Grain on Grass

Producer case study: N Baker

Property owner: N Baker
Property Name: Fairfield
Location: Coonabarabran NSW
Annual rainfall: 750mm
Property size: 650ha
Enterprise: Beef cattle and cropping
Pasture type: Tropical grasses
Soil type: Sandy loam

The Warrumbungle Mixed Farm Producer Group (WMFPG) was developed to increase the knowledge and skills of the producers involved through joint learning and experience sharing.

Members of the WMFPG were a mixed group of producers grazing dual purpose and winter crops.

There was an opportunity for these producers to utilise feeding equipment and on-farm grain stores to increase weight gain of stock grazing forage/dual purpose crops and turn stock off more quickly, increasing carrying capacity and, therefore, profitability.

The Grain on Grass project was developed to demonstrate the use of supplementing grain while grazing to:

1. Increase liveweight gain per head per day by 20%
2. Improve carrying capacity through expedited stock turn-off by 3.5%
3. Showcase the utilisation of grain supplementation during forage crop grazing in preserving carcase quality and meeting market specifications while reducing grazing days by 13%
4. Raise awareness among core producers and 25% of observers regarding the importance of feed tests in assessing feed quality
5. Increase awareness among core producers about utilising carcase feedback to ensure compliance with target market specifications
6. Enhance the skills of 75% of core producers in formulating supplementary feeding rations through the utilisation of feed tests.

Background

The Bakers' property, 'Fairfield', is located a short distance north-east of Coonabarabran and produces beef cattle and grain.

The Bakers' beef enterprise production goals include finishing young cattle into the feedlot market and trading when the season permits.

Currently, the Bakers have 150 Angus breeders, plus calves, and 100 mixed-sex trade weaners.

Grain on Grass demonstration at Fairfield

The Grain on Grass demonstration at 'Fairfield' focused on understanding the profitability and productivity benefits of supplementing Angus and Friesian steers on Premier digit pastures during late summer.

The demonstration site consisted of tropical grasses with predominantly Premier digit **(Figure 1).**

It commenced on 6 February 2023 and concluded after 60 days, on 7 April 2023. The demonstration consisted of 40 steers (20 Angus and 20 Friesian).

The breeds were split into two groups, with 10 Angus and 10 Friesians in the treatment group as well as in the control group.

The steers were weighed at the start of the trial which ensured the two trial groups had an even ratio of breeds and as similar as possible average start weight.

At the beginning of the demonstration trial, the control group had an average initial weight of 292kg, while the treatment group had an initial average weight of 294kg.

Figure 1: Premier digit pasture

The average start weight for the Angus steers was 290kg while for the Friesian steers, it was 300kg.

For the demonstration, one large paddock was split into two with temporary fencing and a trough added between them.

Feed samples were taken on 14 January 2023 to determine feed quality **(Table 1)** with initial feed quality test results indicating that Dry Matter (DM) digestibility was around 47% and both protein and energy were below optimum production requirements for weight gain for this class of stock.

Feed test results of the oats on hand had a Crude Protein (CP) content of 5.5% and metabolisable energy (ME) content of 10.5% **(Table 2)**.

For the treatment group, a liveweight average daily gain (ADG) target of >700g/head was chosen. The control group received no supplement.

Grazfeed® modelling was used to calculate the supplement needed to achieve this target, showing 5kg of the oat supplement would be required. This was fed out using adjustable self-feeders.

The quality of the oats was low and therefore once this supplement ran out, the supplement was changed to barley approximately halfway through the demonstration. However, the barley supplement was higher in CP and ME than the oats **(Table 3)**.

There were some acidosis issues with the change in ration which could have affected the results to some extent.

