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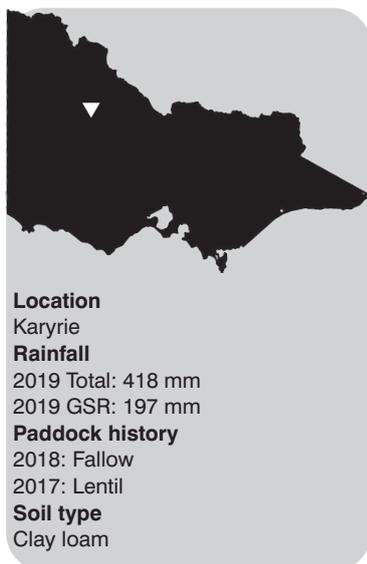
SARDI, Minnipa Agricultural Centre

Livestock

Value of standing crops for lamb production and soil protection

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Key messages

- A standing cereal crop is a low risk option for feed; it is a familiar crop grown on winter rainfall, with lower grain handling efforts and its end-of-season result can be flexible with seasonal and market conditions.
- With a protein supplement, lambs can be finished faster and turned off earlier, leaving more groundcover for soil protection than other pasture paddocks.
- Have you considered using a standing crop for grazing in spring or summer? Feeding sheep over the late spring

feed gap when pastures are unproductive and before stubbles are ready or during summer months once stubbles are exhausted and you could be taking a break, is time consuming and requires extra resources and double handling of feed.

- A 'standing crop' is a crop that has been held as a fodder bank for grazing later in the year once it becomes reproductive, from head formation in the boot to full grain maturity. The standing crop can be a cereal, or a combination of a cereal with a pasture legume or grain supplement to satisfy higher protein demands of growing lambs.
- A standing crop can offer improved nutrition and groundcover compared to other annual pasture paddocks at these times. Systems growing autumn/winter drop lambs with genetic potential for growth rates >300 g/day, need to be maintaining high growth rates to achieve target sale weights for marketing. The standing crop can be a useful way to help finish these lambs faster at three to six months of age, enabling

you to sell earlier and take stocking pressure off your farm.

- A standing crop can also be useful for ewes to regain condition pre-joining, during pregnancy and lambing.

Why do the trial?

To demonstrate the value of standing crops for sheep production and soil protection.

How did we do it?

Single plots of cereal varieties (wheat, barley, oats, Table 1) were sown using knife points, press wheels and 30 cm row spacing as a demonstration on 17 May 2019, targeting a plant density of 130 plants/m². Assessments included GS30 biomass, GS65 (anthesis) biomass, grain yield and quality (harvested 5 December 2019). Feed tests were conducted on GS30 and GS65 biomass and grain for selected varieties in Table 2.

Granulock® Supreme Z fertiliser + Flutriafol (200 mL/100 kg) fungicide @ 60 kg/ha was applied at sowing, and urea was top-dressed on 24 June @ 100 kg/ha, 25 July @ 100 kg/ha, and 26 August @ 100 kg/ha.

Weeds, pests and disease were controlled according to best management practice.

Table 1. Sowing rate (kg/ha) to achieve 130 plants/m², GS30 and GS65 biomass (t/ha) and grain yield (t/ha) for standing cereal crops, Karyrie 2019*.

Cereal type	Variety	Sowing rate (kg/ha)	GS30 biomass (t/ha)	GS65 biomass (t/ha)	Grain yield (t/ha)
Oats	Wintaroo	47	0.8	13.8	2.9
	Mulgara	64	1.1	11.3	1.4
	Yallara	50	0.9	10.4	2.6
	Mitika	53	0.8	8.9	2.9
	Bannister	41	0.7	9.3	4.5
	Outback	40	0.8	9.7	0.7
Mulgara	Moby	47	1.6	9.9	0.1
	Rosalind	62	1.2	10.7	5.0
	Spartacus CL	67	1.4	10.8	4.9
	Scope CL	66	1.2	9.2	3.5
	Compass	73	1.1	11.0	1.8
	Fathom	54	1.6	10.0	2.6
	RGT Planet	81	1.6	12.1	5.5
Yallara	Scepter	76	1.1	12.7	5.3
	Trojan	64	0.8	10.6	5.6
	Longsword	40	0.7	11.5	3.9
	Wedgetail	59	0.9	11.5	4.9
	DS Bennett	49	1.1	12.1	5.3

*Demonstration data only

What happened?

Feed production

Early biomass measured at GS30 indicated 0.7-1.1 t DM/ha for oats, 1.1-1.6 t DM/ha for barley and 0.7-1.1 t DM/ha for wheat (Table 1).

If left ungrazed until GS65, biomass results showed oats produced 8.9-13.8 t DM/ha, barley 9.2-12.1 t DM/ha and wheat 10.6-12.7 t DM/ha (Table 1).

