final report

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Prepared by: Sarah Rankin

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Meat and Livestock Australia Limited
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NORTH SYDNEY NSW 2059

Increase Merino lambs weaned

PIRD WA/01– Part A

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Executive Summary

The aim of PIRD WA/01 was to improve the reproductive performance and efficiency of Merino ewes mated from early February to mid March in the Great Southern region of Western Australia. In light of the recent interests of animal activist groups in the livestock industry, it was important to achieve these goals in a 'clean, green and ethical' manner. The study therefore attempted to synchronize the timing of reproductive events using the ''ram or male effect'' so ''focused feeding'' strategies could be implemented at mating to improve fertility and fecundity, and just prior to the commencement of lambing to enhance lamb survival and quality.

A total of 9315 ewes where mated on five farms within the Kojonup, Woodanilling and Broomehill Shires of Western Australia between early February and mid March in 2004 and 2005. Ewe age varied from 2.5 to 4.5 across the five farms. Trial mobs were selected and allocated to a control or treatment group. In 2004 the trial mobs were also tagged using Primarylink Technology electronic ear tags. If mixed age groups were used the proportion of ages were kept consistent across the treatment and control groups. Treatment ewes were teased with testosterone injected wethers at 3% for 6 weeks prior to mating. Teasers remained in with the treatment ewes during the 32 day mating period. Rams were put in at 3% in treatment groups and normal percentages in control groups. T1 ewes were fed a Lupin supplement, 500g/head/day for 14 days, during mating in 2004 and a Lupin/Oat (300g Lupins:200g Oat supplement every second day for a 12 day period in the 2005 mating. After pregnancy scanning all ewes where allocated to either an early or a late group (2004 only) and recorded as single, twin or dry. All dry ewes were drafted off at pregnancy scanning and took no further part in the study.

At lambing single bearing treatment ewes where run as a separate group, as were the control group which consisted of a mixture of single and twin bearing ewes. Twin bearing treatment ewes were split into either a fodder and barley group, a barley only group or a normal pasture group depending on the development of the fodder crop, individual farm management system and group mob size. All treatment twin mobs remained separate until marking. After marking and initial lamb body weighing and identification, single and twin treatment groups were run together. In 2004 a follow up body weight was recorded on 20 individually identified lambs from each treatment and control group at weaning.

In summary, the ram effect is capable of synchronising the mating of Merino ewes as late as mid February in the Great Southern region of Western Australia. Nutrition supplements implemented at strategic times during pregnancy can lift the reproductive performance of Merino ewes and the quality and number of twin lambs born. An economic analysis of this strategy shows that a

profitable response to teasing and flushing was achieved more often than from managing twin bearing ewes. These results suggest that further development of the protocol is required to develop a ‘cheaper’ system before a profitable response is consistently achieved.

Project Objectives

What did the group set out to do?

The project objective of PIRD WA/01 was to improve the reproductive performance and efficiency of Merino ewes mated from early February to mid March in the Great Southern region of Western Australia. In doing so the aim was to synchronise the timing of reproductive events using the ‘’ram or male effect’’ so ‘’focused feeding’’ strategies could be implemented to improve fertility and fecundity, and enhance lamb survival and quality.

The project had a number of measurable outcomes which will form the basis of this report and indicate the success of the project:

- Achievement of synchrony - compare treatment and control groups at pregnancy scanning and lambing to calculate the percentage of ewes mated in the first and second cycles.
  Aim: Treatment groups to have at least 80% of ewes mated in first cycle to indicate good synchrony and ram effect present.

- Improved fertility and fecundity – measure the influence of a Lupin supplement at mating on ewe fertility and fecundity by direct comparison of conception rates of groups with and without Lupin supplementation.
  Aim: Treatment groups fed a lupin supplement at mating will exhibit higher fertility and fecundity than treatment and control groups.

- Increase number of lambs marked - compare number of lambs marked in each treatment group and as combined treatment and control groups *between and within farms*.
  Aim: Increase mean group marking rates from 85% to 120%.

- Increase number of lambs weaned – compare number of lambs weaned in each treatment group and as combined treatment and control groups *between and within farms*.
  Aim: To reduce lamb losses from current group mean of 6% to 3%

- Improve quality of twin born lambs - compare lamb bodyweights at marking and weaning of treatment twins, control twins and singles to determine the effectiveness of the colostrum strategy on lamb quality.
  Aim: To improve twin born lamb bodyweights to a level equivalent to those of single born lambs.

- Lamb faecal egg counts (FEC) – measure the FEC at weaning to make direct comparisons between control and treatment groups to determine if FEC are reduced by the colostrum strategy, especially for twin lambs.

Aim: To document any differences observed in the FEC of lambs subjected to a colostrum boosting regime.

- Economic analysis of project protocols – perform an economic analysis of all groups, treatment and controls, comparing gross margins.
  Aim: To receive increases in gross margins (10-30%) as a direct result of increases in weaning percentages and lamb quality.

Methodology

How the project was done?

Results presented in this report are based on the 2004 and 2005 production years in the Great Southern region of Western Australia. In both years the experimental design was replicated on 4 farms with three of the four farms consistent over the 2-year trial period. To examine the effects of seasonal variation we commenced data collection again in 2006. Unfortunately as the season developed farmers had to alter the protocol and feeding strategies to cope with a very poor season. As a result it was decided to not include this data in the final analysis as methodologies were too varied.

Animal preparation for 2004 and 2005 mating:

All project participants were informed about the importance of trial sheep being in good condition prior to mating and each class of sheep involved in the project had a set of basic management guidelines involving physical and physiological requirements;

Ewes: All trial ewes, treatment and control, were well isolated from all rams and any teaser wethers for 6 weeks before the teaser wethers were put in with the ewes. That meant ewes were kept out of site of the rams and or teaser wethers and separated by at least one paddock. It was preferable that ewes where in at least Condition Score (CS) 2.0 with an average CS of 2.5 when the rams went in for mating. Farmers were requested to ensure that ewes were not loosing condition during mating. After the mating period farmers were instructed to hold the CS of the ewes at 2.5 to 3 for the next 10 weeks, to ensure good placental development.

Teasers: Castrated wethers, injected subcutaneously with an effective Testosterone (Ropel) product 7 days before going in with the ewes, were used as teasers in this trial. Selected castrated wethers were required to be in good condition and similar in size, but no bigger, than the selected trial rams.

Rams: Rams were required to be well-prepared and in good condition across all treatment groups in time for mating. In addition to good physical condition it was important that sperm production was also at its peak. As sperm production typically takes about 7 weeks, rams were fed Lupins (up to 750 grams/head/day of Lupins) for 7 weeks prior to being put in with the ewes. Farmers inspected all rams to ensure they were free of any infectious diseases such as Brucellosis or any sickness that may elevate their temperature during this period. The ram's testicles needed to be in good condition; free of any lumps, bumps, swellings or abnormalities, firm and full of sperm. The rams were also checked for sound teeth, good feet and being able to

walk well so they could freely mount the ewes, as they would be mating many ewes in a short period of time due to the synchronised matings.

2004 mating strategy:

Treatment Groups and methodology:

The 2004 mating incorporated three treatment groups;

Treatment 1 - tease and feed (T1): castrated wether teasers were used to synchronise ewes prior to mating and during mating sheep were fed a 14 day Lupin supplement (Table 4).

Treatment 2 - tease only (T2): castrated wether teasers were used to synchronise the ewes prior to mating.

Control (C): ewes were mated under the individual growers "normal" mating practices.

In addition to the above treatments, twin bearing ewes from both Treatment 1 and 2 groups were combined and then divided prior to lambing into a fodder crop, fodder crop and grain Barley, or grain Barley on normal pasture to assess and implement a colostrum boosting strategy.

