
Oat Breeding Newsletter

Hay edition

October 2012



Aaron Kendrick & John Pitcher from Uncle Toby's with Peter McCormack, Michelle Williams, Pamela Zwer, Sue Hoppo, Kerry-Lee McMurray, Peter Wheeler & Joe Naughton on a recent tour of the R&D facility at Rutherglen

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Editors' note:

Just a reminder, this newsletter should not be quoted without consent from the authors.

1. Entries for 2012 Hay Trials

New in 2012

- CCN tolerance evaluation trials not sown
- Additional hay trials sown for observation at Mt Barker and Merriden in WA

In 2012 the hay and late hay trials were merged with the total number of entries reduced to 60. The Stage 5 (S5) hay trial for 2012 comprised 32 entries and was sown at Wongan Hills and Katanning in WA and Horsham in Victoria. S4 hay trials included the 32 entries from the S5 trial and an additional 28 entries to make a total of 60 entries. Hay and grain yield and quality assessment will be conducted at three locations in SA, two locations in Victoria and three locations in WA (Table 3). Two hay trials for observation only were sown at Mt Barker and Merriden in WA. The Stage 4 entries were also sown in nurseries to evaluate rust, BYDV and septoria resistance in WA and stem nematode tolerance in SA. They are also evaluated for CCN resistance at the Waite Campus in SA and for rust by the Australian Cereal Rust Control Program at Cobbitty in NSW.

Information about the hay yield and hay quality as well as grain yield of released lines is included in section 6 of this newsletter.

Table 3: Stage 5 and Stage 4 hay trial and nursery locations in 2012

South Australia	Victoria	Western Australia
Stage 4 trials Pinery Turretfield Riverton Seed increase Arthurton Nurseries Farrell Flat (stem nematode) Waite Campus (CCN resistance)	Stage 5 Horsham Stage 4 Elmore (32 out of 60 entries cut for hay and all harvested for grain)	Stage 5 Wongan Hills Katanning Stage 4 Williams York Mt Barker (obs) Merriden (obs)
	New South Wales	Nurseries Mt Barker (septoria) Manjimup (BYDV) Canarvon (rust)
	Nurseries Rust evaluation at ACRCP Cobbitty	

2. Breeding Program Developments

New partnership with AEXCO and launch of Forester

In May, 2012, the National Oat Breeding Program (NOBP) announced that AEXCO had been chosen as the commercial partner for the hay component of the breeding program for the next 5 years. This will ensure that AEXCO continues the existing relationship with the NOBP to produce and market new and improved varieties suitable for hay production.

In February, 2012, the new late hay variety Forester was launched at the Sungold Field Days in Warnambool. Seed of Forester is available from AGF Seeds.



Murray Smith (Balco), Gary Hansen (Coomandook), Pamela, Sue, Peter and Denis McGrath (AEXCO) at the AFIA conference in Hobart in August, 2012

3. New hay varieties

New developments for 2012 include commercial seed production of three hay varieties.

Tammar (SV96098-24) and Forester (SV97200-3) were released in 2011. Tammar is later than Tungoo by about four to seven days with excellent disease resistance and colour. Forester is the first very late line released from the program. It heads about seven to 10 days later than Glider, almost 16 days later than Tammar, and three weeks later than Wintaroo. It has much better early vigour than Glider and good foliar disease resistance. About 100 t of Tammar and 200 t of Forester seed will be produced in 2012. Although Tungoo was released in 2010 there has been limited seed availability. Expected production for Tungoo is 250 t in 2012. Seed of Tungoo and Tammar is available from AEXCO and seed of Forester is available from AGF Seeds.

More detailed information including yield, quality and disease resistance attributes for these lines is included in section 6 in this newsletter.



Pamela talking about oat varieties at the Hart Field Day, 2012



Michelle weighing hay at the Riverton trial site, October 2012

4. Long term hay trial results

Tables 10 to 16 show the long term hay yield and quality and grain yield of varieties in the hay series and tables 17 to 21 show the long term hay yield and quality and grain yield of varieties in the late hay series. Table 22 shows the disease reactions of current and new hay varieties in SA and Victoria.

For more detailed or specific information please contact the National Oat Breeding Program.

4.1 Hay Variety Summary

Forester[Ⓛ]

Forester is a new variety release for 2012. 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, Smeaton, Victoria.

Tammar[Ⓛ]

Tammar is a medium tall late variety that will be available in limited seed amounts from AEXCO in 2012. It is four to seven days later than Tungoo to cut.

Tammar also has an excellent disease resistance profile. It is moderately resistant to stem and leaf rust, septoria, BYDV, and bacterial blight. Tammar is the first late variety available with resistance to CCN and SN, tolerance to CCN, and moderate tolerance to SN.

