LAMBING PERCENTAGE BOOSTED BY GRAZING CROPS

Alison Frischke (BCG)

TAKE HOME MESSAGES

- Cereal crops provide an opportunity to increase lamb production while maintaining, or increasing, the area of land cropped.
- Early-sown crops, grazed early and moderately (i.e. green leaf is left for plant recovery) can recover to yield similar to ungrazed crops.
- During a 2012 trial, barley grazed early recovered to yield the same as ungrazed barley. Wheat grazed twice yielded 0.4t/ha less than the ungrazed control crop. Simulated grazing of canola near bud elongation (late) reduced grain yield by 0.6t/ha compared with the ungrazed canola.

BACKGROUND

It has been well demonstrated that cereal and canola crops can be grazed without yield penalty in high-rainfall areas provided some general principles are followed. To achieve this, crops should be: sown early; grazed when anchored and before particular plant growth stages (stem elongation for cereals and bud elongation for canola); and then locked-up (animals excluded) for the remainder of the season to allow biomass recovery and grain yield.

A plant's ability to recover biomass depends on its maturity type (short versus long season) and growth habit (winter versus spring types), as well as the level of biomass remaining to intercept light, available nutrition and stored soil moisture and in-crop rainfall for the remainder of the season. If these conditions are changed or compromised, for example, in a drier or shorter growing season, crops may not reach their yield potential.

Tim and Jodie Demeo, who operate a mixed farm at Raywood in Central Victoria, have been grazing cereal crops since 2007. In that time they have successfully increased their lambing percentages by 10 per cent, using crops as green feed for ewes and lambs while legume pastures are still establishing.

In addition to increasing lambing percentages, Tim's and Jodie's approach has enabled their farm business to expand with greater cropping intensity and lamb production.

AIM

To evaluate the feed value of wheat, barley and canola crops and determine whether grazing affects crop grain yield, quality or crop recovery at a medium-rainfall site.

METHOD

A replicated trial was established to evaluate the effect of grazing on three crop types: barley, wheat and canola in a medium-rainfall area.

Grazed crop trials
Three square exclusion cages made from 9m panels of steel mesh were positioned 100m apart in each paddock before grazing.

Feed value, or crop dry matter (DM), was measured for barley on 4 July at early tillering (plants had 6-8 tillers and were 10-12cm high). A mob of 500 crossbred ewes in late pregnancy grazed the 40ha barley crop continuously for 10 days from 4 July.

Wheat dry matter was measured on 24 July at mid-tillering. The wheat had regrown from a very light graze at the 2-3 leaf-stage to a height of 21cm. A mob of 120 lambing ewes then grazed the 20ha wheat crop for 10 days, as well as an adjacent barley paddock using a 'drift lambing' approach from 24 July. This practice ensured that the main mob was never in a paddock for any more than 24 hours at a time.

Drift lambing involves leaving ewes with lambs born during the past 24 hours in the birthing paddock, while the rest of the mob (ewes yet to lamb and ewes that have already lambed) are moved into an adjacent paddock. By moving the general mob away, newborn lambs are given better bonding opportunities with their mothers (no disturbance for at least the first six hours), thus reducing mis-mothering and improving lamb survival. After 24 hours, the process is repeated, with the mob moved back to the initial paddock while new mothers and their lambs are left in the second paddock.

Canola was going to be grazed and was sampled on 4 July in preparation for grazing, but a series of unforeseen circumstances prevented this. These included a late start to the season and an unfavourable weather outlook (a predicted El Nino finish), which diminished confidence. Additionally, the rain that was received was untimely, making the paddock unsuitable for grazing when the canola was ready. Consequently, grazing was simulated using a lawn mower inside the caged areas on 24 July. The crop had between 6-10 leaves and buds were visible on five per cent of plants.

Tissue samples were collected at each time of grazing and analysed for nutritive value.

Grazed and ungrazed crops were harvested by taking three large $1m^2$ quadrat samples from each cage site. From these samples, final dry matter and grain yield were measured.

Grazing intensity trial

Exclusion cages within the wheat crop, small quadrats (two rows x 50cm long), were either left uncut (ungrazed), or cut to half height at about 8cm (chip grazed) or down to the white line at 2-3cm (whole plant grazed) to represent different grazing pressures.

Cuts were used to measure feed value and tissue was tested for nutritive value. At crop maturity, areas were harvested for final DM and grain yield.

RESULTS AND INTERPRETATION

The seasonal break at Raywood started during February 2012, with 75mm of rainfall building subsoil moisture. However, apart from some light showers which allowed crops to be sown, another substantial rain wasn't received until late May.

Grazed crop trials

The nutrition value of the barley, wheat and young canola crops were high for protein, energy and digestibility (see Table 1). Fibre content was also adequate for barley and wheat, but low for the canola, sampled on 4 July (not yet ready to graze as DM too low). Although increasing by 24 July, canola dry matter was still short of the minimum nutritional requirements for lactating ewes and growing lambs. This common short-fall of fibre when grazing canola crops needs to be met by supplementing with high-quality hay.

Table 1. Nutritional value of barley, canola and wheat crops, Raywood 2012.