The 2004 mating focused on 2 tooth and older Merino ewes as mature ewes generally respond better to the “Ram or Male Effect”. On drafting ewes into the treatment and control groups, farmers were asked to use a single age group if possible with a minimum of 300 ewes per group. If however they needed to split mobs and combine age groups, they were instructed to ensure age groups were evenly distributed across all groups. Each collaborating farm assigned ewes to each treatment group depending on normal mob size. Control mobs were run under normal management conditions. Table 1 shows the distribution and flock sizes for the 2004 mating.

Table 1: Ewe numbers per treatment group per farm (Total ewes 4171)

Farm	Treatment 1	Treatment 2	Control	Total
Farm 1	305	316	305	926
Farm 2	281	302	390	973
Farm 3	409	410	405	1224
Farm 4	341	341	366	1048

Teaser wethers were put in with T1 and T2 ewes on day 0 of the trial (see Table 4 for trial protocol and timing of events), all other events are taken from this date. Teasers were put in over

a 3 week period from 10th January to 30th January across the different participating farms to assess how late we can achieve a synchrony of lambing using the ram effect in the Great Southern region of Western Australia. On each farm T1 and T2 ewes were run together as much as possible to limit paddock influence. T1 ewes were split from T2 ewes on day 29 for the 14 day Lupin feeding supplement, after which they were returned to the T2 group. Rams went in with all ewes on day 32. T1 and T2 groups used ram percentages of 3% to ensure there was no bias between treatments and adequate rams to cover the large number of ewes that would need to be mated in the shorter 4 week mating period as a result of ewe synchronisation. Control ram percentages were as per normal farm mating practice, Table 2. Dry ewes were drafted off from treatment and control groups at pregnancy scanning on day 108. Wet ewes were identified as early or late at pregnancy scanning and divided into singles and multiples at Day 171 just prior to lambing. Twin bearing ewes commenced the colostrum boosting supplement on day 172 and moved to a sheltered, quality feed and water regime (fodder crop) on Day 178 where they remained until lamb marking. At marking, all lambs were recorded as singles or twins and 50 random lambs from each group were identified and weighed on 3 of the 4 farms. All groups were run together again until weaning, when the identified lambs were reweighed. Faecal egg counts and wool production were not performed on any sheep in the trial as initially planned. To reduce inherent paddock differences growers minimised paddock variation by having similar stocking rates and availability of shelter in all treatment paddocks as well as freedom from predators, ie foxes.

Control groups were run on all farms and represented normal mating in the breeding season without the use of Teasers, with normal feeding regimes for rams and ewes and with ram percentages in the order of 1.5%-2%, see Table 2.

Table 2: Normal mating practices per farm

Farm	Ram %	Length of mating
Farm 1	2	5
Farm 2	2	5
Farm 3	2	5
Farm 4	1.5	4

2005 mating strategy:

Treatment Groups and methodology:

In animal studies, especially those performed on farms, it is important to replicate treatments over a number of seasons to ensure the validity of results. Therefore the 2004 mating strategy was repeated on four farms in the Great Southern region in 2005. Some slight modifications were made to the 2004 protocol to simplify the strategy and enable its wide scale application. Of the four farms participating in the 2005 trial, 3 were the same as in 2004.

Table 3: Ewe numbers per treatment group per farm 2005 (Total ewes 5144)

Farm	Treatment	Control	Total
Farm 1	338	157	495
Farm 2	1642	354	1996
Farm 3	1209	504	1713
Farm 4	470	470	940

The protocol alterations included reducing the mating nutritional supplement from 14 days to 12 days and altering the ration to a 300g/lupin:200g/oats mix of per head fed every second day. An alternative colostrum supplementation method, Barley Hay placed in the paddock with twin bearing ewes, was also trialled. Table 4 summarises the mature ewe mating strategy used in the study and highlights the variations made in the 2005 season.

Table 4: Timing of events and intervention for the 2004 and 2005 mature Merino ewe matings.

	2004 strategy Treatment 1	2004 strategy Treatment 2	2005 variations
DAY	**GROUP ACTIVITIES**	**GROUP ACTIVITIES**	**GROUP ACTIVITIES**
	Allocate **ewes in CS 2.5-3** trial groups	Allocate **ewes in CS 2.5-3** trial groups	Allocate **ewes in CS 2.5-3** trial groups
-42	Isolate ewes from Rams	Isolate ewes from Rams	Isolate ewes from Rams
-17	Feed rams lupins upto 750g/h/d) **RAMS IN CS 3-4**	Feed rams lupins upto 750g/h/d) **RAMS IN CS 3-4**	Feed rams lupins upto 750g/h/d) **RAMS IN CS 3-4**
-7	Inject teasers 5ml testosterone	Inject teasers 5ml testosterone	Inject teasers 5ml testosterone
0	**Teasers in @ 3%**	**Teasers in @ 3%**	**Teasers in @ 3%**
9			
15	**Top up teasers 3ml** testosterone	**Top up teasers 3ml** testosterone	**Top up teasers 3ml** testosterone
21	Feed ewes **100 g/hd/day**		Feed ewes **100g/h/d** - 60g lupins:40g oats
22	Feed ewes **100 g/hd/day**		Feed every 2nd day to cover 2 days ration
23	Feed ewes **150 g/hd/day**		Feed ewes **150** g/hd/day 90g lupin:60g oat
24	Feed ewes **150 g/hd/day**		Feed every 2nd day to cover 2 days ration
25	Feed ewes **200 g/hd/day**		Feed ewes **200** g/hd/day 120g lupin:80g oat
26	Feed ewes **500** g/hd/day		Feed every 2nd day to cover 2 days ration
27	Feed ewes **500** g/hd/day		feed ewes **250** g/hd/day 150g lupin:100g oat

28	Feed ewes **500** g/hd/day		Feed ewes **500** g/hd/day 300g lupin:200g oat
29	Feed ewes **500** g/hd/day		Feed every 2nd day to cover 2 days ration
30	Feed ewes **500** g/hd/day		Feed ewes **500** g/hd/day 300g lupin:200g oat
31	Feed ewes **500** g/hd/day		Feed every 2nd day to cover 2 days ration
32	Feed ewes **500** g/hd/day		Feed ewes **500** g/hd/day 300g lupin:200g oat
33	**Rams in @ 3%**	**Rams in @ 3%**	**Rams in @ 3%**
34	Feed ewes **500** g/hd/day		Feed ewes **500** g/hd/day 300g lupin:200g oat
35	Feed ewes **500** g/hd/day		Feed every 2nd day to cover 2 days ration
36	Feed ewes **500** g/hd/day		Feed ewes **500** g/hd/day 300g lupin:200g oat
37	Feed ewes **500** g/hd/day		Feed every 2nd day to cover 2 days ration
38	Feed ewes **500** g/hd/day		Feed ewes **500** g/hd/day 300g lupin:200g oat
39	Feed ewes **500** g/hd/day		Feed every 2nd day to cover 2 days ration
40	back to maintainence feeding		back to maintainence feeding
44			
63	**Rams Out & Box up all ewes**	**Rams Out & Box up all ewes**	**Rams Out & Box up all ewes**
107	**draft ewes back into treatment & control**	**draft ewes back into treatment & control**	**draft ewes back into treatment & control**
108	Scan & draft off dry ewes	Scan & draft off dry ewes	Scan & draft off dry ewes
	Twin Lambing strategies		
	Nutitional supplement 1 Fodder Crop	Nutitional supplement 2 Barley on pasture	Nutitional supplement 3
171	Split trial mob into singles & twin paddocks	Split trial mob into singles & twin paddocks	intro with Lupins Barley Hay/straw
172	Start G1B BARLEY - 200g/h/d	Start G1B BARLEY - 200g/h/d	
173	200g/h/d	200g/h/d	
174	300g/h/d	300g/h/d	
175	400g/h/d	400g/h/d	
176	500g/h/d	500g/h/d	
177	600-700g/h/d	600-700g/h/d	
178	Move to fodder crop - stay till **Day 193**	Move to fodder crop - stay till **Day 193**	
179	600-700g/h/d	600-700g/h/d	
180	600-700g/h/d	600-700g/h/d	Supply Barley Hay/straw
181	G1 Starts lambing	G1 Starts lambing	
182	600-700g/h/d	600-700g/h/d	
183	600-700g/h/d	600-700g/h/d	
184	600-700g/h/d	600-700g/h/d	
185	600-700g/h/d	600-700g/h/d	
186	600-700g/h/d	600-700g/h/d	
187	600-700g/h/d	600-700g/h/d	
188	600-700g/h/d **feed every day same time of day**	600-700g/h/d **feed every day same time of day**	
189	600-700g/h/d	600-700g/h/d	
190	600-700g/h/d	600-700g/h/d	
191	600-700g/h/d	600-700g/h/d	
192	600-700g/h/d	600-700g/h/d	
193	600-700g/h/d	600-700g/h/d	
194	600-700g/h/d	600-700g/h/d	

