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Lean meat yield & eating quality producer demonstration sites – New South Wales sites facilitation

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Abstract

Two Producer Demonstration Sites (PDS) were established in southern NSW as part of a national trial to demonstrate the value of lean meat yield, intramuscular fat and tenderness in prime lamb production systems. On PD13 (Manchester),300 Corriedale ewes and at PD12 (Holding) 251 merino ewes were artificially inseminated with semen from Poll Dorset and White Suffolk sires that were identified to have divergent breeding values on relevant key traits.

From pre-conception though to weaning, the ewes were managed to Lifetime Ewe Management (LTEM) guidelines. Ewes and lambs were all electronically identified, with all relevant information recorded against the ewes (AI, condition score, scanning, wet and dry, treatments), and the lambs (DNA record, weights, treatments). Lambs were weaned and "finished" as per normal management practices at each PDS site. Lambs were processed at 3 processing plants (PD13 at 2 processing sites and PD12 at 1 processing site).

The data collected from these 2 PDS will be aggregated with data from other sites and analysed under the national coordination project, B.SCC.0144, to determine the value of RBVs for LMY and eating quality traits to ram breeders, lamb producers and processors.

Executive summary

This project is providing data to the MLA project B.SCC.0144 - Proof of Concept of Lean Meat Yield and Eating Quality Producer Demonstration Sites. The overarching purpose of these projects is to deliver “proof of concept” for lean meat yield, eating quality and human health attributes within major lamb and sheep meat supply chains by facilitating, empowering and developing a common focus and normal trading mechanisms on these future key industry profit drivers right along the supply chain.

Twenty Producer Demonstration Sites were established to demonstrate the impact new research breeding values (RBVs) for lean meat yield (LMY) and eating quality, particularly intramuscular fat (IMF) and shear force (SF5), will have on lamb production along the supply chain. Two of these sites were in southern NSW.

Ewes inseminated with semen from Poll Dorset and White Suffolk sires with divergent RBVs for LMY, IMF and SF5 were managed according to Lifetime Ewe Management recommendations on two PDS in Southern NSW. The two sites marked 272 crossbred lambs from 300 corriedale ewes mated and 146 cross bred lambs from 251 merino ewes mated. Both these lambs marked are from the AI mating only, with the backup lambs excluded. The lambs were weighed periodically until target slaughter specifications were achieved. The lambs were processed through three supply chains/processors. Sufficient lambs were produced from two sites to provide carcase and eating quality data to contribute to determining the value of the RBVs along the supply chain. Data collected from these PDS will be analysed in B.SCC.0144 to determine the value of RBVs for LMY and eating quality traits to ram breeders, lamb producers and processors.

Understanding of the value of LMY and EQ along the lamb supply chain has been boosted by the involvement of the producers hosting the sites in the processing and measurement of their lamb’s carcases. In addition, over 90 producers attended information sessions/workshops associated with the two Southern NSW PDS to increase their awareness of the value of LMY and EQ to the lamb supply chain.

Table of Contents

1 Project objectives

1. Professionally and efficiently co-ordinate and oversight two Producer Demonstration Sites (PDS) to ensure the approved key activities are achieved, activities are aligned and integrated and all measurement, monitoring and evaluation is carried out according to the project plan.
2. Ensure that rigorous timely measurement occurs on all animals and that they reach target slaughter specifications.
3. Ensure the ewes are run in accordance with Lifetime Ewe Management (LTEM) targets.
4. 20-50 producers are actively engaged per site.
5. Coordinated at least one field day / workshop per site.

2 Methodology

Two sheep producers agreed to be part of and host producer demonstration sites (PDS). Throughout the trial both producers ran their ewes to Lifetime Ewe Management (LTEM) guidelines/targets. A sample of ewes (50) from each PDS were assessed at pre joining, joining, scanning, pre lamb treatment, lamb marking and weaning to make sure that they were meeting their condition score targets.

Both PDS had 300 ewes identified to be artificially inseminated (AI) to Poll Dorset and White Suffolk sires. AI at PD12 (Holding) happened on the 4th April 2013 and at PD13 (Manchester) 13th March 2013. Semen was sourced by Sheep Genetics (SG), from rams with divergent breeding values for LMY, IMF and SF5. At PD12 300 Merino ewes were used while at PD13 300 Corriedale ewes were used for AI. At both PDS ewes were randomly selected for AI to the 8 sires. At PD12 251 from to 300 ewes were AI, due to 49 already been pregnant. This was due to ewes having been away on aggistment (due to poor seasonal conditions), and was concluded that neighbouring rams got in with ewes while aggisted. AI was completed on both PDS by Livestock Breeding Services. At AI ewes were linked to AI sire via the Radio Frequency Identification (RFID) tag.

