South Canterbury

South Canterbury modelling methods

The South Canterbury group chose increasing lambing percentage as the principle mitigation. The impacts of climate were modelled on the current average scanning percentage for the basin and hill country and were compared to the top 15% of farmer results. These values were sourced from the FT2000 benchmarking project (T. Fraser, personal communication).

The use of genetics to improve lamb survival was also investigated as per the methodology in the section 'Modelling genetics'. It must be emphasised that this only one way of assessing the impacts of genetics. Given that lamb survival is highly variable and has only a low heritability when estimated using broad parameters such as number of lambs weaned, then it is logical to assume that many individual factors are interacting to provide a final outcome.

Two sites were chosen to represent the diversity of the sheep farming in the region. These are representative of the inland basin region (South Canterbury Basin) and the hill country (South Canterbury Hill).

Wind speed data (8 am NZST) from the Fairlie (lat. -44.103, long. 170.824, alt. 300 masl) and Fairlie Riverview (lat. -44.101, long. 170.883, alt. 304 masl) stations was used to represent the South Canterbury Basin model. Data from the Fairlie, Riverview station covered the period 1980-1990, while the period 1992-1999 were covered by the Fairlie station. The missing period 1990-1992 was replaced by a repeat of the 1986-1988 data.

Wind run data from the Lake Tekapo electronic weather station (lat. -44.00173, long. 170.443, alt. 762 masl) for the period 2003-2009 was used to calculate average wind speed to represent the South Canterbury Hill model and was repeated as required to match the 20 year modelling period.

Results

Increasing lambing percentage and the use of genetics were important mitigations for the South Canterbury region.

Variations in mating date by up to 10 days before the current date of 9 April saw very little practical variation in live lamb numbers (Table 1,2).

Increasing scanning percentage from the regional average to that of the highest 15% in the region was used as an achievable target. While the number of lambs lost increased in all cases, at both the Basin and Hill sites, the overall number of live lambs per 1000 ewes still increased significantly, by 156 and 200 respectively (Table 1,2). The increase of 156 lambs at the Basin site related to a potential 200 lambs, resulting in a survival rate of approximately 75%, whereas the 200 lambs at the Hill site related to a potential 300 lambs or a survival of 67%, highlighting the greater impact of wind run at the Hill site.

Table 1. South Canterbury Basin

Site					
South Canterbury Basin		**Time**			
		Future	Future	Future	
Scanning percentage = 172%	Present	1	2	3	lsd
Lambs lost (exposure of the ewe)	245	236	231	225	8.5
Lambs lost (exposure of the lamb)	111	108	106	103	3.4
Live lambs per 1000 ewes lambing	1463	1475	1482	1491	11.8
Top 15% scanning percentage = 192%		**System**			
		Top			
	Median	15%			lsd
Lambs lost (exposure of the ewe)	220	249			6.0
Lambs lost (exposure of the lamb)	98	116			2.4
Live lambs per 1000 ewes lambing	1400	1556			8.3
		Mating Date			
	30-Mar	4-Apr	9-Apr		lsd
Lambs lost (exposure of the ewe)	240	233	230		7.3
Lambs lost (exposure of the lamb)	108	106	106		2.9
Live lambs per 1000 ewes lambing	1471	1480	1483		10.2

Table 2. South Canterbury Hill

Site					
South Canterbury Hill		**Time**			
		Future	Future	Future	
Scanning percentage = 155%	Present	1	2	3	lsd
Lambs lost (exposure of the ewe)	344	336	332	327	9.5
Lambs lost (exposure of the lamb)	140	137	136	135	3.3
Live lambs per 1000 ewes lambing	1218	1227	1232	1239	12.5
Top 15% scanning percentage = 185%		**System**			
		Top			
	Median	15%			lsd
Lambs lost (exposure of the ewe)	305	365			6.7
Lambs lost (exposure of the lamb)	119	155			2.3
Live lambs per 1000 ewes lambing	1129	1329			8.9
		Mating Date			
		25-			
	20-Apr	Apr	2-May		lsd
Lambs lost (exposure of the ewe)	335	340	330		8.2

Lambs lost (exposure of the lamb)	140	138	133	2.8
Live lambs per 1000 ewes lambing	1226	1223	1238	10.9

The investigation of the impacts of genetics had a very narrow focus using the potential heat production likely from a heavier birth weight as one factor that may influence lamb survival. Using this approach the resulting increase in live lambs per 1000 ewes was small, ranging from 8 to 16 lambs depending on the site and the system (Table 3). Interestingly greater benefit was derived from this parameter at the less exposed site (Basin) and at higher scanning percentages (Top 15%). The influence of genetics on lamb survival is multifaceted and will be much more complicated than this simple example. Further research will provide a clearer understanding of how the influence of genetics may be applied in models such as these in the future.

Table 3. South Canterbury genetics

Change in live lambs/1000 ewes	**South Canterbury Sites**		
System	Basin	Hill	lsd
Median	13.2	7.7	
Top 15%	15.9	10.9	
			0.54