sheep connect south australia

Managing Livestock Feed Sources

Information Sheet

Benefit of Sheep/Wool in a mixed farming system - Information Sheet 3 (of 3)

Connecting people in the business of sheep

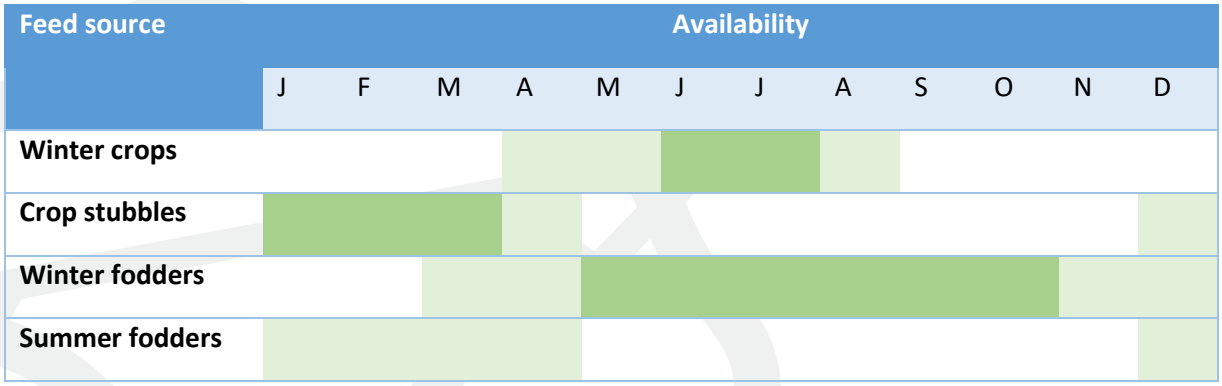
Introduction

In a mixed farming operation, there are different sources of feed that provide greater flexibility and opportunities. The availability of different feed sources during the year are shown in Figure 1. Making best use of these different sources however can be challenging because of the variability of feed quantity and quality at different times of the year.

Whatever the reasons, the most profitable mixed farming businesses seek synergy, not conflict between their livestock and cropping enterprises. This involves implementing the key profit drivers for both livestock and cropping enterprises, and eliminating enterprise conflict. The ability to integrate multiple enterprises and create synergies between them ultimately drives profit in a mixed farming business.

Figure 1: Likely availability of different feed sources during the year

(lighter green represents less reliability). Source: adapted from *Nicholson (2017)*



Winter Crops

Planting dual-purpose crops can minimise farm risk and may be one of the tactics used to manage livestock in a late or poor break seasons.

Well-timed early sowing and grazing also has the benefit that there is little impact on yield (as long as biomass is maintained above critical levels). Both wheat and canola have shown good results but canola can be a bit more difficult, particularly with getting the timing of stock removal correct.

In the context of a whole farm, winter crops increase the amount of feed available for grazing. Just how this additional feed is captured and used to best advantage will depend on the individual farmer. Flexibility in the decision to graze is necessary as the ultimate goal for managing dual-purpose crops is to maximise the profit from the combined income generated by the grazed forage and the grain. This requires an understanding of how grain yield is affected by heavier or delayed grazing and appropriate timing of lock-up from stock.

The early and 'safe' grazing period is once the crop is well anchored and there is still plenty of

CONTACT
Jodie Reseigh
M: 0428 103 886 • **E:** jodie.reseigh@sa.gov.au

awi Australian Wool Innovation Limited

SA Sheep Industry Fund
Administered by PIRSA for industry
Government of South Australia
Primary Industries and Regions SA

time for recovery after a period of grazing, even if the crop is grazed quite heavily (Figure 2). The late and 'unsafe' period is when the reproductive parts of the crop (spikes in wheat, or buds in canola) are elongating above the ground, and can be removed by stock. At this stage, there is too little time for the crop to recover enough biomass by anthesis or flowering to set a reasonable yield potential.

The 'sensitive' period is the time when the crop has not yet begun to elongate, but where yield recovery can be very sensitive to the amount of residual biomass left. This is the period where some idea of how much residual biomass is needed to reach a specified target grain yield can assist growers with lock-up decisions to avoid yield loss while maximising grazing potential (Sprague, 2018).

