final report

Project code: B.SCC.0151

Prepared by: Leanne Sherriff
Macquarie Franklin

Date published: August 2014

PUBLISHED BY
Meat & Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Lean meat yield and eating quality producer demonstration sites – Tasmanian sites facilitation

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

Abstract

The aim of the Producer Demonstration Site (PDS) trials is to deliver “proof of concept” for lean meat yield (LMY) and eating quality ASBVs. There were three trials in Tasmania, part of 20 nationally. The Tasmanian trials used 2 maternal ewe base flocks and one Cormo ewe base flock. Ewes were artificially inseminated with semen from Poll Dorset and White Suffolk rams selected to have divergent Research Breeding Values (RBVs) for key traits for lean meat yield and eating quality. Artificial insemination was conducted in April 2013 with a success rate of 80% at two properties and 71% at one property. Ewes were managed to Lifetime Ewe targets and achieved an excellent number of lambs at weaning - all flocks greater than 200 – 289 (96% joining to weaning) at Chudleigh, 205 (68%) at Bothwell and 347 (115%) at Blackwood Creek. Blood samples were collected from the lambs at marking to identify the sires, and lambs were double tagged with EID and visual tags. The mobs of trial lambs were all weighed at least 3 times between weaning and slaughter. Two mobs were slaughtered in early February 2014 and one mob was slaughtered in mid-May 2014, at two different processing plants in Tasmania. The numbers of lambs with known sires slaughtered at each site were 199,133 and 196, respectively.

Data collected from these PDS’s 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, 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. Three of these sites were in Tasmania.

Ewes inseminated with semen from Poll Dorset or White Suffolk rams with divergent RBVs for LMY, IMF and SF5 were managed according to Lifetime Ewe Management recommendations on three PDS in Tasmania. All of the sites had good conception and lamb marking rates (>70% conception at all sites, marking 306, 223 and 356 lambs from 300 ewes at each of the sites). The lambs were weighed monthly from weaning until target slaughter specifications were achieved. The lambs were processed through two supply chains/processors in Tasmania. Sufficient lambs were produced from all sites to provide carcase and eating quality data to determine the value of 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 lambs’ carcases. In addition over 350 producers have been exposed to the trials through attending workshops and field days with information presented about the LMY and EQ trials.

Table of Contents

1. Background

The aim of this project is to deliver “proof of concept” for lean meat, 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. From the Sheep Genomics Program and the Sheep CRC Information Nucleus Flock, Poll Dorset, White Suffolk and Merino sires have been identified that have significant differences in research breeding values (RBVs) for dressing percent, lean meat yield (LMY) and eating quality, particularly Intramuscular Fat (IMF) and Shear Force (SF5). Proof of Concept Producer Demonstration Sites were established to demonstrate the impact these new RBVs will have on lamb production along the supply chain.

Twenty Producer Demonstration Sites (PDS) were established across Australia involving 8 sires (2 high and 2 Low by 2 traits) per site, with the target of producing 200 lambs for measurement & processing and allowing 10 lambs per sire (80) to be sampled for eating quality determination. The data from each site will be aggregated for analysis, validation of the RBVs and used in major communications programs with Sheep Genetics, MLA and the Sheep CRC.

The data will contribute to the overall outcomes of the LMY & EQ Proof of Concept project (B.SCC.0144), which include:

1. Determining the value of 6 or more new research breeding values for ram breeders, lamb producers & processors at 20-30 sites.
2. Developing suitable measurement technology and feedback mechanisms for these breeding values at processing.
3. Initiating a common focus and foster the development of normal trading mechanisms including potential Value Based Trading on these future key industry profit drivers right along the supply chain.

This project report encompasses the three PDS located in Tasmania.