195	600-700g/h/d	600-700g/h/d	
196	600-700g/h/d count lambs & **FG1 finish on crop**	600-700g/h/d count lambs & **FG1 finish on crop**	
197	G2 Starts lambing late start		
213	Lambing ends	Lambing ends	Lambing ends
221	Mark& Weigh lambs identify single/twin then run together again	Mark& Weigh lambs identify single/twin then run together again	Mark& Weigh lambs identify single/twin then run together again
277	Wean Lambs, Re Weigh & FEC		Wean Lambs & Re Weigh.

Results

What was achieved, analysis of the data?

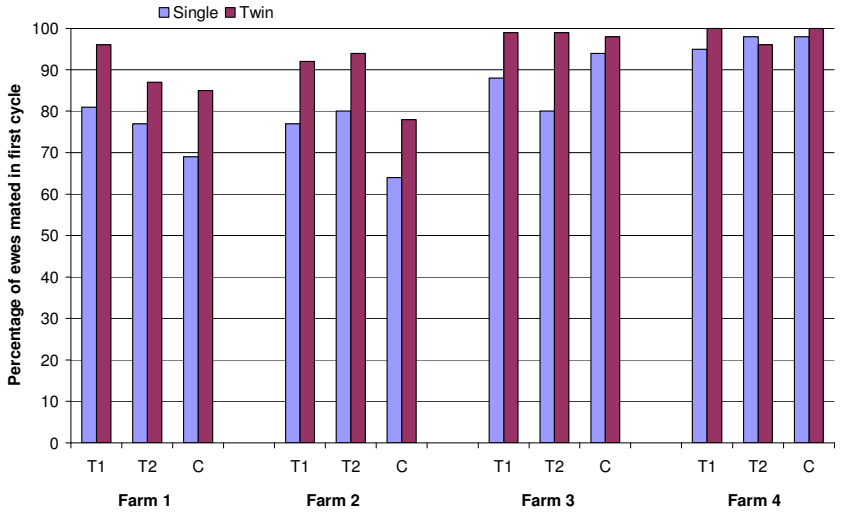
Season 2004

Synchrony and Conception

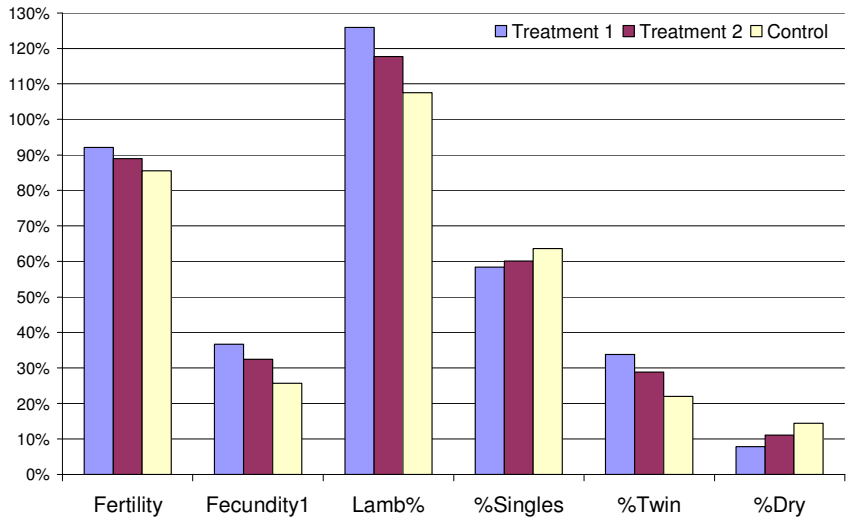
Graph 1 illustrates the degree of synchrony achieved on the four farms in the 2004 mating season. When interpreting this graph it is important to note that Farm 1 and Farm 2 mated in mid February whilst Farm 3 and Farm 4 were mated in early March. Although Farm 3 mates in early March, the control mob was mated 10 days earlier in late February. This has confused the results for the trial mob and should be considered when looking at Farm 3 results. The effect of teasers is more marked in Farm 1 and 2 than Farm 3 and 4 suggesting that the effect of teasers is lost after mid February when ewes start to cycle naturally. Graph 1 also shows that the majority of twins were conceived in the first cycle across all treatments and all farms.

The measure for ram effect and good synchrony for the trial was 80% of the ewes conceived in the first cycle. Graph 1 clearly demonstrates that if mating Merino ewes in early and mid February, teasing and pre mating ewe feeding improves synchrony as does teasing alone. The effects of teasing and feeding are evident for both single and twin bearing ewes. Across all treatments and farms, more twins were conceived in the first cycle.

Graph 1: Level of Synchrony across the four participating farms – Percentage of ewes mated in the first cycle

