Evaluating halfbreds in the North Island

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Contents

Summary

This report covers a suite of projects which looked at opportunities for farming halfbred sheep in East Coast of the North Island to produce more mid-micron wool. An initial study (not reported here) took halfbred lambs from the South Island in autumn, shearing a 23.3 fleece worth $30.5 in August and slaughtering at 25.5 kg carcass weight in November. This study demonstrated that returns from halfbred and crossbred lambs could be comparable, with higher fleece values in halfbred lambs compensating for a slower growth rate. However, there appear to be insufficient halfbred lambs available in the South Island to shift to the North Island for winter finishing.

Subsequent studies looked at producing halfbred lambs from both ewes and hoggets. In dry East Coast areas, there is a real focus on early slaughter to achieve premiums and to de-stock before the summer dry. In spite of being leaner, the reduced ability of halfbred lambs to finish early will be a significant disincentive to many farmers. Moreover, lambs born in early spring tend to need shearing in early summer to reduce fly and weed seed issues and this means that the subsequent fleece shorn from these lambs as a hogget will be coarser.

Halfbred lambs from hoggets offer real potential within a supply chain. There are minimal lambing issues and because these lambs are born late, they do not need a late spring management shear. Moreover, a late birth date means they are never going to be killed before summer so growth rate is less critical. There are a range of summer feeding strategies that can be used post-weaning to take these lambs through the summer. Because the teeth of halfbred lambs are late erupting (by mid-January only 50% of teeth were up) they have a good fit with the late spring lamb trade.

It should be possible to build a supply chain which involved mating hoggets to Merino rams and weaning lambs at around 19 kg. Instead of dropping these lambs in the store pens, they would pass to a summer grazier to grow them to 35 kg and in autumn move to a winter finisher. The finisher could shear them in September and then slaughter them at 55 kg in late spring with no fear of teeth issues. Assuming a 22 kg slaughter weight ($132 @ $6/kg) and a $23 fleece this would provide $155 (less transport and shearing) to be shared across the supply chain. Even a simple three way spilt of $50 each would suggest that a supply chain is viable. What would add even more value is if these lambs could be slaughtered at even heavier weights (e.g. 25 kg plus) for a specialist market.

It is worth noting that the Poukawa Research Farm has been farming halfbred's for two years without footrot being a problem. There was a single case of footrot in the original halfbred lamb consignment (March 2011) and 1 or 2 of the Merino rams have been treated for footrot. Whilst halfbreds are more susceptible to flystrike, this can be managed with good fly control remedies.

Where to?

- Merino rams over hoggets offers the best opportunity for mid-micron wool in the NI
- We have 180 halfbred lambs which have been born to hoggets in Oct 2012 and which could be shorn and finished in spring 2012
- A supply chain producing half bred lambs from hoggets needs to be demonstrated on a commercial scale.

Experiment 1 - Merino rams over mixed age Romney and Composite ewes

This project aimed to compare the performance of Merino rams over Romney and Composite ewes and to benchmark their performance against Suffolk rams. The project was initiated in 2011 and remaining lambs were finished in spring 2012 and liveweight, carcass, fleece and teeth eruption data collected.

Methods

This project was a continuation of work initiated in 2011. Mixed age Romney (128) and mixed age Composite ewes (241) were split into 3 groups and mated to either Suffolk or fine and medium wool Merino rams. Two fine-wool and three medium-wool Merino rams were each joined with 77 ewes and three Suffolk rams were joined with 215 ewes on the 9th March. Tup marks were recorded and crayon colour changed every 17-20 days. Rams were removed after three cycles. Ewes were pregnancy scanned on 8th June. Lambs were weighed and tagged and identified to dam within 24 hours of birth. Dead lambs were tagged, weighed and autopsied to determine cause of death. Lambs were weaned on the 16th Nov (approximately 87 days of age), drenched and farmed as a single mob. On the 2nd Dec, lambs were shorn for management reasons and then grazed on rape (Winfred). A sample of Suffolk sired lambs were selected and farmed with the Merino sired lambs until slaughter. Lambs were slaughtered on the 14th Feb and 1st May 2012 as they reached 40 kg LW. From this point there were 75 Merino-sired and 13 Suffolk-sired lambs. On the 1st May, lambs were separated into ram and ewe lamb groups and farmed through and monitoring in terms of growth rate, fleece production and teeth eruption. Lambs were shorn on the 11th September 2012 and fleece weights recorded. Fleece samples were collected over the hip bone from individual animals and submitted to NZWTA for standard analysis of fibre diameter, yield and staple strength. On the 28th September, 20 F1 Merino ewe hoggets were selected and paired with a similar number of mixed breed (Composite) ewe hoggets of similar birth date and for monitoring of teeth eruption on a fortnightly basis. All remaining Merino and Suffolk sired lambs not in the teeth eruption study were killed on the 2nd October and carcass weight, grade and fatness data collected.

Results

Lamb growth rates and carcass data. Average birth date was 21st August (Table 1). From birth to weaning, Merino-sired lambs grew at 242 g/d and Suffolk-sired lambs grew at 282 g/d. By weaning Merino-sired lambs were 26.2 kg, significantly lighter than the 30.2 kg Suffolk-sired lambs. More Suffolk lambs were killed at the first two kills (n the 14th Feb and 1st May at the first two kills so by the time of final slaughter (2nd October) only 7% of Suffolk-sired lambs were left – these averaged 56 kg. By comparison, 41% of the Merino-sired lambs were still present at final slaughter – these averaged 49.1 kg. These liveweights do not include wool shorn on the 11th September.

Figure 1 Liveweights of lambs sired by Merino and Suffolk rams.

