

Foliar disease management – a key factor in growing Baudin malting barley in south-eastern Australia.

AWB Seeds Limited

KEY MESSAGES

- Baudin is a high yielding, dual-purpose malting and feed barley with improved straw strength and grain size but is susceptible to important leaf diseases.
- Foliar disease risk and management are important considerations when growing Baudin. Consider the suitability of Baudin for different growing environments and where suitable, plan appropriate disease management strategies.
- Baudin is very susceptible to leaf rust and can develop this disease more frequently than other varieties. Baudin is not suited to environments subject to frequent risk of leaf rust.
- Baudin should always be grown in rotation with non-barley to reduce risk of early disease establishment. After harvest, graze or spray self-sown Baudin that germinates in summer or autumn to destroy any green bridge for leaf rust.
- Baudin will require early protection from powdery mildew by applying a suitable seed dressing fungicide. Suitable seed dressing fungicides can also suppress early infection with scald.
- Monitor Baudin during stem elongation for signs of leaf disease (between first node stage, GS31 and early flag leaf emergence GS35/37).
- Spot type net blotch, powdery mildew or scald that is evident during stem extension (GS31-37) can be controlled with fungicide sprays, reducing disease pressures likely to develop during grain filling in disease prone areas or in seasons of above average rainfall.
- For Baudin, results from experiments indicate disease protection with a foliar fungicide during mid-late or late leaf canopy development was beneficial in the presence of these fungal leaf diseases and can also assist in control of leaf rust.

POTENTIAL AREAS OF PRODUCTION FOR BAUDIN

Baudin is a 2-row semi-dwarf barley with good straw strength that has a low risk of lodging and better head retention than Gairdner but with higher risk of leaf diseases (Table 1). Its short straw is an advantage for stubble management, however it may be considered too short for growing in areas with a quick season.

While the maturity pattern of Baudin makes it suitable across medium to higher rainfall areas, high frequency of leaf diseases increases the risk to production in higher rainfall areas. *For this reason the optimum areas of production are likely to be the more reliable parts of medium rainfall areas where leaf disease risks can be more effectively managed* (Table 2).

Table 1. Susceptibilities of malting barley varieties in SE Australia.

	Scald	Spot form net blotch	Net form net blotch	Powdery mildew	Leaf rust	BYDV
Arapiles	S	MS	MR-MS	VS	S	S
Baudin	S	S	MR	S	VS	MR
Cowabbie	R-MR	S	VS	-	S	-
Dhow	MS	S	MR	MS	S	S
Franklin	S	S-VS	S	R	S	MR
Gairdner	R/S#	S-VS	MR	R-MR	MS	MR
Schooner	MS-S	MS-S	R/MS#	S	S	S
Sloop	S	S-VS	R/MS#	S	S	S
SloopSA	S	S-VS	R/MS#	S	S	S
SloopVic	S	S-VS	R/MS#	MR	MS-S	S

*Reproduced from Cereal Variety Disease Guide 2004, SARDI and Department of Primary Industries, Horsham, Victoria

These varieties may be susceptible if virulent strain present

Table 2. Estimated risk of losses from leaf diseases in variety Baudin in SE Australia.

State	Region	Disease potential/risk
South Australia	Eyre Peninsula	Moderate
	Yorke Peninsula	Extreme (leaf rust)*
	North West & Mid-North	Moderate
	South East	Very High (leaf rust)*
Victoria	Mallee	N/A (lower yield potential)
	Northern Wimmera	Moderate
	Southern Wimmera	High (leaf rust)
	Western Districts	Very High (leaf rust)*
New South Wales	North West	Very High (leaf rust)*
	Central West	Very High (leaf rust)
	South West	Very High (leaf rust)
	Riverina	N/A (lower yield potential)

*Baudin is not suited to these environments as it is more likely to encounter frequent leaf rust, rest of the areas disease management is crucial while choosing to grow Baudin.

CROP ROTATION AND Paddock MANAGEMENT OVER SUMMER

Baudin should always be grown in rotation with non-barley to reduce risk of early infection. A one-year rotation will significantly reduce the potential for serious disease due stubble borne diseases including net blotches and scald. Self-sown Baudin that germinates in summer or autumn after harvest should be destroyed (grazed or herbicide sprayed) to preclude a green bridge for leaf rust.

USE SEED DRESSING OR IN-FURROW FUNGICIDE TO SUPPRESS EARLY DISEASE

If powdery mildew builds up in young crops, tillering is reduced and this can significantly lower yield potential. Baudin will require early protection from powdery mildew by applying a suitable seed dressing or in-furrow fungicide. Suitable seed dressing or in-furrow fungicides can also suppress early infection with scald (Table 3).

MONITOR CROPS FOR FUNGICIDE SPRAY

In conditions conducive for disease (disease prone areas or high rainfall seasons) fungicide can be cost effective in reducing disease impact in Baudin and may be required to achieve expected yield and quality. Lower treatment costs and more reliable production of malting quality grain with expected yields over 2.5t/ha has increased the opportunity for economic fungicide disease control. Among registered products, propiconazole has the broadest range of registered uses (scald, spot form net blotch and powdery mildew) (Table 3).

