

GRAZING STANDING CROPS

Using standing crops to finish lambs and improve summer groundcover and soil health



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Key Messages

- Standing crops offer a protective alternative feed base option during times of high grass seed burden for lambs in the Upper South East.
- It is important to evaluate your feedbase and understand when to make decisions and take actions that optimise the growth rate of lambs.
- Grazing standing crops allow for flexibility in management of a mixed enterprise farm and offer a reduced labour cost option from growing lambs.
- Standing crops provide groundcover over summer, preventing erosion and

Sites

Makin family- Keith, SA
Soil: Clay loam
Enterprise: sheep and cropping

Menz family- Sherwood, SA
Soil: Sandy loam
Enterprise: sheep and cropping

Paul & Rodney Bartlett- Sherwood, SA
Soil: Sand over clay (delved)
Enterprise: sheep and cropping

Jamie & Josie Jackson- Willalooka, SA
Soil: Sand over clay (delved)
Enterprise: sheep and cropping

Background

Integration of cropping and grazing operations provides flexibility for farm businesses to manage seasonal and market variation, reduce business risk and improve profitability, while enhancing land condition. Managing the feed-base in a mixed enterprise can be problematic or complementary because both enterprises use the same land, and timing of operations can sometimes conflict. In the Upper South East, the winter-dominant rainfall dictates the management of breeding and finishing systems around growing season

PROSPERITY THROUGH COLLABORATION

Background cont.

months (April to October). When harvest begins in late spring, grass seeds can become a significant burden for lambs grazing in pasture paddocks, so having a seed-free paddock to graze lambs on for the duration of harvest is advantageous. To this end, MFMG has worked on demonstrating the role of standing crops in our local environment.

A standing crop is a cereal crop sown and taken through to flowering or grain fill, and managed as a crop would be for harvest. This means that varieties are chosen to suit the location, and are sown on time with adequate fertiliser and weed management to maximise dry matter production. The crop is then evaluated in spring to determine its most beneficial end-use, whether that be grazing, cutting for hay, or harvesting.

In terms of benefits, standing crops:

- Allow for **flexibility** in management

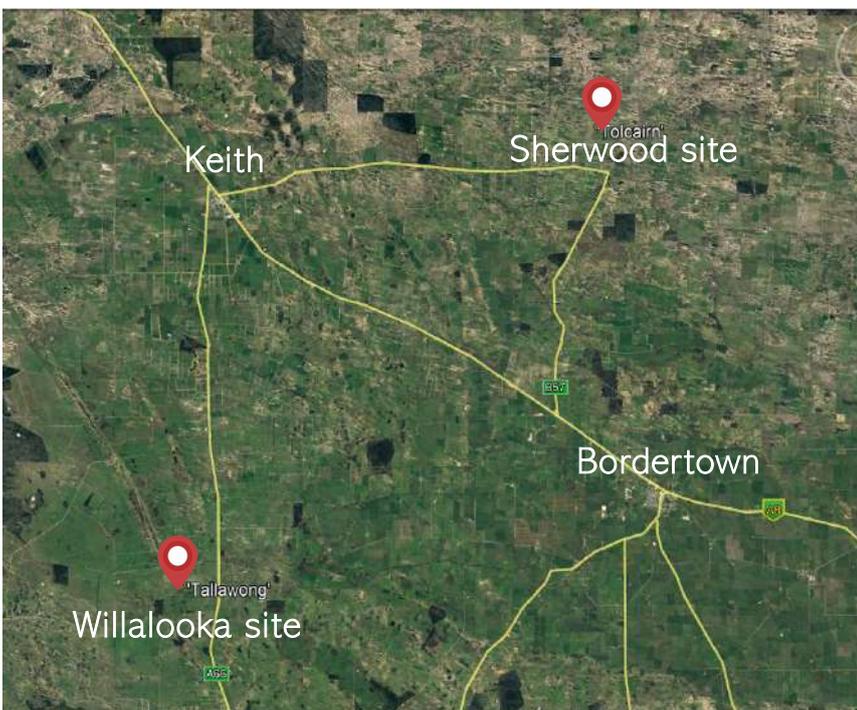
(e.g. Grain & Graze opportunity in early winter and for finishing lambs, as well as grain harvest)

