

Shepherd Barley (Tested as NRB03470)

A tall plant with good seedling vigour and vigorous early growth suited to all dryland regions of Queensland and the NW Slopes and Plains of NSW. Shepherd is a quick maturing line which displays improvements in foliar disease protection, grain size and hectolitre weight and reliable high yields across northern NSW & Queensland barley growing regions. It is a tall plant with good straw strength and has demonstrated the ability to maximise yields in high yielding sites.

Planting recommendations

As a quick maturing line Shepherd is showing wide adaptation to the northern grain growing region where heat during grain fill has been limiting yields of later maturing lines during the 2000's. While Shepherd is recommended for all parts of the region, best results will be obtained in situations with higher yield potential. In comparison to other quick maturing material (i.e. Grout & Fleet) Shepherd is to be able to hang onto high yields in favourable conditions and compete well against later maturing varieties. It also has leaf rust resistance which is a disease to which Grout has shown some susceptibility in 2008. It is recommended to try Shepherd against current commercial varieties.

Region	Recommendation
NQ & Coastal areas	A good choice for grain, silage or hay due to leaf rust resistance and quick maturity.
CQ	Recommended for all planting times, best into good soil moisture conditions.
SE Downs	Recommended for all but very early (April – 1 st week May) planting where later maturing lines should be preferred. Opportunity for double cropping or late planting.
Dalby & Central Downs	Ideal for good moisture profiles mid May – end June planting. Good potential for earlier planting but some frost risk.
SW QLD	A good choice for most plantings in this region. Best in better moisture profiles. Grout should be preferred in lower moisture sites (yield potential > 2.00 t/ha) or for late planting.
NE Slopes & Coastal (NNSW)	Recommended for all but very early plantings (April) where frost could be a risk. Also later maturing lines could have a yield advantage in early planting
NW Plains (NSW)	A good choice for early planting and good sub soil moisture situations in this region. Grout should be preferred in lower moisture sites.
Tamworth and Liverpool Plains	Ideal for a quick rotation either into a double crop situation or as a later winter crop. In early plant high moisture situations later maturing lines could have a potential yield advantage. For plantings from mid June – end of July on would be an ideal choice.

Yield and grain quality

Shepherd has very good yield potential. On average yields across a number of sites it can be difficult to separate Grout and Shepherd however Shepherd tends to be able to capitalise on higher yielding sites and is more reliable across a range of sowing times. Shepherd also shows improved grain quality traits such as grain size and hectolitre weights.

