

Does canola have a fit in mixed farming systems?

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Take home messages:

- Winter habit canola was successfully sown in spring 2011, grazed over summer and harvested for grain in 2012.
- Grazing over summer increased grain yield compared to no grazing. Ungrazed yield was 1.9 t/ha, grazed was 2.7 t/ha. Taurus sown at the conventional time (April) yielded 2.3t/ha.
- Number of grazings had a small effect on yield. Grazing twice produced the best result, yielding 0.1t/ha more than grazing once and 0.2t/ha more than grazing three times. Although there was a yield penalty by grazing 3 times compared to two times, the third grazing supplied an additional 1t/ha of high quality feed at the beginning of May.
- Heavy grazing reduced yield compared to light grazing irrespective of the number of times it was grazed. However the reduction in yield was small and the heavy grazing produced 4t/ha of feed compared to 1.4 t/ha when lightly grazed.
- Applying nitrogen over summer has no yield benefits except for multiple (3) heavy grazings. In this case yield went from 2.0 t/ha to 2.7 t/ha.

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Location: Dunkeld research site

Crop: Winter canola, dual purpose, conventional

Variety: CB Taurus

Grazing cereals has proved to be a major opportunity for mixed livestock and cropping farmers in Southern Victoria. If managed correctly, the crop can provide ample amounts of forage over winter and go on to produce grain without a penalty on yield. With more and more land sown to canola in the HRZ, finding the fit of canola in a mixed farming system has been the focus of more recent research. Over the last four years, SFS trials have shown that grazing of canola over winter hasn't supplied much feed and has usually been at the expense of yield.

Conventional grazing of canola in the HRZ provides valuable winter fodder, yet often at the expense of grain yield come harvest. With the introduction of varieties such as Taurus, that have a vernalisation requirement, spring sowing and grazing over summer/autumn can fill the feed gap with potentially little impact on subsequent grain yield, as well as provide other options for management of problem paddocks.

Sowing in October or November means that the crop is in the ground for over 12 months. The vernalisation requirement of winter canola varieties dictates that a plant will not flower until it has endured a certain period of cold weather (over winter). To test this theory, in 2010 some Hyola 50 (spring canola variety) was sown alongside Taurus and was attempting to flower over summer.

What did we do?

The canola was sown into a fallow area at the Dunkeld site, following the failure of late sown barley on the 16th November 2011. As mentioned previously, the aim was to treat the canola as a forage brassica until autumn, when it would be locked up to be carried on to produce grain at harvest 2012.

Grazing management

We set out to answer some key questions relating to grazing spring sown canola. How many times can it be grazed before a yield penalty is suffered? Should I graze it lightly or can I graze it as heavily as my cereals? Does nitrogen application following grazing enable better recovery?

Grazing commenced at the end of January 2012 following some decent rainfall in the summer to enable the crop to get up and away, with 3t/ha of good quality dry matter available when most of the area was lacking feed. The area was grazed by dry ewes at a stocking rate of 13 dse/ha.

Grazing management of the crop is outlined below (Table 1), detailing the dates of the three grazings as well as the dry matter consumed during this time. All up, there was just over 4000 kg/ha of DM removed over 55 days of grazing.

Table 1. An outline of the grazing management of the Taurus crop including number of days grazed and amount of feed consumed

Grazings (no)	Intensity of grazing	Start date	End date	Days grazed & DM eaten	Start date	End date	Days grazed & DM eaten ¹	Start date	End date	Days grazed & DM eaten ¹	Total days grazed & total DM eaten ¹
1	Light	31 Jan	22 Feb	22 (500 kg/ha)							22 (500 kg/ha)
	Heavy	31 Jan	5 Mar	34 (2300 kg/ha)							34 (2300 kg/ha)
2	Light	31 Jan	22 Feb	22 (500 kg/ha)	29 Mar	5 Apr	7 (450 kg/ha)				29 (950 kg/ha)
	Heavy	31 Jan	5 Mar	34 (2300 kg/ha)	29 Mar	10 Apr	12 (650 kg/ha)				46 (2950 kg/ha)
3	Light	31 Jan	22 Feb	22 (500 kg/ha)	29 Mar	5 Apr	7 (450 kg/ha)	26 Apr	3 May	7 (550 kg/ha)	36 (1500 kg/ha)
	Heavy	31 Jan	5 Mar	34 (2300 kg/ha)	29 Mar	10 Apr	12 (650 kg/ha)	26 Apr	3 May	11 (1100 kg/ha)	55 (4050 kg/ha)