- Can be used as a **fodder bank** to finish lambs on
- Offer a **reduced labour cost** option for growing lambs to achieve their target sale weights for marketing
- Can meet the **higher nutritional demands** needed to turn lambs off earlier
- Promote better **soil erosion protection** and subsequently facilitate maintenance of groundcover outside of the growing season, by turning lambs off earlier
- Are grown on winter rainfall, therefore **reducing the risk** of summer cropping options that are dependent on opportunistic summer rainfall events.

This single-season demonstration project aimed to highlight a fodder option that will turn lambs off faster in

summer and provide more soil protection outside of the growing season, demonstrate the role for standing crops in the local environment and to understand the cost-benefit locally. There were two parts to the demonstration:

- **Small plot demonstration strips:** Varieties were selected by growers at the Grazing Standing Crops forum held in Keith in March 2019, for the purpose of assessing how they grow in the local environment, as a standing crop fodder option. Ten varieties were sown at Keith, and eleven varieties were sown at Sherwood.
- **Paddock-scale demonstration sites:** Two locations – ‘Tolcairn’ at Sherwood and ‘Tallowong’ at Willalooka – were selected to host a large-scale demonstration of the practice. An economic analysis of the practice is presented in Appendix 1 and 2 and a summary is provided



About the Project

Mackillop Farm Management Group collaborated with Birchip Cropping Group to deliver this project in the South East, through funding from the Australian Government's National Landcare Program.

Mackillop Farm Management Group delivered two sites as part of this multi-state project; there were four sites in total – two in the Upper South East of SA (managed by MFMG) and two in the Victorian Mallee (managed by BCG). The project was run over one season, finishing in March 2020.

Figure 1 MFMG hosted two paddock-scale demonstrations, near Sherwood and Willalooka in the Upper South East of SA

PROSPERITY THROUGH COLLABORATION

Activities

MFMG hosted an initial Grazing Standing Crops Forum in Keith in March 2019, with Livestock Consultant San Jolly of Productive Nutrition the expert speaker to introduce the practice to farmers and advisors in attendance. A summary forum was held in Willalooka in March 2020, at which San presented an economic analysis of the practice, based on the local data collected in the paddock-scale demonstrations.

Small plot demonstration strips

Makin family- Keith, SA

Soil: Clay loam

Sowing date: May 23, 2019

Fertiliser: 140kg/ha 18:13:0:10 1%

Zn + 400mL Flutriafof

Enterprise: sheep and cropping

Menz family- Sherwood, SA

Soil: Sandy loam

Sowing date: May 24, 2019

Fertiliser: 115kg/ha 18:13:0:10 1%

Zn + 400mL Flutriafof

Enterprise: sheep and cropping

Local growers selected eleven cereal varieties at the initial Grazing Standing Crops Forum, to assess how they would grow in the local environment as a standing crop fodder option. The demonstration strips were exhibited at the MFMG Sherwood and Keith Crop Walks on November 1, 2019. Varieties sown at Keith were Vampire and Southern Green rye corn, Outback, Wintaroo and Bannister oats, Moby, Compass and Rosalind barley and Scepter and Longsword wheat. The same varieties were sown at Sherwood, in addition to Bilby oats. Sowing rates were as per the variety.



Figure 2 Aerial view of the demonstration site at Sherwood, oriented with north to top.



Figure 3 Aerial view of the demonstration paddock at Willalooka, facing south.