Tammar has improved hay quality compared to Kangaroo. It has high crude protein and hay digestibility with lower WSC than Mulgara and Brusher, but higher than Kangaroo.

Seed is available through AEXCO.

Mulgara[Ⓛ]

Mulgara was released in 2009 and commercialised by AEXCO. It is a tall mid season variety with excellent early vigour and good straw strength. Hay yield is lower than Wintaroo, but

hay quality is better than Wintaroo. Mulgara also retains good hay colour and resists brown leaf tipping. Grain yield is similar to Wintaroo, but Mulgara has slightly better grain quality with the exception of high hull lignin.

Mulgara has excellent disease resistance. It is resistant and tolerant to CCN and SN. Compared to Wintaroo, Mulgara has improved leaf rust, bacterial blight, and red leather leaf resistance.

Tungoo[®]

Tungoo was released in 2010. However, seed was not available until 2012, due to problems with commercial seed bulk-up. It is a medium tall mid to late season variety.

Tungoo has an excellent disease resistance profile. It combines resistance and moderate tolerance to CCN and SN. It also is resistant to leaf rust and the only variety with red leather leaf resistance. Tungoo is moderately resistant to BYDV, septoria, and bacterial blight and moderately susceptible to stem rust. It has the best combination of disease resistance compared to all other varieties except Tammar.

Hay yield is slightly lower than Kangaroo, but Tungoo's hay quality is an improvement compared to Kangaroo. Tungoo has grain quality similar to Kangaroo, but the grain size is smaller resulting in higher screenings. Tungoo has low hull lignin which improves feed grain quality.

Seed is available through AEXCO.

Yallara[®]

Yallara is a medium tall early to midseason variety similar to Euro for flowering and maturity. Yallara, released in 2009, is a milling line with slightly better grain quality than Euro but not as susceptible to stem rust. It has bright, plump grain suitable for the milling industry and specialised feed end-uses. Viterra is the commercial partner.

Yallara is a Euro look alike with improved leaf rust resistance. It is resistant but intolerant to CCN. It is moderately susceptible to BYDV, bacterial blight, and septoria. Yallara is susceptible and intolerant to stem nematode and susceptible to red leather leaf.

Yallara has excellent grain quality. It has high hectolitre weight, low screenings, and high groat percent. The grain is plump and bright and could suit niche markets like the horse racing industry in addition to human consumption. Yallara was evaluated for hay production and although the hay yield is lower than popular hay varieties it has excellent hay quality.

Table 10. Average hay yield (t/ha) for sixteen oat varieties in three states during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	South Australia	Victoria	Western Australia	All States
Bannister	7.7	8.2	8.6	8.4
Brusher	8.0	9.0	9.3	8.9
Carrolup	7.6	8.6	8.3	8.4
Eurabbie	7.7	7.9	9.0	8.5
Kangaroo	8.0	7.7	9.3	8.8
Mulgara	8.1	8.4	9.2	8.9
Swan	8.1	8.0	9.0	8.8
Tammar	7.8	8.0	8.8	8.6
Tungoo	7.9	7.6	9.0	8.6
Vasse	8.5	7.8	9.4	9.1
Wallaroo	7.7	8.4	8.3	8.4
Wandering	7.6	8.5	8.1	8.4
WAOAT2332	7.9	8.2	8.7	8.6
Winjardie	7.8	8.5	8.7	8.6
Wintaroo	8.5	8.7	10.0	9.4
Yallara	7.8	8.2	8.3	8.4
<i>No. sites</i>	<i>19</i>	<i>9</i>	<i>16</i>	<i>45</i>

Table 11. Average grain yield (t/ha) for sixteen oat varieties in three states during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	South Australia	Victoria	Western Australia	All States
Bannister	3.2	3.9	3.0	3.1
Brusher	2.7	3.3	2.2	2.5
Carrolup	2.6	3.3	2.5	2.5
Eurabbie	2.9	3.4	2.7	2.8
Kangaroo	2.5	3.1	2.3	2.4
Mulgara	2.7	3.2	2.2	2.6
Swan	2.6	3.0	2.1	2.4
Tammar	2.3	3.0	2.0	2.1
Tungoo	2.5	3.2	2.3	2.3
Vasse	2.6	3.1	2.5	2.4
Wallaroo	2.6	3.2	2.2	2.5
Wandering	2.7	3.4	2.6	2.6
WAOAT2332	3.3	4.1	3.0	3.1
Winjardie	2.8	3.3	2.5	2.7
Wintaroo	2.8	3.3	2.3	2.6
Yallara	3.0	3.5	2.5	2.8
<i>No. sites</i>	<i>29</i>	<i>9</i>	<i>22</i>	<i>60</i>

