# IMPACT OF GRAZING INTENSITY ON WHEAT CROP PRODUCTION

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## TAKE HOME MESSAGES

- Spring-type cereal crops can be grazed safely if they are grazed early, and/or lightly.
- The more green material remaining post-grazing, the better a crop can recover.
- Grazed crop recovery is a function of paddock conditions, timing, grazing management and remaining season conditions.

## KEY WORDS

Forage value, grazing intensity, yield penalty.

## BACKGROUND

Cereal and canola crops have successfully been grazed without a grain yield penalty in higher rainfall areas when long growing season (often winter type) crops are sown early and grazed before specific plant growth stages (stem elongation for cereals and bud elongation for canola). The ability of the crop to recover from grazing depends on the type of crop (short vs. long season, winter vs. spring habit), the amount of leaf area remaining to intercept light (dependent on the timing, intensity and duration of grazing) and adequate moisture and nutrition to fulfil plant requirements for growth.

From 2009 to 2012, BCG trials in the lower rainfall Victorian Mallee indicated potential yield loss risks when grazing spring cereal crops. Trials using short to mid season maturing varieties usually sown at the end of April have been grazed down to the 'white line' point on the stem – a grazing rule of thumb developed in higher rainfall regions to avoid yield loss. Trials were grazed quite early (at GS3-4), with only 150–300kg DM/ha, when plants are anchored (resistant to being pulled out) and the feed is needed.

There are however, several farmers in northern Victoria who lightly graze spring-type crops with no, or with minimal, yield loss. If yield loss is incurred, the growers' attitude is that a small yield loss is an acceptable trade-off in terms of the feed value that sustains their pregnant or lactating ewes, or growing lambs at a time of low paddock feed. In 2012, a trial at Raywood (see *BCG 2012 Livestock Research Results* pp. 58-62) indicated that crops can safely be grazed when a quantity of green leafy matter is left after grazing to aid crop recovery – a function of crop stage of growth, and grazing duration and intensity.

In 2013, a further trial was conducted in the Victorian Mallee to evaluate the potential for 'safe' grazing in this environment.

## AIM

To evaluate the impact of grazing intensity on forage value, crop recovery and grain production of a wheat crop in the Victorian Mallee.

## METHOD

| | | |
|---|---|---|
| Location: | Watchupga East | |
| Replicates: | Four | |
| Sowing date: | 24 April | |
| Target plant density: | 130 plants/$m^2$ | |
| Crop type: | Scout wheat | |
| Treatments: | ungrazed | |
| | grazed at GS21: 15cm tall, grazed down to 5cm | |
| | grazed at GS30: 20cm tall, grazed down to 5 or 10cm | |
| | grazed at GS33: 25cm tall, grazed down to 5, 10 or 15cm | |
| Fertiliser: | at sowing | Granulock supreme Z treated with Impact (55 kg/ha) (10% N) |
| | 9 July | Urea (90kg/ha) (46% N) |
| | 23 August | Urea (90 kg/ha) (46% N) |
| Herbicides: | at sowing | Triflur X® (1.5 L/ha) + Weedmaster DUO® (1.5L/ha) |
| | 8 July | Velocity (670ml/ha) |
| Insecticide: | 23 September | Alpha Duo (200ml/ha) |
| Seeding equipment: | BCG parallelogram cone seeder (knife points, press wheels, 30 cm row spacing) | |

The trial was sown at the end of April after 5mm of rainfall and into limited soil moisture. The next significant rain event (34mm over four days) did not fall until early June, so germination was staggered well into May. Rain continued to fall, albeit in small amounts, regularly until the end of September. Only one useful rain event occurred during October: 8mm on the 24th.

At each grazing treatment time, dry matter production was measured. A sub-sample of the four replications was extracted and feed tested for nutrient value: crude protein (CP), metabolisable energy (ME) and nutrient detergent fibre (NDF). Grazing was then simulated for the treatment by mechanical removal of the whole plot using a mower (grazed down to 5cm) or whipper snipper (grazed down to 10cm or 15cm).

Using DM and feed tests, dry sheep equivalent (DSE) grazing days were calculated as follows:

> *DSE grazing days = DM (kg/ha) – 30 (kg/ha; physically unavailable DM) x feed test Metabolisable energy (ME) / 8 MJ, which assumes that each DSE requires 8 MJ/day*

Dry matter production was measured at anthesis to evaluate crop recovery after grazing.

Grain yield was measured using a small plot harvester, and samples analysed for grain quality. Grain yields were adjusted to 11.5% moisture for the statistical analysis of results.

