

7a. Oats Variety Trials

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KEY MESSAGES

- Newer milling varieties Bannister and Williams provide a unique fit in the system, having hay yields similar to those of conventional hay varieties, while providing high yielding milling quality grain.
- Hay quality was measured at Frances, and although there was no significant difference in hay production (t/ha) between varieties, there was a significant difference in hay quality.
- NVT site mean yields were well below average, and so long-term predicted yields along with disease profiles should be utilised when making varietal decisions.

In recent years, there has been renewed interest across the South-East region in oats; both for hay and grain production. The development of newer varieties with higher biomass production, but still retaining milling quality has provided growers with increased options and flexibility.

The proximity to the mill in Bordertown and oaten hay markets, as well as the improved milling oat price, and the benefits of oaten hay in a rotation for weed management, growers are looking to increase the amount of oats in their rotation.

In response to this, the MacKillop Farm Management Group – in conjunction with its members initiated a number of trials to evaluate

oats in the system. At Wolseley, this was part of a “cereal challenge” looking at the production of oats relative to other cereal crops grown in the area (barley, milling wheat and durum wheat). The results for this trial are summarised in the Wolseley Cereal Challenge Chapter.

At Frances an oaten hay trial was planted alongside the NVT oats site to look at newer milling oat varieties compared with conventional hay varieties, and at Sherwood a trial was established looking at grain and hay yields across oat varieties. The Frances and Sherwood results are included in the “Oats – Hay or Grain?”

National Variety Trials

The NVT oat sites at Bordertown, Frances and Kybybolite (a breeders trial) were those sites utilised in 2015, with dry conditions experienced across all sites. Seasonal conditions appeared to favour the early maturing varieties with Mitika continuing to be a consistent performer (particularly at Frances and Bordertown). Longer-term Williams and Bannister have been performing well. The NVT yield data is shown

below in Table 1. The grain quality data is available at www.nvtonline.com.au. The long-term yield data should be taken into account when making decisions.

Table 1: Oats NVT 2015 and long term South East Yield Data

Variety Name	Bordertown	Frances	Kybybolite	South East Long Term	
	% site mean	% site mean	% site mean	Predicted Average Yield (t/ha)	No. Trials
Bannister	93	98	115	3.683	15
Carrolup	95	95	92	3.226	11
Dunnart	100	99	100	3.485	15
Echidna	93	107	96	3.29	8
Euro	-	-		3.282	4
Kojonup	75	96	79	3.384	11
Mitika	107	101	99	3.439	15
Numbat	-	-		2.428	8
Possum	116	104	108	3.471	15
Potoroo	-	-	106	3.528	11
Wandering	-	-	90	3.578	9
Williams	98	97	111	3.674	15
Wombat	83	108	105	3.466	15
Yallara	98	105	99	3.35	15
Site Mean (t/ha)	1.47	2.42	3.3		
CV (%)	5.51	5.31	7.1		
Probability	<0.001	0.0015	<0.001		
LSD (%)	10	9	12		
Sowing Date	25-May-2015	26-May-2015	27-May-2015		

Long Term Yield - NVT Production Value 'MET' data provided by the NVT program

Oats - Hay or Grain?

The Frances trial was sown 26 May, at 240 seeds/m², and grain yield harvested 2 December. Hay cuts were taken at milky dough growth stage and dry matter (DM) sent for feed test analysis. Grain yield and quality were measured. Results from the Frances trial are presented in Tables 2-4.

The amount of DM removed did not significantly vary between varieties. DM ranged from 8.58 t/ha (Genie) to 6.44 t/ha (Wintaroo). Although there were no significant differences in DM production there were significant differences in all hay quality measurements. Crude protein averaged 9.5 %, ranging from 7.9 % (Genie) to 10.7 % Mammoth. Genie had a significantly lower ME of 8.3 compared to all other varieties. Water soluble carbohydrates averaged 16 %, but were significantly greatest in Forester (23.3 %).

The two varieties marketed for milling, Bannister (2.24 t/ha) and Williams (2.22 t/ha), were the highest yielding varieties with significantly increased grain yields compared to all other varieties, except Wintaroo (1.77 t/ha). Differences in grain quality were observed. Test weights ranged from 54 kg/hl (Bannister and Wintaroo) to 45 kg/hl (Genie). Mammoth had the highest protein, 16.1 %, and Bannister the lowest, 13.8 %. Oil (fat) ranged from 7.5 % (Bannister) to 5.8 % (Genie). Groat averaged 71.5 %, highest in Bannister (73.7 %) and lowest in Genie (68.7 %). Screenings varied greatly between varieties, 54.1 % (Genie) to 8.1 % (Forester).

Table 2: Frances Oat varieties sown, date of hay cut, hay DM t/ha and grain yield t/ha.