2. Project objectives

1. To professionally and efficiently co-ordinate and oversight Producer Demonstration Sites 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. To ensure that rigorous timely measurement occurs on all animals and that they reach target slaughter specifications.
3. To ensure the ewes are run in accordance with Lifetime Ewe Management (LTEM) targets.
4. To ensure 20-50 producers are actively engaged per site.
5. To coordinate at least one field day / workshop per site.

3. Methodology

Three producers in Tasmania agreed to host producer demonstrations sites. They were located at Chudleigh (Wesley Dale), Blackwood Creek (Nosswick) and Bothwell (Dungrove). Chudleigh and Blackwood Creek were both maternal flocks – Kelso and Coopworth respectively. Bothwell was a Cormo (merino x Corriedale) flock.

The ewes in the trial were mated using AI in April (9, 15 and 16 at each trial site, respectively). Pregnancy scanning was completed on 18 June at Wesley Dale, 4 July at Dungrove and 11 July at Nosswick. The ewes were managed to LTEM principles before, during and after mating to ensure good conception and lamb survival. Ewes were condition scored at joining and pregnancy scanning. Before lambing, ewes were split into single bearing and multiple bearing mobs. At marking, blood samples were collected from all lambs for DNA testing to determine sires. Sex and birth type (twin or single) were also recorded. The lambs were tagged with EID and visual tags.

Sponsorship was provided by a local agricultural supplies company (TP Jones) to provide electronic ear tags for all three properties (donated by Allflex) and a scanner and TSI data recorder from Gallagher to two of the properties (the third already uses this technology). This sponsorship was of great assistance in efficient and accurate collection of data.

Ethics approval was not required in order to conduct this trial (as advised by the inspector animal research), as all the practices used are commonly used agricultural practices, of low welfare impact conducted by competent individuals (refer to attachment in the Appendices).

Lambs were weaned at Nosswick and Wesley Dale in early December. Bothwell lambs were weaned mid-January. Lambs were weighed at weaning and then every 3-4 weeks after.

Nosswick lambs were weaned onto Pacer (forage crop/leafy turnip) on 7 December 2013. On 7 January 2014 they were moved onto irrigated clover. Wesley Dale lambs were weaned onto Pacer on 9 December 2013. At weaning, the top (heaviest) 132 lambs were separated from the mob and were rotationally grazed, while the remainder of the mob (N=132) were set-stocked. Dungrove lambs were weaned onto pasture on 17 January 2014 and then on 11 March they were moved onto rape.

The lambs from Nosswick and Wesley Dale were slaughtered during the first two weeks of February. 100 heavy lambs (47-52kg weight range) from each farm were slaughtered at JBS Longford on 5 and 6 February 2014 and 100 lighter lambs from each farm (42-46kg weight range) were slaughtered at Devonport City Abattoir on 10 and 11 February 2014. Not all of the lambs slaughtered had known sires – hence the actual numbers counted in the trial are summarised in Table 2.

The Dungrove lambs were slaughtered in one mob of 133 lambs at JBS Longford on 14 May 2014.

The SARDI meat research team travelled to Tasmania for all slaughters and additional local labour was coordinated by the site coordinator to assist in collection of data. The use of local labour – including the Tasmanian site facilitator (Leanne Sherriff), another staff member from Macquarie Franklin involved in the livestock industry (Jason Lynch) and casual assistance from a prime lamb producer (Mandy Allen) has improved the skills-base of local people to be involved in future meat research trials in Tasmania. Additionally, producers from the Wesley Dale and Nosswick properties attended all kills for their lambs, participating in some of the data collection and learning more about the trial.

4. Results

Tables 1 and 2 summarise the results from AI and the numbers of lambs weaned and then finally slaughtered. There was an even distribution of sire, sex and birth type (twin or single) across the range of lamb weights at all sites.

