

Kikuyu pastures - do they pay?

Background

There has been strong and growing interest by Kangaroo Island producers in establishing kikuyu pastures. The results are promising in that we know that kikuyu will grow and persist but what is not known is the actual economic benefits (and costs) of a kikuyu pasture compared to an annual pasture.

What was done

A trial was set up on John and Jo Symons property on Turkey Lane (Kangaroo Island Sheep Production Group focus farm). Two adjacent 6 ha paddocks were selected. The 'Control' was a mix of annual grasses plus sub clover, the 'Kikuyu' was sown in 2008 and at the time of the trial had 40% kikuyu groundcover.

Both paddocks were grazed with the same mob of adult sheep until 10th Sept 2010. On the 12th Sept, 50kg/ha urea was applied and both paddocks were then shut up for the trial. The aim was to accumulate Feed on Offer (FOO) to approximately 3.5 t/ha. However, the excellent spring conditions and the urea effect meant that we started with considerably higher FOO than planned (see Table 1 below).

TABLE 1: Pasture composition 20th Oct 2010.

Feed on offer (FOO) t/ha	Control	Kikuyu
Pasture composition		
% kikuyu	0	0
% sub clover	30	85
% capeweed	40	10
% annual grasses	30	5
Crude Protein(CP)	14.3	20.5
Metabolisable energy (ME)	9.36	10.35
Dry Mater %	16.6	14.7

On the 23rd October 2010, a mob of 120 merino weaner wethers from the one ewe age group were weaned and weight matched into two mobs and placed in each paddock (10 weaners/ha). The weaners were weighed, drenched with Cydectin LA, bulletted with Selenium and Cobalt bullets before being placed in to their respective paddocks. They were set stocked in each paddock until shearing on the 18th April 2011. The sheep were monitored for weight gain/loss, wool growth, worm counts, Vitamin E status and general health. They were hand fed as required to maintain weight or allow for slow growth and the costs and final returns for each mob were calculated.

Weather conditions

A very good Spring in 2010, resulted in green annual pastures until late November with some green persisting in the lower lying areas until mid December. December, January and the first half of February were typically warm to hot and dry, but a large rainfall event of 68mm on the 18th February resulted in a general germination of annual species in both paddocks. This rain was followed by a wet March of 88.4mm.

Both paddocks sustained excellent annual pasture germination that was well established by early March and continued until shearing, with the pasture growing above 50kgs DM/ha throughout that time.

Results

Growth

Chart 1 below shows the trend in average body weight for the two groups of weaners.

From weaning until the weighing on 10/12/10, both mobs gained weight at a similar rate, the gain being driven by residual annual feed value. There was no visible kikuyu in the kikuyu paddock when stock were first introduced due to an average pasture height of 15cm and 85% clover composition. Kikuyu became apparent only when the annual pasture senesced and collapsed to allow light in to the base of the sward.

By early December, the annual pasture in both paddocks had died with just a small area of late green in a low lying patch of the Control paddock. The weight gain through December in the Kikuyu paddock was driven by residual dry clover value plus the emerging green kikuyu. Lupins at 50g/hd/day were fed to the Control group throughout December to supply some extra protein to the dry feed. The average weight of the Control group remained constant through December.

In January the Control group lost weight even though they had 4 tonnes dry annual pasture plus 100g Lupins/hd/day. In contrast, the Kikuyu weaners maintained weight on a lower FOO level thanks to the 100g/day lupins plus the green Kikuyu pick.

CHART 1: Trends in average body weight



After the weighing in early February, supplementary feeding rates to both mobs were increased with the Control mob receiving Lupins at 150g/hd/day plus Barley at 150g/hd/day, whilst the Kikuyu mob were fed Lupins at 150g/hd/day plus Barley at 100/hd/day.

TABLE 2. Difference in total weight gain in weaners less than 26kg at weaning for the two paddocks

	Weaning weight	
	< 26kg	> 26kg
Kikuyu	18.7	17.7
Control	17.1	17.6

Significant rainfall from the 18th February onwards lead to a general germination of annual pastures in both paddocks and a rapid build up of green FOO. Supplementary feeding was stopped to all sheep by 18th March 2011. Excellent growth rates at the March and April weighings were driven by the abundant new seasons pasture growth in both paddocks, although the Kikuyu wethers maintained a weight advantage of 0.5 kg liveweight built up over the summer.

Standard Deviation of weights

Chart 2 shows the changes in the standard deviation of weights (StDevWt). The StDevWt illustrates the variation of weights around the mean. In weaners over summer and autumn, an increasing StDWt will often indicate the development of a "tail" in the mob long before it is obvious visually.

CHART 2. Standard deviation of weights



The StDevWt was almost identical initially as the 2 mobs were weight matched. However, the Control group StDvwt increased steadily throughout the trial period compared to the Kikuyu group. This meant that in the Kikuyu group, the weight range remained tight as the lighter sheep at weaning grew at a faster overall rate than the heavier sheep at weaning, whereas in the Control group the smaller sheep did not do as well as the heavier sheep (Table 2).