## RESULTS AND INTERPRETATION

Early feed value (grazing days) provided by the crop increased significantly as plants matured and grazing intensity (forage removed) increased as expected (Table 1). Feed tests showed that protein increased as the crop approached GS30, but only marginal changes were measured in ME and NDF. As more crop was grazed at both 20cm and 25cm tall, there were small changes in nutrients; protein

decreased, ME decreased and NDF increased. This reflects the difference in grazing quality between the tissue of the leaf tips and that of the whole plant. Nevertheless, nutrient value of forage for all grazing treatments was adequate to meet the needs of a lactating ewe or growing lamb (protein >16%, energy >11 MJ kg/DM and NDF >30%).

**Table 1. Early feed value of Scout wheat grazed at different stages and down to different heights, Watchupga East 2013.**

| Grazing date | Growth stage | Height (cm) | Plant height after grazing (cm) | Dry matter (kg/ha) | Grazing days | Crude protein (% of DM) | Metabolisable energy (MJ/kg DM) | Neutral detergent fibre (% of DM) |
|---|---|---|---|---|---|---|---|---|
| 9 July | GS21 | 15 | 5 | 159[a] | 190 | 16.5 | 11.8 | 39.9 |
| 25 July | GS30 | 20 | 10 | 156[a] | 194 | 29.9 | 12.3 | 35 |
| | | 20 | 5 | 262[a] | 328 | 26.2 | 11.3 | 41.7 |
| 8 August | GS33 | 25 | 15 | 1059[b] | 1608 | 29.9 | 12.5 | 38.1 |
| | | 25 | 10 | 1253[c] | 1911 | 27.2 | 12.5 | 39.3 |
| | | 25 | 5 | 1302[c] | 1988 | 21.5 | 11.4 | 44.5 |
| | | | Sig. diff. | P<0.001 | | | | |
| | | | LSD (P=0.05) | 123 | | | | |
| | | | CV% | 11.7 | | | | |

In general, the later and more heavily (to a lower height) the crop was grazed, the less the crop was able to recover, producing less dry matter at anthesis. Crops grazed early (at GS21), however, were able to produce as much dry matter as the ungrazed crop at anthesis (Table 2).

In turn, grain yield reflected the dry matter production. Crop grazed early produced equal grain yield to ungrazed crop, while a later and more heavily grazed crop yielded less (Table 2).

Grain quality was not affected by grazing at any growth stage or degree of grazing severity: protein averaged 11.4% and screenings averaged 3.2% (Table 2).

**Table 2. Grain yield and quality of Scout wheat grazed at different stages and down to different heights, Watchupga East 2013.**

| Grazing date | Growth stage | Height (cm) | Plant height after grazing (cm) | Dry matter at anthesis (t/ha) | Grain yield (t/ha) | Protein (%) | Screenings (%) |
|---|---|---|---|---|---|---|---|
| Ungrazed | – | – | – | 4.04[ab] | 2.54[a] | 11.3 | 3 |
| 9 July | GS21 | 15 | 5 | 4.09[a] | 2.51[a] | 11.1 | 3.3 |
| 25 July | GS30 | 20 | 10 | 3.49[bc] | 2.4[ab] | 11 | 3.4 |
| | | 20 | 5 | 2.89[cde] | 2.18[c] | 12 | 2.7 |
| 8 August | GS33 | 25 | 15 | 3.06[cd] | 2.21[bc] | 11.5 | 3 |
| | | 25 | 10 | 2.87[de] | 2.07[c] | 11.1 | 3.5 |
| | | 25 | 5 | 2.42[e] | 1.84[d] | 11.2 | 2.7 |
| | | | Sig. diff. | P<0.001 | P<0.001 | NS | NS |
| | | | LSD (P=0.05) | 0.60 | 0.2 | – | – |
| | | | CV% | 12.4 | 6.1 | 5.5 | 15.1 |

## COMMERCIAL PRACTICE

Trials in 2012 and 2013 reflected farmer experience in which spring-type cereal crops can be grazed safely if they are grazed early, and/or lightly (that is, if green material remains after grazing to aid crop recovery). These conditions will involve a compromise in terms of the amount of feed available for grazing, but will lessen the risk of undesirable yield penalties.

The decision to graze a spring-type cereal crop while minimising the chance of a grain yield penalty must consider the likelihood of favourable growing conditions for crop recovery.

These include:

- paddock conditions: stored soil moisture , soil cover, nutrient status, crop health
- timing: an early sowing opportunity and crop stage (in low rainfall environments GS30 is generally too late)
- grazing management: stocking density and the duration of grazing will effect crop removal
- the likelihood of favourable conditions for the remainder of the growing season.

Strategic choice of variety maturity, sowing time and grazing management, coupled with considerations of seasonal conditions, will lessen the financial impact of grazing on a crop, and reap the benefits in the livestock enterprise in terms of ewe health and lamb growth rates.

## REFERENCES

Frischke, A. 2013. Lambing percentage boosted by grazing crops. BCG 2012 Livestock Research Results, pp. 58-62

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