Paddock-scale demonstrations

Paul & Rodney Bartlett- Sherwood, SA

Soil: Sand over clay (delved)

Sowing date: May 11, 2019

Enterprise: Mixed annual cropping and lamb finishing and wool

Jamie & Josie Jackson- Willalooka, SA

Soil: Sand over clay (delved)

Sowing date: June 15, 2019

Enterprise: Lamb finishing

Farmer practice was deferred to at both sites in preparing, sowing and managing the standing crop to fit with their system. At both sites, Scope barley was sown; at Sherwood it was oversown on an 8-year old lucerne stand at a rate of 60kg/ha across 40ha, on May 11, 2019, and at Willalooka, it was sown as a pure sward at a rate of 60kg/ha across 16ha on June 15, 2019. Both animal condition and paddock condition were assessed in this project. Animal condition was assessed by collecting empty liveweights and condition scores, as an indicator of animal wellbeing, upon entry to and

exit from the standing crop paddock. At Sherwood, a sample (15%) of the 1000 Merino wether lambs were weighed and condition scored (using the Lifetime Ewe Management app) into the paddock on October 21, 2019. A sample (13%) were weighed and condition scored out of the paddock on December 18, 2019, a total of 58 days grazing. At Willalooka, a sample (17%) of the 860 Wiltipoll x Aussie White cross wether lambs to go into the standing crop were weighed and condition scored into the paddock on November 4, 2019. An additional sample (11%) of 500 Wiltipoll x Aussie White cross ewe lambs were weighed and condition scored as a parallel mob, to graze for the same period on pasture. The same sample (15%, 10%) of wether lambs and ewe lambs were weighed and condition scored out of their respective paddocks on January 6, 2020, a total of 63 days grazing.

The paddock assessment captured information about groundcover, biomass, composition and feed quality

PROSPERITY THROUGH COLLABORATION

Activities cont.

(via feed tests), every two weeks throughout the project monitoring phase (starting October 21, 2019, concluding January 6, 2020), to understand the nutritional value of the

crop, as well as the groundcover and soil protection aspects. Groundcover was monitored using the 'Cover Rating' methodology outlined in the *Soil Erosion Protection Field Survey Manu-*

al: Agricultural Cropping Districts. Preliminary results were presented at the summary Grazing Standing Crops Forum on March 10, 2020 at Willalooka.

Results and Discussion

Small plot demonstration strips

The highest yielding varieties at both sites were Rosalind and Compass barley, yielding 4.93t/ha and 4.69t/ha respectively at Sherwood, and yielding 4.53t/ha and 4.62t/ha respectively at Keith. Rosalind produced the highest dry matter of the varieties that were sampled at Sherwood (16.40t/ha), while Compass produced the highest dry matter at Keith (14.00t/ha).

Grain quality and feed quality tables for the small plot demonstration strips are included in Appendix 3. A summary of average yield and average dry matter of the varieties at each site is shown in Figures 4 and 5.

Paddock-scale demonstrations

At Sherwood, the Merino wether lambs improved in condition score by 0.01 on average over 58 grazing days, corresponding with an average total weight gain of 3.5kg. The average difference between the minimum condition score at entry and exit was -0.25 (the lambs lost 0.25 of a condition score) and the average difference between the maximum condition score at entry and exit was 0.25 (the lambs gained 0.25 of a condition score). The minimum weight at entry into the standing crop was 22.5kg and upon exit was 24kg - an average gain of 1.5kg over the 58 days. The maximum weight at entry to the standing crop was 44kg and upon exit was 53kg - an aver-