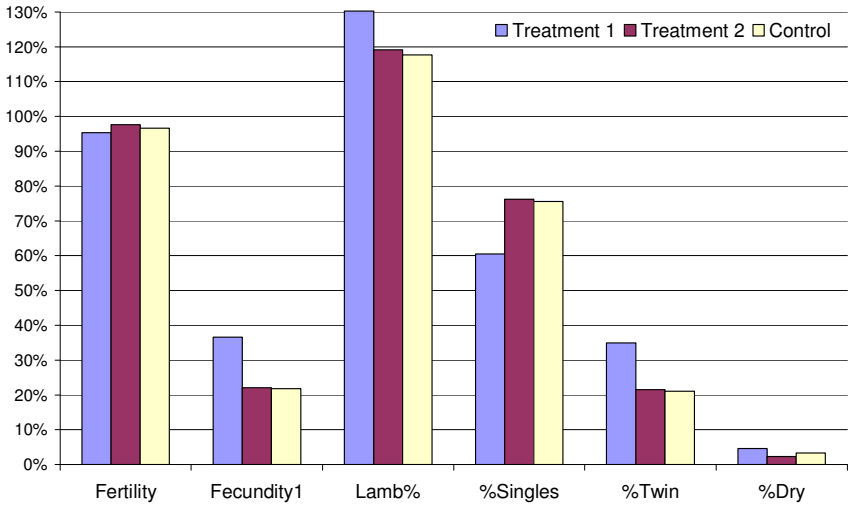


Graph 2: 2004 Pregnancy scanning results Farm 1



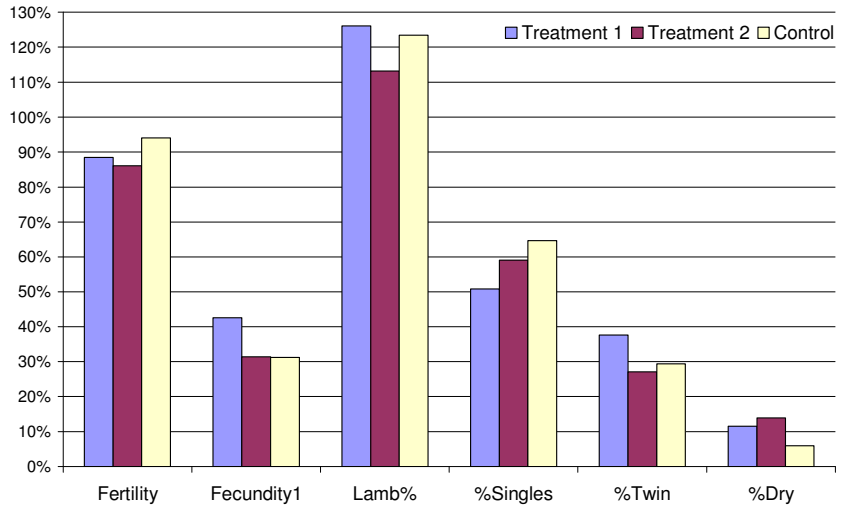
Graph 2 illustrates the improved conception of T1 verses T2 and the control or normal mating experienced on Farm 1. Overall scanned lamb percentage was increased by 18% due to an increase in fecundity and fertility.

Graph 3: 2004 Pregnancy scanning results Farm 2



Farm 2 observed an increase in ewe fecundity in T1 whilst overall fertility was unaffected by the two treatments. T1 did increase overall scanned lamb percentage by 12% from normal mating practice inparticular by a significant increase in twins.

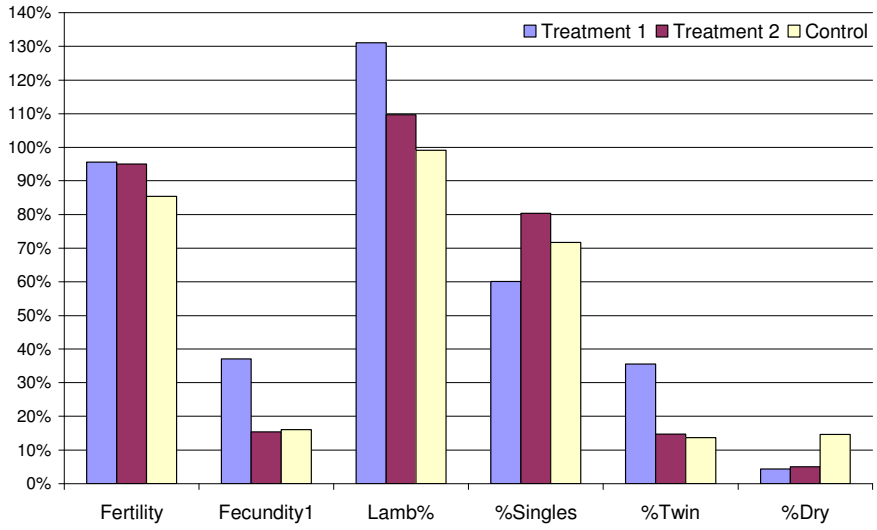
Graph 4: 2004 Pregnancy scanning results Farm 3



Results are difficult to interpret on this property as T1 and T2 were mated 10 days after the control mob. Graph 4 illustrates the increased fecundity induced by the Lupin supplement at mating and its associated increased incidence of twins, as in the previous two graphs.

The effects of T1 and T2 over conventional mating strategies are clearly demonstrated for Farm 4 in Graph 5 with improved fertility, fecundity and an overall increased scanned lamb percentage of 32% in the 2004 season. It should be noted that the ram percentage was also doubled in the two treatment groups (1.5% control vs 3% in treatment 1 & 2).

Graph 5: 2004 Pregnancy scanning results Farm 4

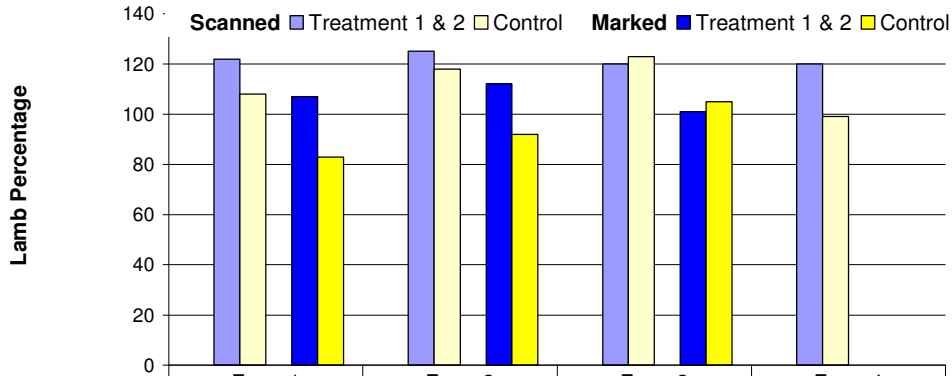


Overall T1 (teasing and lupin supplement) has seen an improvement in ewe fecundity that in turn has resulted in significant improvements in overall scanned lamb percentages. To a lessor extent, T2 in the absence of the Lupin supplement, also improved overall scanned lamb percentages by reducing the percentage of dry ewes.

Marking 2004

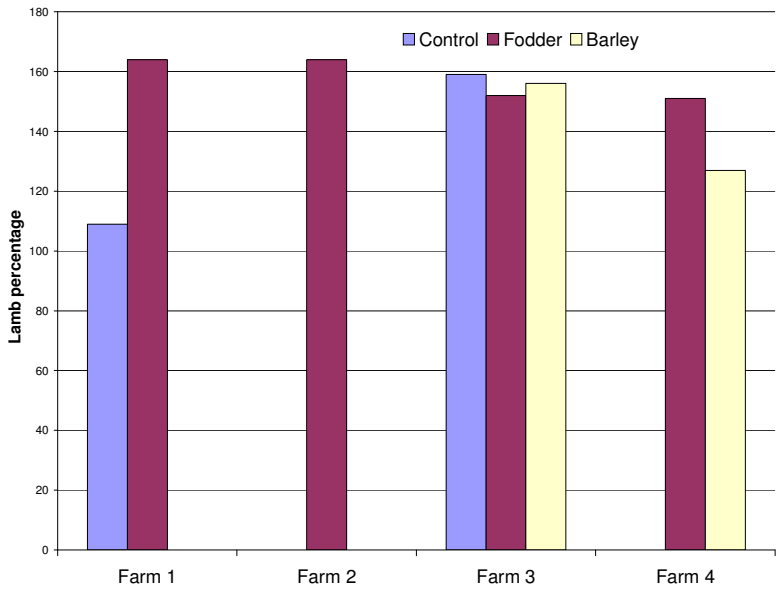
Lamb marking results from the four farms in 2004 are displayed in Graph 6. Due to missing data and altered times of lambing the discussion of results will concentrate on Farms 1and 2. The aim of the trial was to lift lamb marking from the group average of 85% to 120% (four farm average). The combined treatment groups T1 & T2 did improve marking percentages from the control group with average marking percentage across the 3 farms of 106% and 93% respectively. Lamb losses from scanning to marking were reduced in the combined treatment groups verses the control as shown in Farm 1 with a 10% reduction and a 13% reduction in Farm 2.

