

5.1.2 WHEAT VARIETY EVALUATIONS AND RESPONSE TO FUNGICIDES (WESTBURY, TAS)

Abstract:

Nearly 50 wheat varieties and lines were evaluated and grain yields were high due to timely November rainfall. Mid to late maturing varieties were finally able to express their yield potential. Alberic, a new Wrightsons variety and a number of CSIRO lines were the best performers. At Symmons Plains, two replicates in the trial received fungicide applications. Responses ranged from nil in resistant material to over 90% yield increase in a susceptible variety.

Researchers:

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Funding Organizations:

HRZ wheat breeding program, Wrightson Seeds

Location: Symmons Plains and "Glen-Avon", Westbury, Tasmania

Growing season rainfall (April-Nov):

Symmons Plains 386mm
Westbury 479mm

Background/Objectives:

With the release of new varieties, greater awareness of potential yields and improved management practices, there has been a large increase in the area sown to wheat in Tasmania. In particular the CSIRO/HRZ wheat varieties have shown adaptation to the Tasmanian environment and have dominated recent plantings. Of particular interest is Mackellar the first commercial wheat variety with Barley Yellow Dwarf Virus (BYDV) resistance and other new CSIRO BYDV resistant lines. Three wheat varieties from Wrightson Seeds are also being tested following good performances in previous years and in New Zealand. With new races of stripe rust appearing in the last two seasons, it is important that information on the response to stripe rust is gathered. There have also been some differences in disease susceptibility in Tasmania compared with Eastern Australia.

The aim of these trials was to compare existing wheat varieties and evaluate new breeding material under different disease management programs.

Methodology:

Main entries and their origin are listed below:

Tennant, Brennan, Mackellar, Rudd	Canberra – HRZ wheats
Wedgetail, Wylah, Marombi	NSW/ EGA, SunPrime
Kellalac, Chara	Victoria/ AGT
Teesdale, Amarok, Alberic	Wrightson Seeds/GrainSearch

A further 36 breeding lines from CSIRO were also evaluated at Symmons Plains.

The trial designs were randomised complete blocks with 4 replicates at Symmons Plains and 3 at Westbury. To provide information on crop management and disease response, two replicates in the Symmons Plains trial received fungicide applications and additional topdressed nitrogen.

Sowing date:

Symmons Plains 27 May 2004
Westbury 26 May 2004

Fertiliser:

Symmons Plains

basal - 250kg/ha 9:13:17
topdressing - low input 46kg N/ha
- high input 92kg N/ha

Westbury

basal - 250kg/ha 9:13:17
topdressing - 75kg N/ha

Weed Control:

Symmons Plains - 1.5/ ha Brominil (18 Aug)
- 1.5//ha MCPA (18 Aug)
- Affinity 60g/ha (1 Sept)
Westbury - 1.5//ha Brominil (18 Aug)
- 1.5//ha MCPA, (18 Aug)

Fungicides:

Symmons Plains - low input: none
- high input: 2 x 500ml Bumper
Westbury - 2 x 500ml Bumper

Harvest date:

Symmons Plains - 19 January 2005
Westbury - 26 January 2005

Results and Discussion:

Grain yields were very high due to the reasonably good finish to the season (Table 1). These rains favoured the later maturing wheats such as Alberic and LH49E2. The major exception to this was Tennant which is late flowering but was also low yielding. In contrast the earlier maturing varieties such as Chara, Wedgetail and Wylah yielded relatively poorly even with adequate disease control at Symmons Plains. BYDV was not a problem at either site and consequently the BYDV resistant material (LH49E2, LH50M16 and Mackellar) did not have any advantage (compared with the Campbell Town dual purpose trial).

Westbury received a higher rainfall but nearly all of this was over winter and there was some water logging damage although this was not extensive as the gradational soils at Westbury are more freely draining than the duplex soils at Symmons Plains. However at the other end of the season the better drainage properties of this soil may be disadvantageous and hence the mid-late and late maturing varieties (Amarok, LH49E2, Alberic and Tennant) may have all performed better at Symmons Plains due to greater soil moisture. Of the top CSIRO lines none were early types (although two were early-mid maturing). Only the highest yielding CSIRO lines are presented in Table 1.