¹Doesn't include plant growth during the grazing period

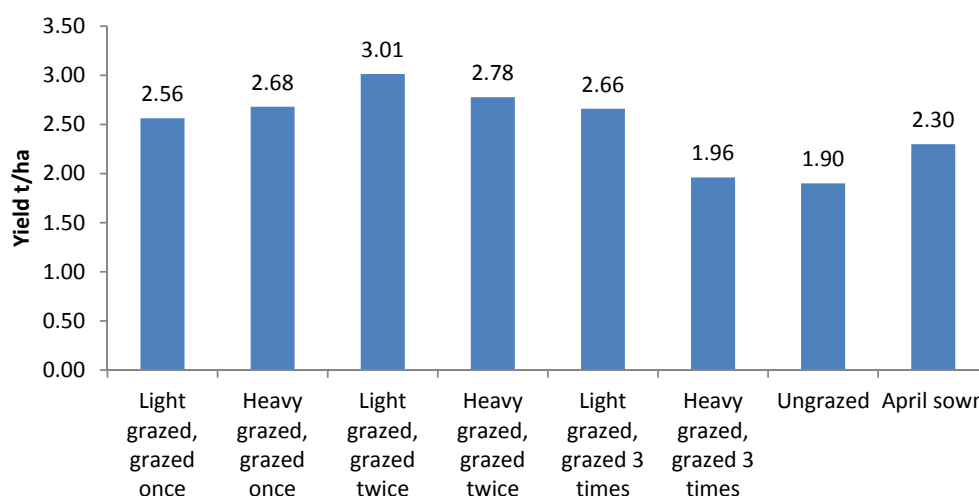
Quality of feed on offer was high throughout the grazing period. Metabolisable energy (ME) averaged 13.5 MJ/kg DM and protein was up around 22%. In 2012, nitrate poisoning was not of concern, with levels well under the toxic threshold of 1000 mg/kg for lambs. In saying that, introducing stock to forage brassicas needs to be done gradually- it is important that stock are not put out on canola with an empty stomach and perhaps should be supplied with some roughage when grazing. Observations of the animals grazing suggest that it can take a few days for them to develop a taste for the crop, as almost every other plant in the trial area was eaten before they began on the canola. It is also important to monitor feed levels when stock are grazing, as it didn't take long for the sheep to completely eat the paddock bare, once they had accustomed to the forage. The third and final grazing in this experiment was much heavier than planned due to the sheep eating it down rather quickly.

What was the effect on grain yield?

This experiment has demonstrated the ability of canola to recover from the stress of complete defoliation and go on to produce a fairly handy grain yield. The final grazing was severe, with most plants eaten back to the ground with next to no leaf present, however after a week or so, they had begun to reshoot and grew back rapidly, catching the lighter grazed plants.

After the grazing treatments were completed, the gate was closed and the trial was left to grow into a grain producing crop. Due to the spectacular recovery and compensatory nature of canola following the stress of grazing, it was very difficult to identify between treatments.

Grazing over summer increased grain yield compared to no grazing. Spring sown and ungrazed yielded 1.9 t/ha with optimal grazing going 2.7 t/ha. Taurus sown at the conventional time (April) yielded 2.3 t/ha. Observations were that plants that were grazed had branched more and produced a denser canopy with stems producing pods for grain.

**Figure 1.** Grain yield of Taurus following spring sowing and grazing, ungrazed and April sown

The number of times the crop was grazed had a small effect on yield. Grazing twice produced the best result, yielding 0.1t/ha more than grazing once and 0.2t/ha more than grazing three times. Although there was a yield

penalty by grazing 3 times compared to two times, the third grazing supplied an additional 1t/ha of high quality feed at the beginning of May.

Heavy grazing reduced yield compared to light grazing irrespective of the number of times it was grazed. However the reduction in yield was small and the heavy grazing produced 4t/ha of feed compared to 1.4 t/ha when lightly grazed. When deciding on stocking rate and grazing intensity, it can be a trade-off between the value of the feed over summer and autumn and final grain yield, attitude and preference will change between growers.

Applying nitrogen over summer has no yield benefits except for multiple (3) heavy grazings. In this case yield went from 2.0 t/ha to 2.7 t/ha when 150kg/ha of urea was spread after each grazing. This would suggest that perhaps an application of fertiliser purely to boost crop performance is not necessary.

Establishing the crop and maintaining plant numbers

Having a good seed bed to sow is paramount to ensuring the success of spring sowing. Sowing into dry, cloddy soil has the potential to set back fodder and yield production before summer even arrives. Successful germination needs good seed/soil contact so a loose, friable soil free of lumps and clods is suggested. Given that spring sowing has a potential fit with fallow/pasture paddocks that are coming back into the cropping rotation means that there may be quite a bit of work involved with paddock preparation particularly if there is residual pasture present.