Graph 6: Lamb percentages 2004: Pregnancy scanning and marking



	Farm 1	Farm 2	Farm 3	Farm 4
Scanned				
Treatment 1 & 2	122	125	120	120
Control	108	118	123	99
Marked				
Treatment 1 & 2	107	112	101	
Control	83	92	105	

Graph 7: Twin survival 2004: Effects of colostrum strategy

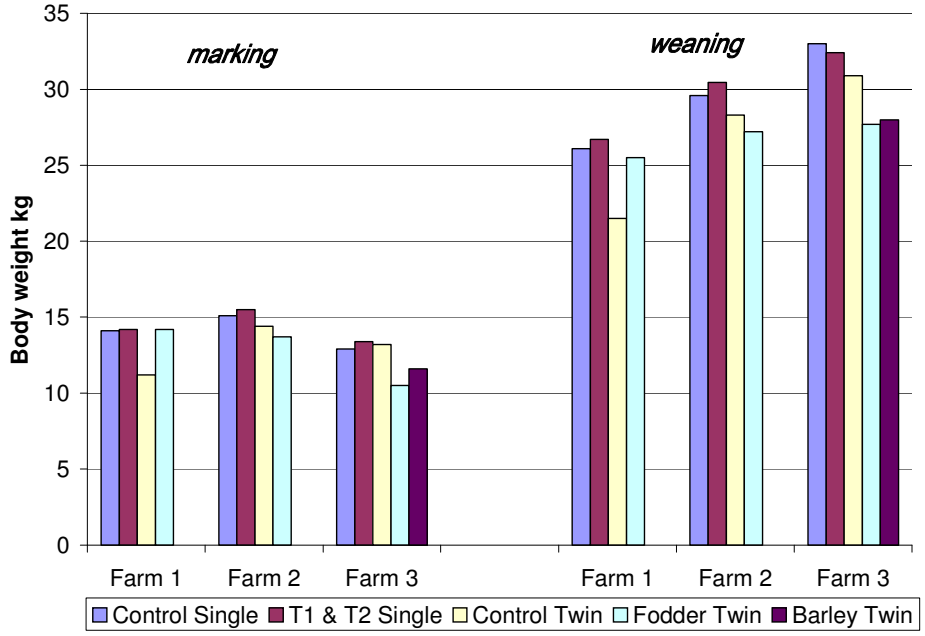


Missing data makes it difficult to assess the effects of the colostrum strategy in the 2004 season. Farm 1 shows a clear benefit with twin lamb survival improved by 55%. Farm 3 and 4 were the only farms to trial the fodder strategy and grain barley strategy, and as displayed in Graph 7 the results are inconclusive.

Weaning 2004

An objective of the trial was to increase the number of lambs weaned with a 3%reduction in lamb losses. Unfortunately on farm management decisions prevented a direct comparison of treatment verses control comparison as all ewes were boxed up after marking to allow weaning paddocks to be set up. The weaning weights of the 50 single and twin lambs identified from each group at marking were repeat weighed at weaning. The effects of the colostrum boosting strategy on lamb quality are presented in Graph 8 on the next page.

Graph 8: 2004 Marking & Weaning Weights:



As expected single born lambs achieved higher body weights at both marking and weaning than twin born lambs. Results presented in Graph 8 show little differences between treatment and control groups with the exception of Farm 1.

Table 9 over the page shows the standard deviation of body weights among the treatment groups was less than that of the control, this further demonstrates that the ewes were synchronised at mating.

Table 9: Mean body weights and standard deviation for identified lambs

Marking weights	Control Single	T1 & T2 Single	Control Twin	Fodder Twin	Barley Twin
Farm 1	14.1 (3.66)	14.2 (2.33)	11.2 (2.42)	14.2 (2.55)	
Farm 2	15.1 (4.23)	15.5 (3.44)	14.4 (3.73)	13.7 (2.5)	
Farm 3	12.9 (2.9)	13.4 (2.35)	13.2 (2.75)	10.5 (1.97)	11.6 (2)
WEANING					
Farm 1	26.1 (3.44)	26.7(2.88)	21.5 (3.66)	25.5 (3.5)	
Farm 2	29.6 (4.8)	30.45 (4.86)	28.3 (3.5)	27.2 (3.8)	
Farm 3	33 (4.04)	32.4 (4.39)	30.9 (4.57)	27.7 (3.7)	28 (4.11)

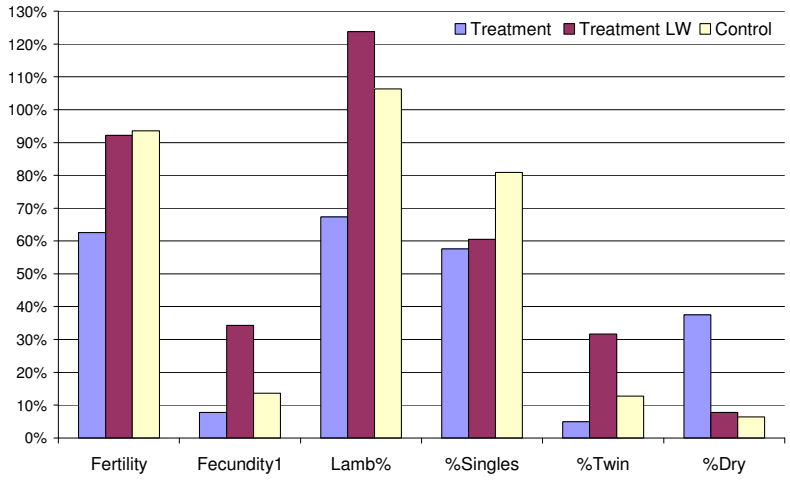
Season 2005:

Four farms were studied in season 2005 to assess the modification and simplification of the 2004 protocol. Results from Farm 1 were compromised as the treatment mob was in a paddock with a "bad" dam during mating and the fertility of this mob was greatly affected, see Graph 9 over the page. In an effort to salvage the trial an additional treatment group was included in the results, treatment LW.

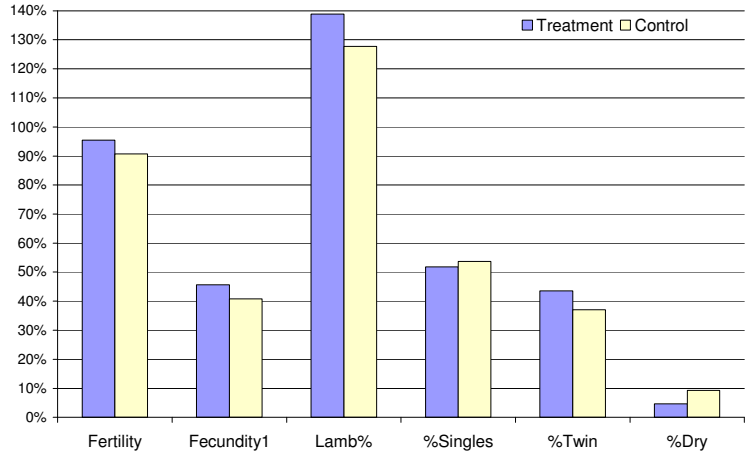
This mob was fed the modified mating ration but was only teased for 1 cycle. All other treatment mobs mated before 15 February were teased for 2 cycles.

Synchrony and Conception

Graph 9: 2005 Pregnancy scanning results Farm 1



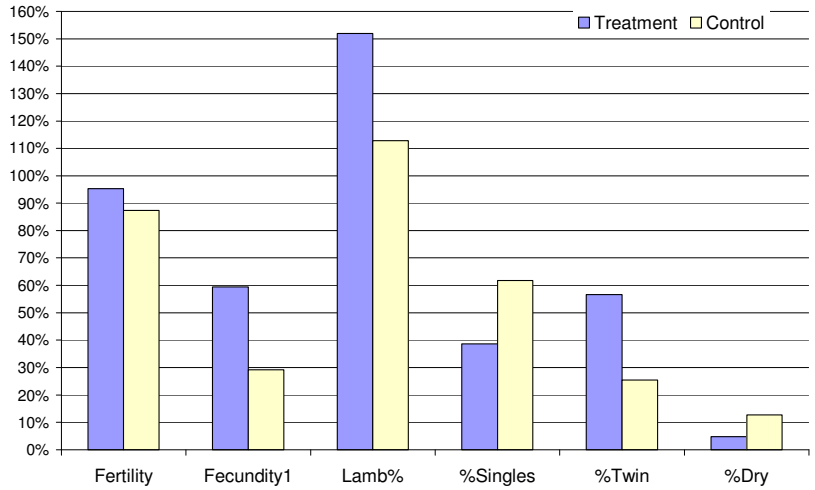
Graph 10: 2005 Pregnancy scanning results Farm 2



Graph 10 shows Farm 2 had higher fertility, fecundity and overall scanned lamb percentages in the treatment verses control group in line with 2004 data. All scanned results are higher than in 2004 demonstrating the effects of the-89 better season in 2005.