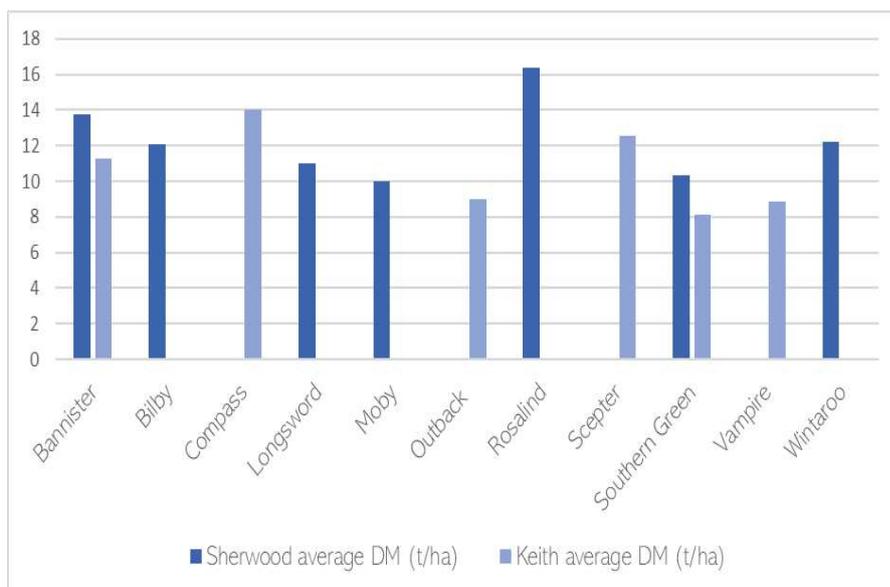


Figure 4— Average dry matter (t/ha) for all varieties at Keith and Sherwood.

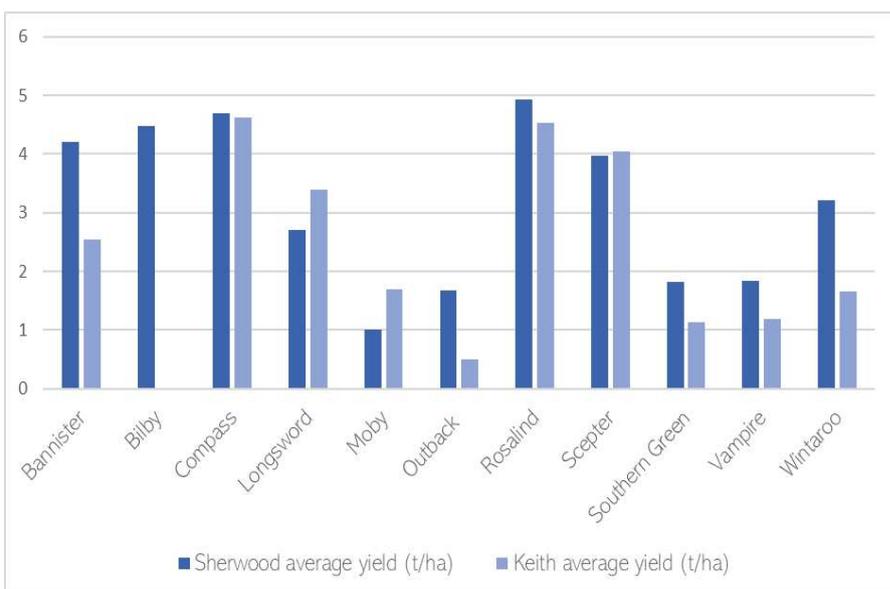


Figure 5— Average grain yield (t/ha) for all varieties at Keith and Sherwood.

Results and Discussion cont.

Table 1 Animal condition data for the Sherwood site

Wether lambs									
Date In/Out	No. of Animals	Condition Score			Weight (kg)				
		Min.	Max.	Average	Min.	Max.	Average	Total	
21/10/2019	150	2.5	3.25	2.82	22.5	44.0	33.5	5045	
18/12/2019	130	2.25	3.5	2.83	24.0	53.0	37.0	4984	
Change	58 days	-20	-0.25	0.25	0.01	1.5	9.0	3.5	-61
Average daily weight gain							60.34g		

At Willalooka, the condition score of the Wiltipoll x Aussie White cross wether lambs remained stable at 3.77 on average over 63 grazing days. Their average total weight improved by 5kg over this period. The average difference between the minimum condition score at entry and exit was -0.25 (the lambs lost 0.25 of a condition score) and the maximum was stable at 4.5 (the lambs maintained condition). The average difference between the minimum weight at entry and exit was 1.5kg over the 63 grazing days with a maximum gain of 12kg.

