numbers will have been decreased due to anaerobic conditions and might result in less nitrogen (N) mineralisation over summer.
- Test the soils (both shallow and deep) for nutrients.
- Flooded paddocks can have soil structural and compaction issues.

Know the weed burdens and have an integrated plan to manage them.

Major issues of 2022 in NSW

- Favourable conditions in 2021 resulted in the increased prevalence of a range of cereal diseases:
 - wheat leaf diseases – stripe rust, fusarium head blight (FHB), and yellow leaf spot (YLS).
 - barley – both net form of net blotch (NFNB) and spot form of net blotch (SFNB), along with scald. The minor disease rumularia was an issue in the south of the state (Figure 1). Most barley varieties are rated only moderately susceptible (MS)–susceptible (S) or lower.
- Spring temperatures remained mild and conducive to disease development.
- Melanism or false black chaff was prevalent in 2023. This disorder is connected to the presence of a stem rust resistance gene and is a physiological condition, not a disease. It is more pronounced in high radiation, high humidity environments. Some varieties are more prone to the disorder than others. It is not transmitted in the seed.
- Sclerotinia stem rot in canola was widespread in spring 2022 due to highly favourable conditions.
- Levels of foliar disease in pulse crops was high across all pulse crops in spring 2022, including chocolate spot of faba bean, blackspot of field pea and ascochyta blight of chickpea.
- There were major problems with mouldy canola grain at harvest.

Waterlogging might have resulted in significant soil denitrification.



Figure 1. Rumularia leaf spot in barley.

Disease dos and don'ts

- Know the disease risk: test for major soil-borne and stubble-borne diseases with Predicta® B. Identify the paddock's disease risk before sowing and adapt the crop species/variety accordingly.
- Crop rotation: **do not** plant a cereal on top of a cereal crop from the previous year.
- Variety: select a variety with the disease resistance package most suited to the paddock and the district. For the latest disease ratings, head to <https://nvt.grdc.com.au/nvt-disease-ratings>
- Consider seed dressings or in-furrow fungicides as part of the foliar disease management plan, especially for susceptible (S) varieties.
- Stubble management: what diseases might it be hosting. Stubble is generally an asset to the farming system.
- Control volunteer cereals and grass weeds: breaking the 'green bridge' reduces the risk of foliar pathogens (e.g. stripe rust in wheat, blotches in barley and bacterial blight in field peas) and insect vectors, such as aphids that transmit viruses.
- Manage early leaf disease pressure. The most effective management can often be 2–3 weeks of warm and dry weather in spring.
- Keep abreast of in-season GRDC and NSW DPI communications that address the dynamics of cereal disease management through the season.
- Be prepared: a proactive approach is always better than reactive strategies.

For details on Predicta® B soil-borne pathogen testing, head to Predicta® B–PIRSA

For the latest variety disease ratings, head to NVT Disease Ratings–GRDC

Manage early leaf disease pressure, then adapt management to spring conditions.

Know the disease risk

PreDicta® B is a DNA-based soil test that identifies soil-borne pathogens that pose a significant risk before sowing, so steps can be taken to reduce chances of yield loss. Predicta® B can identify diseases such as FCR and certain nematode species. For a full list of diseases and sampling protocol, head to [Predicta® B – PIRSA](#)

Crop rotation

Do not plant a crop back into its own residues (stubble). In recent years some paddocks have already had 3–4 cereals in a row. Such practices can lead to high starting disease and nematode levels, as shown in [Table 1](#) and [Table 2](#). For several diseases, crop rotation is the only method of control.

Crop rotation can offer other benefits such as:

- N fixation from pulse crops and legume pastures
- improved weed control options through using alternate chemistries, growing crops with herbicide tolerance (i.e. TT or Clearfield® canola varieties) or through crop termination or export off the paddock (brown manuring, hay or silage production)
- spreading equipment and labour resources more effectively across a season (e.g. canola sown and generally harvested before cereal crops) can offer high economic returns.