Table 1. Effect of ram breed on number of lambs slaughtered

	Sire		
	Fine-wool Merino	Medium-wool Merino	Suffolk
% Killed 1 (14th Feb)	28.7	34.1	54.8
% Killed 2 (1st May)	44.9	47.4	74.5
% Killed first 2 kills	61.7	67.1	91.3
% Killed 3 (2nd Oct)*	68.3	67.6	92.3

*NB Some ewe lambs from merino rams present at Kill 3 were retained while all Suffolk lambs killed, kill decisions prior to this based on same criteria across ram genotypes

Table 2. Effect of ewe breed on liveweight

	Sire						
	Fine-wool Merino		Medium-wool Merino		Suffolk		
Ewe breed	Romney	Composite	Romney	Composite	Romney	Composite	P_{sire}
Birth weight (kg)	4.9	4.9	5.3	5.2	5.4	5.1	0.01
Weaning LW (kg)	25.3	24.4	26.4	25.8	28.5	29.4	0.001
LW 10th Jan (kg)	29.7	29.3	30.4	31.1	34.3	36.5	0.001
LW 30th Jan (kg)	33.8	34.4	34.5	36.1	39.6	42.7	0.001
LW 13th Feb (kg)	35.6	36.6	35.7	37.8	38.8	40.0	0.001
LW 16th April (kg)	39	38.4	39.0	40.0	41.4	41.8	0.001
LW 13th Jun (kg)	39	41.4	42.3	41.8	41.7	44.5	0.04
LW 13th Aug shorn	43.5	47.6	47.5	43.4	47.0	54.2	0.14
LW 27/9/12 (kg)	46.7	51.7	50.6	47.5	54.8	57.6	0.02
Number left	15	27	19	16	5	7	

Lambs carcass weights were similar at both first and second slaughters and lambs sired by Merino rams were significantly leaner than lambs sired by Suffolk rams (Table 3). In general, carcasses from the progeny of crossbred ewes tended to be leaner than those carcasses from the progeny of Romney ewes. Dressing Out % (DO%) was consistently lower in lambs sired by fine-wool Merinos than medium-wool Merinos and both groups had lower DO% than Suffolk-sired lambs.

Table 3. Carcass weights and fatness of lambs sired by Merino and Suffolk rams.

		Sire		
		Fine-wool Merino	Medium-wool Merino	Suffolk
14/2/2012	Number	27	28	57
	Liveweight (kg)	42.4	43.3	43.6
	Carcass weight (kg)	17.5	18.6	18.9
	DO%	41.3	42.9	43.3
	GR (mm)	6.7	7.7	9.3
1/5/2012	Number	31	27	38
	Liveweight (kg)	42.6	44.0	44.5
	Carcass weight (kg)	17.4	18.3	18.6
	DO%	40.9	41.7	41.8
	GR (mm)	4.7	4.5	7.4
2/10/2012	Number	28	23	12
	Liveweight (kg)	50.3	49.1	55.8
	Carcass weight (kg)	22.3	22.3	24.6
	DO%	41.8	43.8	44.3
	GR (mm)	8.0	8.6	13.0

Table 4. Effect of ewe breed on carcass weights/ fatness of Merino-sired and Suffolk-sired lambs.

		Sire							
		Fine-wool Merino		Medium-wool Merino		Suffolk			
Ewe breed		Romney	Composite	Romney	Composite	Romney	Composite	P_{sire}	P_{ewe}
14/2/2012	Number	7	20	7	19	20	34		
	LW (kg)	41.7	42.7	44.0	42.9	42.3	44.3		
	CW (kg)	17.3	17.6	19.1	18.4	18.3	19.2		
	DO%	41.5	41.3	43.4	42.8	43.2	43.3		
	GR (mm)	7.7	6.4	9.7	7	8.6	9.6		
1/5/2012	Number	14	17	9	18	16	22		
	LW (kg)	42.2	42.9	43.4	44.2	44.1	44.9		
	CW (kg)	17.5	17.3	18.4	18.3	18.5	18.8		
	DO%	41.6	40.3	42.4	41.4	41.9	41.8		
	GR (mm)	5.5	4.1	5.6	3.9	8.9	6.3		
2/10/2012	Number	8	20	11	12	5	6		
	LW (kg)	47.8	51.7	50.6	47.5	54.1	57.6		
	CW (kg)	21.3	22.7	22.9	21.7	24.4	25.1		
	DO%	41.4	42.0	42.8	44.8	45.2	43.7		
	GR (mm)	7.9	8.0	8.3	8.8	14.2	12.2		
Overall	Date	25/5/12	28/5/12	13/6/12	7/5/12	12/4/12	3/4/12	0.001	0.21
	LW (kg)	44.7	46.8	47.7	44.8	44.4	46.0	0.59	0.74
	CW (kg)	18.5	19.3	20.4	18.8	19.1	19.0	0.45	0.49
	DO%	41.5	41.2	42.8	41.9	43.0	40.9	0.57	0.13
	GR (mm)	6.7	6.3	7.7	6.3	9.4	8.6	0.001	0.08

Animal health. There were no apparent differences in animal health between Merino and Suffolk sired lambs. Halfbred lambs sired by Merino rams were born on the property and farmed through to 14 months of age without any feet issues. No precautionary treatments were applied (e.g. footbath) and no lambs feet needed to be checked, in spite of what was a particularly wet winter in 2012.

Wool production. All lambs were shorn after weaning (2nd Dec 2011) as part of normal farm practice and both Merino and Suffolk sired lambs both clipped an average of 0.7 kg. Wool store evaluations were $4.50/kg and $3.30/kg net for Merino and Suffolk x lambs, respectively. The average value of lamb's wool was therefore $3.15 and $2.31 per head for Merino and Suffolk sired lambs, respectively.

Lambs which were carried through the winter for spring finishing were re-shorn on 11th September 2012 (a 40 week fleece). The lambs sired by the medium-wool Merino rams had heavier and coarser fleeces (3.12 kg; 27.5 μ) than lambs sired by the fine-wool Merino rams (2.84 kg; 23.3 μ). Both groups of Merino-sired lambs produced heavier fleeces than the Suffolk sired lambs (Table 5). Based on values supplied by Merino NZ of 1130, 785 and 405 c/kg clean for wool of 23.3, 27.5 and 35.0 μ, fleece returns were $23.5, $18.5 and $6.9 for lambs sired by fine-wool, medium-wool and Suffolk rams, respectively.