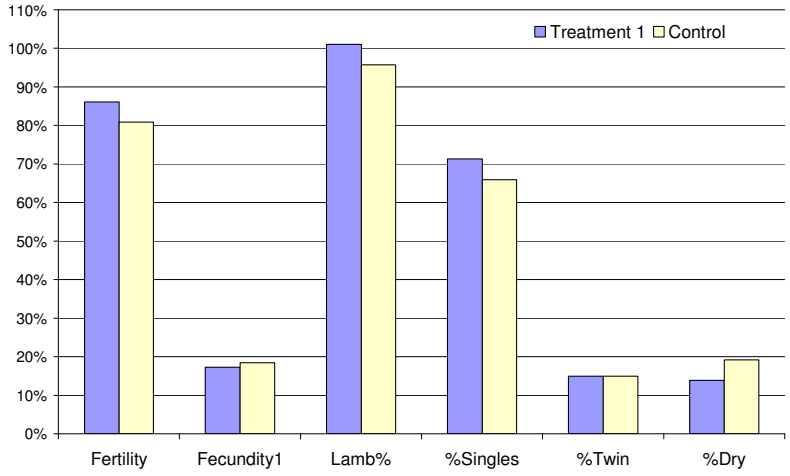
Farm 3 which mates in mid March, Graph 11, differed from the other three farms in 2005, as teasers were not used in the treatment groups due to 2004 results which showed little if any effect of teasers when mating after mid February. The mating supplement (Lupin/Oat mix) has again resulted in an increased overall scanned lamb percentage with increased twin bearing ewes and a reduction in dry ewes.

Graph 11: 2005 Pregnancy scanning results Farm 3



Farm 4 despite an overall lower scanned lamb percentage, demonstrated the effects of the treatment, teasing and feeding, over normal mating with improved fertility and reduced dry ewe numbers.

Graph 12: 2005 Pregnancy scanning results Farm 4

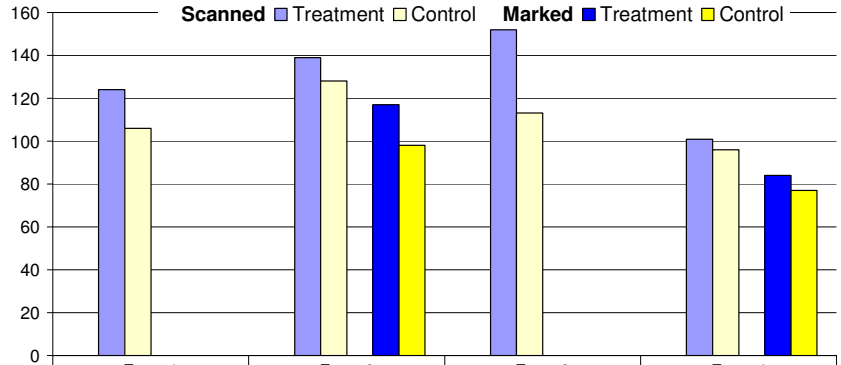


The teasing and mating feed supplement has again improved overall scanned lamb percentages with increases in fertility and fecundity.

Marking 2005

Lamb survival across the four farms at marking for the 2005 season is presented in Graph 13. Farm 2 observed an 8% reduction in overall lamb survival from scanning to marking which was consistent with results in 2004. On the same farm the overall marking percentage was significantly higher than the control at 117% to 98% respectively. Farm 4 maintained the improved marking percentage observed elsewhere in the treatment groups although the higher lamb numbers were due to conception improvements and not lamb survival. As shown in the table below some marking data was not available for analysis despite many requests for data.

Graph 13: Lamb percentages 2005: Pregnancy scanning and marking



	Farm 1	Farm 2	Farm 3	Farm 4
Scanned				
Treatment	124	139	152	101
Control	106	128	113	96
Marked				
Treatment		117		84
Control		98		77

Weaning 2005

A discussion of the weaning results for season 2005 is not possible as data was not presented or difficult to interpret. Farm 2 went into quarantine for Footrot after lambing and imposed a minimal stock movement and handling strategy so final data capture was not possible. Farm 1 data was corrupted by the paddock influence at mating and despite several requests for data from the remaining growers it was not received.

Season 2005 was a “better” season than 2004 as demonstrated by increased overall lambing percentages for both treatment and control groups. It was pleasing to see that the effects of the protocol, teasing and mating feeding, observed in 2004 were repeated in 2005, that is treatment groups had higher conception rates due to a combination of higher fecundity and less dry ewes. These two factors indicate that the protocol is repeatable and its effects can be achieved over a variety of seasons and conditions.

Discussion

Overall Summary of Objectives:

Achievement of synchrony

The aim of this objective was to have 80% of ewes mated in the first cycle. This objective was only measured in 2004. Results from this season showed that twins tend to be conceived early, in the first cycle, and a higher percentage of twins were conceived in T1 verses T2 verses C demonstrating the influence of our treatments. The degree of synchrony in the singles tended to follow the same trend with a higher percentage of first cycle singles in T1 verses T2 verses C. Although lambs were not aged in the 2005 season, there was again a greater incidence of twins in the treatment verses control groups. From these results and farmer observations of a more even line of lambs in treatment verses control mobs in both seasons; we can confidently conclude that Synchrony of the ewes was achieved in this project. It must be noted here that a later mating, after mid February, saw a higher level of synchrony in the control groups than those of earlier maters due to the natural cycling of ewes at this time. However treatment groups still had a higher level of synchrony than control mobs but the difference was less significant than that observed in early mated ewes.

The only question which remains unanswered in this aspect of the project is, was the greater level of synchrony due to a higher ram percentage (3%) or the teasing of the ewes prior to mating, as control groups were not teased and had normal ram percentages ranging from 1.5% - 2%. Further study is needed to definitively answer this question. In terms of on farm management if an increased ram percentage is the main contributor to ewe synchrony, then this would reduce ongoing costs associated with teasing and add to ease of management.

Improved Fertility and fecundity (Lupins higher fertility)

It was hypothesised that a lupin supplement fed during mating would increase fertility and fecundity. The positive effect of lupins on fertility and fecundity was evident across all farms in both seasons. Significant increases of 15% on average over the farms was observed in the 2004 season but at a significant cost as Lupins were fed at 500g/h/day for 14 days. Farmers suggested a lower effect would still be worthwhile if the cost of feeding was reduced, so in 2005 a ration of 300g/h/d lupins:200g/h/day oats was trialed. On all farms this ration again produced a significant increase in fertility over 10% due mainly to an increase in ewe fecundity. It is worthy to note that an overall increase in fertility across all groups was observed in 2005 which saw more favourable seasonal conditions, showing the robustness of this protocol across seasons. The economic analysis of this strategy however is yet to be justified, especially in the absence of significant increases in lamb survival and in times of high grain prices.