Stubble management

Stubble retention favours the prevalence of soil and stubble-borne diseases with heavy cereal stubbles common after recent high-yielding years. This stubble provides a source of inoculum for necrotrophic foliar diseases such as septoria tritici blotch (STB) and YLS in wheat, and SFNB, NFNB and scald in barley. Management options for reducing stubble-borne diseases include reducing stubble height at harvest, burning, mulching, grazing, baling stubble or stubble incorporation.

Burning might have minimal effect on FCR, common root rot and take-all levels, as most of the inoculum is in the crown or root system below ground. The decision to burn stubble should be weighed up against disadvantages such as nutrient loss, reduced storage of fallow moisture and an increased erosion risk.

Lowering harvest height, mulching and incorporating stubble can reduce the amount of standing stubble but can potentially also spread pathogen inoculum more uniformly across a paddock.

Inter-row sowing is effective at physically distancing the plant from the previous stubble row, reducing contact with pathogens that cause soil- and stubble-borne root diseases, such as FCR.

Paddocks that were flooded might have been left bare, with zero stubble and severe erosion from floodwater. In such cases, growers are encouraged to grow crops that will leave the paddock with high stubble levels, such as barley or wheat ([Figure 2](#)).

The effect of floodwater on soil

Flooding and waterlogging effects on beneficial microbes

Flooding and waterlogging not only negatively affect crops and soils, but can also significantly affect soil microbes, with waterlogging causing the most damage.

This effect is primarily through the anaerobic environment caused by the water infiltration. Studies have shown the microbe community shifts with a proliferation of anaerobic microbes and a reduction in aerobic microbes.



[Figure 2](#). Flood-affected paddock at Forbes in 2022 that had sorghum sown into a huge wheat stubble, all of which were washed away. Photo courtesy of Mark Swift.

Beneficial microorganisms, such as arbuscular mycorrhizal fungi (AMF) and rhizobia are aerobic and can die in these conditions.

The condition known as 'long fallow disorder' is associated with drought. However, there are forms of 'fallow syndromes' associated with flooding, referred to in America as 'post-flood syndrome'. Both are similar in that average crops will follow either drought or flood due to the beneficial microbes being affected. The advice would be the same as for long fallow, test the soil using Predicta® B. In chickpea experiments conducted by NSW DPI, with the right management, levels of beneficial microbes in soil can bounce back in a season.

Another consequence of reduced microbe numbers is the slower rates of breakdown of organic matter and therefore decreased mineralisation of nutrients, including N. The nutrients contained in unharvested winter crops will eventually break down but this process takes time and only a small proportion will be available to the following winter crop.

Soils and nutritional challenges

Soils that are flooded or waterlogged for more than a few days can become anaerobic, where all the pore spaces are filled with water and microbes quickly consume any remaining oxygen. In such conditions denitrification can occur, where the microbial degradation of organic matter uses nitrate-N instead of oxygen (O). Denitrification converts plant-available nitrate in the soil into N gases (di-nitrogen, nitrous oxide, nitric oxide) that are lost from the soil.

Denitrification can be extremely variable, and growers are encouraged to test soils for nitrate levels (both shallow and deep) before planting the 2023 crop.

Prolonged waterlogging can lead to changes in soil chemistry. Under prolonged anaerobic soil conditions, iron (Fe) and manganese (Mn) oxides are reduced to soluble ionic forms, making them more available, sometimes at toxic levels to plants. The solubilisation of Fe oxides can also increase plant-available phosphorus (P) in acidic soils. Inundation can change soil pH towards neutral, i.e. pH increases in acid soils and decreases in alkaline soils. Acidification of alkaline soils can release plant-available P. Longer-term anaerobic conditions can also lead to reduction of sulfate-sulfur (S) to sulfides or hydrogen sulfide gas – both reducing the amount of plant-available S in the soil. Flooding has also been shown to increase the availability of molybdenum (Mo) but decrease that of zinc (Zn) and copper (Cu).

Most of the flooding-induced changes to soil nutrition are reversed once the soil pores are no longer filled with water. The main exception to this is the N lost from the soil as gases, which needs to be replaced by new mineralisation of soil organic matter or with fertiliser and manures.