Table 5. Effect of sire breed on wool production (fleece produced 2/11/2011-11/9/2012)

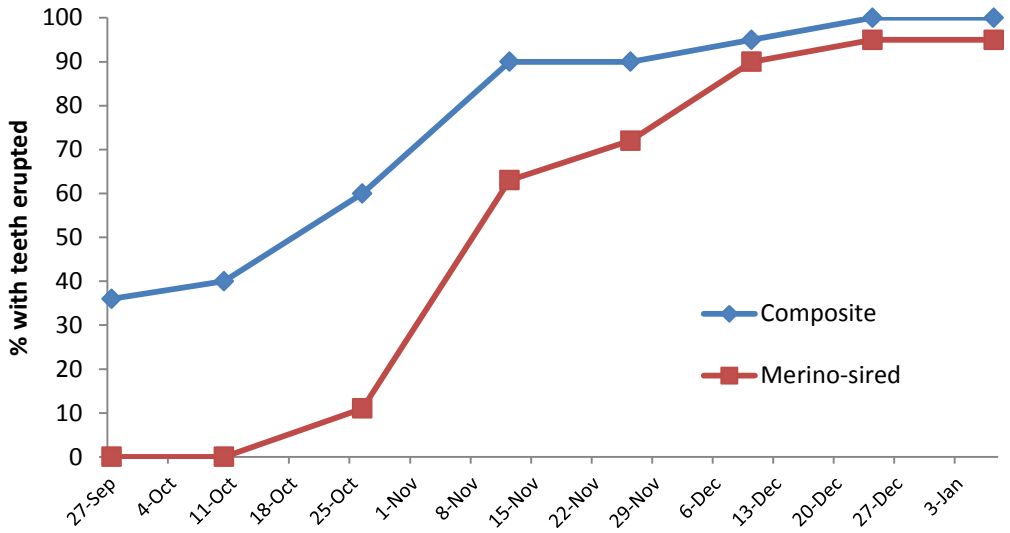
	Sire breed		
	Fine-wool Merino	Medium-wool Merino	Suffolk
Greasy fleece weight (kg)	2.84	3.12	2.47
Yield (%)	73.26	75.71	69.32
Fibre diameter (μ)	23.37	27.49	34.94
Strength	26.58	27.36	23.00
Length (mm)	87.34	96.44	86.67
SD	5.37	6.22	9.31
Wool value ($/kg clean)	23.51	18.54	6.93

Table 6. Effect of ewe genotype on wool production (fleece produced 2nd Dec – 11th Sept)

	Sire						
	Fine-wool Merino		Medium- wool Merino		Suffolk		
Ewe breed	Romney	Crossbred	Romney	Crossbred	Romney	Crossbred	Psire
# hoggets	13	25	17	15	3	5	
Fleece wgt (kg)	2.85	2.84	3.32	2.90	2.35	2.52	0.001
Yield (%)	74.0	72.9	75.5	75.9	68.6	68.3	0.001
Fibre diam (μ)	23.2	23.5	27.7	27.2	34.4	34.2	0.001
Strength	25.8	27.0	27.2	27.6	32	17.2	0.66
Length (mm)	91.2	85.4	97.3	95.4	79.3	87.2	0.01
SD	5.07	5.53	6.23	6.21	8.10	9.52	0.001

Teeth eruption. Currently, teeth eruption patterns are being monitored in a subsample of Merino-sired and Composite ewe lambs with similar birth dates of 21st and 24th August, respectively. On average, teeth eruption patterns were 1 month later in Merino-sired lambs than in their Composite counterparts (Figure 2).

Figure 2 Pattern of teeth eruption in Merino-sired and Composite lambs



Conclusions

- Merino-sired lambs grew slower than Suffolk-sired lambs. These slower growth rates meant that it took longer for the lambs to reach slaughter weights and this means it will be difficult to find a role for Merino rams over flock ewes in summer dry areas.
- Merino-sired lambs were leaner than Suffolk-sired lambs.
- Merino-sired lambs returned more fleece value ($12-$18)but there was no difference between lambs born to Romney or Composite ewes. This is counter to the industry belief that Merino rams over Composite ewes will result in halfbreds with inferior fleeces.
- The teeth of Merino-sired ewe lambs erupted a month later than those of composite-sired ewe lambs with similar birth dates. This has a potential advantage in meeting supply commitments for heavy, late season lamb.
- The advantage of halfbred lambs is likely to come from late mating of hoggets. Growth rate of hogget lambs is less critical as these lambs will often be destined for late slaughter, thus bringing into play the advantages of higher fleece value, leaner carcasses and later teeth eruption.

Experiment 2 – Merino rams as a terminal sire over Romney hoggets

This project aimed to monitor the performance of Merino rams mated to Romney hoggets and to compare their performance with Southdown rams mated over similar hoggets. The project was initiated at mating 2011 and lambs born to hoggets in 2011 were finished during 2012 with liveweight, carcass, fleece and teeth eruption data collected.

Methods

For this study, 300 Romney ewe hoggets were "borrowed" from Landcorp's Opouahi Station. Ewe hoggets averaged 39.6 kg on arrival at Poukawa on the 18th March. Hoggets were quarantine drenched, treated with Toxovax and Campylobacter and divided into three mating groups of approximately 100 ewes. Harnessed teaser rams were run with each group of ewes and once tupping started, entire rams were substituted for the teaser rams. The Merino rams were those which had been used over the mixed age ewes (Experiment 1) and comprised of three fine-wool Merino rams (two mixed age and one two-tooth) and two medium-fine wool Merino rams (both two-tooth rams). Four Southdown ram lambs were used as a control group. Ewe hoggets were scanned on the 20th July and dry hoggets returned to Landcorp. Lambs were weighed, tagged and identified to dams within 24 hours of birth. A random half of the 38 Merino sired males were castrated (rubber ring) to enable a future comparison of wether and ram lamb performance.