Table 12. Average hay yield (t/ha) for sixteen oat varieties in seven years averaged for three states. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	2005	2006	2007	2008	2009	2010	2011
Bannister	9.8	4.8	7.4	7.0	9.6	8.3	10.5
Brusher	10.4	5.3	7.7	7.5	10.1	8.8	11.2
Carrolup	9.4	5.3	7.3	6.7	9.5	8.6	10.5
Eurabbie	10.2	4.4	7.6	7.3	9.9	7.9	10.4
Kangaroo	10.7	4.7	7.5	7.5	9.9	8.8	10.5
Mulgara	10.4	5.1	7.7	7.3	10.0	8.7	10.9
Swan	10.4	5.0	7.7	7.1	10.0	8.7	10.8
Tammar	10.2	4.8	7.7	7.0	9.9	8.3	10.5
Tungoo	10.3	4.5	7.5	7.2	9.8	8.3	10.4
Vasse	11.1	5.1	8.5	6.9	10.6	8.6	11.0
Wallaroo	9.6	5.3	7.4	6.6	9.6	8.7	10.4
Wandering	9.2	5.3	7.2	6.4	9.4	8.7	10.4
WAOAT2332	9.8	4.9	7.4	6.9	9.7	8.5	10.7
Winjardie	9.9	5.1	7.5	7.0	9.8	8.5	10.7
Wintaroo	11.5	5.3	8.5	7.7	10.9	9.0	11.5
Yallara	9.6	5.2	7.5	6.5	9.6	8.5	10.4
<i>No. sites</i>	7	6	6	5	8	5	8

Table 13. Average grain yield (t/ha) for sixteen oat varieties in seven years averaged over three states. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	2005	2006	2007	2008	2009	2010	2011
Bannister	3.9	2.2	2.9	1.8	3.4	3.5	4.1
Brusher	2.8	1.9	2.5	1.9	2.5	3.5	2.8
Carrolup	2.7	2.0	2.5	1.8	2.7	3.1	3.2
Eurabbie	3.8	2.1	2.6	1.6	3.0	2.8	3.5
Kangaroo	3.1	1.8	2.1	1.8	2.5	2.6	2.8
Mulgara	3.0	2.1	2.7	2.0	2.7	3.3	2.7
Swan	2.9	1.9	2.5	1.8	2.4	3.2	2.6
Tammar	2.8	1.2	1.5	1.6	1.9	2.8	2.7
Tungoo	2.8	1.6	2.1	1.7	2.3	3.0	2.9
Vasse	3.3	1.6	2.0	1.4	2.5	2.5	3.3
Wallaroo	2.8	2.0	2.5	1.9	2.5	3.3	2.6
Wandering	3.2	2.0	2.5	1.7	2.8	2.9	3.5
WAOAT2332	4.1	2.1	2.8	1.9	3.4	3.9	4.0
Winjardie	3.1	2.2	2.7	2.0	2.9	3.1	3.0
Wintaroo	3.1	2.1	2.6	2.0	2.7	3.2	2.7
Yallara	3.5	2.1	2.9	1.9	3.0	3.5	3.2
<i>No. sites</i>	11	8	6	12	9	5	9

Table 14. Average hay yield (t/ha) for sixteen oat varieties by rainfall zone averaged over three states for the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	<375mm	375-500mm	>500mm
Bannister	5.5	9.4	12.7
Brusher	5.9	10.0	13.0
Carrolup	5.5	9.4	12.2
Eurabbie	5.4	9.4	13.3
Kangaroo	5.6	9.8	13.5
Mulgara	5.9	9.8	13.1
Swan	5.9	9.7	13.1
Tammar	5.6	9.5	13.1
Tungoo	5.5	9.5	13.3
Vasse	6.2	10.0	13.8
Wallaroo	5.5	9.4	12.4
Wandering	5.6	9.3	12.1
WAOAT2332	5.7	9.5	12.7
Winjardie	5.6	9.6	12.7
Wintaroo	6.3	10.4	14.0
Yallara	5.6	9.4	12.5
<i>No. sites</i>	<i>12</i>	<i>29</i>	<i>4</i>