Despite the heavy grazing in 2012, plant numbers did not suffer under grazing. In fact, the general appearance of the heavily grazed spring sown crop was far better than April sown canola which was struggling with the cool, wet weather as well as pest pressure from slugs and earth mites.



Figure 2. Photo taken in June 2012 comparing spring sown and grazed Taurus with April sown Taurus.

What about slugs and other pests?

In June, the war against slugs was at full steam at the Dunkeld research site. After being in the ground for almost 7 months the resilient, mature Taurus plants were unaffected by slugs and red legged earth mites, whilst these pests posed a real threat to emerging plants in other trials nearby and demanded costly preventative treatments. Figure 1 shows the difference in crop appearance and stage of growth in June 2012 of the spring sown crop compared to an April sown. The overall resilience and health of the spring sown and heavily grazed crop was astounding, allowing us to leave it be and concentrate on the struggling April and May sown crops.

The presence of cabbage moth over summer was noted, however no spray program was implemented. Instead, the crop was grazed by sheep and removed the leaf being eaten by the grubs. How is that for an IPM strategy?

The crop was sprayed for aphids at flowering due to a large burden of mealy cabbage aphid, causing damage.

Will grazing canola increase the risk of blackleg?

Throughout the season, there was concern from growers about grazing increasing the incidence of disease. Blackleg levels were low in all of the treatments, including autumn sown and ungrazed plots. Other canola crops in the district suggest that blackleg infection wasn't a concern in 2012. As Taurus is rated MR against blackleg, the risk of serious infection is quite low.

Kirkegaard et al (2008) found low levels of blackleg in ungrazed and grazed winter varieties, but high levels (up to 50%) in grazed spring varieties, suggesting that grazing had increased susceptibility to infection in the spring types. Incidence of blackleg under grazing should be monitored as there is potential for the disease to enter plants directly into the stem through damage caused by severe grazing. If disease pressure was high in 2012, things may have gone differently.

What about weeds?

Planting a conventional variety can limit weed control from the beginning. Sowing into a paddock that has an

existing broadleaf weed burden is likely to exacerbate the problem due to the long rotation and limited control options throughout this time. In 2012, there was no observed difference in weeds when grazed compared to not grazed, nor were there any less weeds in the April sown crop. Further insight into the weed story under grazed crops will be released by Grain & Graze in 2013.

Release of winter canolas with Clearfield chemistry is highly anticipated, with a couple of varieties currently being trialled. Success of these varieties is sure to provide greater flexibility and weed control options, particularly when sowing in spring or early autumn.

Grazing effect on canopy

As the crop matured, there were noticeable differences in the canopy development of the plants. Grazing appears to have removed the main stem, causing secondary stems or tillers to appear, of which all went on to produce pods and grain. Grazing more led to more stems. Plant height was not noticeably altered by grazing. There was some discussion through the season, whether these secondary stems would go on to produce sufficient grain compared to one good main stem, results indicate that in fact, the branching of canola following grazing was a positive effect.



Figure 3. The difference in branching: ungrazed compared to three grazings. This change in canopy structure appears to have had a positive effect on yield.

Fitting into the farming system

Spring sowing of dual purpose canola variety, CB Taurus, proved to be a wise management decision at the SFS Dunkeld trial site.

One of the biggest benefits was the opportunity to sow in spring which meant that the crop could make the most of summer rainfall and establish at a time when there were fewer threats to plant growth. Large amounts of rainfall in May (80mm) and June (75mm) left a lot of the site and surrounding area either underwater or very close to it, making access for sowing and subsequent management difficult. By then, plants were well and truly established, with tap roots of 300mm being observed in the grazed areas- giving us a healthy, vigorous crop at a time when conventional sown canola was struggling to cope with the conditions or paddocks were unable to be driven on. The resilient, mature plants were unaffected by slugs and red legged earth mites, whilst these pests posed a real threat to emerging plants nearby and demanded costly preventative treatments.

Benefits of spring sown canola in the system:

- Sowing in spring means less pressure at usual sowing time
- Makes use of summer rainfall
- Large amounts of dry matter at three grazing intervals (4t DM/ha)
- Established, vigorous crop at a time of potential frost, waterlogging and slug damage
- Paddock sown before paddock gets too wet in autumn/winter
- A crop to harvest in summer

Potential threats/limitations

- Weed numbers and weed control
- Possible decline in grain yield
- Insufficient moisture over summer and failed crop

Acknowledgements

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References

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