All lambs were weighed on the 12th Dec, 2011 when the lambs were an average of 9 weeks old. The heaviest lambs weaned and drenched. Lambs that were less than 18 kg were left with their mothers for a further 3 weeks and weaned on the 4th Jan. Post weaning, these lambs were offered the best pasture available on the research farm. These lambs were then run together until 1st slaughter on the 2th October, 2012. Lambs were shorn for the first time on 11th of September and fleece weights recorded. Fleece samples were collected over the hip bone from individual animals and submitted to NZWTA for standard analysis of fibre diameter, yield and staple strength. On the 28th September, 20 Merino sired ewe hoggets were selected and paired with a similar number of Southdown sired ewe hoggets of similar birth date. Teeth eruption pattern in these hoggets is being monitored at fortnightly intervals. All remaining Merino and Southdown cross lambs were killed on the 2nd October and carcass weight, grade and fatness data collected.

Results

Growth rate and carcass data: Hoggets that got in lamb had a high lambing percentage (144%). Birth weights were highest in the Southdown-sired lambs, followed by the medium-wool Merino and the fine-wool Merino (Table 7). Average lamb growth rates to weaning were fastest in the Southdown-sired lambs (247 g/d) and slowest in those sired by the medium-wool Merino rams (206 g/d) and fine-wool Merino rams (214 g/d). At weaning (9 weeks of age) average lamb weight was 18 kg. The combination of a later birth date and slower growth rate meant that by the 12th Dec, only 40% of the lambs sired by medium-wool Merino rams were heavy enough to be weaned (i.e. > 18 kg). The remaining lambs were weaned on the 4th Jan. Growth rates from weaning to slaughter were 95, 123 and 121 g/d for the lambs sired by fine-wool Merino, medium-wool Merino and Southdown rams, respectively (Figure 3).

Figure 3 Liveweight over time for lambs born to ewe hoggets and sired by fine-wool merino, medium-wool Merino and Southdown rams

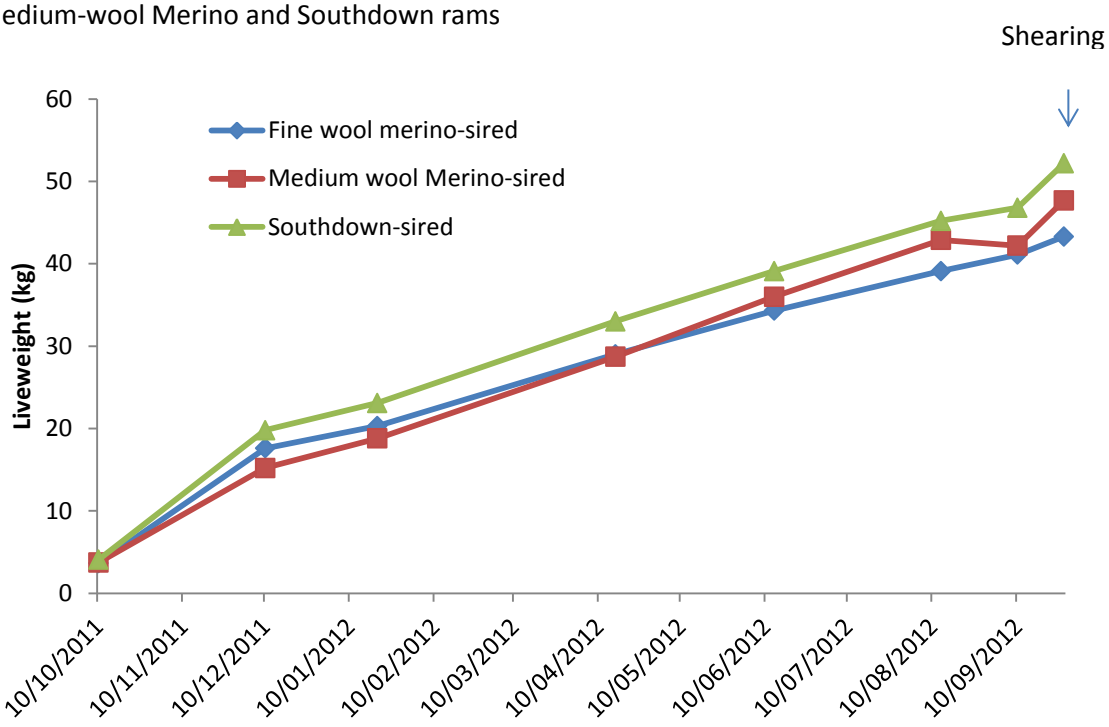


Table 7. Lamb growth rate and kill data of Merino and Southdown-sired lambs born to ewe hoggets

	Ram genotype			
	Fine-wool Merino	Medium-wool Merino	Southdown	P
Lambing % (lambs born/ewe lambing)	151	141	139	
Fleece weight 11/9/12	2.60	3.06	2.35	0.001
Pre kill LW (27/9/12)	45.4	48.2	52.3	0.001
CW (kg)	18.6	19.7	22.1	0.001
GR (mm)	7.0	7.3	7.9	0.56
DO%	40.9	40.8	42.3	0.03
No killed	33	25	44	

Table 8. Effect of castration on liveweight of Merino-sired male lambs

Weight	Castrated	Entire	P
Birth weight	3.67	3.55	0.80
12/12/11	17.4	16.9	0.70
20/1/12	19.9	21.0	0.29
16/4/12	29.8	29.5	0.80
13/6/12	35.3	36.4	0.34
13/8/12	44.6	47.9	0.06
27/9/12	46.5	50.3	0.07

Table 9. Effect of castration on carcass weight and fatness of Merino-sired lambs

	Castrated	Entire	P
No	21	17	
CW (kg)	19.8	20.3	0.56
GR (mm)	7.2	5.2	0.03
DO%	41.4	39.6	0.05

Entire lambs grew slightly faster as they got older and were 4 kg heavier at slaughter though this difference was not significant because of the relatively small numbers of lambs involved. As expected entire animals were leaner and had a lower dressing out percentage.

Animal health: There were no apparent differences in animal health between Southdown-sired and Merino-sired lambs. No feet had to be treated and no precautionary foot-bathing was undertaken. Whilst rotational grazing was practised, there was no rigid management ensuring that hoggets only went into areas previously un-grazed by sheep.