Table 1: Initial feed test results of Premier Digit pasture - 14th January 2023

Test Description	LOR	UNITS	1 Road Paddock
Dry Matter	0.5	%	41.4
Moisture		%	58.6
Neutral Detergent Fibre - NIR	10	%	65
Acid Detergent Fibre - NIR	4	%	35
Crude Protein - NIR	2	%	7.7
Inorganic Ash - NIR	3	%	8
Organic Matter - NIR		%	92
DMD	39	%	46
DOMD	38	%	47
Calculation of ME	4.3	MJ/kg DM	6.5
WSC - NIR	4	%	<4.0
AFIA Hay and Silage Grade			NO GRADE

Table 2: Initial feed test results of the oats

Test Description	LOR	UNITS	1 Field Bin Oats
Dry Matter	0.5	%	95.6
Moisture		%	4.4
Neutral Detergent Fibre - NIR	10	%	48
Acid Detergent Fibre - NIR	4	%	32
Crude Protein - NIR	2	%	5.5
Inorganic Ash - NIR	3	%	3
Organic Matter - NIR		%	97
DMD	39	%	64
DOMD	38	%	64
Calculation of ME	4.3	MJ/kg DM	10.5
Crude Fat - NIR	1.1	%	3.1
Bulk Density as kg/hectolitre	1	kg/HL	n/a
Starch (Concentrate) - NIR	2	%	22.8

Table 3: Feed test results for barley supplement

Test Description	LOR	UNITS	1 Feed Barley
Dry Matter	0.5	%	92.7
Moisture		%	7.3
Neutral Detergent Fibre - NIR	10	%	18
Acid Detergent Fibre - NIR	4	%	6
Crude Protein - NIR	2	%	10.8
Inorganic Ash - NIR	3	%	3
Organic Matter - NIR		%	97
DMD	39	%	86
DOMD	38	%	85
Calculation of ME	4.3	MJ/kg DM	13.0
Crude Fat - NIR	1.1	%	1.8
Bulk Density as kg/hectolitre	1	kg/HL	52.4
Starch (Concentrate) - NIR	2	%	60.7

Results

Increase average daily gain by 20%

The two groups were weighed after 60 days at the completion of the demonstration.

The demonstration ended earlier than was initially expected due to a decrease of available herbage mass from decreased seasonal rainfall.

The final average weights of the control group were 315kg (Angus) and 332kg (Friesian), and the treatment group were 327kg (Angus) and 362kg (Friesian).

The control group had an ADG of 0.54kg/day, while the treatment group had an ADG of 0.88 kg/day – an increase of 63% **(Figure 2 and Table 4)**.

This was a statistically significant difference ($P<0.05$), and well above the 20% increase in ADG target.

The ADG of the dairy animals was 0.79kg/day, while the ADG of the beef animals was 0.53kg/day.