Leaf diseases have greatest impact when they increase to severe levels prior to or during grain filling. For best control of leaf diseases, Baudin should be monitored between early stem elongation and flag leaf emergence. If disease is detected, fungicide should be applied during this period but before damage occurs on the flag and second top leaves. In medium to long season environments poor control may result from low application rates that provide shorter duration of protection, as infection can redevelop. Re-application of fungicide may be required to extend protection during grain filling. Currently registered cereal fungicides are DMI's (demethylation inhibitors) (group C). For best practice management to minimise risk of developing fungicide resistance, do not apply more than 2 foliar applications of fungicide to a crop.

EXPERIMENTAL RESULTS WITH BARLEY LEAF RUST

Baudin is very susceptible to leaf rust and may develop this disease more frequently than other varieties. Baudin is not suited to environments subject to frequent risk of leaf rust as it may act to build up the disease.

In an experiment undertaken in Western Australia in 2002, fungicide treatments for leaf rust increased yield significantly compared to untreated plots that yielded 2.2 t/ha. Triadimenol seed treatment (Baytan 150 g/100kg) or triadimefon in-furrow (Triadimefon 500WP 200 g/ha) increased yield by 13-22 per cent (to 2.5-2.7 t/ha) respectively. A single application of propiconazole (Tilt 250EC 250mL/ha) achieved better disease control during grain filling than seed or in-furrow treatment and gave a yield

increase of 28 per cent (2.9 t/ha). The combination of triadimefon in-furrow and propiconazole spray achieved the highest yield increase of 36 per cent.

In a second experiment in 2002 in WA, leaf rust infection was treated with cereal fungicide sprays applied at early stem elongation. Leaf rust severity was significantly reduced when assessed at head emergence. A high rate of propiconazole (e.g. Tilt 250EC 500 mL/ha vs. 250 mL/ha) provided longer duration of control and greater yield increase (0.35 vs. 0.20 t/ha) compared to the untreated plots that yielded 1.3 t/ha.

In a third experiment in 2003 in WA, powdery mildew and leaf rust control resulted in a yield increase from 4.1 to 5.1 t/ha when plots were treated twice with propiconazole (e.g. Bumper 250EC 250mL/ha early flag emergence and early flowering). In this experiment disease development occurred late in the season and seed dressing or in-furrow fungicide did not improve yield of Baudin without follow-up fungicide spray.

Research has demonstrated that yield of Baudin can be improved through fungicide control of leaf rust and other diseases. Cereal fungicides registered for powdery mildew, scald or spot form net blotch have shown activity against leaf rust but are not currently registered for control of this disease. Until registration is established, the use of cereal fungicides specifically for leaf rust control requires a current permit from the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Table 3. Cereal fungicides registered for control of leaf diseases of barley.

Active Ingredient	Fungicide and registered method of application			Disease				
	Seed dressing	In-furrow with fertiliser	Foliar spray	Scald	Spot form net blotch	Net form net blotch	Powdery mildew	Leaf rust
Flutriafol ¹	Yes			Yes	-	-	Yes	-
Triadimenol ²	Yes			Yes	-	-	Yes	-
Triticonazole ³	Yes			Yes	-	-	Yes	-
Flutriafol ⁴		Yes		Yes	-	-	Yes	-
Flutriafol ⁵			Yes	-	-	-	Yes	-
Propiconazole ⁶			Yes	Yes	Yes	-	Yes	-
Tebuconazole ⁷			Yes	Yes	-	-	Yes	-
Triadimefon ⁸			Yes	Yes	-	-	Yes	-

*Rates of application and uses vary with the method of application. Always refer to the label supplied with a specific trade name product. Unless indicated, fungicide uses are not registered.

¹ ARMOUR

² BAYMAX, BAYTAN, DERBY, FOLIARFLO, PHOENIX, PROLEAF, TRIADIMENOL, TRIDIM, VANGUARD

³ ALPHAFLO, PRO-RITE, REAL

^{4,5} IMPACT, JUBILEE

⁶ AURORA, BUMPER, PRESTIGE, PROPICONAZOLE, SLIPSTREAM, TILT, TYRANT

⁷ FOLICUR, QUASAR, STINGRAY, TEBUCONAZOLE

⁸ ACCORD, BAYLETON, SLINGSHOT, TRIAD, TRIADIMEFON

SUMMARY

Yield and quality characteristics of Baudin should be balanced against production risks from disease and grown in areas where disease risks are manageable. Baudin requires early protection from powdery mildew with a seed dressing fungicide (e.g. Armour, Baytan, Real or equivalents). This is the first priority when budgeting for disease management.

For disease management during mid to later stages of crop development, foliar fungicides provide maximum flexibility in achieving cost effective disease control and should be considered the next expenditure priority after seed dressing. Fungicide sprays applied in spring are effective at controlling a range of foliar diseases (subject to registered uses), including spot-type net blotch. Management of barley leaf rust may be required more frequently in Baudin than other varieties. When treating crops for leaf disease before flag leaf emergence or when disease pressure is high, apply fungicide at full label rate or plan to reapply fungicide 3-4 weeks after initial treatment.

Where crop productivity is high and returns justify additional inputs, consider augmenting early protection in the young crop by using longer-acting treatments at seeding such as in-furrow fungicide (e.g. Impact in-furrow). Long-acting treatments at seeding can assist with mid season protection and may reduce but not replace fungicide sprays when diseases threaten Baudin crops.

This information sheet has been produced in consultation with the New South Wales Department of Agriculture, Primary Industries Research Victoria, Department of Primary Industries and Resources South Australia and the Department of Agriculture Western Australia.