Wool production: Lambs were shorn on 11th Sept and this was the first shearing for these lambs from hoggets. Lambs sired by the medium-wool Merino rams had heavier and coarser fleeces (3.06 kg; 25.2 µ) than lambs sired by the fine-wool Merino rams (2.60 kg; 21.6 µ). Both groups of Merino-sired lambs produced heavier fleeces than the Southdown- sired lambs (Table 10). Based on values supplied by Merino NZ of 1290, 1000 and 400 c/kg clean for wool of 21.6, 25.2 and 28.9 µ, fleece returns were $23.4, $22.6 and $6.02 for lambs sired by fine-wool, medium-wool and Suffolk rams, respectively.

In spite of being shorn at the same time (11th September 2012), the mean fibre diameter was finer in halfbred lambs from hoggets than in halfbred lambs from ewes. This was presumably because the lambs produced by the ewes had an additional shearing as lambs for management purposes. For example, hogget lambs sired by fine-wool Merinos and previously un-shorn had 21.6 µ fleeces whereas lambs produced by ewes (and sired by the same rams) and shorn as lambs had 23.4 µ fleeces.

Table 10. Fleece characteristics by sire

	Fine-wool Merino	Medium-wool Merino	Southdown	P
GFW (kg)	2.60	3.06	2.35	0.001
Yield (%)	69.75	73.88	64.08	0.001
MFD (µ)	21.60	25.18	28.68	0.001
Length (mm)	97.84	108.79	91.75	0.005
Strength	22.06	19.00	18.75	0.12
SD	4.84	5.63	6.32	0.001
Fleece value ($)	23.40	22.60	6.02	

Teeth eruption. Both Merino and Southdown sired lambs born to hoggets had late patterns of teeth eruption, with first permanent incisors being in wear on the 1st November. By the 7th January, 53% of Merino-sired lambs had one or more permanent incisors in wear. At the same time, 40% of lambs sired by Southdown rams and born at the same time had incisors in wear. On average, teeth eruption in Southdown sired lambs was approximately 8 days later than in Merino sired lambs. Previous researchers have also seen this phenomenon of later teeth eruption in Southdown sheep. Tagle and Helman (1943) compared the teeth eruption patterns in 15 sheep breeds and found that the latest teeth eruption was occurring in the earliest maturing breed such as Southdown. Muir (1977) compared teeth eruption patterns in 5 sheep breeds and found the following pattern in age of teeth eruption: Romney < Corriedale < Border Leicester < Dorset Down < Southdown, with Southdown being the latest to get their permanent incisors. In spite of having later teeth eruption, early maturing breeds such as Southdown are unlikely to have a place in the production of heavy, late lambs because most will tend to be slaughtered early.

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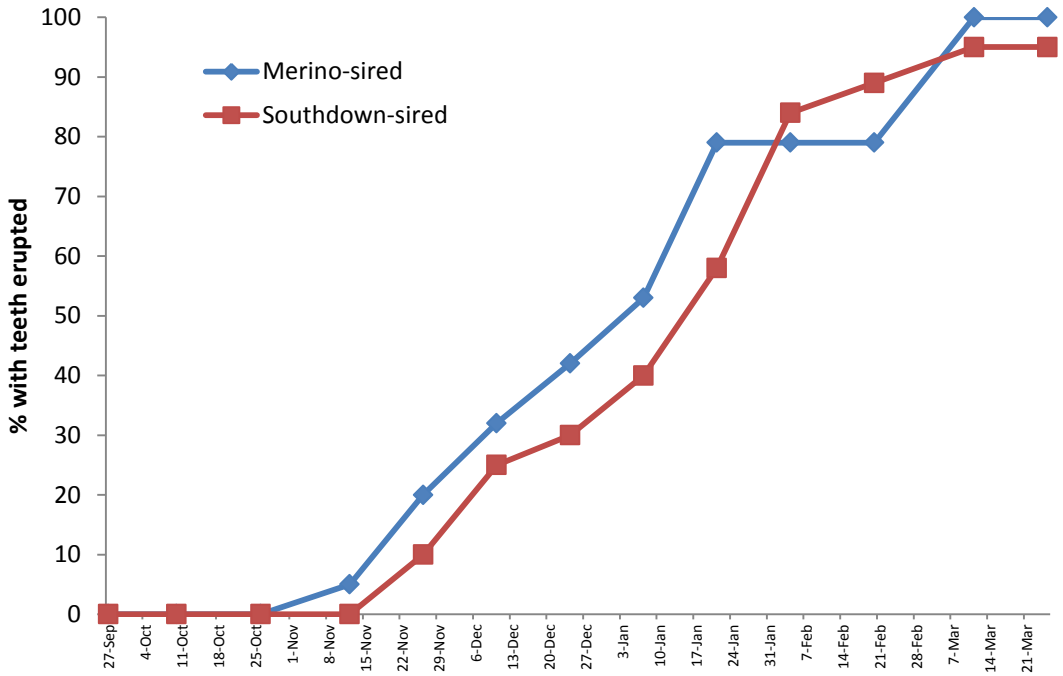
Figure 4. Pattern of teeth eruption in ewe hoggets sired by Merino and Southdown rams



Conclusions

- Southdown-sired lambs were heavier at birth and grew faster than the Merino-sired lamb. This meant these lambs were heavier at slaughter. Type of Merino sire (fine-wool or medium-wool) had no impact on lamb growth rate.
- Producing half-bred lambs from hoggets meant that it was feasible to almost a 12 month fleece off these lambs prior to slaughter. This resulted in significant differences in the value of the fleece between the Merino-sired and the Southdown-sired lambs (23.4 and 22.6 vs 6.02 for the Southdown-sired lambs).
- Castrating the ram lambs resulted in an additional but non-significant 4 kg liveweight at kill and a significantly leaner carcass.
- The Merino-sired lambs had slightly earlier teeth eruption than the Southdown-sired lambs . Although the first Merino-sired lamb had teeth in wear on the 1st of November the average teeth eruption date was the 10th January for the Merino-sired lambs and the 18th January for the Southdown-sired lambs By these dates the majority of the lambs would have been killed.
- The halfbred lambs produced from mating Merino rams over Romney hoggets were able to be farmed from birth to slaughter (11 months) without any feet issues.
- Using the Merino ram over ewe hoggets is a better fit for many North Island finishing properties and with these lambs there are the added benefits of the additional fleece value.