After the completion of AI, ewes were pregnancy scanned using commercial scanning businesses approximately 80 days post AI. PD12 sheep were scanned 30th May 2013 and at PD13 on the 7th May, 2013. At both PDS, scanning pregnancy statuses were recorded against the ewe RFID tag and were separated in pregnancy mobs (single and twins) up until lamb marking. At both sites the ewes conceiving to backup were separated from the ewes conceiving to AI at scanning.

The lambs were RFID tagged at lamb marking with their birth type and sex recorded. A manual number is stamped on each individual RFID tag. Lamb-marking took place at PD12 on the 6th November, 2013 and at PD13 on the 20th September, 2013.

At lamb-marking a blood sample was collected from each lamb for DNA identification to the AI sire. The blood samples were sent to Sheep CRC for analysis. Post lamb-marking the mobs were boxed. From lamb-marking up until slaughter, multiple weights were recorded including prior to trucking for slaughter.

Animal use in the project was approved by the Agrisearch Services Pty Ltd Animal Care and Ethics Committee (ACEC number 1308).

3 Results

Ewe Performance

Condition score (CS) was recorded on a minimum of 50 ewes at each event (Table 1) following LTEM guide lines. It must be noted that both PDS experienced below average nutritional conditions due to the lowest rainfall recorded since 1997, and both sites did their utmost to achieve LTEM targets. PD12 did exceptionally well to maintain CS through to lamb-marking.

Table 1: The condition scores recorded at AI, scanning, pre lamb and lamb marking and weaning

Producer	Ewe Breed	CS AI	CS Scanning	CS Pre Lamb	CS Lamb Marking	CS Weaning
PD13	Corriedale	3.1	3.3	3.4	3	3
PD12	Merino	2.8	2.7	2.7	2.7	2.7

Food on offer (FOO) was recorded at AI, scanning, pre lambing and lamb marking (Table 2). A minimum of 15 sites per paddock were recorded to get an average FOO as recommended by the LTEM guidelines. As can be seen PD13 significantly lower FOO.

Table 2. Food On Offer (FOO; kgDM/ha) at AI, scanning, pre lambing and lamb marking.

Producer	Ewe Breed	FOO AI	FOO Scanning	FOO Pre Lamb	FOO Lamb Marking
PD13	Corriedale	450	680	900	1300
PD12	Merino	120	180	330	800

With the challenges of limited FOO, both PDS managed supplementary feeding programmes for their ewes, meeting their ME requirements relevant to where they were in their breeding cycle. Both PDS used grain and hay to meet the ewes ME requirements.

Conception rates at pregnancy scanning mirrored the condition score of the ewes (Table 3). The higher average CS in PD13 achieved a better conception rate of 109% to ewes AI. This supports the literature in LTEM of the linkages of higher CS to ovulation rates. PD12 still achieved a good result with 86% conception in light of their lower average CS.

Table 3: Conception rates from total ewes AI (trip = triplet).

Producer	N Ewes AI	Single No	Single %	Twin No	Twin %	Trip No	Trip %	Total No	Total %
PD13	300	81	27	104	35	13	4	328	109
PD12	251	97	39	58	23	1	na	216	86

Lamb survival at PD 12 was low with only 68% lambs marked from lambs scanned (Table 4). At PD12 from when the merino ewes came back from aggistment pre AI through to weaning there was a consistent underlining challenge with meeting the nutritional needs of the ewes. With that consistent challenge, plus also an average CS of 2.8 at AI, there was the challenge of at least maintaining current CS with a poor seasonal outlook. Lambing started on the 4th September and continued through to the 14th September. The ewes at PD12 maintained CS 3 through to weaning (30th November 2013; Table 1). By weaning, PD12 was experiencing a declining spring, with a continual supplementary feeding programme for the weaner lambs. Supplementary feeding of oats/barley and lucerne hay was provided from scanning through to weaning, and then continued for weaner lambs.

Table 4: Lamb conception, lamb marking and weaning rates.

