4

August
2003

DEVELOPING LOW COST 'NATURAL-CARE' SYSTEMS OF SHEEP PRODUCTION

AgriSearch NI
Farmer Funded Research

AgriSearch NI
Farmer Funded Research

AgriSearch was formed in 1997 to provide a mechanism through which dairy, beef and sheep farmers could have a direct involvement in near market research. Funds contributed to AgriSearch are used to commission research into the improvement and development of sheep, beef and dairy farming and to disseminate and publish the results. Sheep projects are recommended to the AgriSearch Council by a Sheep Advisory Group comprised of five people, of which three are farmers. The AgriSearch Council is comprised of ten people of which six are farmers.

The Agricultural Research Institute of Northern Ireland,
Hillsborough, Co. Down, BT26 6DR

Research Team
Lynne Dawson and Alistair Carson

CO-FUNDERS

Department of Agriculture and Rural Development
AgriSearch

OVERALL SUMMARY OF PROJECT

A study was carried out over three years on six lowland farms located throughout Northern Ireland, to investigate the potential to develop lower labour input easy-care lambing systems. On each farm, 90 ewes of four crossbred ewe genotypes (Bluefaced Leicester X Blackface, Texel X Blackface, Suffolk X Cheviot and Texel X Cheviot) were mated with high lean growth index Suffolk, high lean growth index Texel or Beltex rams. Half of the ewes lambed in a conventional indoor lambing system and the other half lambed outdoors in a grass-based easy-care lambing system. In the third year of the study half of the ewes lambing outdoors were provided with additional shelter to assess the effect on lamb survival and performance. Lambs born in easy-care lambing systems were on average 0.2 kg heavier than those born indoors which is a reflection of the superior nutritive value of grazed grass as a feed for ewes in late pregnancy. However, overall lamb output in terms of weight of lamb weaned per ewe was similar in both lambing systems. Little or no concentrates were offered to ewes in the easy-care system and major savings in labour inputs were also obtained. Provision of additional shelter to ewes and lambs in the easy-care system had no beneficial effect on lamb performance. Shelter use by ewes and lambs was low with less than 1% of ewes using the shelters during the lambing period. This may be due to the favourable weather conditions experienced during the lambing period. Results from this study have demonstrated the potential of easy-care lambing systems to reduce labour and feed costs during lambing while maintaining similar levels of performance to conventional indoor lambing systems.

INTRODUCTION

The sheep industry in Northern Ireland has been under severe financial pressure over recent years. For example, over the last 20-years the gross margins of recorded flocks in Northern Ireland have fallen by 50% in real terms. To remain competitive options for reducing the costs of production must be continually evaluated. In particular, options for reducing the labour requirements of sheep production require examination. Survey data indicates a labour input of between 4 and 8 hours per ewe for lowland sheep production systems in Northern Ireland. In view of this, a research programme was established to investigate the potential to develop lower labour input easy-care lambing systems. The main objectives of this study were to assess the effect on labour input and lamb output of adopting a controlled grass-based lambing system (easy-care) in comparison to indoor lambing systems.

In a previous study funded by AgriSearch and DARDNI the major effect of the genetics of crossbred ewes and terminal sires on lamb output was demonstrated. Consequently the current study also assessed the effect of ewe and ram breed on lamb output in indoor and easy-care lambing systems in a bid to identify superior breeds for grass-based systems.

PROCEDURE

- The experiment was carried out over three years on six lowland farms located throughout Northern Ireland.
- On each farm the experimental flock (approximately 90 ewes per farm) consisted predominantly of:
  - **Bluefaced Leicester X Scottish Blackface**
  - **Texel X Scottish Blackface**
  - **Suffolk X Cheviot**
  - **Texel X Cheviot**
- Prior to mating the ewes were divided into three groups and allocated to one of three ram types:
  - **High lean growth index Suffolk**
  - **High lean growth index Texel**
  - **Beltex**
- Ewes were also allocated to two lambing systems
  - **Indoor**
  - **Grass-based**
- In year 3, the effect of provision of additional shelter on the performance of ewes in grass-based lambing systems was examined. On each farm half of the ewes in the easy-care system were provided with additional shelter
  - **Two basic designs - X or Z shaped**
  - **With or without roof**

REVIEW OF FINDINGS

Which lambing system?