Flooding also affects soil fertility through an influx of dissolved nutrients and sediments from eroded topsoils. Nutrients, such as P and Zn are very immobile in the soil and generally isolated in the top 100–150 mm. If a paddock has flooded and topsoil has been removed or relocated, levels of these nutrients might have changed and not be adequate to meet a crop's requirements. Test the soil to determine starting levels.

Weed challenges

The wet 2022 season has left many legacies including high weed burdens. Late sowing and late in-crop rainfall made weed control challenging with 'escapes' common; ryegrass, fleabane and milk thistle being the biggest offenders. Growers should be aware of potential weed issues in their paddocks and manage the risk via several methods:

- delay sowing and ensure an effective knock-down spray at sowing
- grow a rotation crop, such as a broadleaf crop, for cheaper and more effective in-crop grass weed control options
- growing crops containing herbicide packages, such as TT canola

Test soils for nitrate levels (both shallow and deep) before planting the 2023 crop.

For more information on weed management, head to The Big 6 - Weed Control Tactics – WeedSmart

- growing crops for hay production or terminating as a green/brown manure crop. This will destroy all weeds in that paddock, including any resistant ones.
- long fallow, especially where the disease risk is also high.

For more information, head to [The Big 6 - Weed Control Tactics –WeedSmart](#)

In addition, growers are encouraged to control crop volunteers and weeds over summer to reduce the survival of rusts and insect virus vectors such as aphids. Controlling the ‘green bridge’ can break the disease cycle or life cycle of virus vectors.

Sourcing good quality seed

2022 saw a wet harvest for most of NSW resulting in downgrade of grain quality, therefore, seed quality cannot be assured from 2022 crops. Sourcing quality planting seed should be a priority for growers.

Cereal sowing seed

Source seed from crops that:

- had high protein levels at harvest
- had low falling number levels at harvest (Figure 3)
- were disease and weed free.

Use seed that:

- is large size
- has been stored below 20 °C and below 12% moisture content
- has good germination and vigour
- is disease- and weed-free. Seed-borne diseases are summarised in [Table 1](#).

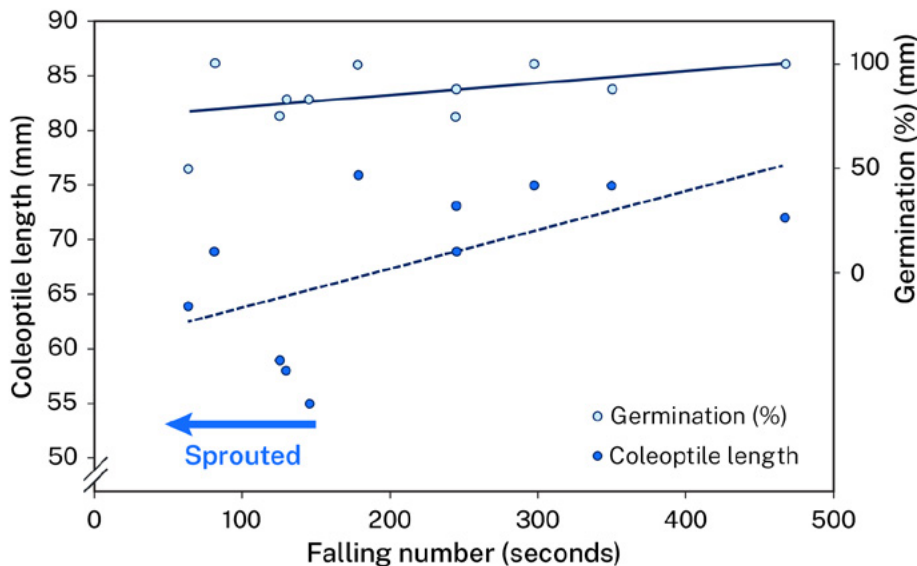


Figure 3. The effect of high falling numbers on germination and coleoptile length in wheat (Botwright et al. 2001).

Canola sowing seed

If growers are considering using retained seed for sowing, several factors should be considered. Being a small seed with an average germination from good quality seed being ~50%, knowing the seed quality is paramount.

