

## 5.4 EVALUATION OF DUAL PURPOSE CEREAL VARIETIES (NILE TAS)

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**Location:** "Waddymore", Nile, Tasmania

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**GSR:** (Feb – Nov) 577 mm  
(including 65 mm irrigation)

### Summary:

Grain yields ranged from disappointing through to excellent (over 10t/ha). The outstanding wheat lines were 95102.1, K89.44 (both from CSIRO, Canberra) and Teesdale. The two CSIRO lines have performed well in the three years of evaluation, topping the grain-only trial in 2004-05. All of the top yielding lines were early flowering, possibly due to temperature extremes in early – mid November which may have affected pollen viability and/or seed set in mid to late flowering types.

Mackellar was relatively late flowering compared with other seasons and this combined with little BYDV disease pressure may have affected yield relative to other varieties. Despite two fungicides there was a small level of stripe rust on most varieties but Teesdale and nearly all the new CSIRO breeding lines remain resistant. The greatest incidence of stripe rust was on Marombi and this variety was also the most susceptible to eyespot.

Grain yield after two dry matter cuts tended to be lower than for one cut for nearly all lines with an average of nearly 0.6t/ha difference.

### Background/ Objectives:

Dual purpose oats, and to a lesser extent wheat, have been traditionally grown in many areas of Tasmania. In the mid 1980's wheat varieties such as Isis and Macquarie proved to be very susceptible to stripe rust and area declined significantly to almost nil.

With the release of new winter wheat varieties from CSIRO, Plant Industry, Canberra and private breeding companies there is again the opportunity to grow wheat for both grazing and grain.

This use has particular potential where the crop can be watered up in a dry summer/autumn. The major limiting factor will be greater disease pressure due to the longer growing season. The aim of this trial was to assess dual purpose wheat, triticale and oat varieties for dry matter production, recovery from grazing and grain yield.

### Methodology/ Treatments:

<b>Wheat</b>	Tennant, Brennan, Mackellar + 10 breeding lines	CSIRO, Canberra/HRZ Wheat
	Teesdale	PGG Wrightson/Grainsearch
	Marombi	SunPrime Seeds
<b>Triticale</b>	Crackerjack	Heritage Seeds
	SPA	Seed Production Australia
<b>oats</b>	Bass	TIAR

Given the dry summer and autumn it was fortunate the trial was sown under a centre pivot and could be watered. The trial consisted of four replicates in randomised complete blocks.

### Sowing Date & Details:

18<sup>th</sup> March 2005 with 4:13:7:9 fertiliser at 250kg/ha and followed a pea crop. Initial dry matter cuts were taken on 30<sup>th</sup> June. A second dry matter cut was taken on August 16<sup>th</sup> from 2 replicates to assess potential grain yield losses with two cuts.

Nitrogen (50kgN) was top-dressed on 7<sup>th</sup> September and with the favourable season a further 50kgN was applied on 17<sup>th</sup> October.

Two fungicides were applied at growth stages Z33 and Z45.

**Harvested:** 13<sup>th</sup> January 2006.

## Results and Discussion

As distinct from previous years the trial was irrigated under a centre pivot thus ensuring uniform establishment in a dry autumn (Decile 2). Rainfall over winter continued to be low (Decile 3) and the season looked pretty ordinary with little subsoil moisture reserves going into August. However in mid August the situation changed dramatically and rain basically continued until the end of the year (Decile 8). While conditions were wet on the well structured black clay there was no water lying on the ground and waterlogging damage was probably minimal.

There was some leaf disease (stripe rust and to a lesser degree leaf rust) but in most varieties this was controlled adequately with the two fungicides. Of greater significance was the lower stem disease "eyespot" which responded to the wet conditions and resulted in some tillers breaking away from the rest of the plant at just above ground level in the latter part of the season.

### **Dry Matter Production:**

In past trials after taking quadrat dry matter cuts, sheep and cattle have been used to remove the remaining growth. However with animals being introduced from paddocks of wheat it was found that the triticale and oats were preferentially grazed. Consequently the decision was made to cut all of the plots with a mower. Also from past experience, cutting at a height of 40mm has been too low for triticale resulting in a significant loss of tillers. Consequently triticale plots were cut at 50-60 mm which is probably more in line with commercial practice. Total dry matter production would therefore have been higher than indicated for the triticale. For the second cut all plots were cut at 70-75mm above ground level to avoid damage to growing points.

Data is presented in the accompanying table on an oven dried basis. For the first cut both triticales produced significantly higher dry matter (DM) than most of the wheat lines. Not surprisingly the wheats cutting the highest weights were generally early maturing types with good early vigour. Total DM production from two cuts also tended to be higher for the earlier maturing wheats, in particular Marombi and H123.1. Both lines were visually slower to recover after grazing in the two replicates that received a second cut and this later cut was obviously too late for some lines.

Total DM production from LH49E2, Tennant and Teesdale was significantly lower than most of the other wheats. This result is generally consistent with trials in other seasons due to the lower early vigour of these lines.

The performance of Bass was poor due to preferential grazing by deer and the result should be ignored – Bass usually produces significantly higher DM than all wheat varieties. The grazing damage was not severe as the later growth of Bass was very tall and lodging was a major problem.