Experiment 3 – Merino rams as a terminal sire over Romney and Composite hoggets and developing a supply chain to produce heavy halfbred lambs

This project aimed to mate Merino rams to Romney and Composite hoggets and to finish their progeny to heavy weights prior to their teeth erupting. These lambs are likely to need a specialist supply chain involving specialised summer forages/feeding systems for small hogget lambs. This is likely to be another step in the chain – a grazier who will take weaned hogget lambs in December/January and feed through summer e.g. on brassica, lucerne or supplemented with grain.

Mating and lambing

Methods This project commenced in 2012. Three hundred ewe lambs (155 Romney and 150 Composite) were purchased commercially on the 13th March 2012 and treated with Toxovax and Campylobacter. Harnessed vasectomised rams were introduced on the 10th April and hogget mating weight recorded on the 19th May at which point hoggets averaged 37.2 kg, with only a small difference (1.2 kg) between Romney and Composite ewe hoggets. Once tup marks were observed (4th May) vasectomised rams were removed and Merino rams introduced.

Results Hoggets were scanned on the 9th August with a higher dry rate showing up in the Romney hoggets (29%) in the Composite hoggets (19%). Composite hoggets also had a higher percentage of multiples (23% vs 14%). This is in line with previous work which shows than Composite hoggets have a wider breeding season and are more fertile. Hoggets were shorn on the 11th September and dry hoggets were slaughtered on the 2nd October.

Table 11. Scanning results from 2012 hogget mating

	Composite	Romney
LW 19/4/12	37.6	36.8
LW 12/6/12	41.1	40.1
LW 7/12/12	55.4	50.6
LW 9/1/13	52.9	47.8
Tupped 1st cycle	70	61
Tupped 2nd cycle	41	38
Total tupped	111/150	99/155
% tupped	74	66
Preg scan (incl dries)	1.05	0.85
No dries (%)	19	29
% Multiples	23	14

Lambs were weighed and tagged and identified to dam within 24 hours of birth. Average lamb birth weights were 4.81 and 3.81 kg for single and twin lambs, respectively. Hoggets were intensively shepherded to enable recordings to be made. Two in-lamb hoggets died pre-lambing and one hogget died during lambing. There were very few assisted lambings (7/210 hoggets were assisted). Average growth rate of halfbred lambs fed on pasture from birth to weaning was 210 and 170 g/d for single and twin lambs respectively. However, this increased significantly when lambs were fed a

high quality feed (see next section on Persian clover). All lambs were weaned on the 8th January, 2013 and those off pasture averaged 20.2 kg, (range 9.8 – 31.6 kg). Conditions were dry in late 2012 and apart from lambs fed on Persian clover, feed quality on offer was poor from early November through to weaning in early January.

Table 12 Summary of hogget lambing and weaning results off pasture.

	Composite	Romney	P
Lambing %/ewe lambing	1.44	1.26	
Lambing %/ewes scanned	0.90	0.65	
Weaning %/ewes scanned	0.77	0.55	
Lamb survival (%)	85.9	84.2	
Birth weight (kg)	4.6	4.3	0.11
Maternal behaviour score	2.9	2.7	0.05
Weaning weight (kg)	21.7	18.6	0.001
Weight /2/13 (kg)	26.4	22.7	0.001
Weight 12/3/13 (kg)	33.4	30.1	0.001

Table 13. Lambing and weaning results (off pasture) in Composite and Romney hoggets

	Composite		Romney		P	
	Single	Twin	Single	Twin	Brd	BR
Birth weight (kg)	4.82	3.73	4.82	4.00	0.42	0.001
Maternal behaviour score	2.8	3.0	2.6	2.9	0.19	0.04
Weaning weight (kg)	22.8	20.1	19.9	17.4	0.006	0.003
Lamb survival (%)	90.7	76.7	86.7	70.1		

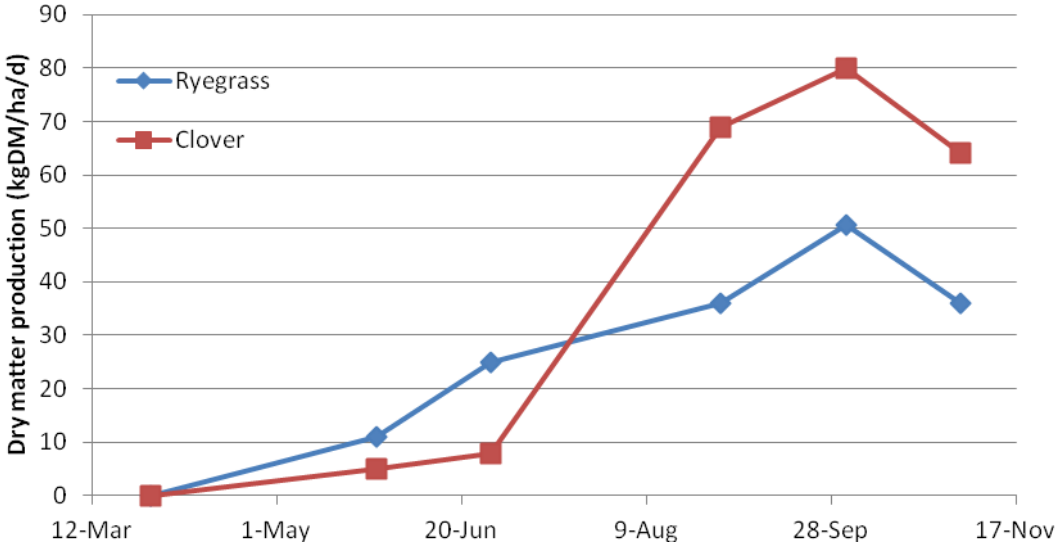
Using a high octane feed (Persian clover) to grow hoggets and their lambs.