Steps to get it right:

- use large seed; greater than 1.8 mm and preferably >2.0 mm
- ensure canola seed is stored below 20 °C and below 7% moisture content
- grade seed for sowing to remove sclerotes

- do not retain seed from hybrid canola crops
- source seed from crops that:
 - were not weather damaged (Figure 4)
 - had high P nutrition
 - had uniform with good plant populations
 - **did not** receive glyphosate before harvest
 - were windrowed or direct headed (preferable) when maturity was at least 80% seed colour change (SCC).

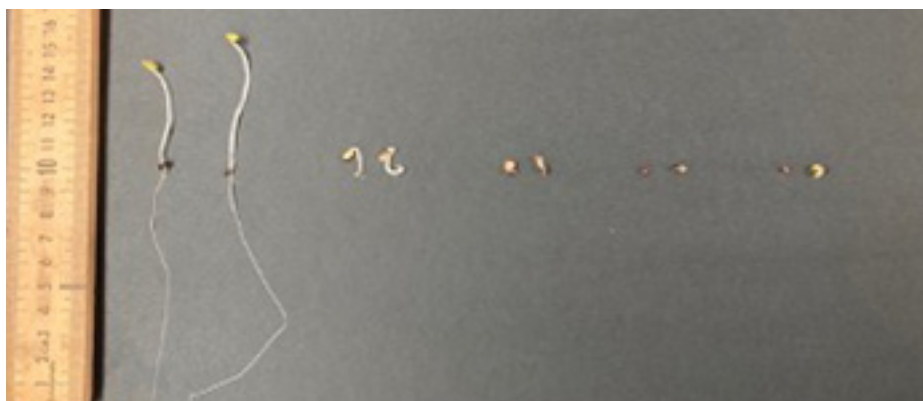


Figure 4. The effect of weather damage on germination on canola seed. Plants on the left with no damage versus those on the right where the seed was damaged during harvest or by weather.

Know your FCR risk in paddocks planned for cereals in 2023, especially if sowing durum.

Pulse sowing seed

- Ensure pulses are stored below 20 °C and below 12.5% moisture content.
- Ensure seed is disease-free, e.g. AB in chickpeas and bacterial blight in field peas.
- Some seed-borne virus has been detected in Albus lupins in central west NSW in recent years.

Diseases

Diseases require a susceptible host, a source of inoculum and conducive environmental conditions (rainfall, temperature and humidity) to develop. Each disease has a specific set of climatic conditions that promote the initial infection and favour disease development. Foliar diseases were of major concern to growers in 2022, the carryover of many will need to be managed in 2023. Tables 1 and 2 illustrate the various ways diseases and nematodes are carried over from season to season.

Disease threats in 2023 –cereals

Fusarium crown rot

FCR disease causes the most damage in seasons that end with limited soil moisture and hot and dry conditions and can result in ‘whiteheads’ in a crop. With the wet conditions of 2022, FCR would not have been considered a problem disease. While unfavourable climatic conditions cause the greatest yield loss from this disease, wet conditions, such as those in 2022, favour its reproduction and spread.

FCR is capable of surviving in post-harvest cereal stubble (Figure 5) for about 3 years. The disease can grow vertically to the height the cereal stubble was cut at harvest over the summer fallow months, so will progress further in taller than shorter stubble.

What are the risks of FCR in 2023?

- The wet conditions of 2022 lead to increased inoculum loading.
- NSW DPI has been analysing stubble samples from 2022, with some samples having FCR levels >90% (Figure 6).



Figure 5. Basal browning caused by FCR.



Figure 6. Burgundy/red colonies are FCR. The bottom 2 rows are fungus recovered from the crowns (88%) and the top 2 rows are fungus isolated from above ground stems (94%).

Key management tips for FCR

- Know the FCR risk in paddocks planned for cereals in 2023, especially if sowing durum. FCR-integrated disease management options are all before sowing, so knowing the risk level within paddocks is important.

If FCR risk is medium to high then:

- sow a non-host break crop (e.g. faba bean, chickpea, canola).