Variety	Grade	Date of Hay cut	Hay DM (t/ha)	Grain Yield (t/ha)
Bannister	Milling	15-Oct	6.98	2.24
Forester	Hay	4-Nov	7.35	1.22
Genie	Hay/Feed	16-Nov	8.58	0.97
Mammoth	Hay/Feed	27-Oct	6.83	1.33
Williams	Milling	15-Oct	8.17	2.22
Wintaroo	Hay/Feed	15-Oct	6.44	1.77
Site mean			7.39	1.63
P Value (0.05)			0.331	0.004
I.s.d.			2.27	0.52

Table 3: Frances hay quality

Variety	Dry Matter %	Moisture %	Crude Protein %	Acid Detergent Fibre (ADF) %	Neutral Detergent Fibre (NDF) %	DMD %	DOMD %	(ME)	Water soluble carbohydrates (%)
Bannister	91.7	8.4	9.3	26.6	52.3	67	63.6	9.9	18.8
Forester	91.9	8.1	8.7	28	50.5	66.6	63.3	9.8	23.3
Genie	92.7	7.3	7.9	33	58.2	57.5	55.5	8.3	12.2
Mammoth	92	8	10.7	30.2	56.4	64	61	9.4	13.8
Williams	91.4	8.6	10.4	28.9	57.2	62.1	59.5	9.1	12.5
Wintaroo	91.3	8.7	9.7	28.4	55.3	64	61.1	9.4	15.4
Site mean	91.8	8.2	9.5	29.2	55	63.5	60.7	9.3	16
(P<0.05)	0.005	0.006	0.008	<.001	0.003	0.003	0.003	0.003	0.002
I.s.d	0.63	0.64	1.35	2.07	3.41	3.86	3.27	0.66	4.51

Table 4: Frances grain quality

Variety	Test Weight (kg/hl)	Protein (%)	Oil (fat%)	Groat (%)	Screenings (%<2.0mm)	1000 grain weight (g)
Bannister	54	13.8	7.5	73.7	8.3	35
Forester	46	15.8	6.2	71.6	8.1	31
Genie	45	15.7	5.8	68.7	54.1	25
Mammoth	52	16.1	6.5	72.5	31.3	27
Williams	51	14.7	7.1	71.4	17.8	29
Wintaroo	54	14.8	7.1	71.3	13.8	34

The Sherwood trial was sown 22 May, 180 seed/m² for grain treatments and 240 seed/m² for hay treatments, and harvested 2 December. Hay cuts were taken in October and measured for DM. Grain yield and quality was measured. Results from the Sherwood trial are presented in Table 5 and Table 6.

Although production was lower at Sherwood compared to Frances the results between

varieties are similar, with Bannister (5.68 t/ha) having lower DM production compared to Williams (7.59 t/ha). There was no significant difference in grain yield between the milling varieties at Sherwood. Grain quality varied, with protein ranging from 13.6 % (Bannister) to 15.5 % (Mitika). Groat averaged 67.3 %. Williams had the highest screenings, 28.5 % and lowest 1000 grain weight, 26 gm.

Table 5: Sherwood oat varieties sown and grain yield t/ha.

Variety	Grade	Date of Hay cut	Hay (DM t/ha)	Grain Yield (t/ha)
Bannister	Milling	22-Oct	5.68	1.5
Mitika	Milling	22-Oct	7	1.37
Williams	Milling	22-Oct	7.59	1.4
Site mean				1.42
P Value (0.05)				0.844
l.s.d.				0.621

Table 6: Sherwood grain quality

Variety	Test Weight (kg/hl)	Protein (%)	Oil (fat %)	Groat (%)	Screenings (%<2.0mm)	1000 grain weight (g)
Bannister	46	13.6	6.1	65.4	14.2	30
Mitika	49	15.5	5.6	71.6	6.4	32
Williams	45	14.9	5.9	64.8	28.5	26

Notes on Selected Varieties

(Taken from SARDI 2016 sowing guide, unless otherwise stated)

Bannister is a dwarf milling variety with high grain yield released for Western Australia in 2012. Bannister is suited to eastern Australia as well as Western Australia. It is adapted to low, medium, and high rainfall zones of Southern Australia. It is 13 cm taller than Mitika and heads about 3 to 4 days later than Mitika. Seednet is the commercial partner. Bannister is resistant to leaf rust and moderately resistant to bacterial

blight. It is susceptible and intolerant to CCN. Bannister has slightly lower hectolitre weight and slightly higher screenings compared to Mitika. It is similar to Mitika for groat percent.

Forester is a very late hay variety adapted to high rainfall and irrigated cropping regions. It is seven to 10 days later than Glider, three days later than Riel, two days later than Targa, and

three weeks later than Wintaroo. Forester has excellent early vigour and is an improvement compared to Glider. It has excellent lodging and shattering resistance. Forester has an excellent foliar disease resistance spectrum. It is moderately susceptible to CCN. It has good hay colour, but like all late hay varieties may not resist hot dry winds as well as earlier varieties. Forester has excellent hay quality and is an improvement compared to Glider, Tammar, Targa, and Vasse, but similar to Riel. Seed of Forester is available from AGF Seeds.

