Managing lentil diseases in high pressure seasons - otherwise known as 2022!

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Key findings

- Botrytis grey mould (BGM) in lentil was frequently reported and widespread throughout spring in South Australia in 2022.
- The first step to good disease management is choosing a resistant variety.
- BGM is best controlled initially by using a prophylactic foliar fungicide targeting BGM, applied immediately prior to canopy closure.
- Newer fungicides with dual actives can provide superior disease control of BGM of lentil and may preserve yields in a high disease situation.

Methodology

A disease management field experiment combining five fungicide strategies (Table 1) and three lentil varieties (Table 2) was conducted at Hart in 2022 to assess the grain yield loss from foliar disease infection in lentil. Fungicide treatments were allocated to control both botrytis grey mould (BGM) and ascochyta blight infection.

The field experiment was set up as a randomised block design with three replicates. Each fungicide treatment consisted of two key fungicide application stages: prior to canopy closure, and post-canopy closure but prior to podding applied ahead of rain.

All fungicides were applied ahead of a rain event where > 5 mm is forecast.

BGM disease plot severity was assessed on November 16 by looking at the level of infection showing on the top of the canopy and visually assessing the area affected within the plot.

A score was allocated for area of infection, where 1 = 0-10%, 2 = 10-20%, 3 = 20-30%, 4 = 30-40%, 5 = 40-50%, 6 = 50-60%, 7 = 60-70%, 8 = 70-80%, 9 = 80-100%.

Plots were harvested at crop maturity and grain yield was converted from kg/plot to t/ha.

Data was analysed using an ANOVA model in Genstat 22nd Edition.

Plot size	1.75 m x 10.0 m	**Location**	Hart field site
Sowing date	April 22, 2022	**Fertiliser**	80 kg/ha MAP

Table 1. Details for each of the five fungicide treatments, applied to lentil to manage foliar disease at Hart, 2022.

No.	Fungicide product	Active Ingredient (concentration)	Rate (mL or g/ha)
T1	Untreated control	N/A	N/A
T2	Carbendazim (pre-cc) f/b carbendazim (post-cc)	Carbendazim (500 g/L)	500
T3	Veritas® (pre-cc) f/b Veritas® (post-cc)	Tebuconazole (200 g/L) + azoxystrobin (120 g/L)	1000
T4	Aviator® Xpro® (pre-cc) f/b carbendazim (post-cc)	Prothioconazole (150 g/L) + bixafen (75 g/L) Carbendazim (500 g/L)	600 500
T5	Miravis® Star (pre-cc) f/b carbendazim (post-cc)	Fludioxonil (150 g/L) + pydiflumetofen (100 g/L) Carbendazim (500 g/L)	750 500

Note: f/b = followed by, pre-cc = pre-canopy closure, post-cc = post-canopy closure

Table 2. Lentil varieties and associated disease resistance ratings. Source: GRDC NVT Disease Ratings (https://nvt.grdc.com.au/nvt-disease-ratings).

Variety	Botrytis Grey Mould	Ascochyta Blight (Foliar)	
		Pathotype 1 (Nipper virulent)	Pathotype 2 (PBA Hurricane XT virulent)
PBA Bolt	S	MR	MRMS
PBA Highland XT	MS	MR	MR
PBA Jumbo2	RMR	R	R

Key: S = susceptible, MS = moderately susceptible, MRMS = moderately resistant/moderately susceptible, MR = moderately resistant, R = resistant.

Results and Discussion

Ascochyta blight was not visibly present at Hart in 2022. BGM infection occurred relatively late, with infection only becoming visible on the top of the canopy in November. BGM is favoured by mild temperatures and high humidity, and in spring 2022 the disease was frequently reported and observed as aggressive across South Australia. Due to the nature of the season and the high disease pressure, all fungicide strategies controlled BGM at a similar level at Hart (P=0.808). Variety selection for disease resistance was critical in reducing disease infection (P<0.001) and grain yield loss (P<0.001). PBA Jumbo2, rated RMR for BGM, was the highest yielding variety at 4.2 t/ha. PBA Bolt, which is susceptible to BGM infection, had a reduced grain yield of 2.76 t/ha. Disease score and grain yield of lentil were highly correlated, where greater disease infection resulted in lower grain yields (Figure 1).

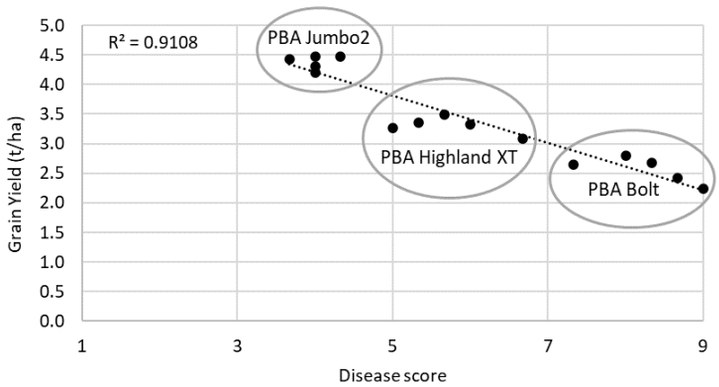

Figure 1. Lentil grain yield was highly correlated with disease severity at Hart, 2022.

Figure 2. Lentil varieties PBA Jumbo2 (left), PBA Highland XT (middle) and PBA Bolt (right) in November, at Hart 2022.

Conclusion

Wet and humid conditions throughout spring and early summer aided the rapid spread of botrytis grey mould (BGM) in lentil crops across South Australia in 2022. In these exceptional conditions, disease may not be successfully controlled with fungicides alone. Dense canopies remained wet and humid at the base, promoting the disease. BGM is best controlled initially by using a prophylactic foliar fungicide targeting BGM applied immediately prior to canopy closure. This is recommended in all regions for all varieties to protect the base of the crop, regardless of resistance rating. Follow up sprays may be required in medium to high rainfall regions or seasons conductive to infection. Some newer fungicide products with dual actives can provide superior disease control of BGM in lentil and may preserve yields in a high disease situation. In these types of high-pressure seasons, the first step to good disease management is choosing a resistant variety.

Acknowledgements

The authors would like to thank growers and funding partners for their continued support. The work undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC (UOA2105-013RTX – SA Grain Legume Validation). The continued assistance in trial management from SARDI Agronomy Clare is gratefully acknowledged and appreciated.