8.5 The Impact Of Grazing At Different Growth Stages On Drymatter, Grain And Stubble Of Two Wheat Varieties - Mininera, Vic

Location : Mininera

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Rainfall (mm) April – November:
Total Rainfall 607 mm GSR 430 mm

Summary of Findings :
A late sown winter wheat *Marombi* and experimental wheat *10.10.3* were grazed at three different times and compared to the ungrazed crop. Drymatter production available for grazing up to GS 30/31 was 1.48 t/ha for *Marombi* and 1.89 t/ha for *10.10.3.*

Early grazing had minimal or no impact on grain yield. Grazing in the early to mid vegetative stage increased grain yield of *10.10.3* by 0.36 t/ha or 5 %. However there was a yield reduction (0.48 t/ha or 8 %) by grazing the *Marombi.* Given the limited number of samples taken, the variation in yield may not be different from the no grazing treatment.

The change in stubble mass was less than anticipated, with a decline of up to 13%.

Background:
Cereal crops have been shown to provide valuable drymatter for grazing during winter. If grazing is completed before GS 30 is reached, previous research has shown grain yield can be equal to or better than ungrazed crops. This trial has been developed to demonstrate three objectives:

- To quantify the amount of high quality feed that can be grown before GS 30
- To identify the difference growth patterns of two winter wheat varieties
- To quantify the grain yield and stubble mass changes due to grazing

Trial Inputs :
Two winter varieties were compared. These were Marombi and a CSIRO experimental winter wheat line 10.10.3. The varieties were sown in mid June at 100 kg/ha with 100kg/ha of MAP. Urea at 100 kg/ha was broadcast on 1/8/2007

▼ Table 8.15: Chemical applications

	Product	Rate	Date
Pre emergent:	PowerMax	1.5lt/ha	25/6/2007
	Trifur	1.2lt/ha	25/6/2007
	Goal	50ml/ha	25/6/2007
Post emergent:	Dual Gold	250ml/ha	28/6/2007
	Diuron	500ml/ha	28/6/2007
	Tigrex	600ml/ha	15/7/2007
	Dimethoate	100 ml/ha	28/6/2007
	Axial	300ml/ha	30/7/2007
	Adigor	500ml/100lt	30/7/2007

Trial Design:

The trial site of approximately 1 ha was divided into two area. Three quarters of the area was sown to *10.10.3* wheat and the remaining quarter sown to *Marombi* wheat. The sown area was then fenced into three sections to allow grazing to occur at three different times. Each grazed area had grazing exclusion areas established.

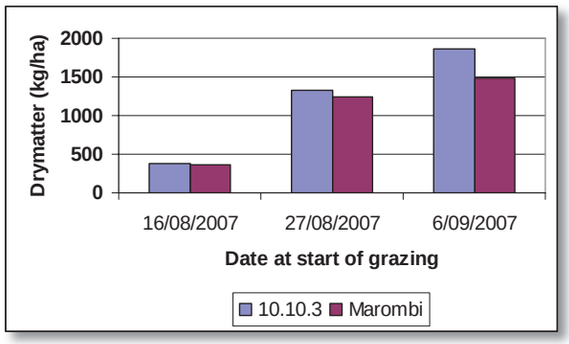
Merino ewes were used to graze the sections. The sections were grazed "into the ground" within 10 days.

Prior to each grazing the amount of drymatter available was measured and a feed analysis was conducted.

Grazed and ungrazed sections were all hand harvested over a week long period in mid January with both grain and stubble yields recorded. A full grain analysis was conducted.

Results:

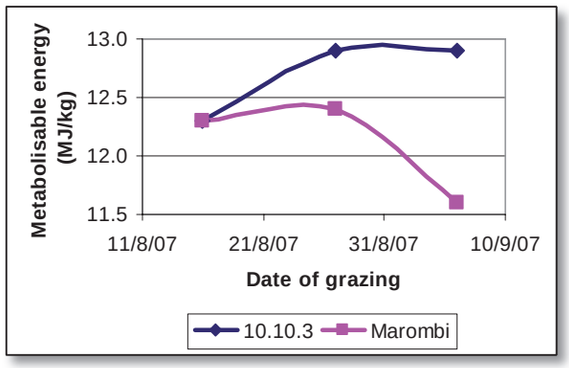
Both varieties established satisfactorily, with Marombi at 282 plants/m^2 and 10.10.3 at 238 plants/m^2. As expected the amount of drymatter for grazing increased with later grazing (Figure 8.19).