Genie is a new true forage oat variety bred in northern Australia for northern Australian farms. It has fast establishment, high forage production and late maturity, as well as a new, potentially more durable form of leaf rust resistance. Genie has good seedling vigour and quick early growth for early grazing, it will produce large quantities of autumn and winter feed and has very late maturity so will remain vegetative into late spring. Genie has large broad leaves, an erect growth habit and a low growing point giving excellent recovery from grazing. Genie has excellent leaf rust resistance that will prevent yield loss in most situations. Genie has a new form of resistance that minimizes the level of infection and prevents the spread of the disease within the crop. This type of resistance is potentially more durable, unlike traditional resistance which can be quickly overcome by evolving races of leaf rust. Genie is suitable for grazing in both extensive and intensive situations in all areas of central and southern Queensland and northern New South Wales. Genie is also suitable for hay and silage production. (Accessed online at www.heritage-seeds.com.au)

Mammoth is a true forage oat, with excellent establishment vigour. It was identified in 2007 from the Heritage Seeds' program that specifically targets high forage yield and quality for southern Australia. In particular, the program looked at early establishment vigour and winter yield to select Mammoth. Mammoth has shown excellent autumn and winter performance, and good overall yield in multiple locations over a number of years. Mammoth oats are particularly suited as a winter crop in temperate pastoral zones where cool season performance under grazing is required. Mammoth may be sown from late summer to maximise feed on offer through autumn and winter. Improved BYDV tolerance gives the producer confidence

that yield losses due to early aphid infestations are mitigated to a large degree. Mammoth has been developed to offer speedy, high yielding forage and is very suitable for silage and hay production. Mammoth oats are an option for oversowing & direct drilling into under-performing pastures. (Accessed online at www.heritage-seeds.com.au)

Mitika is an early maturing dwarf milling oat developed by SARDI and now commercialised by Heritage Seeds. It is resistant to leaf rust and moderately resistant to stem rust and bacterial blight. However, Mitika is susceptible to CCN, BYDV, septoria and red leather leaf and intolerant to CCN and stem nematode. Mitika is a milling quality oat with high hectolitre and grain weight, low screenings percent and moderately high groat percent. It is also a high feed value oat with low hull lignin and high grain digestibility. Mitika averages higher levels of Beta-glucan than Possum, Yallara and Euro. It is recommended for all rainfall zones where CCN or stem nematode is not a problem.

Williams is a tall milling variety commercialised by Heritage and released in Western Australia in 2013. Williams, formerly known as the breeding line WA2332, is a high yielding early to midseason variety with similar maturity compared to Yallara. It is three to seven days later maturing than Mitika. Williams is 15 cm taller than Mitika, 5 cm taller than Bannister, and 15 cm shorter than Yallara. Although classified as MS for septoria, Williams has the highest level of septoria resistance compared to all other current oat varieties. It is resistant to leaf rust and depending on the stem rust pathotype present can range from moderately resistant to susceptible. Williams is resistant to bacterial blight and moderately resistant to moderately susceptible for BYDV. It is susceptible and intolerant to CCN. Williams has similar grain yield to Bannister with slightly inferior grain quality. Screenings are similar to Wombat and can be high, especially in the low rainfall regions. Williams has high B-glucan levels. Williams averages slightly lower hay yield compared to other hay varieties. Hay quality is similar to Wintaroo with slightly lower water soluble carbohydrates and slightly higher crude protein.

Wintaroo (tested as 88083- 4) is a tall, mid season maturing hay oat to replace Marloo. It is suited to all rainfall regions of south eastern

Australia. It has lower levels of foliar disease than Glider and therefore is less suited to high rainfall areas. Wintaroo has higher hay and grain yields than Bettong, Swan and Marloo and higher hay yields than Wallaroo when grown in all rainfall areas. Wintaroo is an improvement over Marloo, Wallaroo and Bettong for septoria resistance and BYD Virus tolerance. It has similar stem rust resistance to Wallaroo and Marloo. Wintaroo, although rated as susceptible for leaf rust, is slower to develop rust than Marloo, Swan and Wallaroo. Wintaroo is tolerant of stem nematode and is resistant and tolerant of cereal cyst nematode. Wintaroo

has similar hay digestibility, metabolisable energy and protein to other hay oat varieties such as Marloo and Wallaroo. Wintaroo has better grain quality than Marloo and Wallaroo and is slightly inferior to Bettong. Wintaroo is slightly taller than Marloo, Wallaroo and Bettong. It has better lodging resistance than Marloo and Wallaroo and is similar to Bettong. Wintaroo has early vigour and shattering resistance similar to Marloo and Wallaroo, and superior to Bettong. Wintaroo is more tolerant than Marloo to brown-leaf tipping from hot, dry winds.

(Accessed online at www.seednet.com.au)

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