At Willalooka, a parallel mob of ewe

lambs were monitored, grazing pasture for the same 63 days as the wether lambs grazing the standing crop. This project acknowledges that numerous previous studies show ram lambs grow faster than wethers, which grow faster than ewe lambs on grass-based swards. This demonstration project focussed on the feedbase as the main variable, and the class of stock was secondary to the priorities and convenience of the producers. On average, the Wiltipoll x Aussie White cross ewe lambs in this parallel mob improved in condition score by 0.25, corresponding with an average total weight gain of 11.0kg. The average difference between the minimum

condition score at entry and exit was -0.25 (the lambs lost 0.25 of a condition score) and the average difference between the maximum condition score at entry and exit was 0.25 (the lambs gained 0.25 of a condition score). The average difference between the minimum weight at entry and exit in the project was 10.5kg with an average of 24.5kg upon entry and 35kg upon exit. The maximum weight among the ewe lambs at entry was 46kg and at exit was 56kg - an average weight gain of 10kg.

Table 2 Animal condition data for the Willalooka site

Wether lambs									
Date In/Out	No. of Animals	Condition Score			Weight (kg)				
		Min.	Max.	Average	Min.	Max.	Average	Total	
4/11/2019	150	2.5	4.5	3.77	20.5	46.5	36.0	5504	
6/01/2020	132	2.25	4.5	3.77	22.0	58.5	41.0	-	
Change	63 days	-18	-0.25	0	0	1.5	12	5.0	
Average daily weight gain							79.37g		
Ewe lambs									
Date In/Out	No. of Animals	Condition score			Weight (kg)				
		Min.	Max.	Average	Min.	Max.	Average	Total	
4/11/2019	57	3.0	4.25	3.86	24.5	46.0	33.0	1841	
6/01/2020	52	2.75	4.5	3.75	35.0	56.0	44.0	-	
Change	63 days	-5	-0.25	0.25	-0.11	10.5	10.0	11.0	
Average daily weight gain							174.6g		

PROSPERITY THROUGH COLLABORATION

Results and Discussion cont.

The feed quality at both sites declined after four weeks of grazing, measured in feed tests collected on November 19, 2019 at Sherwood and December 3, 2019 at Willalooka as shown in Tables 3 and 4. It is important to note that at Sherwood the paddock was sampled in a 'north' section and 'south' section, predominantly reflective of the staggered maturity of the crop at the time the lambs were due to enter the paddock, likely due to the soil type variability and landscape. Grazing behaviour of the lambs influenced the feed on offer. The lambs grazed out the lucerne plants first, which were more abundant in the north. They grazed the north part of the paddock more heavily at first, particularly closer to the water point (located in the northeast corner of the paddock). After four weeks, feed testing indicated that the maturity of

the crop had evened out and the feed quality was more uniform, so the 'north' and 'south' samples were bulked and the lambs grazed across the paddock on the feed that was left on offer. An additional sample of hay from Willalooka was feed tested, representative of an alternative feed source. The quality of the hay was slightly better than the standing crop, based on energy, protein and NDF, though poorer quality compared with the pasture. This feed quality is important to inform management decisions.

Based on rations developed for Sherwood (Merino wether lambs, targeting 40kg liveweight) the energy requirement was 15.0 total megajoules (MJ)/day and total protein requirement was 180g/day. The maximum energy the crop could provide without

protein supplementation was 13.5MJ/day and 117g/day of protein. In a second scenario where beans were added into the ration, the energy increased to 19.0MJ/day and 203g/day of protein, exceeding the requirement for growing lambs. This highlights the importance of providing appropriate supplementation and managing introduction of that feed effectively to ensure the lambs consume enough feed to achieve their growing potential. Without a protein supplement, the lambs did not grow as fast as they would have with a protein supplement.