Table 1. Effect of lambing system on lamb mortality and growth rate (years 1 & 2)

	Indoor	Easy-care
No. lambs born/ewe	1.81	1.78
Lamb birth weight (kg)	5.0	5.2
% lamb mortality (birth - weaning)	11	14
No. lambs weaned/ewe	1.61	1.51
Lamb growth rate (g/day)		
Birth - 6 weeks	317	331
Birth - weaning	281	292
Weaned lamb output (kg/ewe)	57.0	55.9

Lamb mortality and growth rates (years 1 & 2)

- Similar numbers of lambs were born in indoor and easy-care lambing systems (Table 1).
- Lamb birth weight was 0.2 kg higher in the ewes in the easy-care lambing system compared with those lambing indoors.
- Lamb mortality from birth to weaning was similar in both lambing systems (11% indoor; 14% easy-care).
- Lamb growth rates in the first six weeks post-lambing were 4% higher in lambs born in the easy-care system.
- Lamb output, in terms of weight of lambs weaned per ewe, was similar in both systems.
- Little or no concentrates were offered to ewes lambing in the easy-care system compared with around 16 kg per ewe lambing indoors.

Labour requirements

- A similar length of time was spent lambing in the indoor and easy-care systems (Table 2).
- In the indoor system, more time was spent catching ewes which required assistance at lambing or needed to be moved into lambing pens than was spent in catching ewes which required assistance in the easy-care system.
- The time spent on lamb care was similar in both systems.
- Overall, there was a 30% reduction in labour inputs in easy-care compared with indoor lambing systems.

Table 2. Effect of lambing system on labour requirements (years 1 & 2)

Activity (min/ewe)	Indoor	Easy-care
Lambing	2.1	2.7
Catch/move ewes at lambing	6.7	4.5
Neonatal lamb care	1.6	2.2
Moving ewes to grass	3.5	0.0
Total time	13.9	9.4

Which ewe breed?

Table 3 Effect of ewe breed type on lamb output in indoor and easy-care lambing systems

Crossbred ewe type	No. lambs born/ ewe	% ewes lambing without assistance	% lamb mortality (birth-weaning)	Weaned lamb output (Kg/ewe)
Indoor				
Leicester X Blackface	2.00	77	13	64.1
Texel X Blackface	1.80	75	14	55.9
Suffolk X Cheviot	1.77	83	10	56.7
Texel X Cheviot	1.65	76	8	53.4
Other breeds	1.82	70	9	54.8
Easy-care				
Leicester X Blackface	1.97	59	18	58.4
Texel X Blackface	1.70	67	16	52.1
Suffolk X Cheviot	1.76	81	13	56.2
Texel X Cheviot	1.64	71	12	51.1
Other breeds	1.82	83	9	61.9

- Bluefaced Leicester X Blackface ewes were the most prolific of the four ewe breeds in both systems producing 15% more lambs in both the easy-care and indoor lambing systems (Table 3).
- A greater percentage of Suffolk X Cheviot ewes lambed without assistance relative to the other three breeds.
- Lamb mortality tended to be higher in the Bluefaced Leicester X Blackface ewes in the easy-care system (18% mortality birth to weaning) compared with the indoor lambing system (13%).
- Bluefaced Leicester X Blackface ewes had the greater lamb output at weaning compared with the other three breeds (16% greater in the indoor system and 10% in the easy-care system).

Which ram breed?

- Beltex-sired lambs weighed 0.25 kg less (indoor system) and 0.4 kg less (easy-care system) at birth compared with Texel or Suffolk-sired lambs
- A greater percentage of Beltex-sired lambs lambed without assistance (85% indoor; 76% easy-care).
- Double-muscled-sired lambs grew 10% (indoor) and 8% (easy-care) slower than Suffolk- or Texel-sired lambs

Table 4 Effect of ram breed on lamb output in indoor and easy-care lambing systems

Ram breed	Lamb birth weight (kg)	% ewes lambing without assistance	% lamb mortality (birth-weaning)	Lamb growth rate (birth-weaning)
Indoor				
Beltex	4.8	85	10	262
Texel	5.0	77	10	286
Suffolk	5.1	74	13	298
Easy-care				
Beltex	4.9	76	15	276
Texel	5.2	70	11	300
Suffolk	5.4	71	16	299

PROVISION OF ADDITIONAL SHELTER

Shelter use by ewes and lambs

- Less than 1% of the ewes used the polymesh shelters during the lambing period (Table 5).
- After lambing, both ewes and lambs used the shelters.
- Shelter use was greatest in the first two weeks post-lambing.
- Lambs showed a distinct preference for the 'X' shaped shelter with the roof.
- Shelters placed centrally in the field were used to a much greater extent than those placed around the perimeter of the field.