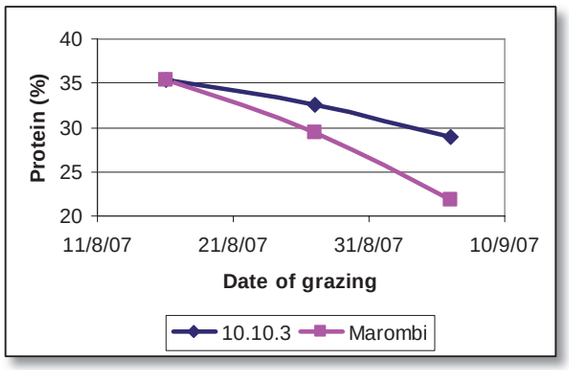
▲ **Figure 8.19: Drymatter produced at various grazing dates for Marombi and 10.10.3 wheat**

The growth rate in late August was more than 80 kg/ha/day, although this slowed to approximately 50 kg/ha/day in early September due to the onset of a dry period.

The quality of the drymatter was extremely high (Figure 8.20 and 8.21). The energy and protein content of the drymatter with variety *10.10.3* appears higher than *Marombi*. The pattern of maximum energy peaking at late tillering and protein declining from sowing is consistent with observations from other trials.



▲ **Figure 8.20:Change in energy content at various grazing dates for Marombi and 10.10.3 wheat**



▲ **Figure 8.21: Change in protein content at various grazing dates for Marombi and 10.10.3 wheat**

Grazing may have resulted in a small increase in weeds. Annual ryegrass in the grazed areas increased from 5 to 8 plants/m^2 and toadrush from 21 to 39 plants/m^2.

Grazing had minimal or no impact on grain yield if grazing occurred before growth stage 30 (Table 8.16 and 8.17). Due to a miss in sampling, the effect of grazing at or after GS 30 could not be determined.

▼ **Table 8.16: Impact of grazing on grain yield of Marombi wheat**

Cultivar	Grazing date	16-Aug	27-Aug	6-Sep
	Growth stage	GS 21	GS 22	GS 30
		Yield (t/ha)		
Marombi	Ungrazed	5.63	5.84	4.34
	Grazed	6.34	6.08	N/A

▼ **Table 8.17: Impact of grazing on grain yield of *10.10.3* wheat**

Cultivar	Grazing date	16-Aug	27-Aug	6-Sep
	Growth stage	GS 23	GS 24	GS 31
		Yield (t/ha)		
10.10.3	Ungrazed	7.38	6.73	5.37
	Grazed	6.88	6.52	N/A

There was no noticeable change in grain protein due to grazing for either variety (approximately 10.5% CP +/- 0.3%). Thousand grain weight was also similar. Grazing only had a small impact on the stubble left after harvest. This is much less than many other trials recorded.

▼ **Table 8.18: Reduction in stubble mass due to grazing of Marombi wheat**

Grazing date	16-Aug	27-Aug	6-Sep
Growth stage	GS 23	GS 24	GS 31
Reduction (t/ha)	-0.47	0.30	N/A
Reduction (%)	-5%	4%	N/A

▼ **Table 8.19: Reduction in stubble mass due to grazing of 10.10.3 wheat**

Grazing date	16-Aug	27-Aug	6-Sep
Growth stage	GS 23	GS 24	GS 31
Reduction (t/ha)	0.20	1.33	N/A
Reduction (%)	2%	13%	N/A

Trial Observations:

Although sown late, the trial experienced good conditions for establishment and early tiller development. The major impacts of grazing wheat up to GS30 was a reduction at approximately 1500 kg/ha drymatter with no impact on grain yield were supported by this trial. The reduction in stubble mass was less that previous experience, but may be partly explained by the reduced number of samples taken for analysis.

The different growth habits (Photo 8.11) of the two varieties were evident with the *10.10.3* wheat variety showing more early vigor and the *Marombi* wheat responding to the extra nitrogen and good conditions later in the growing season. Very little leaf disease was encountered until flag leaf emergence when the *Marombi* showed signs of Stripe rust. A fungicide was not applied to determine what affect grazing would have on the outbreak. By grazing the development of the rust infection was delayed but not avoided.

At harvest it was difficult to distinguish the grazed from the ungrazed in terms of height in the early grazed plots. The major difference was the reduction in mass of the lower canopy in the grazed plot. The later grazed plot showed a reduction in both crop height and canopy mass. The below average rainfall experienced in August and October may have contributed to this observation. This trial has also identified that there may be increased weed populations through grazing. The aspect of weed impact from grazing will be studied in more detail in the future.

▲ **Photo 8.11: Illustrates the different growth habit of 10.10.3 (left) and Marombi (right)**

▲ **Photo 8.12: Recovery from grazing. Ungrazed left, grazed right.**