Table 15. Average grain yield (t/ha) for sixteen oat varieties by rainfall zone averaged over three states during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	<375mm	375-500mm	>500mm
Bannister	2.3	3.6	4.3
Brusher	1.6	2.9	3.7
Carrolup	1.9	3.0	3.4
Eurabbie	2.0	3.2	4.1
Kangaroo	1.7	2.7	3.5
Mulgara	1.7	2.9	3.8
Swan	1.5	2.8	3.6
Tammar	1.4	2.6	3.3
Tungoo	1.7	2.8	3.4
Vasse	1.9	2.9	3.5
Wallaroo	1.6	2.8	3.6
Wandering	2.0	3.1	3.6
WAOAT2332	2.2	3.7	4.5
Winjardie	1.9	3.0	3.7
Wintaroo	1.7	2.9	3.9
Yallara	1.8	3.2	4.2
<i>No. sites</i>	<i>17</i>	<i>32</i>	<i>10</i>

Table 16. Average hay quality for sixteen oat varieties in three states during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	Digestibility (%dm)	WSC* (%dm)	ADF* (%dm)	NDF* (%dm)	Metabolisable Energy (MJ/kg DM)	Crude Protein (%dm)
Bannister	65.2	25.9	29.5	49.2	9.4	8.7
Brusher	65.0	27.8	30.4	49.1	9.4	8.4
Carrolup	63.1	26.9	31.0	49.5	9.1	8.5
Eurabbie	67.4	28.0	27.7	46.9	9.8	8.9
Kangaroo	62.8	23.2	33.0	53.0	9.0	8.7
Mulgara	64.0	26.7	31.6	50.0	9.3	8.7
Swan	63.6	26.7	31.6	50.4	9.1	8.0
Tammar	63.8	24.3	31.5	50.8	9.2	8.7
Tungoo	64.0	24.5	32.0	52.1	9.2	8.8
Vasse	65.1	26.1	30.9	50.2	9.4	8.4
Wallaroo	63.5	25.7	31.9	51.1	9.1	8.5
Wandering	65.4	25.7	29.7	48.9	9.5	9.1
WAOAT2332	63.9	24.4	30.6	50.8	9.2	9.2
Winjardie	64.2	25.8	31.0	50.5	9.3	8.5
Wintaroo	63.0	25.3	32.2	50.9	9.0	8.2
Yallara	63.8	28.6	30.8	49.0	9.2	8.4
<i>No. sites</i>	<i>39</i>	<i>39</i>	<i>39</i>	<i>39</i>	<i>40</i>	<i>37</i>

*WSC=water soluble carbohydrates, ADF=acid detergent fibre, NDF=neutral detergent fibre

Table 17. Average hay yield (t/ha) for nine oat varieties grown in late hay trials in two states and in medium and high rainfall zones during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI .

Variety	South Australia	Victoria	375-500mm	>500mm	All Trials
Eurabbie	10.3	9.8	9.5	10.7	10.3
Forester	11.3	10.4	9.4	12.2	10.8
Glider	11.6	9.9	9.7	12.2	10.8
Kangaroo	12.5	9.8	10.8	12.5	11.2
Riel	11.3	10.3	9.5	12.2	10.9
Tammar	11.6	9.7	10.5	11.5	10.8
Targa	11.4	9.8	9.5	12.0	10.8
Tungoo	12.0	10.0	10.9	11.8	11.2
Vasse	12.0	9.8	11.0	11.6	11.1
<i>No. Sites</i>	<i>12</i>	<i>10</i>	<i>15</i>	<i>7</i>	<i>22</i>

Table 18. Average grain yield (t/ha) for nine oat varieties grown in late hay trials in two states and for two rainfall zones during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI.

Variety	South Australia	Victoria	375-500mm	>500mm	All Trials
Eurabbie	2.0	3.9	3.1	5.6	3.7
Forester	1.3	2.4	1.7	3.7	2.2
Glider	1.5	2.7	2.1	3.9	2.5
Kangaroo	2.0	3.2	2.8	4.5	3.2
Riel	1.3	2.7	1.7	4.0	2.3
Tammar	2.0	2.9	2.7	4.1	3.1
Targa	1.3	3.1	1.9	4.6	2.6
Tungoo	1.7	2.6	2.6	3.8	2.9
Vasse	1.8	3.6	2.7	5.1	3.3
<i>No. Sites</i>	16	8	19	5	24

Table 19. Average hay yield (t/ha) for nine oat varieties grown in late hay trials by year during the period 2005 to 2010. Data courtesy National Oat Breeding Program. Analysis by Bev Gogel, SAGI