The demonstration indicated that if sheep were able to graze the grain of mature crops in 2019, they would have had access to 1.4-4.5 t/ha oats, 1.8-5.5 t/ha barley and 3.9-5.6 t/ha of wheat grain (Table 1).

The site experienced strong winds on 21 November, resulting in lodging of Wintaroo and Mulgara. It also caused head loss in Moby which had very few remaining attached at harvest. This impacted on final yield, however the grain is easily grazed off the ground by sheep.

Feed value

When GS30 was reached, all crops tested had high digestibility, protein and metabolisable energy (ME) levels (Table 2).

By anthesis (GS65) and milky dough stage, nutritional values begin to vary so a feed test is recommended to better understand the crop value. In this trial, crude protein and metabolisable energy dropped towards dry ewe maintenance values (8% protein, 8 MJ ME/kg DM), so supplements are needed for production.

Grain quality

Samples were analysed externally using NIR. Feed quality of grain is stated in Table 2. Note the range of values, reinforcing the need to feed test to understand how crop type, variety, location and season has influenced its value. Oats are generally lower in protein, but higher in fibre than wheat and barley.

On-farm profitability

Extensive head loss occurred in some barley varieties this season. The following example can be used to calculate feed value of lost heads (Table 3).

The example valued the grain at \$245/t and used a grazing wastage loss of 20% - an estimate of trampling and burying that could vary between 15 and 40%. Therefore, for a 1.26 t/ha crop,

there will be about 1 t/ha grain available for sheep production.

What does this mean?

Based on current barley, wool and lamb prices, converting 1 t of standing crop grain into sheep production produces a gross margin for grazing higher than the gross value of the grain before production costs have been deducted (Table 3). This suggests that grazing a standing cereal crop offers a great conversion of grain value and can be a more profitable alternative than harvesting.

If the standing crop is a two-year option, the wastage factor can be discounted as any grain trampled or buried in year one will be eaten as regenerated cereal in year two.

Commercial practice

The advantage of grazing a standing crop to finish lambs is that it is a low cost, low risk proven practice that can be either planned or opportunistic. There is no need to learn new skills, it just involves using the crop for a different purpose.

Table 2. Feed value of standing cereal crops.

Crop variety	Plant growth stage	Crude protein (%)	Metabolisable energy (MJ/kg DM)	Neutral detergent fibre (%)	Digestibility (DMD) (%)
Mulgara oats	GS30	30.3	12.5	38.0	82.3
	GS65	8.3	9.2	53.5	62.7
	Grain	16.8	12.6	30.3	74.5
Yallara oats	GS30	28.6	12.5	39.4	81.8
	GS65	7.6	10.2	43.4	68.5
	Grain	14.0	12.1	32.0	71.4
Moby barley	GS30	28.1	12.2	44.5	80.4
	GS65	10.6	9.4	56.6	63.9
	Grain	13.0	13.0	17.1	84.9
Fathom barley	GS30	28.8	12.3	44.3	81.2
	GS65	9.0	8.4	61.6	58.2
	Grain	13.5	13.2	15.4	87.1
Scepter wheat	GS30	32.5	12.1	42.3	79.8
	GS65	7.2	8.9	53.1	61.1
	Grain	15.6	14.4	10.0	95.9

Table 3. Estimating grazing value of a standing crop of barley (\$/ha).

Grain yield (t/ha)	Gross grain value (\$/ha)	DSE grazing days*	Gross margin Prime lamb/Merino ewe enterprise Grazing value (\$/ha)**
1	245	1500	288
2	490	3000	575

*DSE grazing days = (DM (kg/ha) – wastage) x feed test ME (we used 12 MJ) / 8 MJ (1 DSE requires 8 MJ/day)

**Gross margin grazing value = DSE grazing days x (GM/DSE/365)

2020 Prime lamb/Merino ewe GM/DSE = \$70, pers. comms. Barry Mudge, PIRSA Farm Gross Margin and Enterprise Planning Guide

The standing crop is sown and grown as a winter crop would be managed for harvest. In spring, the crop can be assessed for its best end-use/return opportunity, and a responsive decision made according to market and seasonal conditions. If the decision is made to graze a standing crop, grain handling and labour costs over spring and summer are lower because any supplementary feeding will be for a shorter time.

What cereals should I grow for grazing as a standing crop?

The first option is to use a cereal variety that is already on hand. It will be a variety that performs well in the local area that can easily be managed. By sowing and managing the paddock as for a normal crop, responsive decisions can be made to graze, cut for hay or harvest grain based on lamb

and grain prices and seasonal conditions or events such as heat stress or frost that may have compromised grain production. Alternatively, choose a variety that is fit for purpose. Examples include:

- Winter grazing: early maturing Moby barley that has good early biomass.
- Spring/summer grazing: longer season Outback oats.
- Finishing lambs: grain varieties with good protein.
- Grass control: choose herbicide tolerance for ryegrass and silver grass control.