Increased number of lambs marked (increase marking from 85% to 120%)

The aim of the project was to increase average number of lambs marked over the participating farms from 85% to 120%. Despite increases in lamb survival observed in our treatment groups this objective was not achieved as combined marking percentages were typically 108% in treatment groups verses 92% in control groups. The observed increase in marking percentages was primarily due to increases in conception rather than lamb survival. In order to achieve a significant increase in marking percentages producers concluded better survival strategies are needed. Although some increases were observed in shelter paddocks these came at a significant economic cost and as yet the increased survival is not high enough to justify the costs, and in times of high grain prices these pressures will increase. Data presented in the economic analysis accompanying this report clearly show that efforts made in this area where not economic unless marking and ultimately weaning percentages were increased by 15-30%.

Increase number of lambs weaned (reduce lamb losses from 6% to 3%)

In order to increase the number of lambs weaned producers must reduce lamb losses from pregnancy scanning right through to weaning. This objective was not able to be fully measured in the trial due to on farm management decisions in 2004 where all mobs were boxed up to allow room for lambing paddocks to get away, and quarantine and missing data in 2005. If the marking data is used however to address this objective, we have made some positive inroads into lamb survival, as all treatment groups had higher lamb marking percentages than control groups across both seasons. These improvements ranged from 2% to 8% in 2005 and 3% to 13% in 2004. As already discussed, much of the improved marking numbers observed in the treatment groups were due to greater scanning percentages and conception than lamb survival.

Continuing on the discussion from the previous point, much work needs to be done to increase lamb survival from scanning through to weaning. Ewe nutrition during lambing and lactation does appear to have increased lamb survival but not enough to fully justify the economics of the fodder crops used in this trial.

Improve quality of twin born lambs (effectiveness of colostrums)

The aim of this objective was to ensure that twin born lambs would be of equivalent bodyweights of single born lambs. This objective was very important to measure and document, as increasing the incidence of twins is the only way to lift lambing percentages over 100%. Producers are all too aware of poor doing twins which often together, fail to produce as much as their single born counterparts. To combat this problem we introduced several nutritional trials aimed at boosting colostrums of twin bearing ewes. Data was only collected in the first year 2004.

In terms of meeting the desired objective, this trial proved it is possible to improve the quality of twin born lambs but that the colostrum methodology is not yet robust enough to guarantee this outcome. As shown in the economic analysis, this outcome has high economic risks especially when fodder crops are grown in place of grain production. Unfortunately the economic analysis used the establishment of a fodder crop in place of a cereal or canola crop when in fact our produces used paddocks coming back into pasture rotations. This choice in fact lifted the production off these first year pasture paddocks and is a practice that has been maintained amongst the group who now under sow pastures with oats. It would be nice to see this system included in further economic analysis.

Lamb faecal egg counts (FEC)

- observe any differences in faecal worm egg counts as a result of colostrum treatments.

This question remains unanswered as no faecal worm egg counts were collected or measured in the trial. It would be interesting to validate this hypothesis as it may add to the economic benefits of colostrum treatments if lower faecal worm egg counts and improved bodyweights were consistently achieved. This outcome again reinforces the need for further work on early lamb survival and nutrition.

Economic analysis of project protocols (improve gross margins)

The final aim of the trial was to increase gross margins in the order of 10-30% as a direct result of increases in weaning percentages and lamb quality. The economic analysis performed on the trial results focused at a district rather than trial participant level. Analysis made assumptions for district conditions and costs associated with supplementary feeding and land use. Individual data was not supplied to enable an assessment of gross margin changes in response to treatments.

The economic analysis did however show that profit is possible and more often than not our trial participants broke even. These figures may have been underestimated as lupin feeding of rams and ewes was common practice for many of the trial participants and most set up their fodder crops on to paddocks coming back into pasture rather than sacrificing cropping opportunities. A strong theme of the economic analysis was the need to reduce and simplify the strategy in terms of dollars spent and time. I am pleased to say that since the completion of the trial, the group has been working to do exactly that. The trial participants also agreed that the time and money spent on improving twin lamb survival was not well returned. This area remains one of interest for the group but as yet has had little attention.

In summary some aspects of the trial have made significant differences to on farm management with some improvements in economic terms. The goal however still remains to increase individual gross margins through better management of lambing and lamb survival.

What did the group learn by doing the trials?

Consider the following:

- Did the group achieve the results planned at the beginning?

I believe the PIRD WA/01 was a successful trial and great experience for all involved. It has allowed Merinotech WA to undertake industry relevant on farm research under commercial conditions and in an area of interest to its members. It has exposed commercial farmers to research and the methodologies necessary to meaningfully explore new management practices. It has also highlighted to them the need to present, record and report data in a reliable and meaningful way.

Unfortunately not all of the objectives set out have been addressed in the present trial as discussed in the results section. We failed to measure faecal egg counts and record accurate weaning survival rates and fleece data. Despite these shortfalls it must be noted that the results of the trial remain very meaningful and relevant to our group and have ramifications for the whole industry. It was also disappointing to us that we had the reduced dataset for 2005. We also commenced data collection in 2006 but a very dry season meant that growers had to sell sheep and minimise inputs to reduce financial losses. It was interesting to note that the producers commented that the teasing allowed them to focus feed the ewes at the critical stages of fetal development throughout 2006, and therefore maximise their feeding inputs knowing they were going to increase the lambs survival and lifetime production. This confidence was a direct result of the previous two season's trials which demonstrated to the growers that the ram effect was effective in achieving ewe synchonisation as late as mid February.

- What changes have members made as a result of doing the project, or what changes are planned as a result of running the trials? (the impact of the project)

The trial has shown sheep producers in the Great Southern region of Western Australia that the ram effect can be used to synchronise Merinos ewes up until mid February and reduce the number of dry ewes. They have seen that a feeding supplement at mating can increase lamb percentages due mainly to an increase in the conception of twins. However the failure of significant increases in lamb survival and economic returns has meant that producers currently are not prepared to adopt the colostrum boosting protocol. This situation could be altered if and when we have the technology to ensure the survival of the extra lambs born.

The mating ration used in the project is under review with efforts to reduce the amount fed per head and associated costs. Data from the economic analysis has confirmed that teasing ewes is of value in terms of returns per ewe. It also has the potential to save on supplementary feed costs by allowing feeding to match the demands during the pregnancy. This will ensure lamb survival and as shown by the lifetime wool[1] project, maximise lifetime production and returns of these lambs.

Discussion with trial participants has revealed several other management changes as a direct result of the PIRD experience. As set out above ram percentages used in the trial were high at 3% and due to the need to keep mob numbers reasonable no direct comparison was made to teasing ewes and simply increasing ram percentage. Some growers have since done this and think it may be the increase in ram percentage rather than teasing, which lifted conception and this combined with a 4 week mating will also achieve the same level of synchrony without the extra work and costs associated with teasing. This aspect of the trail is now under further investigation and if proved to be correct will make wide scale adoption easier.

- Trial measurements. Have these enabled you to show the economics of the outcomes and what benefits [dollar] members may be able to gain? How have/will members improve their bottom line?

An economic analysis has been completed and is attached. In summary the analysis and the on-farm trials show that profitable responses can be achieved using the ram effect to synchronise Merino ewes. Profits ranged from +$4.35/ewe to a loss of $1.65/ewe in a merino wool flock. In a merino prime lamb flock the profit ranged from +$10/ewe to -$1/ewe. There was also evidence that flushing at joining and managing twin bearing ewes could be profitable provided we have better technologies to manage and increase twin survival. For further detail please see the full economic report.

An additional outcome of the trial difficult to value in economic terms, is the increased lamb survival which increases your rate of genetic improvement. As we all know higher lamb survival allows for more older, less genetically advanced sheep (provided you have a measured breeding objective) to be sold out of the farming system. So if you can increase lamb survival you will enhance the genetic gain of your flock. This situation has never been more important with the current focus on the merino industry and the need to breed plainer, easy care sheep that do not require surgical mulesing.

- Any environmental benefits of the outcomes of your project? Eg better bush/tree regeneration, less dust or water run off etc.