Producer	Ewes AI (hd)	Conception Rate (%)	Lambs Conceived (hd)	Lambs Marked (hd)	Lamb % from Ewes AI	Lambs Weaned (hd)	Weaning % from Ewes AI
PD13	300	109	328	272	91	265	88
PD12	251	86	216	146	69	136	54

At PD13 with an average CS of the ewes at AI (3.1) there was an easier journey through the ewe's gestation and lactation up to weaning, even though there was significant nutritional challenge. Unlike PD12, PD13 received some significant rain events, which helped significantly in FOO (see table 2). This in turn helped in maintaining CS throughout pregnancy and lactation. Lambing occurred over the period from the 30th August through to the 14th September. Lamb marking had to be conducted inside the shearing shed due to poor weather. PD 13 achieved a good result of lambs marked from ewes AI (91%; Table 4). Weaning at PD13 took place November 15th, weaning 265 lambs (88%) and 136 (54%) on 1st December at PD1

Image 1: AI at PD12

Lamb Performance

Lambs from PD12 (n=133) were weighed 4 times between weaning to slaughter. The total drop of lambs were slaughtered as one draft, with the last weight taken before trucking to JBS, Cobram, VIC on the 7th July 2014. Over the period from first weight until the last weight the lambs put on average 112g/day over 229 days (Table 5). The weight gain in the lambs over this period reflects the poor seasonal conditions experienced at PD12, but considering this did well to get to reach slaughter weight. It can be also noted that over time weight gain dropped. This decline in weight gain mirrored the declining season that was experienced. Additionally, at the end of March when good rain was received sudden good pasture growth resulted. The high moisture content of the pasture in turn caused scouring, which would have contributed to weight gain declining. On advice from the livestock agent, the lambs were not shorn, but did receive a crutch 6 weeks pre slaughter.

Table 5: Weight and weight gain for PD12 for lambs.

Date	Weight (kg)	N days Between Weigh	Weight Gain (g/d)
20/11/13	23.3	0	
22/02/14	37.6	94	142
14/05/14	46.5	81	124
07/07/14	48.8	54	43*

* Final weight was taken as an empty weight; this will have reduced the final weight gain relative to earlier periods which were taken from full weights.

Lambs from PD13 were weighed 4 times from post lamb marking until being slaughtered in two drafts. The first draft of 81 lambs went on the 19th January. Over the period from first weigh to the second weigh, the lambs had an average weight gain of 184 grams over 40 days. They were yarded the night before and were

weighed at 7.00am in the morning, and picked up by the carrier by 11.00am and taken to Coles, Gundagai.

A team of 3 people from UNE Meat Science came to Gundagai to facilitate the measuring of the lambs. Anthony Shepherd also attended and scanned in the RFID tags at point of slaughter to ID carcass's to sires.

The 2nd draft of 95 lambs went on the 9th of April. As the second draft they had a total of 4 weighing's and had an average weight gain over 164 days of 118 grams. They were yarded at 7.00am in the morning, and were weighed 4.00pm that afternoon and picked up by the carrier at 5pm. The second draft was taken to Thomas Foods International, Tamworth, for processing. A total of 176 were processed and measured from a potential 265 (69%). The remaining were sold either locally or through the same processing plants, as a separate draft as a normal processing lot.

Table 6: Weight and weight gain for PD13 for lambs Slaughter Group 1 and 2. Weights and weight gain in 2nd Slaughter Group are a continuation on from 1st Slaughter Group, total of 176 lambs.

1st Slaughter Group (81 hd)			
Date	Weight (kg)	Days Between Weigh	Weight Gain (grams)
30.10.13	34.9	0	
09.12.13	39.5	40	184
2nd Slaughter Group (95 hd)			
31.03.14	50.6	111	100
09.04.14	53.9	10	330
Total Average Weight Gain All Lambs (121 Days)			118

Image 2: Weaner lambs at PD13. Weaners were on feeders with oats/barley mix ad lib in dry lucerne paddocks, over summer 13/14

The PD13 lambs were assessed in the processing plants by the team from the Meat Science group at University of New England, led by Geert Geesink. Colin Starky facilitated the PD13 lambs in which Anthony Shepherd helped in collecting data in the Gundagai processing plant. The PD12 slaughter at Cobram was facilitated by Aron van Heuvel and Xuemei Han.

Image 3: PD13 slaughtered lambs hanging in cold storage at Gundagai processing plant

Image 4: Colin Starky assessing loin cuts at Gundagai processing plant of PD13 lambs.

4 Field days

Two major field days were held to promote the southern NSW LMY & EQ PDS project. The project was also promoted through local LTEM groups, in which both participants are/were involved. The first field day was held on farm at PD13 in conjunction with a pre ram sale inspection at the end of August, 2013. Forty five people attended, which included producers, industry representatives and some local school children, as part of their Agricultural studies.

The second field day was held in mid-February at Cootamundra, in which Dr Janelle Edward-Hocking attended to present results. Approximately 50 people in attended, with the majority being producers. The presentation was part of the annual Sheepmatters field day, held for Sheepmatters clients. Also in attendance was a representative from The Land newspaper. An MLA promotional flyer was embedded onto the Sheepmatters website, which has been promoted to Sheepmatters subscribers, and is open for public viewing at http://www.sheepmatters.com.au/industry-info

5 Acknowledgements

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