Overall DM production in the trial was relatively low and although the initial irrigations ensured uniform plant establishment, the dry autumn and winter reduced early growth.

### **Grain Production:**

Grain yields were above average to excellent but given the high spring rainfall showed a low water use efficiency. The outstanding lines were 95102.1, K89.44 (both from CSIRO) and Teesdale. The two CSIRO lines have performed well in the three years of evaluation, topping the grain-only trial in 2004-05. K89.44 also performed well in the dual purpose trial in 2004-05. 95102.1 has yielded well interstate and is likely to be the next CSIRO wheat to be released (2008?). Teesdale has also yielded reasonably well in past trials, both grain only and dual purpose and is available for commercial production in 2006.

All of the top yielding lines were early flowering, i.e. end October / early November which is surprising given that the season would be expected to favour later types. It is possible that a 29°C day on the 8<sup>th</sup> November followed by a 1°C minimum on the 13<sup>th</sup> November may have affected flowering or seed set in later flowering lines.

The high yields of 95102.1, K89.44 and to a lesser degree Teesdale over the last two seasons are cause for optimism although it is worth remembering the yield advantage of Mackellar for the first 3 years of trials has not been expressed as much in the last 2 years. Mackellar was relatively late flowering compared with other seasons and this may have affected yield. In addition the yield advantage of Mackellar stems from resistance to BYDV and when this disease is not prevalent (due to the dry autumn) Mackellar has not been as outstanding. The fellow BYDV resistant lines LH49E2 and LH 50M16 also performed below par although both are very late flowering. LH49E2 was a potential release for Tasmania as it had performed very well over 4 years but has shown some susceptibility to leaf rust and resistance to new strains of stripe rust is now only moderate, although slightly better than Mackellar.

**Table 5-10: Dual Purpose Cereal Trial - Dry Matter Production And Grain Yields From Nile, 2005-06**

Dry Matter Production				Grain Yields		
Variety	1 <sup>st</sup> cut DM Yield (t/ha)	Total DM Yield (t/ha)	%Tennant	Variety	Yield (t/ha)	%Tennant
SPA Trit	1.06	2.06	134.2	95102.1	10.29	134.2
Marombi	0.87	2.02	131.2	Teesdale	9.41	122.7
H123.1	0.87	1.93	125.6	K89.44	9.37	122.1
K89.44	0.95	1.90	123.9	H150.2	8.62	112.3
Brennan	0.93	1.89	123.2	H154.4	8.60	112.0
96188.18	0.95	1.88	122.3	K37.18	8.10	105.6
Mackellar	0.81	1.88	122.1	LH49E2	8.06	105.0
95102.1	0.88	1.81	117.4	Brennan	7.91	103.1
Crackerjack	1.10	1.80	116.8	SPA Trit	7.91	103.1
LH 50M16	0.92	1.77	115.2	H123.1	7.80	101.7
H150.2	0.98	1.74	113.2	Mackellar	7.68	100.1
95192.14	0.82	1.73	112.6	Tennant	7.67	100.0
H154.4	0.90	1.67	108.7	95192.14	7.58	98.8
K37.18	0.75	1.67	108.3	96188.18	7.49	97.7
LH49E2	0.69	1.55	100.6	Crackerjack	7.48	97.5
Tennant	0.68	1.54	100.0	Marombi	7.04	91.8
Bass	0.58	1.42	92.5	LH50M16	6.72	87.6
Teesdale	0.61	1.25	81.4	Bass	5.28	68.8
<b>LSD (5%)</b>	<b>0.12</b>	<b>0.16</b>			<b>0.55</b>	
<b>CV%</b>	<b>10.0</b>	<b>6.2</b>			<b>4.8</b>	

Despite two fungicides there was some stripe rust on Mackellar and Brennan and to a lesser degree Tennant and the two triticales. Teesdale and nearly all the new CSIRO breeding lines remain resistant. The greatest incidence of stripe rust was on Marombi. The relatively low yield of the latter was mainly due to eyespot and by harvest there were visually lower ear numbers. Eyespot was also evident in a plot of Mackellar and several of the CSIRO lines.

Grain yield after two cuts was lower than for one cut for nearly all lines with an average of nearly 0.6t/ha difference. This effect was close to significant ( $P=0.09$ , data not presented). Statistically there was no significant interaction between variety and cutting treatment but visually some varieties showed better recovery after the second cut than others. However only 2 reps for each cutting treatment is probably insufficient to separate effects. In the Marombi it appeared that the 2 cuts may have exacerbated the incidence of eyespot.

Grain yield of the two triticales varieties was comparable with the current commercial wheat varieties, but significantly lower than some of the newer wheat lines. The yield of Breakwell was close to significantly higher than that of Crackerjack and there was far less lodging but the latter appears to have better stripe rust resistance which would be advantageous with a lower fungicide program, commonly used when growing triticales.

The low grain yield of the Bass oats can be at least partly attributed to extensive grain shedding prior to harvest. The complete lodging of most Bass plots also created harvesting problems. Of the current wheat varieties, Mackellar appears predisposed to some lodging. Lodging was higher with only the one cut and there were variety differences.

Due to further rain, harvest was delayed several days and in the interim strong winds resulted in some grain losses with the worst affected wheats being Tennant and several CSIRO lines. Although not severe, two of the lower yielding CSIRO lines also suffered from head losses.