To maximise production by grazing cereals and dual purpose crops:

- Select paddocks with good summer weed control, adequate herbicide plant-back and withholding periods and adequate stored soil moisture.
- Sow as early as possible or dry sow by the 30th April if the opening break has not occurred
  Winter wheats in March, long-season springs wheats in mid-April, spring wheat late-April. Winter canola types in March or even spring, spring hybrid types from mid-April. Select vigorous canola varieties (hybrids) with good blackleg resistance (>R-MB).
- Sow varieties with good early vigour to maximise production and compete with weeds
- Use high seeding rates – at least 50% more than normal grain rates.
- Protect early-sown crops from establishment pests and aphids that transmit virus. Seed dressings are effective but follow-up aphid sprays in warm autumns may be required if aphids persist.
- Use sufficient fertiliser, particularly nitrogen for good early growth and crop yield potential
- Applying additional nitrogen (N) can be beneficial but higher seeding rates will give greater production.
- Start grazing early – as soon as plants are anchored, and secondary roots have developed
- Be cautious of erosion risk if not using No-till
- Remove stock at mid-tillering in low rainfall areas to reduce the risk of grain yield loss
- In higher rainfall areas (> 400mm) remove stock before GS 3.0 stage for cereals and bud elongation in canola
- Leave at least 1.5 t/ha of residual biomass in spring canola and more than 0.5t/ha residual biomass at stem elongation - growth stage 30 (GS30) - for spring and winter wheat.
- Recovery and winter growth of canola is slower than cereals. Graze canola once for longer as animals take some time to adjust (at least two weeks grazing).
- Apply additional nitrogen after grazing to assist yield recovery

Crop stubble will be reduced when grazing, even when defoliated at the early vegetative growth stage. Grazing will also result in visual changes to the soil surface but does not change subsequent water infiltration, soil water storage or crop yields.

Figure 2: shows the yield recovery (% of un-grazed crop) of grazed dual-purpose crops highlighting the safe, sensitive and unsafe periods of grazing. Yield recovery from grazing during the sensitive period for a given target yield is affected by the residual biomass at lock-up. Late grazing reduces the time for recovery, so more residual biomass is needed. Source: Sprague, 2018

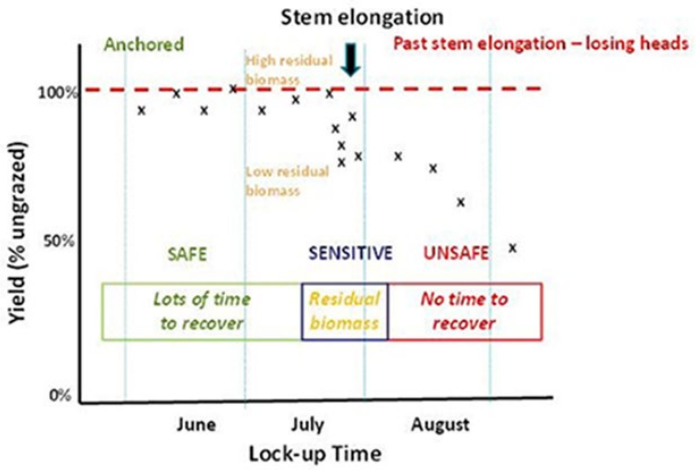
Crop stubbles

Winter crop stubbles can provide a valuable source of feed, primarily from residual grain and green shoots from shot grain and weeds.

Standing straw and trash have much lower quality (energy and protein) which are below maintenance requirements for all classes of livestock. Therefore animal weight gain is directly linked to the amount of grain and green material in the stubble (assuming no supplementary

feeding). Improved efficiency of harvest machinery means not all crop paddocks have grazing value and only those with sufficient high energy material should be grazed, otherwise sowing and herbicide efficacy problems can be created with livestock laying over standing straw. There needs to be at least 40 kg/ha of residual grain or 40 kg/ha of green material for a sheep to maintain or gain weight (although the gain is difficult to predict). Below these values animals lose weight, irrespective of how much straw or leaf trash remains.