Crop	Stage grazed	Forage DM available (kg/ha)	Crude protein (% of DM)	Neutral detergent fibre (% of DM)	Digestibility (% of DM)	Metabolisable energy (MJ/kg DM)
Barley (Gairdner)	4 July	515.0	27.6	41.7	74.0	12.0
Canola (Crusher)	4 July	7.6	36.5	16.5	76.5	12.5
	24 July	342.0	31.3	26.2	64.5	10.1
Wheat (Young)	24 July	354.0	33.0	32.6	79.2	13.1
Minimal nutritional requirement for lactating ewes and lambs			**>16%**	**>30%**	**>75%**	**>11**

The nitrate level in canola was 500ppm, a level considered safe for grazing. Subclinical effects start to take effect over 2000ppm and toxicities occur above 4000-5000ppm. The potential nitrate levels in canola again support recommendations to provide stock grazing canola with an alternative high-quality feed source on an ad lib basis. Canola should contribute no more than 70 per cent of the total diet.

The canola nutrient results demonstrate the limited window available for grazing canola. While waiting for fibre content to rise, other nutrient levels start to fall and paddock conditions can change. Weed management must not be compromised either, particularly as this is one of the reasons growers

commonly include canola as a break crop in their cropping rotations. Consequently, chemical withholding periods must be considered when planning and implementing grazing.

Barley was not detrimentally affected by grazing, however final DM production and grain yield was lower for grazed canola and wheat during 2012 (see Table 2).

Table 2. Final DM production and grain yield of grazed and ungrazed crops, Raywood 2012.

Crop	Date sown	Stage grazed	Maturity DM (t/ha)			Grain yield (t/ha)		
			Ungrazed	Grazed	Sig. diff.	Ungrazed	Grazed	Sig. diff.
Barley (Gairdner)	24 April	Early tillering	9.67	9.74	ns	4.03	3.79	ns
Canola (Crusher)	27 March	6 – 10 leaf	9.64	7.05	P<0.001 LSD = 0.95 CV% = 10.5	3.01	2.37	P = 0.003 LSD = 0.39 CV% = 12.8
Wheat (Young)	10 May	3 Leaf and mid-tillering	10.61	8.81	P<0.001 LSD = 0.71 CV% = 6.7	3.30	2.88	P = 0.009 LSD = 0.29 CV% = 8.6

The yield penalties incurred in canola and wheat can be attributed to the timing of grazing and a less-than-favourable finish to the season. In this trial, canola and wheat were grazed later in development and while the district received average winter rainfall, the finish to the season, although mild, was dry. Conversely, barley was grazed earlier than the other crop types and was able to recover dry matter by flowering, helping to maintain grain yield.

The oil percentage of canola grain was not affected by grazing, and averaged 45.3 per cent.

Grazing intensity trial

Forage value was reduced by 40 per cent when grazing half the crop down (clip grazing) compared with grazing the crops down completely (see Table 3).

The nutritional value remained adequate, as expected, in both cases.

Table 3. Nutritional value of wheat grazed to different heights at mid tillering, Raywood 2012.

Crop	Forage DM available (kg/ha)	Crude protein (% of DM)	Neutral detergent fibre (% of DM)	Digestibility (% of DM)	Metabolisable energy (MJ/kg DM)
Clip grazed	214	34.7	31.2	80.8	13.4
Whole plant grazed	354	33.0	32.6	79.2	13.1
Minimal nutritional requirement for lactating ewes and lambs		**>16%**	**>30%**	**>75%**	**>11**

The greater the grazing intensity, the less DM the plant could recover by maturity (see Table 3). Grain yield was not affected when crops were only grazed lightly, but yield was penalised when the grazing was intensified (see Table 4).

Table 4. Final DM production and grain yield of wheat ungrazed and grazed at different heights at mid tillering, Raywood 2012.

Grazing pressure	Maturity DM (t/ha)	Grain yield (t/ha)
Ungrazed	11.48	3.42
Clip grazed	10.06	3.24
Whole plant grazed	7.90	2.42
Sig. diff	**P = 0.002**	**P = 0.062**
LSD (P < 0.05)	**1.10**	**0.85**
CV%	**5**	**12.4**

COMMERCIAL PRACTICE

This small trial demonstrated it is best to leave some green plant material in the paddock to facilitate better plant recovery post grazing, especially if soil moisture is low or the season outlook is looking marginal. Tim and Jodie Demeo's manage their grazed crops in a way that ensures plants have the best opportunity to recover. On the Demeo farm animals are often only in the paddock for 24-36 hours before being moved and plants are rarely grazed more than 10cm down.

Grazing also benefits the crops with the reduced DM of grazed crops at maturity making stubble management easier when sowing crops into these areas the following season.

In general, Tim and Jodie feel crop yields on their farm have not been penalised significantly by grazing, achieving comparable yields to their own ungrazed crops and similar crops in the district.

The benefit of using grazing crops to increase lamb production while at the same time being able to increase the cropping percentage of their business, has far outweighed any compromises incurred by any changes in grain yield, weed control (chemical withholding periods) and managing the timing of topdressing of urea.

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