Table 5. Effect of shelter type on % usage by ewes and lambs

	Shelter type			
	X		Z	
	With roof	No roof	With roof	No roof
Prelambing				
Ewes	0.9	1.1	0.9	1.0
Weeks 1-2 post-lambing				
Ewes	4.2	4.3	4.7	0.4
Lambs	7.9	4.5	5.2	2.6
Position of shelter				
Ewes				
Inner	3.3	4.2	4.6	1.5
Outer	0.0	1.3	0.8	0.0
Lambs				
Inner	3.7	3.0	3.6	1.3
Outer	2.8	3.3	1.6	1.6

Lamb mortality and growth rate

- Lamb birth weights were similar in easy-care lambing systems with shelter compared with easy-care systems without shelter (Table 6).
- Lamb mortality was slightly higher in easy-care lambing systems with additional shelter.
- Lamb growth rate was not affected by provision of additional shelter in easy-care lambing systems.
- Lamb output at weaning was lower in easy-care lambing systems with shelter compared with easy-care lambing systems without shelter

Table 6. Effect of provision of shelter on lamb mortality and growth rates

	Easy-care		
	Indoor	Without shelter	With shelter
No. lambs born/ewe	1.95	1.90	1.91
Lamb birth weight (kg)	5.1	5.4	5.2
% lamb mortality (birth - weaning)	15	13	19
No. lambs weaned/ewe	1.67	1.61	1.54
Lamb growth rate (g/day)			
Birth - 6 weeks	295	335	325
Birth - weaning	249	264	262
Weaned lamb output (kg/ewe)	53.8	54.1	50.8

SUMMARY AND IMPLICATIONS FOR THE INDUSTRY

EFFECT OF LAMBING SYSTEM

- Easy-care (grass-based) lambing systems produce similar levels of lamb output to conventional indoor lambing systems.
- Easy-care lambing systems have consistently increased lamb birth weight - lambs born in the easy-care system were 0.2 kg heavier than those born indoors.
- The superior growth rates of lambs up to weaning in the easy-care system indicates that grazed grass is a superior feed for ewes with this effect being attributable to improved body condition and milk yields of the ewe.
- Major reductions in feed costs are achieved in the easy-care system, as little or no concentrates are required compared with indoor lambing systems.
- Less time is spent moving ewes in the easy-care system resulting in a major saving in labour inputs (overall, there was a 30% reduction in labour inputs in easy-care compared with indoor lambing systems).
- **Easy-care lambing systems have the potential to achieve similar levels of performance to conventional indoor lambing systems with major reductions in labour and feed costs.**

EFFECT OF SHELTER PROVISION

- Less than 1% of ewes used shelters during the lambing period which may be explained by the favourable weather conditions experienced during the lambing period.
- Shelter design influenced usage with lambs preferring the 'X' shaped shelter, with a roof in the first two weeks after birth.
- Shelters located centrally within the field were preferred over those placed around the perimeter of the field.
- Lamb performance was similar in sheltered and unsheltered areas
- **Provision of shelter had no beneficial effects on lamb performance, but further research is needed in this area under more severe weather conditions.**

THE PROJECT TEAM

We are grateful for the contribution made by the lowland farmers who participated in this programme by providing valuable data and assistance throughout: Mr & Mrs I. Crilly, Castlederg, Messrs J. & F. McHenry, Moss-side, Mr R. Moore, Londonderry, Mr A. Montgomery, Downpatrick, Messrs J. and W. Martin, Greyabbey.

For further information or to request a copy of the full scientific report detailing the experimental tests and statistical analysis contact:

The Secretary
AgriSearch
97 Moy Road
Dungannon
BT71 7DX
Northern Ireland

T: 028 8778 9770
F: 028 8778 8200
E: info@agrisearch.org
W: www.agrisearch.org

AgriSearch NI
Farmer Funded Research