Figure 2: ADG comparing treatment and control groups and dairy and beef groups

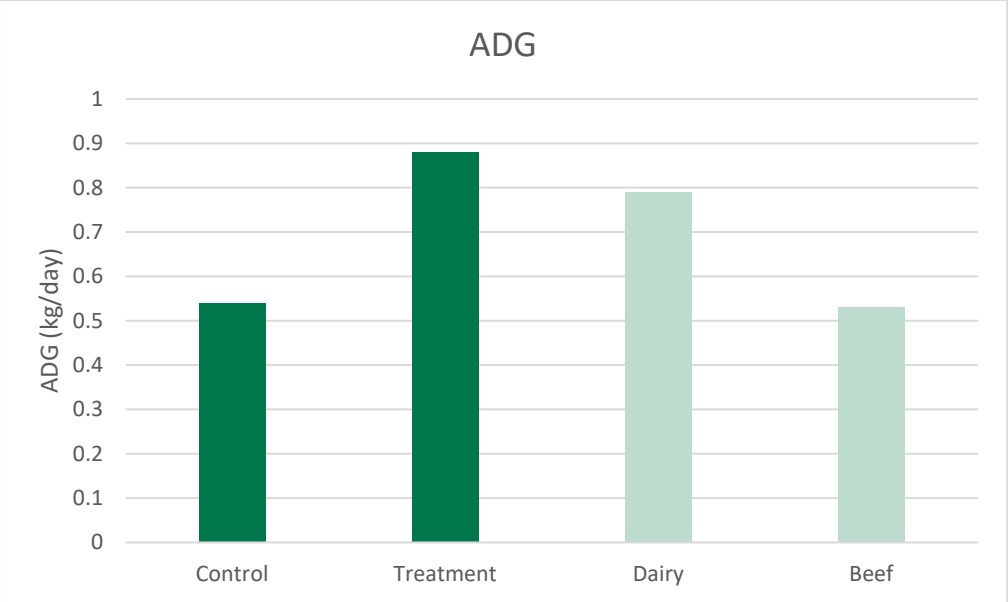

Table 4: Percentage increases in average daily gain (ADG) between the groups

% Increase in average daily gain (ADG)			
Breed	**Treatment**	**ADG**	**% Change**
Angus	Control	0.49	
	Treatment	0.67	36
Dairy	Control	0.56	
	Treatment	1.02	83
Combined	Control	0.54	
	Treatment	0.88	63

Improve carrying capacity and reducing grazing days

The 63% increase in weight gain of supplemented animals compared to those that were not supplemented meant more animals could be run and finished in a shorter amount of time, therefore increasing carrying capacity and reducing grazing days.

Exact figures around carrying capacity and grazing days are difficult to calculate without a target finishing weight.

Cost-benefit analysis

Over the demonstration period, the treatment group received a total of 6t of oats. **Table 5** shows the cost of grain and labour.

Table 5 Cost of grain and labour for the treatment group

Treatment group costs	
Total cost of grain	$1,500
Total cost of labour	$210
Cost grain + labour	$1,710
Cost grain + labour (per tonne)	$285
Cost grain + labour (per kg)	$0.29
Grain consumed per day (kg)	100
Grain consumed per head (kg)	5.0
Cost/hd/day	$1.43
Cost/hd/demo period	$85.50

The total amount of grain supplement consumed was 100kg/day, which equates to 5kg consumed per head per day. At a cost of $250/t of grain, the cost per head per day (including labour) was $1.43 for the supplemented group.

When looking at financial gain based only on ADG without costs factored in, there was a financial gain of $1.10 **(Table 6)**.

Table 6: Average daily gain and $ gain per head per day

	Total ADG (kg)	$/kg Liveweight	$ Gain/hd/day	$ Gained through supplementary feeding
Control group	0.54	$3.59	$1.94	
Treatment group	0.88	$3.45	$3.04	$1.10

When the costs of labour and grain were factored in, supplementing animals resulted in a loss of -$0.33/head/day or -$19.68 over the duration of the 60-day demonstration **(Table 7)**.

Table 7: Cost benefit of grain supplementation for the beef and dairy animals and treatment versus controls (combined)

Cost benefit/day				Cost benefit for duration of demo		
	Cost/hd/day ($)	Return/hd/day ($)	Cost Benefit ($)	Cost/hd/demo ($)	Return/hd/demo ($)	Cost Benefit ($)
Beef	1.43	0.80	-0.62	85.50	48.25	-37.25
Dairy	1.43	1.39	-0.03	85.50	83.40	2.10
Combined	1.43	1.10	-0.33	85.50	65.83	-19.68

The $ return/hd figure was calculated assuming that the liveweight price per kilogram was $4.50 for the Angus steers and $3.00 for the Friesian steers.

These figures were then multiplied by the additional average daily weight gain as a result of grain supplementation.

Evaluation of case study

Average daily gain was significantly above the 20% target through supplementing with grain at this demonstration site.

This was achieved despite quality issues with the initial oats ration, as well as acidosis issues arising from the sudden change in ration from oats to barley.

The demonstration also highlighted the difference in weight gains of dairy versus beef, with dairy animals gaining 0.26g/hd/day (on average) more than the beef animals.

Despite the 63% increase in ADG of the animals supplemented with grain compared to those that were not supplemented, there was still a negative return associated with grain supplementation of -$19.68/hd for the demonstration period.

This demonstration indicated that supplementing grazing animals with grain may only be worthwhile when feeding low quality grain that can't be sold or when grain prices are very low.

The recommendation is that producers undertake some basic calculations before commencing to ensure that there is a production and financial benefit to supplementing livestock.

Factors to consider would include the cost of supplementation (commodity prices) and livestock prices (current and future).

For further information:

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