Does plant structure or growth stage affect sheep preference for grazing?

From grower experience, sheep will eat any cereal, regardless of whether it has awns, rough texture, is green or dry. They will

preferentially graze varieties for palatability (mouth feel, sweetness and digestibility) if they are given a choice, but when there is only one variety available they will eventually consume it.

During milky dough stage, crops can become unpalatable but sheep will graze if there is no alternative. If sheep are put in earlier, the crop will ripen at different stages as it is grazed, so there will be something good to eat somewhere in the paddock. Supplement with protein during this time, especially if weaning lambs.

Supplements

Sheep protein requirements range from 8% for a dry ewe to 18-20% for lambs growing at 200 g/day. If there has been a dry finish and the crop protein is 14-16%, wait until the crop heads have been eaten off before supplementing with more protein. In favourable seasons, protein can fall to 8-10% and a supplement of legume grain would be beneficial.

All cereal grains are low in calcium and sodium, so supplement with a limestone 80%: salt 20% loose mix. There is no need for magnesium supplementation on a mature crop. Provide supplements to sheep before they enter the standing crop, so they are used to it and ready to consume it when they enter.

Introducing animals to the standing crop

The standing crop can be used at any time but take care if introducing animals to the crop once grain has set. Barley and wheat contain high levels of readily digested starches and low levels of fibre so care must be taken to prevent grain poisoning or acidosis.

It is safe to introduce lambs during head emergence, milky dough stage of crop and early grain fill as it ensures that they are grazing the crop when it matures and grain develops, and rumen microbes can gradually adjust to the change in nutrition.

If grain has set, the usual rules when introducing sheep to grain apply:

- Check pulpy kidney vaccinations are up to date and vaccinate before entering the crop if necessary. Repeat after four weeks if trading lambs and vaccination history is unknown.
- Train sheep onto the grain gradually. Begin by trail feeding in their current paddock before introducing to the crop.

- During the introduction phase, feed grain daily. Start with 50 g per head on the first day, followed by increases of 50 g every day until a full ration is reached.
- Fibre stimulates saliva production, which contains the natural buffer bicarbonate. Provide fibre or a bicarbonate supplement if paddock feed is low while trail feeding. There will be adequate fibre once in the standing crop.
- Alternatively, move sheep in and out of the standing crop over 10 days of adjustment. To avoid gorging, introduce to the paddock late in the day with full bellies, and only leave on for a short time initially, then gradually increase the time each day.
- Providing vetch/legume hay during introduction to the crop is also an acidosis prevention strategy, supplying an alternative feed as well as protein.
- Lambs will initially be more hesitant to graze as they familiarise themselves with the standing crop and are less likely to gorge themselves than ewes with previous experience.
- Monitor the flock for signs of scouring, unhappiness, lethargy, disjointed gait or lameness which will indicate the amount of grain is being increased too soon.

Wheat and triticale have the highest risk of acidosis due to high starch and low fibre levels. Barley is not as dangerous, but has a huge range of nutrient values, so be familiar with the grain analysis. Oats are safest due to their higher fibre levels and lower starch levels and sheep can go straight onto the crop. Scope barley and forage cereals (less grain) also have lower acidosis risk. At times sheep can be put onto rations quicker than the guidelines, at other times it might take longer.

Grazing behaviour of sheep in tall crops

Mow 1-2 header widths around the edge of the paddock to the trough, but not through the crop – they will make walking tracks and rut it out. Sheep will move across the standing crop paddock as they graze over time.

If the crop has been left to mature, first graze with lambs. They will eat approximately 75% of the grain and 25% leaves. Once heads have been knocked to the ground, Merino lambs are reluctant to eat them, but British or crossbred lambs will eagerly continue grazing. Start topping up lambs with legume grain to finish or shift to another paddock. Once upright heads have gone, turn in the ewes to graze the remainder.

Standing crop paddock management

Ideally leave 1-1.5 t/ha residue to provide adequate groundcover, protecting the soil from wind and water erosion and reducing evaporation of stored water over summer. Because the bulk of biomass provided by the standing crop is much larger than a finished pasture or stubble, the standing crop will provide better paddock protection for longer over the summer months.

A system suggested for a standing crop paddock is to plan to graze the paddock for two years. Sow the standing crop in April and put lambs on it to graze from milky dough stage through grain maturity. Once lambs are finished and removed from the paddock, there will still be a lot of grain remaining the next autumn to germinate on early rains. The germinating cereal seed can be used for lambing, then sprayed out and sown to vetch for the second year – or the paddock can be cleaned up further with ewes or wethers to use more straw,

then destocked to germinate the residual cereal seed for a second season of cereal pasture.

Sowing the standing cereal crop into a lucerne stand or a regenerating clover or medic-based pasture will provide added protein nutrition for lamb production and help the pasture legumes persist in the rotation.

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