Table 1: Results from scanning

Property	No. ewes	No. singles	No. twins	No. triplets	Dry	% wet	No. lambs predicted
Wesley Dale	300	92	132	17	59	80	408
Dungrove	300	129	83	0*	88	71	294
Nosswick	300	62	179	NA#	61	80	420

** no triples recorded at Dungrove*
 # triplets were not assessed at Nosswick

Table 2: Lambing results

Property	No. lambs marked	No. lambs at weaning	% survival joining - weaning	No. trial lambs slaughtered
Wesley Dale	306	288	96%	199
Dungrove	223	199	66%	133
Nosswick	356	343	114%	196

Table 3 Summary of the results from weighing of lambs during the trial

Property	No. lambs	Weaning date	Av weight weaning	Av daily wt gain & no. days	Av weight time 2	Av daily wt gain & no. days	Av (min – max) weight time 3	Av daily wt gain & no days	Av (min – max) weight time 4
Wesley Dale	285	9/12/13	32.9 kg	270g/day	39.6 kg	286g/day	45 kg	-	-
	Top 100		35.6 kg	293g/day 25 days	43 kg	313g/day 19 days	48.9 kg	-	-
Nosswick	342	7/12/13	31.3 kg	250g/day	38.3 kg	281g/day	43.1 kg	-	-
	Top 100		36.4 kg	261g/day 28 days	43.8 kg	310g/day 17 days	49 kg	-	-
Dungrove	208	19/1/14	35.5 kg	101g/day	39.8 kg	-25g/day **	39.1 kg	220g/day	**46.6** (33-62)
	Top 100*		38.7 kg	125g/day 43 days	44.1 kg	-50g/day 28 days**	42.6 kg	245g/day 34 days	**50.9** (47-62)

** top 100 is based on the top 100 lambs by weight at the final weigh (overall also includes top 100). This has been recorded to enable the average performance in weight gain to be compared to the top performers*

*** during this period is when lambs were moved from dryland pasture to rape*

The growth rates of all lambs were checked after weaning compared to the next weighing (Table 3). The growth rates at Wesley Dale and Nosswick where lambs were weaned onto irrigated fodder crops were very good, with lambs reaching slaughter weight at approximately 150 days old (Tables 3 and 4). The Dungrove lambs were slower maturing, likely to be due both to the maternal genetics and the fact that they were weaned onto dryland pasture. 51 days after weaning (at 176 days old) these lambs were moved onto rape. Initially (Tables 3 and 4) this severely checked their growth rates, but once they become accustomed to the change in diet the growth rates were double what had been previously observed on dryland pasture. The Dungrove lambs were slaughtered at 238 days old. The numbers of Dungrove lambs slaughtered and able to used in the trial analysis was reduced due to the fact that prior to marking the trial lambs were boxed up with another mob, hence the sire of some lambs in the group was unknown. In addition, there were difficulties identifying progeny for one sire, due to technical issues at the laboratory.

Table 5 summarises the data from the slaughter of the lambs. The electronic scales malfunctioned at Wesley Dale prior to loading lambs for slaughter at plant 2, hence a weight off feed was not able to be obtained.

Table 4 Summary of key dates and raw liveweight data from the three Tasmanian producer demonstration sites

	Date	Age (d)	Count	Min (kg)	Max (kg)	Ave. (kg)
PD14 (Wesley Dale)						
AI	9/4/13		300			
Scanning	18/6/13		241			
DOB	5/9/13	0				
Marking	19/9/13	14	306			
WWT	9/12/13	95	288	16.5	47.5	32.7
EPWT1	3/1/14	120	271	24.5	52	39.5
EPWT2	22/1/14	139	285	32	56	45.1
PSWT1	4/2/14	152	127	46.5	65	52.5
PSWT2	9/2/14	157	99	39.5	47.5	44.4
PD15 (Dungrove)						
AI	16/4/13		300			
Scanning	4/7/13		212			
DOB	16/9/13	0				
Marking	7/11/13	52	223			
WWT	19/1/14	125	199	20.6	47.2	35.5
EPWT1	24/2/14	161	211	26.6	55.5	39.9
EPWT2	26/3/14	191	205	28.2	50.5	39.2
PWWT1	29/4/14	225	208	33	62	46.6
PSWT1	12/5/14	238	149*	39.2	64	50.5
PD16 (Nosswick)						
AI	15/4/13		300			
Scanning	11/7/13		241			
DOB	9/9/13	0				
Marking	25/9/13	16	356			
WWT	7/12/13	89	343	17.6	56.5	31.4
EPWT1	4/1/14	117	347	24.2	52	38.4
EPWT2	21/1/14	134	344	27.4	57.5	43.2
PSWT1	4/2/14	148	100	39.8	57	49.0
PSWT2	8/2/14	153	94	47.8	51	46.9