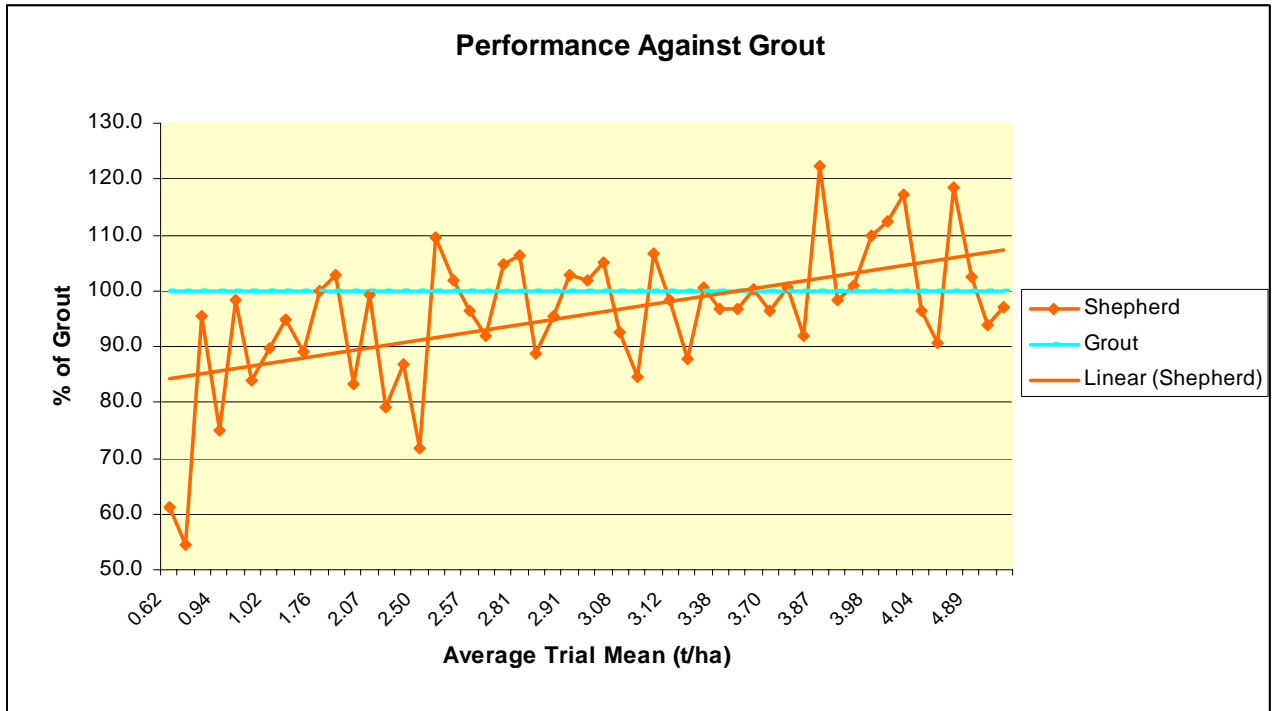
Table 1: Summary of yield and grain quality from 2008 Pork CRC strip trials (8 trials).

	Average yield	HLW	Screenings	Retention
Shepherd	3.31	66.5	9.1	55.0
Hindmarsh	3.63	67.7	10.8	50.1
Grout	3.46	66.0	11.2	51.2
Commander	3.41	64.8	15.9	49.9
Fitzroy	3.22	61.0	21.7	34.7
Fleet	3.05	62.6	7.6	66.2
Skiff	3.03	64.5	33.9	24.0
Gairdner	2.74	66.4	22.7	28.0

Table 2: Shepherd has demonstrated high yield potential across the region. In 39 trials conducted by Barley Breeding Australia (North) between 2006 and 2008 it has consistently been among the top performers.

Genotype	2008	2006-2008	No of trials
Grout	4.09	3.29	39
Commander	4.01	3.26	39
Shepherd	3.91	3.15	39
Mackay	3.67	2.95	39
Fitzroy	3.62	2.92	39
Skiff	3.50	2.83	39
Binalong	3.35	2.80	39
Grimmett	3.24	2.69	39
Tallon	3.20	2.66	39
Gairdner	3.20	2.62	39
Hindmarsh	3.96	3.22	37
Fleet	3.81	3.09	31

Figure 1: This graph shows the performance of Shepherd (NRB03470) against Grout in trials from 2005 - 2008. Although there is very little difference in average yield between the two varieties across the 52 trials Shepherd has an advantage in the higher yielding sites and Grout still demonstrates an advantage in the lower yielding sites (below 2-2.5 mt/ha). All trials are replicated trials from the BBA north program in NSW and QLD conducted between 2005-08.