If still considering a cereal on cereal then:

- consider stubble management options
- sow more tolerant bread wheat or barley variety (not durum)
- sow at the start of the recommended window for each variety in the area
- consider inter-row sowing (cultivation is bad as it spreads inoculum)
- be conservative with N application at sowing (N exacerbates FCR and 'hyper yielding' is potentially 'hyper risk' when FCR is present)
- apply adequate zinc at sowing
- remember current fungicide seed treatment options are suppression only – useful, but have limited control
- determine infection levels around GS39 to guide in-crop management decisions.

Fusarium head blight

Detection of FHB was widespread across eastern Australia in 2022, even in the drier areas west of the Newell Highway. The 2022 season, with prolonged high humidity (>80%) during flowering and grain-fill, was extremely conducive to FHB infection and development.

FHB causes yield loss (up to 100%) but also potentially downgrading of grain due to production of mycotoxins in affected white or pink grains (deoxynivalenol, DON mainly), which can affect end use depending on the level of infection

What are the risks of FHB in 2023?

- NSW DPI has been analysing seed lots from 2022, with some samples having fusarium levels >70%, way above the 5% infection threshold for planting seed (Figure 7 and Figure 8).
- The level of infection can be higher than the visual level of white or pink grains, as late infections might not discolour the seed.
- Using seed infected with fusarium (Figure 9) as planting seed in 2023 can reduce germination and cause early seedling death (blight).
- Infected grain can introduce FCR into clean paddocks through seed infection.

Key management tips for FHB

- Registered fungicide seed treatments can reduce the extent of seedling blight when sowing fusarium-infected grain.
- Once infection levels are >5%, source cleaner seed. Grading out lighter seed before sowing can also help, as this will remove severely infected grains.
- If you had any level of FHB in crops retained for sowing seed, then get a commercial germination and vigour test or send a sample to NSW DPI for 'free' fusarium testing well in advance of sowing.

For more information refer to the 2023 GRDC Update paper *Fusarium head blight and white grain issues in 2022 wheat and durum crops*

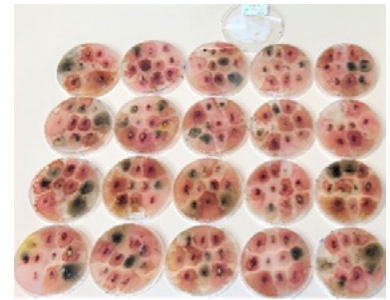


Figure 7. Fusarium growing from durum wheat seed affected by FHB, the level in the sample being 70.5%.



Figure 8. FHB infected wheat head.



Figure 9. FHB affected seed on the top versus normal seed on the bottom.

Infected grain can introduce FCR into clean paddocks through seed infection.

Table 1. Method of transmission of cereal diseases and root lesion nematodes (RLN).

Disease	Pathogen	Crops affected	Method of spread							Moves in flood water
			Seed	Stubble	Soil	Wind-borne/ rain splash	Green bridge	Varietal resistance		
Stripe rust		Wheat, durum	No	No	No	Yes	Yes	Yes	No	
Fusarium head blight	FHB	<i>Fusarium graminearum</i> 1 <i>Fusarium pseudograminearum</i> 2	Wheat, durum	Yes	Yes	No	Yes	No	No?	Yes, on stubble
Fusarium crown rot	FCR	<i>Fusarium pseudograminearum</i>	Wheat, durum, barley		Yes	No	No	No	Yes	Yes, on stubble
Septoria tritici blotch	STB	<i>Mycosphaerella graminicola</i>	Wheat	?	Yes	No	Yes	No	Yes	
Powdery mildew		Different strains affect different crops	All cereals	No?	Yes	No	no	Yes	Yes	No
Yellow leaf spot	YLS		Wheat, triticale, barley (rare)	No	Yes	No	No	No	Yes	
Net form of net blotch	NFNB	<i>Pyrenophora teres</i>	Barley	Yes, NFNB	Yes	No?	Yes	Yes	Yes	Yes, on stubble
Spot form of net blotch	SFNB	<i>Bipolaris sorokinian</i>								
Scald		<i>Rhynchosporium commune</i>	Barley	Yes	Yes	No	Yes	No	Yes	Yes, on stubble
Root lesion nematode	RLN	<i>Pratylenchus neglectus</i> and <i>P. thornei</i>	Wheat, barley, triticale*	No	No	Yes	No	No	Yes	Yes

*Crops differ in their susceptibility to the different species of RLN.

