The Short Straw
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Dual purpose crops double the value
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It has been exciting in the last month or two to see just what sort of growth and biomass for feed is possible from early sown dual purpose crops, both winter wheats and winter hybrid canola varieties.

The dual purpose wheat varieties were introduced into our mixed farming system after the release of the wheat varieties Whistler and Wylah, followed by EGA Wedgetail in 2002. They soon showed their potential to help fill the autumn and/or winter feed gap in many seasons and ease the pressure on pastures.

While stock are grazing dual-purpose crops, the slower growing winter pastures can accumulate some feed before spring. Both ewes and weaners grazing on wheat and canola crops can show larger weight gains than sheep grazing on more traditional pastures. Feed quality is typically excellent for both dual purpose wheat and canola and feed quantity is driven by sunlight, soil moisture, soil temperatures and crop nutrition.

Research on dual purpose crops

There has been a body of research in the last decade that focused on how our mixed farming systems could best realise the opportunities offered by the dual purpose crops.

The Grain and Graze Projects were supported by major funding bodies including MLA, AWI, GRDC and Land and Water Australia. The first Graze and Grain project kicked off in 2003 and all reports can be accessed at the website http://www.grainandgraze3.com.au/

Research funded by GRDC and CSIRO and led by Dr. John Kirkegaard, Chief Research Scientist, CSIRO into the potential of longer season canola varieties or winter hybrid canola types as another dual purpose option was initially novel. Interest has continued to grow and new varieties that suit this purpose are now available.

Dr. Kirkegaard has shown that from April sowings, winter canola can produce 2.5 to 4 t/ha of high quality forage for grazing in winter, which is readily eaten by sheep. Live-weight gains of 210g to 300g/day can be achieved for Merino lambs. A feed window of 600-800 DSE (dry sheep equivalent) of grazing days per hectare can be achieved although higher grazing days of up to 2000 grazing days per hectare can be achieved from hybrid winter types sown early in a high rainfall environment.

Forage brassicas versus dual purpose, winter hybrid types of canola

There is a difference in management between forage brassicas that are grazed but never harvested and the winter hybrid types of canola regarded as dual purpose, where following recommended grazing practices in the vegetative window protects the important crop yield. The forage brassica types and the winter hybrid types of canola both assume a forage value from grazing. In comparison, spring type canola is grown solely for yield and any forage value from an early sowing would be a bonus.

When you compare the fertiliser strategy for grazing forage brassicas it has long been

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recommended by NSW DPI and industry advisors to apply more Nitrogen upfront and before sowing.

A forage brassica can easily accumulate 8-10 tonne of dry matter per hectare (t DM/ha) available for grazing but they are typically not grazed until they have accumulated at least 4 t DM/ha or reached about 50cm in height with more than 8 mature leaves on the brassica plant. This stage of growth would usually occur about 6-7 weeks after sowing. A typical fertiliser recommendation for a forage brassica would be up to 100 kg available nitrogen/hectare before sowing (higher for dairy pastures), 15-20 kg nitrogen/Ha (within starter fertiliser) at sowing and then 50 kg Nitrogen/ha after each grazing to stimulate re-growth between 3-4 grazings.

With a dual-purpose canola crop the targets of quality feed or biomass are lower than for a forage brassica. It would be reasonable to expect a target forage yield of 4000 kg or 4 t DM/Ha this year of high quality forage assuming your winter-type canola was sown back in March or early April. If nitrogen was applied to a high fertility paddock, underneath the crop or top-dressed soon after sowing then growth to now should have been rapid.

**Fertiliser strategy on top dressing Nitrogen and grazing management**

So what should my fertiliser strategy for topdressing dual purpose canola be from here?

In a given scenario Tom sowed a winter canola back in the last week of March after a storm. It came up quickly in warm soil and as the paddock was only moderately fertile Tom applied 100 kg/ha urea at 46% nitrogen soon after, knowing he needed growth as quickly as possible. The stock went on in May when the crop was 6-8 leaves and jumping away quickly. Tom is looking at all of June for grazing and hopefully through July but doesn’t want to graze past the mid-maturity stage and compromise the canola yield. Tom and his agronomist will monitor the growth stage in July.

Should Tom top-dress another 50 kg of nitrogen/Ha and then withhold the stock for three weeks to reduce the risk of nitrate poisoning? At the start of July, this scenario is far from ideal. If the dual purpose canola is looking good and continuing to grow despite the grazing pressure, then leave the stock on.

To top-dress now means Tom will need to wait for plant uptake of the nitrogen to stimulate new growth and then the safe period before livestock go back on which could be a lost opportunity. Tom wants to maximise the grazing value now by having stock on, not by having them off and then waiting. Even if there is ample feed-on-offer in other paddocks, by the time Tom brings the stock back to this paddock, there will be a reduced grazing period available. It would be better to wait until the grazing window is completely over, then top-dress for a faster crop recovery and a better yield potential.

If the crop has slowed down in growth already due to a lower plane of nutrition then consider alternatives such as reducing the stocking rate. If growth has slowed considerably then make a quick decision about topdressing and consider re-grazing up until the growth stage of bolting.

As always, seek your agronomist’s advice.
Tips from the expert

Some tips for dual purpose canola provided from researcher Dr. John Kirkegaard who says the Nitrogen management isn’t much different for grazed canola compared to un-grazed canola.