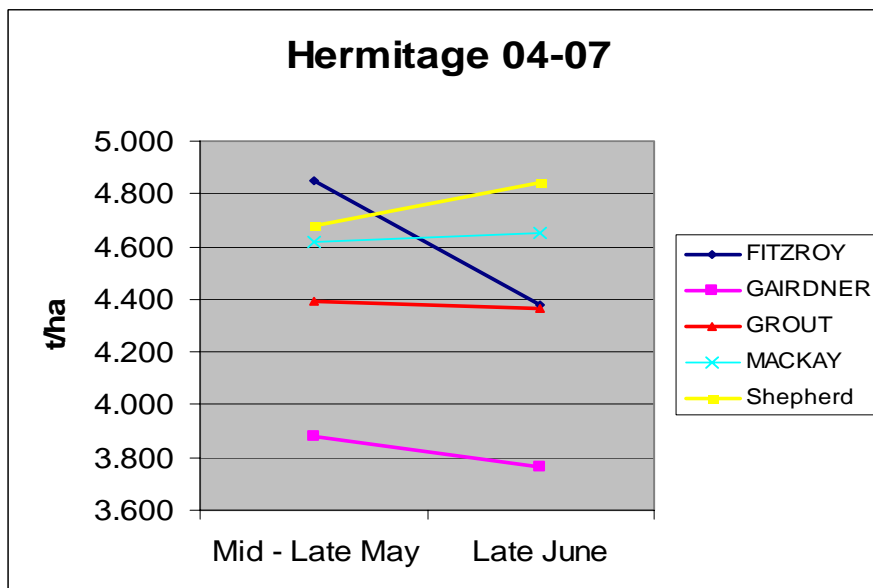


Planting time

Shepherd is similar to Grout for maturity during the main planting times (Early May to Mid June) during the earlier and later parts of the season Shepherd tends to be later to flower than Grout. This makes it more suitable for earlier planting but less suitable for later

planting in the western areas where Grout should be preferred for late planting. In eastern areas where heat during grain fill is less of a problem Shepherd has shown good yield potential on late plantings (see Figure 2).

Figure 2: Three years of time of sowing trials conducted at Hermitage Research Station near Warwick indicate that Shepherd barley is very stable in yield potential across sowing dates in this environment.



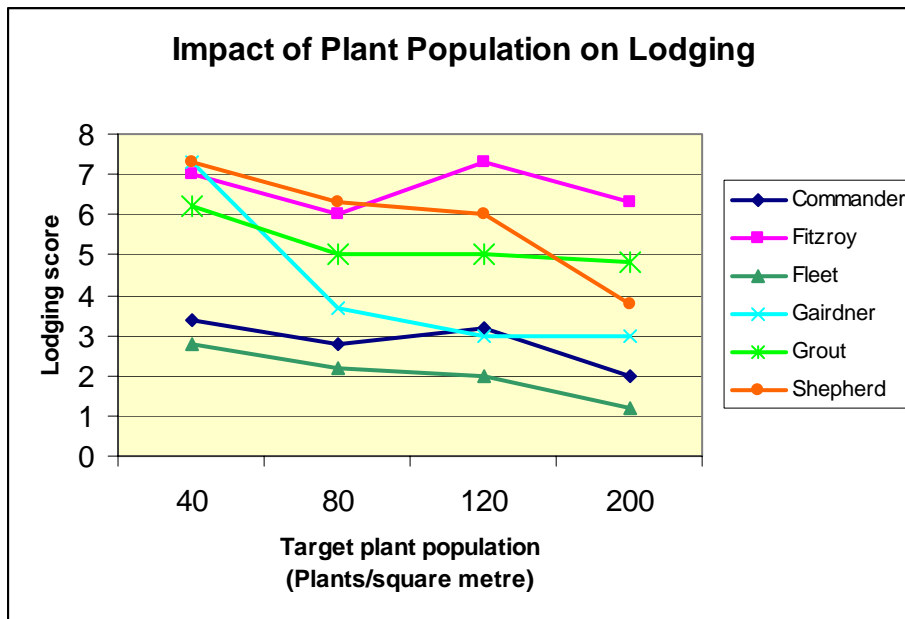
Note: In more western or northern environments where heat could be a problem during grain fill it is preferred that Grout be used on a later planting as Grout will reduce its days to flower and avoid heat during grain fill.

Plant Population & Planting Rate

Shepherd will produce best yields with established populations of between 1 million and 1.2 million plants per hectare, populations above 1.2 million plants per

hectare could result in some lodging in favourable conditions.