Wheat stripe rust

Stripe rust is a communal disease with spores being able to travel hundreds of kilometres. Under favourable environmental conditions, yield loss can be up to 75% if uncontrolled in susceptible (S) varieties (Figure 10). Stripe rust was a major challenge for growers across the eastern states last year, but the 2022 season needs to be kept in perspective.

What is the risk of stripe rust in 2023?

- Stripe rust pressure in 2023 is likely to be high early in the season requiring timely management. Further development will depend heavily on conditions in spring.
- The delayed 2022 harvest meant the first fallow spray was also delayed and volunteer wheat plants germinated.
- The higher risk from 'green bridge' volunteers S rated varieties.
- Elevated spore loads in the environment, particularly in regions where S rated varieties are more commonly grown.
- An early break, possible in good seasons, leading to early planting of grazing crops and earlier start to stripe rust epidemic in 2023.
- Suitable climatic conditions in 2023 will determine the disease severity.

For further details see 'Wheat stripe rust management 2023', a comprehensive resource on stripe rust and its management. Head to Wheat stripe rust management – NSW DPI

Key management tips for stripe rust

- Choose the variety carefully. Consider the increase in logistics of growing varieties more susceptible to stripe rust that require more fungicide applications.
- Know what pathotypes were present in the district last season and monitor pathotype distribution throughout 2023 in the area and keep updated with in-season information, as management can be dynamic.
- Know the N status of the paddock. Under high levels of N nutrition, growers need to manage a variety as one category lower in resistance (e.g. manage an MRMS as an MS).
- Consider using flutriafol on starter fertiliser to suppress early infection, particularly on more susceptible varieties.
- Know the resistance rating of each variety to the dominant diseases in the region and the paddock.
- In 2023, control stripe rust early and then adapt the management to match seasonal conditions.

For more information, head to [Wheat stripe rust management 2023](#)



Figure 10. Stripe rust on an S wheat variety (top) compared with a resistant-moderately resistant (RMR) variety without fungicide application in 2022.

Disease threats in 2023 – canola

Many of the same principles apply for canola and pulse crops as for cereals; an integrated approach to disease management is required (Table 2).

Sclerotinia stem rot

Outbreaks of sclerotinia were extensive in spring 2022 due to the widespread wet conditions across the state. This resulted in sclerotinia stem rot developing in districts where the disease is not normally seen, and epidemics of the disease were able to develop from very low background pathogen levels. Both canola and broadleaf crops are affected or are disease hosts. There are no Australian canola varieties with known resistance to sclerotinia.

What is the risk of sclerotinia in 2023?

- Paddocks with a recent history (last 5 years) of sclerotinia outbreaks and those adjacent are at risk. Ascospores of sclerotinia can spread up to 100–400 m of the apothecia (Figure 11).
- Outbreaks of sclerotinia stem rot are sporadic and dependent on the growing season conditions, with a saturated canola canopy for more than 48 hours during flowering favouring disease development.

For further information head to the 2023 GRDC Update paper *Managing sclerotinia stem rot of canola in 2023*

Blackleg

Blackleg is the most important disease of canola and can cause severe yield loss, but it can be successfully managed. Fungal spores are released from canola stubble and can be spread by wind and rain splash. It can also move with floodwater on the canola debris. The disease is more severe in areas of intensive canola production.

The pathotype interactive map is updated throughout the season and can be found [here](#) Australian Cereal Rust Survey – Faculty of Science (sydney.edu.au)



Figure 11. Apothecia of sclerotinia.

To determine your blackleg risk, head to [Blackleg Management Guide-GRDC](#)

Table 2. Method of transmission of pulse and canola diseases.

