

2.4.2 Triticale variety trial - Symmons Plains, Tas

Location:

"Symmons Plains" Tasmania.

Funding:

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Researchers:

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Background/Aim:

Triticale has been recognised for its tolerance to waterlogging, better resistance to leaf and root disease and greater tolerance to acid soils compared with wheat. There are also perceived to be fewer difficulties associated with feeding of triticale grain to some livestock compared with wheat. A new strain of stripe rust resulted in the breakdown of resistance in most triticale varieties in 2004-05 and it is important to further assess disease responses, particularly as triticale is considered a low input crop. The aim of this trial was to compare existing triticale varieties and evaluate new breeding material with stripe rust resistance.

Take home messages:

- All triticale varieties evaluated showed some degree of susceptibility to stripe rust with Breakwell being most susceptible. Grain yield rankings largely reflect this with Breakwell finishing a distant last.
- Hawkeye was significantly higher yielding than all other varieties and this was probably assisted by significantly less lodging compared with the other varieties except Breakwell.
- Further trials will be conducted in 2009-10 to validate the performance of Hawkeye and screen new disease resistant material from other breeding programs..

Trial information:

As a consequence of the severe stripe rust in most varieties in 2004-05 the number of triticale entries being evaluated has been significantly reduced. Entries, their breeding program origin and seed licensee are listed below. Jaywick and Hawkeye were evaluated in field trials in Tasmania for the first time.

Tahara	Vic DPI / various
Breakwell, Tobruk	University of Sydney / Waratah Seeds
Hawkeye, Jaywick	AGT Seeds / AGT Seeds

The trial design was a randomised complete block with 4 replicates. The trial was sown on June 2 with 250kg/ha 9:13:14:3. With reasonably good soil N levels and a very dry season with virtually no soil moisture the decision was made to avoid detrimental effects from excess N and apply only 25kg N/ha (foliar application). It was planned to apply fungicide to two replicates to assess response to fungicide. However due to the susceptibility of all entries to stripe rust all four replicates received two fungicides applied at Growth Stages 32-33 and 43-55. The grain was harvested on 27th January.

Rainfall:

Growing season rainfall (Apr-Nov): 269 mm

Results and discussion:

There was a late break to the season and it wasn't until the end of May that there was sufficient soil moisture to plant into and no good rains until mid June. Consequently plants were slow to establish. After a very dry winter there were good soaking rains in September which turned the season around but rainfall in October was virtually non-existent (7 mm). The dry conditions compounded damage from two severe frosts between -3 and -4°C on October 22nd and 23rd. There were again good rains in November and follow up rains until late December.

With triticale in 2008-09 the over-riding issue was stripe rust. This took off on all triticale material and was so severe on Breakwell, in particular, the decision was made to spray all plots with fungicide to avoid the effects of highly susceptible lines reducing the grain yield of neighbouring plots. It was obvious in any case which material was susceptible and could be culled for future trials.

Hawkeye, Jaywick and Tobruk, were all listed as resistant to stripe rust but scored no better than Tahara (moderately resistant to mod. susceptible). The rainfall and cooler weather in Nov/Dec were also conducive to development of stripe rust in the ear. This was particularly noticeable in Tahara and Tobruk and to a lesser degree Hawkeye. Breakwell appeared to overcome earlier susceptibility with relatively green flag leaves (adult plant resistance finally kicking in?) but most of the damage had been done and all the lower leaves were almost totally covered with stripe rust lesions.

Grain yield largely related to stripe rust with the susceptible Breakwell significantly lower yielding than all other material (Table 1). With this strain of stripe rust (Jackie pathotype), Breakwell, which had been performing particularly well as a dual purpose crop, needs to be replaced or a rigorous spray program adopted (or a season far less conducive to stripe rust!).

The dual purpose variety Endeavour, from the same breeding program as Breakwell, has reportedly maintained its resistance and will be evaluated in trials in 2009-10. Of the new varieties, Tobruk was probably the most disappointing as yields had been exceptionally high in NSW trials and reasonably good in previous trials in Tasmania. Recently there was speculation that the susceptibility of Tobruk is due to plant off-types and that a pure line would be reselected.

Table 1: Grain yields from triticale variety trial at Symmons Plains, Tasmania, 2008-09.

Variety	Yield (t/ha)	% Tahara
Hawkeye	6.17	147
Jaywick	4.76	114
Tahara	4.19	100
Tobruk	4.11	98
Tahara + Breakwell	3.41	81
Breakwell	1.65	39
F prob	<0.001	
LSD P=0.05	1.03	
CV%	10.9	

The new AGT varieties Hawkeye and Jaywick performed relatively well and the former was significantly higher yielding than all other varieties and this may partly relate to less lodging. Early growth was good, particularly in Hawkeye, Jaywick and Tahara. However this resulted in considerable lodging in plots of the latter two varieties and to a lesser degree Tobruk. Hawkeye is of shorter stature and there was significantly less lodging and Breakwell has always shown good standability. Both Hawkeye and Jaywick are spring types and not suitable for early sowing. The early and severe lodging in Jaywick is cause for concern.

Although there was some frost damage in all triticale varieties the effects were not severe. Up until this season the later maturing Breakwell has generally avoided most frost damage at flowering. It is likely that a minor frost (-0.3°C) on 17th Nov (four days after a 27°C day) and three frosts in early December (lowest temperature of -1.4°C on 4th Dec) were more damaging in Breakwell than the frosts in late October.

Tahara tends to rank highly in seasons with lower rainfall and when there are no frosts at flowering. In seasons with a sharp finish Tahara has yielded as much as 40% higher than the later flowering lines. However, in seasons with frosts at the end October/early November, later flowering lines perform relatively well and if in addition there is a reasonable finish to the season some of the later lines have yielded 100% higher than Tahara.

Due to the large variation in ranking of cultivars between years, seed from an early maturing (Tahara) and a late maturing cultivar (Breakwell) was mixed with the idea that if the early line was affected by frosts the later flowering line could (at least partially) compensate for the grain losses. Conversely, in a season with no frosts and a dry finish the early line could compensate for the lower yields of the late line. Such composite lines could provide a means of minimising fluctuations between years.

In the first four years of trialing variety mixtures there was no significant frost damage and consequently Tahara yielded relatively well. Over this time period the composite line ranged from 91% to 101% of Tahara. In this trial the composite line yielded over 200% higher than Breakwell but clearly the more disease resistant Tahara grown solely in 2008-09 was a better option.

The triticale trial was grown adjacent to the main wheat variety trial at "Symmons Plains" and thus provides some comparison. Overall the wheat tended to out-yield the triticale which was not surprising given the poorer stripe rust resistance and generally lower frost tolerance in triticale. Never-the-less, yields of Hawkeye were comparable with the better wheat lines (but with all 4 replicates receiving fungicides).