Variety	2005	2006	2007	2008	2009	2010	2011
Eurabbie	12.0	7.0	8.8	10.6	12.6	12.7	10.7
Forester	14.1	7.2	9.5	10.5	12.8	12.5	11.3
Glider	13.8	7.5	8.7	10.5	12.6	13.8	10.7
Kangaroo	14.2	7.3	8.3	10.8	13.6	15.3	11.7
Riel	13.9	7.3	9.8	10.6	12.5	13.0	11.2
Tammar	12.8	7.1	8.8	10.9	13.2	14.9	11.5
Targa	13.3	7.8	10.0	10.7	11.7	14.5	10.2
Tungoo	13.4	7.0	9.6	11.1	13.6	15.2	12.4
Vasse	13.2	6.9	9.3	11.1	13.7	15.4	12.3
<i>No. Sites</i>	4	5	3	3	3	2	2

Table 20. Average grain yield (t/ha) for nine oat varieties grown in late hay trials by year during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI

Variety	2005	2006	2007	2008	2009	2010	2011
Eurabbie	4.7	3.0	3.9	2.0	2.8	2.6	2.3
Forester	3.0	1.0	1.8	1.3	0.7	0.7	1.5
Glider	3.2	1.3	2.3	1.5	1.3	1.1	1.8
Kangaroo	3.8	2.0	3.3	1.9	2.3	1.8	2.4
Riel	3.2	1.2	2.0	1.4	0.8	0.8	1.4
Tammar	3.5	1.7	3.1	1.8	2.2	1.7	2.5
Targa	3.7	1.7	2.3	1.4	1.1	1.2	1.4
Tungoo	3.6	1.8	2.8	1.6	1.9	1.9	2.1
Vasse	4.2	2.4	3.4	1.9	2.3	2.0	2.1
<i>No. Sites</i>	5	3	3	8	4	2	3

Table 21. Average hay quality for nine oat varieties grown in the late hay trials during the period 2005 to 2011. Data courtesy National Oat Breeding Program. Analysis by Chris Lisle, SAGI .

Variety	Digestibility (%dm)	WSC (%dm)	ADF (%dm)	NDF (%dm)	Metabolisable Energy (MJ/kg DM)	Crude Protein (%dm)
Eurabbie	65.7	27.5	28.5	47.9	9.6	8.6
Forester	64.6	25.9	29.4	48.9	9.4	8.5
Glider	63.6	23.7	30.6	51.4	9.2	9.3
Kangaroo	60.3	20.4	33.7	54.2	8.7	8.6
Riel	64.4	27.0	29.3	49.0	9.4	8.7
Tammar	61.3	21.7	32.8	53.5	8.8	8.8
Targa	62.8	23.9	30.6	50.9	9.1	8.6
Tungoo	62.0	22.6	32.2	52.4	9.0	8.8
Vasse	63.6	24.0	31.1	51.0	9.2	8.6
<i>No. Sites</i>	12	14	15	15	12	14

Table 22. Disease reactions in SA and Victoria and comparative stem diameter for current and new hay variety releases.

Variety	Stem rust ¹	Leaf rust ¹	BYDV ¹	Sep-toria ¹	Bacterial blight ¹	CCN R ¹	CCN T ²	Stem Nematode R ¹	Stem Nematode T ²	Red leather leaf ¹	Stem diam-eter ³
Bannister	R-MR	R	MS	S	MR-S	MS	I	na	MI	MS	M
Brusher	MS-S	MR-MS	MS	MS	MR-MS	R	MI	MS	I	MR-MS	M
Carrolup	MS	VS	MS	S-VS	MR-S	S	I	MS	VI	S	M
Forester	R-S	MR-MS	MR-S	MR	MS-S	MS	MI	S	I	R-MR	MT
Kangaroo	MS-S	MS	MR-S	MR-MS	MR-MS	R	MT	MS	MI	MS	MF
Mulgara	MS-S	MR	MS	MS	MR	R	MT	R	MT	MS	M
Tammar	MR-S	MR	MS	MR	MR	MR	MT	R	MT	R-MS	MF
Tungoo	MS-S	MR	MR-MS	MR	MR	R	MT	R	MT	R	M
Wandering	MS	VS	MR-MS	S-VS	MR-S	VS	I	VS	I	MS	M
Wintaroo	S	MS	MR-MS	MR-MS	MR	R	MT	MR	MT	MS	M

¹ Disease reactions where R= resistant, MR=moderately resistant, MS=moderately susceptible, S= susceptible, VS=very susceptible

² T=tolerant, MT= moderately tolerant, MI=moderately intolerant, I=intolerant

³ F=fine, MF=moderately fine, MT=moderately thick, T=thick, VT=very thick

(Rust and BYDV reactions may vary in different regions and with different seasonal conditions depending on the prevalent pathotype/serotype. Monitoring your oat crop is therefore essential.)



Pete cutting hay at the Riverton trial site, October 2012