5.5 EARLY SOWN (MARCH) WHEAT AND TRITICALE – EFFECT OF CUTTING (NILE TAS)

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Location: "Waddymore", Nile

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

Summary:
Responses to cutting treatments in Mackellar wheat and Breakwell triticale were examined in an early sowing (March). Plots were either cut once or twice to simulate different grazing pressure, or left uncut. There was little effect on grain yield from the cutting treatments in Mackellar whereas cutting resulted in an 18% reduction in yield of Breakwell. The second cutting treatment compared with the first cut had little additional effect on grain yield in Breakwell suggesting impacts on grain yield occurred during early spikelet initiation and not from removal of the growing point. Further trials with additional replication are required to examine the effect of early cutting on plant physiology. In uncut plots Breakwell was 24% higher yielding in grain compared with Mackellar.

A forage harvest of Breakwell sub-plots at late milky dough stage produced over 21 t/ha of dry matter. Samples are being tested for feed value and suitability for forage.

Background/Objectives:
With early sowing dates in the UK excess vegetative growth is controlled by lower plant population and where necessary, reduced nitrogen inputs early in the life of the crop. In the high rainfall areas of Australia excess growth can be controlled through grazing. The aim of this trial was to determine the effect of grazing (cutting) on grain yield of early sown wheat and triticale in comparison with uncut treatments. The potential of triticale for production of silage was also assessed.

Varieties: Mackellar, Breakwell
Treatments: Uncut and cut

The trial consisted of four replicates in a randomised complete block design with buffer plots to separate the different cereals and cutting treatments.

Sowing Date:
18th March 2005 with 4:13:7:9 fertiliser at 250kg/ha and was watered up under a centre pivot irrigator. Nitrogen (50kgN) was top-dressed on 7th September and with the favourable season a further 50kgN was applied on 17th October. A two spray straddle fungicide schedule was used (GS34 and GS45-51).

For the cut plots, dry matter cuts were taken on the 30th June (4 reps) and 16th August. Only 2 replicates received a second cut to determine whether there were deleterious effects from a late (GS31-32) cut. At late milky dough stage, 2.4m^2 of plot was removed from each of the previously uncut triticale plots to assess the potential for silage. The remainder of the plot was left for grain harvest on 13th January 2006.

Results and Discussion

Growth:
With irrigation, establishment was good but early growth was reduced by the dry autumn (Decile 2) and early winter (Decile 3). The complete turn-around in the season with a wet spring (Decile 8) and mild temperatures resulted in good growth later in the season. Prior to the first fungicide application there was a minor level of stripe rust present and the incidence tended to be greater in the uncut plots. In contrast cutting of plots may have increased the level of eyespot in Mackellar, particularly where cut twice.

In mid October a solarimeter was used in the wheat to measure the amount of light being allowed to pass through the canopy to reach ground level. Light interception was considerably lower where plots had been cut.

The Mackellar and Breakwell plots cut for grazing estimates yielded 1.88 and 2.06 t/ha of total dry matter respectively. From past trials, cutting at a height of 40mm, as for wheat, has been too low for triticale resulting in significant loss of tillers. Consequently Breakwell plots were cut at 50-60 mm which is more in line with commercial practice where grazing of triticale has occurred. Total dry matter production would therefore have been higher than indicated for Breakwell. For the second (grazing) cut all plots were cut at 70-75mm above ground level to avoid damage to growing points.

Despite the initial irrigation the dry autumn and early winter restricted early dry matter production. In contrast the silage cuts of Breakwell yielded an impressive 21.6 t/ha with obvious potential for silage production. Samples will be shortly tested for analysis of feed value.

Lodging was extensive in the uncut Mackellar plots. Lodging scores are based on an index calculated as $^1/_3$ (proportion of plot leaning at an angle between 5° and 45°) + $^2/_3$ (% plot at angle between 45° and 80°) + (% plot lying flat). There was considerable variation between plots but not surprisingly the cut treatments showed little lodging. Nevertheless in one cut plot (with only one cut taken), the lodging index score was high and it is apparent that Mackellar is susceptible to lodging. There was only minor leaning in Breakwell plots and no significant difference between cut and uncut plots.

Grain yield:
There was little difference in the grain yield from cut plots of Mackellar and Breakwell. Cutting (for grazing estimates) had no significant effect on the grain yield of Mackellar whereas with Breakwell there was an 18% reduction in grain yield and this was highly significant. Of note was the negligible effect of number of cuts of both cereals i.e. whether there were 2 cuts or only 1 early cut (data not presented). For Breakwell the first cut at the end of June restricted the development of yield potential and the second cut had little additional impact. For effects on grain yield to occur so early in the season warrants further investigation and greater replication instead of only the 2 replicates of each cutting treatment used in this trial. As the plots were cut with a mower, compaction from grazing is not an issue. In an adjacent trial it appeared that the incidence of eyespot was exacerbated by cutting of wheat plots. However no eyespot was observed on the triticale.

The uncut plot of Breakwell was 24% higher yielding than Mackellar. In a badly but uniform waterlogged variety trial in 2003-04, Breakwell showed greater waterlogging tolerance compared with the other triticale (and wheat) varieties. It is possible that there was some waterlogging damage in the current trial (and root diseases?) which limited the yield of Mackellar regardless of cutting treatment. The effect of the early cutting in Breakwell may have reduced root biomass or imposed additional stress on plants and this may have reduced waterlogging tolerance and possibly tolerance to pathogens. Commercially, it is clear that grazing of Breakwell requires caution.

Table 5-11: Effect of cutting of early sown wheat (Mackellar) and triticale (Breakwell) on grain yield and lodging, Nile, 2005-06.

Variety	Cutting trt	Yield (t/ha)	%Diff cut/uncut	Lodging score
Mackellar	uncut	7.74	99%	67.9
	cut	7.67		3.4
Breakwell	uncut	9.61	82%	5.8
	cut	7.85		2.1
LSD (0.05)		**0.77**		**18.1**
CV%		**4.4**		**55.9**

It was expected that the March sowing may have created too much vegetative growth in the uncut plots with associated problems of less available soil moisture during grain fill and higher levels of leaf disease. However growing conditions may not have been detrimental for excess growth. Soil moisture was not a major limitation in 2005 with the good spring and early summer rainfall. While there tended to be more stripe rust on uncut lots this effect was only small. Without fungicide application considerably larger effects could be expected. Two fungicide applications were sprayed and this is not excessive given that it is already current practice in at least some May – June sown crops.

It is also possible that yield reduction from excess vegetative growth in the uncut Mackellar plots may have been balanced by additional physiological stress and greater incidence of eyespot in cut plots resulting in comparable grain yields. In a season with a drier finish the cut plots could be expected to have more available soil moisture during grain fill.

Samples from quadrats cut prior to grain harvest are yet to be processed to determine treatment effects on the number of ears/m^2, grains/ear and grain weight and this may help explain the results.