Disease pressure at Symmons Plains was high and with two fungicide sprays there was still some activity late in the season. There was more than one active rust strain as several lines remained resistant until the end of November when they appeared to suddenly succumb. Several other varieties such as Tennant were susceptible until late stem elongation and exhibited what is known as adult plant resistance, where resistance kicks in and the upper leaves are protected from rust infection. Response to higher inputs ranged from nil (and negative) to 93% higher (see % diff column in Table1). Not surprisingly the nil and less responsive material (about 20% of the varieties and lines) rated as stripe rust resistant. (The lack of response in many lines also suggests no benefit from the additional top-dressed nitrogen. The previous crop of lupins would have provided carry over nitrogen but the paddock has been continuously cropped for at least the last 10 years.)

In contrast to the lack of response in the top yielding lines, the 4 lowest yielding varieties in Table 1 showed extremely large to large responses and with the exception of Brennan all ranked as moderately susceptible to susceptible. Similarly the most responsive of the CSIRO lines showed a yield increase of 22% with the higher inputs and was rated as stripe rust susceptible (data not presented).

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Table 1: Wheat Grain Yields from Symmons Plains and Westbury

Variety/Line	Symmons Plains					Westbury		
	Yield low input	Yield high input	% diff high/low input	Mean Yield (t/ha)	%Tennant	Yield (t/ha)	%Tennant	%Tennant mean
95102.1	9.12	9.51	104.3	9.32	124.5			124.5
K89.44	8.94	8.99	100.6	8.97	119.8			119.8
H123.1	8.59	9.06	105.4	8.82	117.9			117.9
95192.14	8.84	8.80	99.6	8.82	117.9			117.9
ALBERIC	9.41	9.21	97.9	9.31	124.4	7.89	109.9	117.2
LH49E2	8.53	8.78	102.9	8.65	115.7	8.43	117.5	116.6
H154.4	8.68	8.64	99.5	8.66	115.8			115.8
97207.84	8.56	8.73	102.0	8.65	115.6			115.6
97835.141	8.39	8.79	104.9	8.59	114.8			114.8
H150.2	8.71	8.45	97.1	8.58	114.7			114.7
LH50M16	8.23	8.87	107.7	8.55	114.3			114.3
RUDD	8.13	8.06	99.2	8.10	108.2			108.2
AMAROK	8.21	8.40	102.2	8.31	111.0	7.38	102.8	106.9
MACKELLAR	7.36	7.66	104.1	7.51	100.4	7.59	105.8	103.1
TEESDALE	7.60	7.36	96.8	7.48	100.0	7.58	105.7	102.8
MAROMBI	7.15	7.84	109.7	7.50	100.2	7.52	104.8	102.5
KELLALAC	6.98	7.59	108.8	7.29	97.4	7.52	104.8	101.1
TENNANT	7.38	7.58	102.8	7.48	100.0	7.17	100.0	100.0
WEDGETAIL	5.31	6.90	129.9	6.10	81.6	7.34	102.4	92.0
BRENNAN	6.07	6.64	109.5	6.36	84.9	6.87	95.8	90.4
CHARA	4.09	6.56	160.4	5.33	71.2			71.2
WYLAH	3.56	6.87	193.0	5.21	69.7			69.7
LSD 5%	0.61		0.42				0.42	
CV %	3.9						3.2	

With the strong winds in the week prior to harvest there was grain shedding in some lines. Although losses were not high Tennant was the worst offender and to a lesser extent Teesdale but only at Westbury. The effect was less noticeable in the higher input reps at Symmons Plains due to delayed maturity

Conclusions:

In a season with good finishing rainfall in November the mid to later maturing wheat lines were able to show their potential – in particular the new material: Alberic, LH49E2 and a number of other CSIRO lines. The past few seasons have favoured the early maturing varieties. In particular, Brennan which is relatively early, ranked much lower in 2004-05 compared with previous trials. Tennant is a robust variety but appears to have a lower yield potential with favourable conditions.

Response to 2 fungicide applications ranged enormously, from nil to 93%. Tennant, the Wrightson varieties and a large proportion of the new CSIRO/HRZ wheat germplasm proved resistant to the recent strains of stripe rust. Varieties that would be regarded as carrying moderate levels of the disease ie Mackellar, Marombi, Brennan, showed much less response (4-10%) compared with the more susceptible varieties ie Wylah, Chara, Wedgetail (93-30%).