1. Avoid growing crops on soil with very low levels of Nitrogen as Nitrogen is needed to produce biomass.

My comments: In other words, if you are counting on early feed and putting stock on as quickly as possible then early soil moisture and warm soil temperatures alone will not be enough. The young crop will need access to good crop nutrition and respond more quickly to good seasonal conditions if supplied.

2. Avoid applying any nitrogen close to grazing and take all precautions (well known) to avoid nitrate poisoning.

My comments: If there was an early sowing opportunity in February or March and you sowed the crop on that moisture then it is unlikely you placed additional nitrogen at the time with the crop. It may however have been a high fertility paddock.

If you sowed in April of this year then you could be thinking about topdressing decisions now that sowing is completed. To think about topdressing now, raises questions about how long it takes the crop to access the majority of the Nitrogen provided.

Once plant uptake has occurred and plants grow away, how much growth do you need to have before the risk of nitrate poisoning is low enough to put stock on? See the comments below from the District Veterinarian.

3. Sheep remove little nitrogen from a paddock; most is cycled in urine and re-distributed. Some growers may increase topdressing a little to account for small losses or delay in availability of returned N.

Dr. Kirkegaard recommends top-dressing Nitrogen after the paddock is locked up with the rate of Nitrogen related to yield expectations and N supply from the soil. In some cases John thinks it’s the higher yield potential of the earlier-sown grazed crops that might support higher N rates provided the crops are not grazed late (late grazing reduces the yield potential).

My comments: While the sheep remove little Nitrogen from the paddock, the nitrogen excreted in urine may not be available to the crop before harvest.

Applying Nitrogen to the paddock after the stock are out will promote crop recovery and is the safest way of avoiding Nitrate poisoning. Given cool, cloudy conditions increase the risk of Nitrate poisoning these can be hard to predict and if these conditions occur then stock movements are necessary when it isn’t always practical to move mobs quickly between paddocks.

I would like to thank Dr John Kirkegaard of CSIRO for providing comments especially for this article of the Short Straw.

Both winter and spring canola can recover after grazing with no seed yield penalty if grazing is completed when the plant is in a vegetative stage.

Crop nutrition for a dual purpose cereal

Consider the nutrients required to grow a dual purpose cereal. The dual purpose cereal is managed to grow a bulk of dry matter in its vegetative mode for grazing before the plant switches into reproductive mode later in the season and then uses resources to build the crop yield.

Table 1 describes the nutrients required. I have highlighted (in bold) a popular target of growing 4 t/Ha dry matter plus aiming for a 4 T/Ha grain yield, with the total nutrients required by the plant from the soil and fertiliser program.
Table 1: Nutrients required for growing a winter wheat crop.

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<th>Grazing Yield t/ha Dry Matter</th>
<th>Grain Yield t/ha Grain</th>
<th>Kilograms Nitrogen</th>
<th>Kilograms Phosphorus</th>
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Source: NSW DPI Agnote DPI 438

How to minimise the risk of Nitrate poisoning in livestock grazing dual-purpose crops by Tim Biffin, District Veterinarian, Riverina Local Land Services, Wagga Wagga

Dual purpose crops recently top-dressed with nitrogenous fertiliser such as urea are considered to be high risk.

Canola can pose a greater risk to animal health than cereals, but this usually occurs when animals are suddenly introduced to the crop, often combined with conditions that make the crop stressed such as a lack of moisture, frost or herbicide application.

As a precaution, it is recommended not to graze dual purpose crops for at least three weeks after the application of N fertiliser.

Furthermore, at least another week’s wait should be added if there have been periods of rainfall, cloudy days, frosts or the other extreme of high temperatures or moisture stress that cause wilting of the plants. Dull, cloudy weather can reduce photosynthesis in the plant which in turn can allow the nitrates to accumulate at a time of slower plant growth.

The more common animal health problems include neuropathy (brain damage), liver damage, photosensitisation and nitrate poisoning.

Stock should be fully vaccinated against enterotoxaemia before grazing (e.g. "5 in 1").

The recommendation when grazing canola is to offer additional fibre such as hay to livestock and observe the animals closely for at least the first two weeks of grazing.

When you do start to graze the crop, the key messages are:

- introduce stock onto the feed by grazing in the afternoon for ~2 hours only initially, remove them overnight and graze on other feed.
- monitor stock closely in this introductory period for any signs of a problem.
- ensure stock are not hungry going in to the paddock. Well feed stock will adjust and cope with the increased nitrate load much better than hungry stock.
• ensure the paddock is not overstocked or strip grazed as the stalks contain higher amounts of nitrates than the leaves.
• ensure the stock are not stressed or in poor health as they will be more susceptible to nitrate/nitrite poisoning.

Livestock producers should also note that ewes grazing dual-purpose wheat may require a mineral supplement that includes magnesium, calcium and salt to reduce the risk of metabolic diseases such as hypocalcaemia and hypomagnesaemia (grass tetany).

**Article references:**


http://www.queenslandcountrylife.com.au/story/3647597/the-best-of-both-worlds-graze-and-grain-canola/Like cereals, grazing winter canola later in the season (early reproductive stage) will delay the onset of flowering and may cause a reduction in seed yield, especially if the season finishes early. The oil content of harvested canola is similar from grazed and un-grazed crops.