Disease	Pathogen	Crop host	Method of spread						Moves in flood water
			Seed	Stubble	Soil	Wind-borne/ rain splash	Green bridge	Varietal resistance	
Ascochyta blight	<i>Phoma rabiei</i>	Chickpea	Yes	Yes	No	Yes	Yes	Yes	Yes, on chickpea residue
Phytophthora root rot	<i>Phytophthora medicaginis</i>	Chickpea	No	No	Yes	No	Yes	Yes	Yes, on soil
Viruses	Multiple	All broadleaf crops*	Yes (some)	No	No	No	Yes	Yes	No
Bacterial blight	<i>Pseudomonas syringae</i>	Field pea	Yes	Yes	No	Yes	Yes	Yes	Yes, on field pea residues
Chocolate spot	<i>Botrytis fabae</i>	Faba bean	Yes	Yes	No	Yes	Yes	Yes	Yes, on faba bean residues
Faba bean rust	<i>Uromyces viciae-fabae</i>	Faba bean	No	Yes	Yes	Yes	Yes	Yes	Yes, on faba bean residues
Blackleg	<i>Leptosphaeria maculans</i>	Canola	Yes	Yes	No	Yes	No	Yes	Yes, on canola residue
Sclerotinia stem rot	<i>Sclerotinia sclerotiorum</i>	Canola, lupin, most broadleaf crops	Yes	Yes	Yes	Yes	No	No	Yes Sclerotes contaminate seed lots, stubble and soil
Root lesion nematodes (RLN)	<i>Pratylenchus neglectus</i> and <i>P. thornei</i> .	Canola, chickpea, faba bean**	No	No	Yes	No	No	Yes	Yes, on soil

* Primarily spread by vectors such as aphids

** Crops differ in their susceptibility to the different species of RLN.

What is the risk of blackleg in 2023?

Even though 2022 was a very wet year, seedling infection levels and upper canopy infection levels of blackleg were not severe, so blackleg management recommendations will not be changed in 2023.

Key management tips for canola 2023

- Never sow canola into last year's canola stubble. Rotate canola once in every 4–5 years to reduce build-up of diseases.
- Use rotation crops such as cereals, field pea and faba bean.
- Separate new seasons' crops from last year's canola stubble by at least 500 m.
- Use disease-free seed.
- If blackleg monitoring has identified yield loss and you have grown the same cultivar for 3 or more years, choose a cultivar from a different resistance group.
- Know the latest blackleg disease ratings of the varieties. Cultivars rated R–MR or above have very low risk of developing crown cankers. MR will develop cankers but only if grown under high disease severity, for example canola/ wheat/canola in high rainfall.

Separate new seasons' canola crops from last year's canola stubble by at least 500 m.

- Wider row spacing or reduced seeding rates can increase air flow through the canopy, reducing moisture retention and potential for infection.
- Use SclerotiniaCM app to help with management strategies. For iPad or Android tablets.
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- Use SclerotiniaCM app to help with management strategies for sclerotinia. For iPad or Android tablets.

Disease threats in 2023 – pulse crops

Many of the issues that confront both cereal and canola crops in 2023 apply to pulse crops. A summary of diseases that could be an issue and how they are transmitted is presented in Table 2.

Avoid planting pulses in the same paddock for at least 4 years or next to the previous year's pulse stubble.

Chickpeas

Ascochyta blight

The area sown to chickpeas in 2022 was low due to both the very wet planting conditions at sowing and the current low commodity price. This would have led to a reduction of disease pressure as the disease can be spread by wind.

What is the risk of Ascochyta blight in 2023?

- The small area sown in 2022 will reduce the level of inoculum in the environment to infect crops.
- Areas sown in 2023 will again be low.
- Stubble infected with AB from previous seasons can still be present at sowing time the following year and be a source of the disease.

For more information refer to the NSW DPI guide [Managing ascochyta blight in chickpeas in 2021](#)

Phytophthora root rot

Phytophthora root rot (PRR) is a soil- and water-borne disease of chickpea (Figure 12), with no in-crop control options. Substantial yield losses (up to 70%) can occur in conditions highly favourable for the disease, even in chickpea varieties with the highest PRR resistance ratings. Waterlogging, common in 2022, increases chickpea susceptibility to PRR.

Minimising yield loss is based on avoiding at risk paddocks and variety choice. The disease can survive in the soil for up to 10 years.

PRR is able to infect and multiply a large number of legume hosts, especially pasture legumes such as medics and lucerne.

What is the risk of phytophthora root rot in 2023?