Based on rations developed for Willalooka (Wiltipoll x Aussie White cross wether lambs, targeting 40kg) the energy requirement was 15.0MJ/day and protein was 180g/day. Lentils were supplementarily fed as a protein

Table 3 Feed quality data for the Sherwood site

Date Sampled	Dry Matter %	Moisture %	Crude Protein % DM	ADF % DM	NDF % DM	Digestibility % DM (DMD)	Digestibility % DM (DOMD) (Calc.)	Est. MEMJ/kg DM (Calc.)	Water Soluble Carbohydrates % DM	Fat % DM	Ash % DM
NORTH											
21/10/2019	38.7	61.3	11.1	24.6	49.6	70.1	66.2	10.4		3.5	2.8
31/10/2019	56.1	43.9	9.0	22.5	50.3	68.7	65.0	10.2	11.0	3.5	1.6
19/11/2019	87.8	12.2	9.4	21.4	49.5	70.7	66.7	10.5	9.0	3.4	<1
3/12/2019*	87.6	12.4	6.4	31.2	63.9	60.8	58.3	8.8	5.6	2.9	<1
18/12/2019*	92.5	7.5	3.5	41.5	78.4	48.3	47.7	6.7	3.4	2.3	2.0
SOUTH											
21/10/2019	35.7	64.3	12.8	23.1	45.0	73.6	69.2	11.0		3.8	4.1
31/10/2019	53.1	46.9	10.0	18.8	45.8	72.4	68.1	10.8	10.5	3.7	1.3
19/11/2019	81.0	19.0	9.5	21.7	50.0	70.1	66.2	10.4	9.3	3.5	<1
3/12/2019*	87.6	12.4	6.4	31.2	63.9	60.8	58.3	8.8	5.6	2.9	<1
18/12/2019*	92.5	7.5	3.5	41.5	78.4	48.3	47.7	6.7	3.4	2.3	2.0
PASTURE											
21/10/2019	37.7	62.3	12.4	31.5	59.5	61.9	59.2	9.0		3.1	6.4
31/10/2019	49.8	50.2	14.7	29.4	60.6	62.2	59.5	9.1	5.3	3.4	3.3
19/11/2019	70.7	29.3	12.5	32.1	62.6	58.2	56.1	8.4	4.1	3.3	3.0
3/12/2019	71.5	28.5	11.7	33.1	63.3	58.2	56.2	8.4	5.1	3.1	1.9
18/12/2019	66.6	33.4	13.2	32.4	59.1	58.0	56.0	8.4		3.5	4.5

* Bulked sample

PROSPERITY THROUGH COLLABORATION

Results and Discussion cont.

source, comprising 19.5% of the diet in this scenario. The ration provided approximately 15.9MJ/day of energy

and 183g/day of protein, which was adequate to meet the target live-weight gain.

The rations and gross margins are available as Appendices 1 and 2.