Methods The performance of lactating hoggets and their halfbred lambs was compared on Persian clover and Moata. Six similar 1.5 ha paddocks (3 of Persian clover sown @ 5 kg/ha and 3 of Moata annual ryegrass sown @ 25 kg/ha) were established on the 29 March 2012. Prior cultivation, 150 kg DAP was applied. The area was initially disced and then sown with a 'one pass' rotary cultivator/air drill. Establishment was slow and weeds (speedwell, chickweed, stinging nettle and storksbill) were problematic. Grass weeds were prolific. On the 2nd June, grass weeds were controlled with Arrow and Gallant. Both Gallant and Arrow controlled grass weeds effectively and had no apparent impact on the Persian clover.

Results Annual ryegrass pastures were grazed as necessary and pasture growth rates measured using exclusion cages. By the end of August, annual ryegrasses had been grazed three times and had produced 3545 kg DM/ha while Persian clover which remained un-grazed had produced 3000 kg DM/ha. Persian clover grew at 70 kg DM/ha through August. Persian clover continued to grow strongly through spring, with growth rates of 65-80 kg DM/ha/day. On the other hand, Moata performed poorly through spring and only ever peaked at 50 kg DM/ha/day (Figure 1). Persian clover yields to 19th Nov were 8300 kg DM/ha. By comparison, Moata yields at 6500 kg DM/ha were well below our normal expectations. This may have been a function of a very wet late winter and/or a lack of nitrogen.

Persian clover at Poukawa (13th September 2012)

Figure 5. DM production of Persian clover and Moata annual ryegrass at Poukawa (2012)



Late lambing mixed aged ewes were allocated to Persian and Moata blocks and rotationally grazed from 5th September. From mid-October, hoggets and their halfbred lambs were added. The numbers added were adjusted to match the feed availability- this resulted in an average overall stocking rate of 11 ewes/ha on the Persian and 7.5 ewes/ha on the Moata. Over a 54 day period grazing period, lambs on Persian clover grew at 349 g/d (lambs on ewes 380 g/d and lambs on hoggets 294 g/d) whereas lambs on annual ryegrass grew at 276 g/d (lambs on ewes 290 g/d and lambs on hoggets 246 g/d). The combination of higher stocking rate and faster liveweight gains meant that between 5th Sept and 9th Nov, Moata produced 191 kg lamb/ha and Persian clover producer 342 kg lamb/ha.

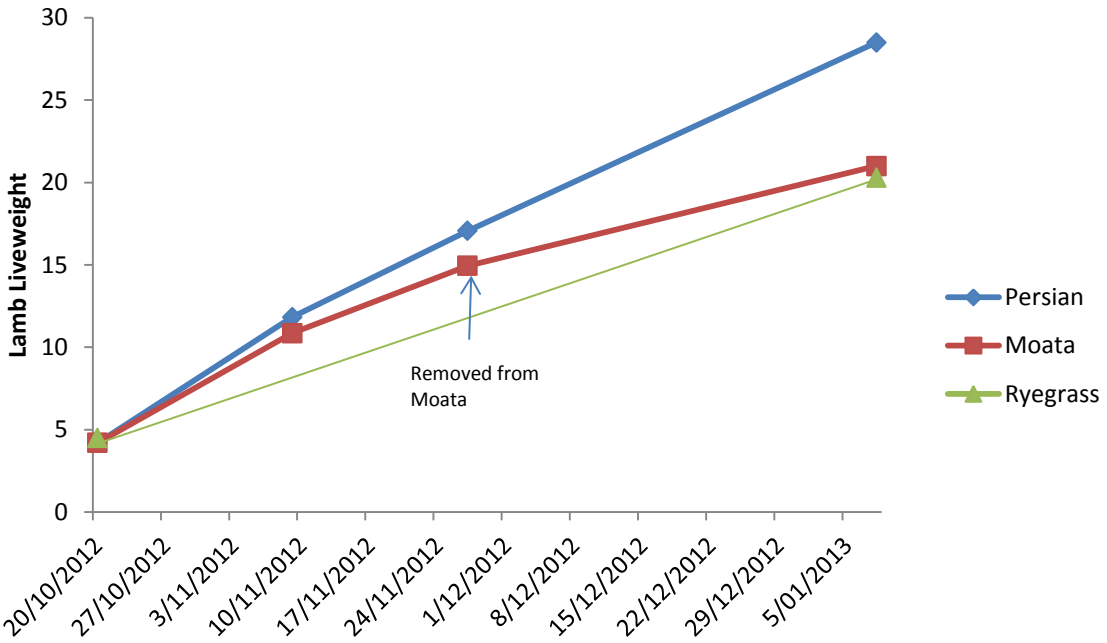
On Persian clover, halfbred lambs reared by hoggets grew at 285 g/d and averaged 28.5 kg at weaning. By comparison, the counterparts on pasture (albeit with a slightly later birth date) grew at

185 g/d and averaged 19.2 kg at weaning. However, perhaps the most telling statistic was the liveweight gain of the hoggets themselves. In spite of having a similar mating weight (41.4 kg) hoggets fed on Persian clover were 63.6 kg at weaning on 8th January whereas those farmed on permanent pasture through a dry Hawkes Bay spring were only 50.3 kg. These hoggets were also in better condition score (1 condition score - Table 14). Clearly, these heavier hoggets will be in a much better position for mating in 2013.

Table 14. The performance of ewe hoggets and their Merino-sired lambs (Oct –Jan 2012)

	Persian	Moata	Other	P
Mating weight (kg)	41.2	41.4	41.4	0.41
Birth date	15/10/12	12/10/12	27/10/12	
Birth weight (kg)	4.21	4.18	4.50	0.37
Number of lambs	23	17	212	
Date on treatment	18/10/12	15/10/12	-	
Date off treatment	8/1/13	27/11/12	-	
Date weaned	8/1/13	8/1/13	8/1/13	
Wean weight	28.5	21.0	19.2	0.001
Ewe wean weight	63.6	50.6	49.4	0.001
Ewe CS at weaning	3.5	2.4	2.4	0.001

Figure 6. Lamb liveweight change over time in lambs being reared by ewe hoggets grazing Persian clover, Moata annual ryegrass or perennial grass pasture.