The paddock is low risk if:

- No PRR disease symptoms have been observed in previous chickpea crops.
- No PRR susceptible hosts were present in break crops i.e. clean break crops.
- No recent floodwater has been on the paddock.

The paddock is high risk if:

- PRR symptoms were observed in previous chickpea crops.
- Predicta® B soil samples from a break crop, fallow or a chickpea crop tested positive in any prior season.
- PRR susceptible non-crop hosts such as medics were present in break crops or fallows.
- Previous pasture paddocks with high medic or clover weed burden.
- Floodwater was over the paddock from neighbouring PRR infected paddock or regions.



Figure 12. PRR causing death in Kyabra[®] chickpeas.

There are no in-crop control options for PRR.

For more information refer to the NSW DPI Phytophthora root rot management in chickpeas tool

Botrytis

For more information on both botrytis grey mould and botrytis seedling disease head to [Managing Botrytis in chickpeas in 2021](#)

Key management tips for chickpeas in 2023

- Avoid planting pulses in the same paddock for at least 4 years or next to the previous year's pulse stubble.
- The wet harvest of 2022 might have reduced seed germination and/or vigour. Test seed before purchase and planting.
- Ensure volunteer pulses ('green bridge') are controlled.
- All planting seed should be treated with a registered seed fungicide (Figure 13), irrespective of seed age and origin, to control seed-borne diseases such as AB, seed-borne botrytis seedling disease (BSD) and other seedling diseases.
- Know the disease levels in the paddock and region and where the disease was in the previous season. Predicta® B has started testing for several new diseases.
- Know the latest disease ratings of the varieties. Variety choice remains the best management tool for many pulse diseases where in-crop control is not effective (PRR) or is expensive and repetitive (AB).

For further information head to [Managing diseases in chickpeas in 2022](#)

Faba bean

Chocolate spot

Chocolate spot has various forms of disease transmission (Table 2).

Chocolate spot can infect stems, flowers and pods under favourable conditions. The disease can reduce yields by 30–50% in conducive years in unprotected crops, mainly by preventing pod-set. Seed from badly affected plants might have a reddish-brown stain, which lowers its market value.

What is the risk of chocolate spot in 2023?

Chocolate spot was a prominent disease of 2022 due to the prolonged wet and humid conditions. As the disease is stubble- and seed-borne and can spread via floodwater on crop debris, the predicted risk is high if the climatic conditions are favourable.

Faba bean rust

Rust (Figure 14) can occur very soon in early sown crops, but normally late in the season when warm, humid conditions prevail. Severe infections might cause premature defoliation, resulting in smaller grain at harvest.

The disease can cause losses of up to 30% in unprotected crops.

What is the risk of rust in 2023?

Like chocolate spot, faba bean rust was common in 2022 due to the climatic conditions. The disease is stubble- and soil-borne, and volunteer plants can host the disease over summer. The occurrence of this disease in 2023 will be determined by the seasonal conditions as there will be plenty of inoculum in the system if management principles are not followed.

Key management tips for faba bean in 2023

- Avoid planting pulses in the same paddock for at least 4 years or next to the previous year's pulse stubble.
- The wet harvest of 2022 might have reduced seed germination and/or vigour. Test seed before purchase and planting.



Figure 13. Ensure fungicide seed treatments are applied to chickpeas uniformly and at the correct rate. It should look like the top seeds. The bottom seeds are not well covered.



Figure 14. Severe rust infection on faba bean.

- Ensure volunteer pulses ('green bridge') are controlled.
- Know the disease levels in the paddock and region and where the disease was in the previous season. Predicta® B has started testing for several new diseases.
- Know the latest disease ratings of the varieties. Variety choice remains the best management tool for many pulse diseases.
- Ensure you have an in-crop fungicide strategy in place and that the resources can manage the area sown to pulses (i.e. equipment and labour) before rainfall. In general, the most effective fungicides are preventative and applied before forecasted, in-crop rain.
- For chocolate spot in faba bean, ensure seed has levels of 10% or less of seed with chocolate spot.

Ensure you have an in-crop fungicide strategy in place and that your resources can manage the area sown to pulses.

References and useful resources

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