Figure 2: Yield recovery (% of un-grazed crop) of grazed dual-purpose crops



Winter pastures

Winter pastures in a cropping rotation are commonly grown to assist in weed control before the next cropping phase, to add biological nitrogen and to improve overall soil condition as well as to provide feed for livestock. This creates a number of possible winter pasture options and there is no single 'right' answer.

- Annual fodder legumes (e.g. arrowleaf, Persian, balansa, sub clover, medic, vetch)
- Annual pulses (peas, beans)
- Perennial legumes (lucerne)
- Annual grasses (annual ryegrass, oats, barley, wheat)

All have advantages and disadvantages with a large variability in fodder production from year to year. Observation from the different legume and grass winter pastures tested as part of the Grain and Graze program were:

- In general grass fodder grew more dry matter of similar quality than legumes grown at the same time.
- Annual ryegrass can be dramatically reduced (to <10%) after 2 years of a pasture phase if seed set can be prevented. However it is essential to control late germinating annual ryegrass (October – November) that grows when applied herbicides are no longer effective. In contrast wild radish remains problematic, with no reduction in plant numbers recorded after many years of a fodder phase.
- Growing fodder legumes does not guarantee an accumulation of soil nitrogen and where accumulation does occur it may be lower than the common rules of thumb of about 20 kg of shoot N/t dry matter (Peoples et al, 2013).
- Lucerne was the least beneficial fodder break crop in the 500mm+ rainfall areas because overall dry matter production was less than other fodder legumes, it captured most soil nitrogen so the next crop started from very low nitrogen levels and the release of organic nitrogen was much slower compared to other legumes (peaked around year 3). In addition, lucerne dried the soil profile more than other legumes which resulted in a greater soil moisture deficit if winter rainfall after removal was below average.
- Crops sown in years after a legume break that receive below average growing season rainfall can be oversupplied by the

mineralised soil N, leading to higher screenings.

Deferred grazing of annual pastures

Deferred grazing is a useful strategy particularly in average and late break seasons. Early in the season annual pastures need to produce enough leaf area to develop a strong root system, to make the best use of sunlight and available moisture. Young pasture plants are susceptible to over-grazing, particularly after a cropping phase, because of lower plant density and stock pulling plants out by their roots due to loose soil.

Table 1. Recommendations for grazing cereals [Nicolson, 2008]

District	Time of sowing	Grazing period	Recover after grazing
Upper Eyre Peninsula and Upper North (SA)	Usually May; Early / dry sowing in March / April	Limited to four weeks if targeting grain	Grain yield usually reduced, except under very favourable seasons
Lower Eyre Peninsula / Kangaroo Island, (SA)	May / June	Four – six weeks if targeting grain Not affected if grazed early.	Grazing at late tillering likely to reduce yield unless favourable spring finish.
Mid North & Yorke Peninsula, SA	May / June	Limited to about six to eight weeks to avoid grain yield loss.	Grain fill is generally not affected unless dry late spring.
Mallee (SA, Vic, NSW)	Usually May. Rare opportunity for early sowing but success relies on follow up rains.	Limited to about four to six weeks.	Affected in most years. Reduction in grain yield common even if grazing is completed before stem elongation.

Annual pasture production can be maximised by:

- reducing grazing pressure (increasing early pasture growth) by deferred grazing
- applying fertiliser (both phosphorus and nitrogen), ideally based on soil testing,
- controlling insect pests and sowing pasture seed (if needed).

Pastures that reach 1 400 kg DM/ha before mid-winter tend to continue growing through the winter, while pastures that do not reach 1 000 kg DM/ha often go backwards even at low grazing pressure.

- If pasture density is reduced (through early grazing) the time taken for the pasture to reach 1 000 kg DM/ha is greatly increased.
- Where pastures fail to grow adequately over winter, lactating ewes and young sheep are likely to require supplementary feeding.

Livestock can be put into confinement feeding or laneways to defer grazing. Supplementary feeding in the paddock will have some benefit but at high stocking densities damage to the pasture can still occur.

Summer Fodder crops

Summer crops are generally sown only on an opportunistic basis. The potential disadvantages of summer crops on the following winter crop needs to be considered carefully.

References

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Nicholson C (2017) Insights from the Grain and Graze program, GRDC

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