Post weaning – developing a supply chain

This part of the project aimed to evaluate options for growing small hogget lambs through the difficult summer period. Unless a viable supply chain can be established to take these lambs through the summer, these lambs are likely to be sold at a significant discount and fail to achieve their potential returns. The summer of 2012/13 has been labelled the worst drought in Hawkes Bay in 75 years so was an ideal period to test treatments groups aimed at summer feeding small hogget lambs.

Methods Immediately after weaning on the 8th January, all 200 halfbred lambs were confined to a yard and offered *ad libitum* lucerne hay and a mix of crushed maize and calf meal. On the 10th January, approximately 50% of the lambs were eating the concentrate ration and the remaining 100 lambs were removed and allocated to either brassica, lucerne or clover. The clover sward was located on the Heretaunga plains and was chosen as a way of simulating what could be achieved on a Manawatu finishing farm. The remaining 100 lambs continued to be fully adjusted to maize grain (whilst being fed lucerne hay) and on 18th January, the group was split at random and 50 lambs were fed on summer pasture along with a daily supplement of 300 g maize grain per head. The trial stopped on the 14th March and all lambs were run on brassica.

- Lucerne – 31 lambs were set stocked on 2 ha of drought affected lucerne (cultivar Kaituna). Whilst set stocking is not typical, this was the best option for managing a relatively small block of lucerne.
- Clover dominant sward – 25 lambs were set stocked on a 4 ha clover paddock and grazed amongst weaner calves. A botanical dissection indicated the sward consisted of 58% clover, 19% ryegrass, 3% other grasses and 19% dead matter.
- Brassica – 41 lambs were set stocked on 4 ha of drought affected Winfred rape (see photos below) and grazed in amongst commercial lambs.
- Grain in paddock – 52 lambs were fed 300g/day of maize grain whilst grazing a high allowance (~ 2000 kg DM/ha of dry summer pasture). The pasture consisted of 70% dead material, 15% ryegrass, 4% other grass, 4% clover and 7% unidentified species.
- The maize grain offered was initially 100% crushed maize but was switched to 100% whole maize over a period of weeks.
- Feedlot ration - 53 lambs were fed 1 kg/head lucerne hay plus a ration consisting of 25% high protein meal, 25% crushed maize and 50% whole maize. The high protein ration (30% protein) was specially formulated to compensate for the lower protein content in maize grain. The ration was gradually increased over a few weeks and once fully adjusted, lambs were eating 841 g/day of concentrate.

Lambs grazing clover

Lambs grazing lucerne

Lambs grazing brassica

On-Farm Research

Lambs fed a feedlot ration

Lambs supplemented with 300 g/head/day of maize whilst grazing dry summer pasture

Results Two of the lambs died during the trial – 1 on the clover and 1 on the lucerne treatment and 1 skinny lamb was removed from the pasture plus 300 g/d maize treatment. There were no other animal health issues.

The lambs on the clover grew the fastest (435 g/d) and had the lowest range of weight gains. Lambs on lucerne grew at 427 g/d – presumably because lambs were set stocked which meant that they were able to select the high quality lucerne tops. By comparison, under rotational grazing, they would have to graze the whole stand from high quality tops down to the low digestibility stem. Lambs on brassica grew at a very acceptable 332 g/d on Winfred rape and as with lucerne, these lambs were not rotationally grazed – rather they were left to graze selectively across the paddock. Lambs were fed a high quality feedlot ration to see what the potential growth rates were. However, in spite of very high intakes of a high quality ration (around 1.8 kg/day) lambs only grew at 314 g/d. This was less than expected relative to their feed intakes and lambs on this ration were inefficient in their use of feed. Lambs fed 300 g/d of maize whilst grazing summer pasture grew at 251 g/d. This was a pleasing result given the pasture quality on offer, although the wide range of live weight gains (74-400 g/d) suggests that the grain was not being consumed evenly. Nevertheless, at $500/Tonne for maize, feeding 300g/d for 100 days would cost $15/head.

Table 15. Growth rate of halfbred lambs from hoggets fed on a range of summer feeds.

	No	Start weight	Finish weight	Average LW gain	Range LW gain
Lucerne	31	18.7	35.2	427	238 - 646
Clover	25	17.7	35.7	435	315 - 573
Brassicas	41	18.1	31.3	332	195 - 600
Grain in paddock	52	19.7	29.7	251	74 - 400
Grain yard	50	19.5	31.8	314	190 - 446
P		0.32	0.001	0.001	

Conclusions

- Composite hoggets out-performed Romney hoggets in terms of the conception rates, number of lambs born and lamb growth rates.
- Lambs born to hoggets averaged 4.8 kg for singles and 3.85 kg for twins. There were very few instances of assisted lambing so mating Merino rams over hoggets offers real potential.
- Even in a summer dry environment, there are possibilities in using high octane feeds (e.g. Persian clover) to achieve good growth rates in both hoggets and their lambs.
- The summer feeding trial has demonstrated that even very small (19 kg) lambs from hoggets can be successfully grown through even the most difficult summer. Lambs were grazing drought affected pasture, lucerne and brassica and still achieved very good growth rates. The key was that lambs were set stocked and not pushed to do any clean-up. Most farmers will have other classes of stock that can carry out this role.
- It should be possible to build a supply chain which involved mating hoggets to Merino rams and weaning lambs at around 19 kg. Instead of dropping these lambs in the store pens, they would pass to a summer grazier to grow them to 35 kg and in autumn move to a winter finisher. The finisher could shear them in September and then slaughter them at 55 kg in late spring with no fear of teeth issues. Assuming a 22 kg slaughter weight ($132 @ $6/kg) and a $23 fleece this would provide $155 (less transport and shearing) to be shared across the supply chain. Even a simple three way spilt of $50 each would suggest that a supply chain is viable. What would add even more value is if these lambs could be slaughtered at even heavier weights (e.g. 25 kg plus) for a specialist market.

References

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