Table 4 Feed quality data for the Willalooka site

Date Sampled	Dry Matter %	Moisture %	Crude Protein % DM	ADF % DM	NDF % DM	Digestibility % DM (DMD)	Digestibility % DM (DOMD) (Calc.)	Est. MEMJ/kg DM (Calc.)	Water Soluble Carbohydrates % DM	Fat % DM	Ash % DM
HAY											
31/10/2019	89.3	10.7	10.3	32.4	60.2	64.4	61.3	9.5	16.0	2.7	3.6
CROP											
31/10/2019	36.2	63.8	8.9	27.5	53.9	64.2	61.2	9.4		3.4	5.5
19/11/2019	53.2	46.8	7.1	29.2	58.6	59.9	57.6	8.7	8.9	3.1	2.9
3/12/2019	80.3	19.7	7.1	25.3	54.0	63.8	60.9	9.4	8.1	3.1	1.0
18/12/2019	92.0	8.0	4.8	33.4	65.5	53.0	51.7	7.5	6.3	2.7	2.5
6/01/2020	84.6	15.4	2.9	42.8	75.1	43.2	43.4	5.8	3.5	2.1	6.5
PASTURE											
31/10/2019	37.6	62.4	13.8	28.5	52.5	65.1	62.0	9.6	10.7	3.5	6.0
19/11/2019	47.7	52.3	10.2	34.0	62.7	59.6	57.3	8.6	6.1	3.1	3.8
3/12/2019	63.1	36.9	7.5	39.8	70.3	49.0	48.3	6.8	2.9	2.7	1.0
18/12/2019	82.0	18.0	9.8	34.4	64.5	59.1	56.8	8.5		3.1	5.2
6/01/2020	77.1	22.9	7.8	38.8	67.5	54.1	52.6	7.7	4.4	3.0	9.6

The summarised gross margins for grain production for harvest and for grazing the standing crop at each site are presented below in Table 5. To harvest grain at Sherwood returns a gross margin of \$288.53/ha or to graze the standing crop returns a gross margin of \$305.36/ha. At

Willalooka, harvesting returned a gross margin of \$680.94/ha and grazing the standing crop returned a gross margin of \$820.70/ha. In both demonstrations, the gross margins for grazing the standing crop were higher than harvesting the crop. The producers have acknowledged that the graz-

ing standing crop gross margins can be improved in future years with further understanding and refinement of the practice on their own farms, including protein supplementation and crop treatment and preparation.

Table 5 Summarised gross margins for harvesting and grazing the crop at each demonstration site

Gross Margin	Sherwood (40ha)	Willalooka (16.5ha)
Grain production – harvest	\$288.53/ha	\$680.94/ha
Grazing standing crop	\$305.36/ha	\$820.70/ha

Host producers noted that in the future, they would draft off the smaller lambs (in this case sub-30kg) and only place lambs greater than 30kg in a standing crop to graze. The smaller lambs grew more slowly on the standing crop compared with the larger lambs, based on observations. The host producers felt the optimal entry weight for lambs onto a stand-

ing crop is 30kg liveweight and in future will aim to manage smaller lambs to ensure they reach the target weight before grazing them on standing crops to optimise the success of the practice.

At Sherwood, the hosts producers' intentions in future are to imprint lambs to lupins for 4-5 days prior to

weaning, to enhance the success of the practice when supplementing the lambs' diet while grazing the standing crop.

Host producers also recognised the value of the standing crop in reducing grass seed burden in their lambs.

PROSPERITY THROUGH COLLABORATION

Conclusions

The major benefit as communicated by both site hosts of the grazing standing crops practice is that it offers a protective alternative feed base option during times of high grass seed burden for lambs in the Upper South East. The data collected in this demonstration shows that it is important to evaluate your feedbase and

understand when to make decisions and take actions that optimise the growth rate of lambs, namely when to remove them from the standing crop, supplement their diet or otherwise manage them.

The practice has added versatility to mixed farms, by keeping options

open at the end of the season. The standing crops have provided good groundcover and subsequently greater soil erosion protection, benefitting soil health at both sites.



Figure 3 Small plot demonstration strips at Sherwood on 1/11/19. Sown 24/5/19. Photo C.Dennerley



Figure 4 Small plot demonstration strips at Keith on 1/11/19. Sown 23/5/19. Photo C.Dennerley

Appendix

[Appendix 1– Standing crops handout Sherwood](#)

[Appendix 2– Standing crops handout Willalooka](#)

[Appendix 3– Small plots rations and gross margins](#)

Acknowledgements

Thank you to our demonstration site hosts and collaborators at Keith (the Makin family) and Sherwood (the Menz family), to the PIRSA SARDI team for the management of both demonstration sites and to our paddock trial site hosts and collaborators at Sherwood (the Bartlett family) and Willalooka (the Jackson family).

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