Weaner mortality in merinos through the summer and autumn is highly correlated to the body weight at the time of feed senescence. These results indicate a lower potential for light weaner mortality when grazing kikuyu pastures over the summer and autumn.

There was a significant difference in the average CK values between the two groups indicating muscle damage which was most pronounced in the Control group. Both groups required and were given Vitamin E supplementation (2000i.u. orally) but Control group was most affected. At the time of blood sampling the kikuyu green pick was less than 50kg/ha DM.

It was likely that the Vitamin E deficiency was contributing to the weight loss in the Control group through January and early February.

Supplementary feeding

Table 5 summarises the supplementary feeding regimen for both groups. Both groups were trail fed at the same time every second day. The cost of supplementary feed was calculated using an actual delivered on-farm cost of \$295 per tonne for Lupins and \$182.50 per tonne for Barley.

Vitamin E

Vitamin E is supplied to sheep in green feed. Vitamin E deficiency is common in weaners on Kangaroo Island in summer and autumn and results in muscle damage, weight loss and failure to thrive. At the weighing on February 11th 2011, five randomly selected sheep from both groups were blood sampled and tested for a range of serum parameters including Creatinine Kinase (CK). CK is an enzyme released from damaged muscle into the blood stream and is a proxy for Vitamin E deficiency. Table 3 below presents the results of the blood testing.

TABLE 3. Values for CK taken 11/2/11

Paddock	CK Value
Control	1746.6
Kikuyu	351.2
Normal range	8-100

Even in this year of very modest supplementary feed demand, the Kikuyu group received \$0.96 per head less supplementary feed.

TABLE 4. Supplementary feeding amounts and costs

Total Feed Cost per head	
Control	\$3.07
Kikuyu	\$2.11
<i>Kikuyu Cost Benefit per head</i>	<i>\$0.96</i>

Worm monitoring

At each weighing, ten sheep at random from each group had faeces collected for individual worm egg counts (WEC). Both groups maintained negative WEC throughout the duration of the trial.

Wool production

Shearing took place for both groups on 18th April 2011. At shearing, a midside wool sample was taken and the shorn wool weight including the belly was recorded for each sheep. The midside samples were tested by Riverina Wool Testers for fibre diameter, CV of diameter, yield, length and strength.

A wool price per kg was then computed using WoolCheque software (Southern prices, last 12 months average) and a 90% clip basis was applied to account for the percentage of non fleece wool value in the clip to give an estimated fleece value for each sheep. Table 5 shows the individual fleece values calculated for the trial.

TABLE 5. Individual wool data

Wool Data								
	GFW	Yield	CFW	Micron	CV	SS	SL	\$/hd
Kikuyu	4.0	69.40	2.79	17.8	18.5	53	83	\$40.89
Control	3.8	69.46	2.64	17.2	18.5	48	83	\$41.49

There were significant differences in wool production in the two groups. The Kikuyu group measured an increase in clean wool production of 0.15kg or 5.7%, an increase in average fibre diameter of 0.6 microns and an increase in tensile strength of 5 N/kT.

Due to the finer average micron in the Control sheep and the micron premiums available between 17 and 18 microns over the last 12 months, wool value per head was higher by \$0.61 than in the Kikuyu group.

Sheep deaths

There were no deaths recorded in either group during the trial period.

Net economic benefit

In this trial, the net economic benefit for the sheep in the kikuyu pasture was:

- Extra weight 0.5kg @ \$2.00 per kg liveweight = \$1.00
- Lower fleece value of \$0.61
- Lower supplementary feed cost of \$0.96

Total economic benefit of kikuyu = \$1.36 per head or \$13.60 per hectare

Discussion

The results of the trial confirmed what we expected to see from kikuyu pastures – better growth rates through Summer/Autumn, lower supplementary feed cost, more wool growth with a higher tensile strength and better Vitamin E status.

The seasonal conditions that were experienced during the trial period (late Spring finish and very early season start) meant that the Control sheep consumed green growing pasture for a much higher percentage of time than is normal for our area. We would normally expect to be supplementary feeding weaners from December until mid-late May, whereas in the trial, they were only fed from December to mid March. Therefore, feed costs were much lower than normal and the wool growth and body growth performance of the Control group was much better through March, April and May than normal.

The kikuyu paddock was established in a very poor Spring in 2008 and is slowly covering the paddock. However, at the time of the trial, kikuyu only constituted 40% of the ground cover of the paddock.

Even given the kikuyu availability limitations due to ground cover and the 1 in 20 year season start in 2011, the weaners grazing kikuyu still recorded a net economic advantage of \$1.36 per head or \$13.60 per hectare. All of this net economic benefit occurred between mid December 2010 and mid February 2011 corresponding to the fall in residual dry pasture digestibility and protein in the control paddock. These results could be considered as the minimum expectation of economic benefit for kikuyu on Kangaroo Island.

Kikuyu ground cover of 80-100% in "average" summer/autumn rainfall years could be expected to provide an economic benefit of 3-4 times this result, as March and April normally have the highest supplementary feeding costs and the lowest wool growth for the year. Previous experience has shown us that kikuyu will provide green FOO in March and April, the amount depending on rainfall occurrence, whereas there is normally no green annual feed available.

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