This trial was not performed to assess environmental benefits.

- Please describe any open days, field days etc and how many attended?

In the course of the trials, 4 morning sessions where held with trial participants only. A total of 5 farmers attended each session. An additional information day was held in Kojonup for Merinotech WA members and trial participants in 2006. In total 12 farmers attended and presentations were given by Dr John Milton, protocol background, Sarah Rankin, trial results, and Andrew Bathgate, economic review. This session created much discussion and debate about the trial and we have now formed an interest group which plans to meet annually. Although the number of participants was a bit disappointing it is necessary to note that these were held during a poor season when farmers where minimizing inputs and off loading sheep.

Was the group satisfied with the results of the project?

Merinotech WA and trial participants were happy with the results of the project as it has demonstrated first hand a clean green way to synhcronise merino ewes mated before mid February. It was however disappointing to see the extra lambs produced by the flushing not reach full potential due to twin management strategies. Although we did improve survival of twins, it was not economical for the level of improvement observed. As mentioned in the report the teasing and synchrony has seen more even lines of lambs which has had management benefits for growers and allowed for better focus feeding of ewes during pregnancy especially in poor seasons.

The continued adoption of the strategy with individual on farm changes is paramount that the group was satisfied with the trial. As mention previously several growers are still experimenting with ram percentages of 2.5% to 3% and a 4 week mating to reduce the need to use teasers. More work will be done on this aspect of the trial in 2009 mating. Growers continue to use focus feeding during pregnancy to ensure lamb survival and lifetime production of those lambs. One grower has combined this work with that of lifetime wool and are monitoring condition scores in an effort to minimse supplementary feeding and maximise the lifetime production of the lambs. This adoption will take several seasons to show potential benefits. Another grower is using the trial outcomes to move his prime lamb flock lambing so he can keep up with the Religious festivals in the Middle East and turn off his prime lambs sooner. These are excellent examples of how this PIRD has impacted on the trial participants and their on farm management.

How could you have done the project better?

The project would have been easier to manage, especially data collection, if Primarylink Tech had been able to supply us with a working EID system. Without the system it was a big job for the growers to collect all data and unfortunately some data was lost. The problems with Primarylink Tech have been poor communication, lack of delivery of product and unreasonable promises of the system. I would therefore recommend any future projects look at alternative sources for EID technology. On reflection we should have allowed for an extra labour unit to assist growers at the times of data collection. For any future on farm trials we will have to improve data capture or consider the costs of an extra labour unit.

Is the group interested in doing another project?

Merinotech WA has a history of industry participation in research and is always open to consider its involvement in trials. It would be good to further develop this protocol especially in developing a cheaper "flushing" ration and to explore an economically viable method to improve lamb survival, in particular twin born lambs. The trial lambing periods tested here were very mild by comparison to some years and may explain why we didn't see greater effects in the twin survival reported here. It would be nice to answer this query with further twin survival trials.

As mentioned above we are continuing to look at the influence of ram percentage and teasing. We would be interested to do a more formal trial with a coordinated group if this is an area of continued interest for you.

Would you recommend other groups run their own trials?

Yes I would recommend other groups participate in trials as it is a worth while and valuable experience where farmers can see first hand the effects of new management systems and the direct value of on farm research. My only advice would be to develop easy and time effective data collection methods and consider having an extra labour unit to assist farmers in data collection in the absence of a "WORKING" EID system.

How would the members sum up their experiences in doing the MLA PIRD project? (What was the bottom line?)

The group of participating farmers enjoyed their role in the project (despite repeated requests for results) and have made management changes discussed above as a direct result of their involvement. There is now a core group within Merinotech WA members committed to the further development of this protocol and improving lamb survival and percentages.

Comment on the organisation and management of PIRDs, this will assist MLA in better management of future projects

The only comment I can make about the organisation and management of the PIRDS is that it was an enjoyable experience with clear communication channels where any and all issues related to the project could and were discussed.

On behalf of our members and participating farmers thank you for the opportunity to perform this research and well done on the PIRD program. It gives farmers a chance to explore problems relevant to them and their production systems.

References:

1. Lifetime wool – information and background at www.lifetimewool.com

APPENDIX:

2004		Scanning Percentages			Survival to weaning				Weaning %			Increase in weaning percentage from pre-joining regrest						Increase from Lambing regrest	
		Barren	Single	Twin	Single	Twins No twin mgmt	Twins Fodder Crp	Twins FC + Bar	No twin mgmt	Fodder Crp	FC + Bar	No twin mgmt weaning	No twin mgmt feeding	Fodder Crp weaning	Fodder Crp feeding	FC + Bar weaning	FC + Bar feeding	F Crop	FC+Bar
Farm 1	T1 (tease+feed)	8%	58%	34%	90%	55%	81%		90%	107%	52%	9%	5%	15%	5%	-5%	-2%	18%	-37%
	T2 (tease+extra runs)	10%	60%	30%	90%	55%	81%		87%	103%	54%	6%		10%		-3%		16%	-33%
	T3 (control)	15%	63%	22%	90%	55%	81%		81%	92%	57%							11%	-24%
Farm 2	T1 (tease+feed)	5%	60%	35%	90%	70%	81%		103%	111%	54%	5%	4%	8%	7%	-14%	-15%	8%	-40%
	T2 (tease+extra runs)	2%	77%	21%	90%	70%	81%		99%	103%	69%	1%		1%		1%		5%	-29%
	T3 (control)	3%	76%	21%	90%	70%	81%		98%	102%	68%							5%	-29%
Farm 3	T1 (tease+feed)	11%	50%	39%	90%	80%	77%	78%	107%	105%	106%	1%	10%	0%	9%	1%	10%	-2%	-2%
	T2 (tease+extra runs)	13%	60%	27%	90%	80%	77%	78%	97%	96%	96%	-9%		-9%		-9%		-2%	-1%
	T3 (control)	5%	65%	30%	90%	80%	77%	78%	107%	105%	105%							-2%	-1%
Farm 4	T1 (tease+feed)	5%	60%	35%	90%	70%	76%	63%	103%	107%	98%	20%	11%	23%	14%	17%	8%	4%	-5%
	T2 (tease+extra runs)	6%	80%	14%	90%	70%	76%	63%	92%	93%	90%	9%		9%		8%		2%	-2%
	T3 (control)	15%	72%	13%	90%	70%	76%	63%	83%	85%	81%							2%	-2%

2005		Scanning Percentages			Survival to weaning				Weaning %			Increase in weaning percentage from pre-joining regrest						Increase from Lambing regrest	
		Barren	Single	Twin	Single	Twins No twin mgmt	Twins Fodder Crp	Twins FC + Bar	No twin mgmt	Fodder Crp	FC + Bar	No twin mgmt weaning & feeding		Fodder Crp weaning & feeding		FC + Bar weaning & feeding		F Crop	FC+Bar
Farm 1	T1 (tease+feed+extra runs)	52%	63%	5%					0%	0%	0%	0%		0%		0%		0%	0%
	Control	6%	81%	13%	0%	0%	0%	0%	0%	0%	0%							0%	0%
Farm 2	T1 (tease+feed+extra runs)	4%	52%	44%					0%	0%	0%	0%		0%		0%		0%	0%
	Control	9%	54%	37%	0%	0%	0%	0%	0%	0%	0%							0%	0%
Farm 3	T1 (tease+feed+extra runs)	4%	39%	57%					0%	0%	0%	0%		0%		0%		0%	0%
	Control	12%	62%	26%	0%	0%	0%	0%	0%	0%	0%							0%	0%
Farm 4	T1 (tease+feed+extra runs)	14%	71%	15%					0%	0%	0%	0%		0%		0%		0%	0%
	Control	19%	66%	15%	0%	0%	0%	0%	0%	0%	0%							0%	0%