Figure 3: Effect of seeding rate on lodging of a range of barley varieties at Spring Ridge in 2008 (Lodging score 1= all plants lodged 9= all plants standing). (Data from Barley Agronomy project 2008)



Deep Sowing

Shepherd has vigorous seedlings with good coleoptile length, 2007 and 2008 data indicates it is a good choice for deep sowing. Seed dressings containing triadimenol will reduce coleoptile length and should be avoided if possible when deep sowing or alternatively increase planting rate to allow for lower establishment.

Nutrition

Shepherd is a high yielding variety and good nitrogen and phosphorus levels are important to maintain yield potential.

Disease resistance/susceptibility

Shepherd offers an advancement in disease resistance over most current varieties, to the major pathogens of barley in the Northern Region. It has good resistance to powdery mildew (*Blumeria graminis* f. sp. *hordei*), leaf rust (*Puccinia hordei*), net form net blotch (*Pyrenophora teres* f. *teres*), covered smut (*Ustilago hordei*) and shows some resistance to spot blotch (*Cochliobolus sativus*). The value of these resistances in farming systems in the Northern Region is given below.

The release of Shepherd will introduce a new leaf rust resistance gene into the commercial arena. This is highly desirable as most current cultivars (except Fitzroy and Mackay) are susceptible. Fitzroy is protected by *Rph3* which provided only ephemeral resistance to leaf rust in New Zealand and it is not

expected to offer durable resistance here. Mackay is believed to have APR but it is not as effective as the APR in Shepherd. Having an alternative source of leaf rust resistance in the system is desirable as it will slow the development of virulence on *Rph3* and when *Rph3* does becomes ineffective it will still provide protection from that pathotype.

Shepherd is highly resistant to powdery mildew. Shepherd is resistant to the dominant pathotype of net form net blotch in eastern Australia. Its resistance is superior to Binalong, Grimmer, Skiff and Tallon. Shepherd is very susceptible to spot form of net blotch (*Pyrenophora teres* f. *maculata*) being similar to Hindmarsh, Mackay and Gairdner.

Summary Table of Variety agronomic and disease comparisons.

Varieties in alphabetical order

	Commander	Hindmarsh	Fitzroy	Fleet	Gairdner	Grimmett	Grout	Mackay	Shepherd
Height	Tall	Short	Short	Tall	Medium - tall	Medium - tall	Medium - tall	Medium - tall	Tall
Standability	Medium - poor	Good	Good	Poor	Medium - good	Medium - poor	Medium	Medium	Medium
Post-ripe straw strength	Medium - poor	Medium	Medium	Poor	Good	Very good	Medium	Good	Good
Maturity (Days to flower)	Medium	Early – Medium	Medium - late	Early – medium	Late	Medium – Late	Early	Medium	Early medium
Net blotch (net form)	MR	MR-MS	MR	MR	MR	S-VS	R-MR	MR-MS	MR-MS
Net blotch (spot form)	MR-MS	S-VS	S	MR	S-VS	S	S	S-VS	S-VS
Leaf rust	S	MS	R	MS-S	S	S	VS	MR	MR
Stem rust	S	S	S	S	S	S	S	S	S
Spot blotch	S	S	S	S	S	S-VS	S	S	MS-S
Powdery mildew	MR-MS	MR	S	MR	S	S	R	MR	R

Foliar disease

R & MR = Management option: Very little to no disease found. No economic management decisions required.

MR -MS Monitor crops for disease development. In the presence of inoculum and in seasons conducive to disease, an economic management decision may be appropriate (eg preventable spray) Later occurrence of the disease may not require any action..

S-VS Management decisions will be required to reduce yield loss and will most probably be economic to do so.

(Foliar diseases have a wide range of pathotypes disease resistance ratings are based current knowledge of pathogen populations in the northern region.)

Shepherd has been released from the Northern node of Barley Breeding Australia and is marketed by AWB Seeds. Data provided in this leaflet is from trials conducted by BBA north and the Barley Agronomy project with funding from GRDC and the Pork CRC.

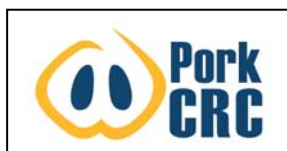
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