** only 133 of these lambs were included in the slaughter data, as all others in this group were sire unknown. The host farm drafted off lighter lambs following the weighing on 29/4/14 and put on different feed, so additional lambs could not be sourced from this mob for the slaughter*

Table 5 Summary of the slaughter data

	Wesley Dale		Nosswick		Dungrove
	Plant 1	Plant 2	Plant 1	Plant 2	Plant 1
Weight (time off feed)	44.4kg (15h)	52.3kg (0h)	47kg (1h)	49kg (6h)	51kg (2h)
Dress	51%	48%	45%	47%	45%
HCWT	22.7kg	25.5kg	21.2kg	22.9kg	22.6kg

Field days and information dissemination

Information about the trials was disseminated through a number of channels:

- Janelle Hocking-Edwards presented on the LMY&EQ trials at 3 lamb survival field days held at Tomahawk (NE Tas), Bothwell and Blackwood Creek, on 4, 5 and 6 September 2013, respectively. More than 130 producers attended these days and were exposed to information about the trials.
- A project update sheet was prepared in January 2014 and distributed via a Sheep Connect Tasmania enewsletter (see Appendix 1 for a copy of the notesheet), which was distributed to 262 people. A July update on the project results has been produced and will be distributed through similar channels. This is also attached in Appendix 1.
- A field day was held at Wesley Dale on 3 February, 2014. Leanne Sherriff presented on the trial results thus far. Lambs for the later slaughter were penned in sire groups with sire ASBV information on signs on each of the pens. Over 40 people attended this event. Refer to Appendix 2 for a copy of the flier and the evaluation results from the day. The media coverage from this day is also presented in Appendix 2.
- Janelle Hocking-Edwards presented on the LMY&EQ trial results at Red Meat Updates in Launceston on 12 June 2014. Over 230 people from right around Tasmania attended this event.

5. Acknowledgements

A massive thanks to the Tasmanian producers who hosted the trials – Scott and Andrew Colvin (*Nosswick*, Blackwood Creek), Greg Sheather and Jonathon Barnes (*Wesley Dale*, Chudleigh) and Emma Boon and Jamie Downie (*Dungrove*, Bothwell). Thanks also to the sponsors, TP Jones, Gallagher and Allflex, for providing the equipment to enable electronic recording of data from the lambs. Finally thanks to the processors in Tasmania for their flexibility in accommodating the slaughter research teams in their plants, and to the slaughter research team Emma Babiszewski, Janelle Hocking-Edwards, Mandy Allen and Jason Lynch for their contribution.

6. Appendices

- Project update notesheets (January and July 2014).
- Flier, evaluation results and media coverage from the Wesley Dale field day.
- Letter re ethics approval.

Figure 1: Matt from *Wesley Dale* and David Findlay (Woolworths meat buyer) inspect the trial lambs at Devonport City Abattior.

Figure 2: Greg Sheather from *Wesley Dale* discusses the trial with attendees at the field day

Figure 3: Trial lambs in pen labelled with sire ASBVs

Figure 4: Trial facilitator Leanne Sherriff helping to weigh trial lambs at *Dungrove*, Bothwell

Figure 5: *Wesley Dale* lambs at weaning

Figure 6: *Nosswick* lambs at marking