

1



November
2001



THE EFFECTS OF GENETICS OF LOWLAND CROSSBRED EWES AND TERMINAL SIRES ON LAMB OUTPUT AND CARCASS QUALITY

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

The Secretary
AgriSearch
475 Antrim Road
Belfast
BT15 3DA
Northern Ireland

T: 028 9037 0222
F: 028 9037 1231
E: agrisearch@ufuhq.com



AgriSearch

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



THE EFFECTS OF GENETICS OF LOWLAND CROSSBRED EWES AND TERMINAL SIRES ON LAMB OUTPUT AND CARCASS QUALITY

INTRODUCTION

Stratified crossbreeding programmes are a key feature of the sheep industry in Northern Ireland. In these programmes, hill breed ewes are mating with crossing sires to produce breeding ewe replacements for the lowland sector. Thus changes in the genetics of ewes and rams used in the hill sector will affect the performance of the lowland sector. Four crossbred ewe types were produced from a research programme undertaken by the Agricultural Research Institute on six hill farms in Northern Ireland. The aim of the study reported here was to provide information on the productivity of these crossbred females.

Texel and Suffolk sires are the predominant terminal sire breeds used in the sheep industry in Great Britain and Ireland. In the last number of years genetic improvement schemes in the UK have led to significant improvements within both of these breeds in terms of lean growth potential. Consequently, this trial was also designed to provide information on the effects of using high lean growth index sires, obtained from sire reference schemes, on performance in terms of lamb output and carcass quality.

SUMMARY AND IMPLICATIONS FOR THE INDUSTRY

Effect of Crossbred Ewe Type

- o Suffolk X Cheviot ewes consumed up to 17% more than the other crossbred ewe types.
- o Compared with the other crossbred ewe types Blue-faced Leicester X Blackface ewes produced lambs with *poorer conformation* with only 10% achieving E and U grades compared with 26-31% with the other crosses. In monetary terms, using a base price of £2.00, it has been calculated that lambs from Blue-faced Leicester ewes are worth *64p per lamb* less than lambs from the other crosses.

BUT

- o Blue-faced Leicester X Blackface ewes were *the most prolific*, producing 4.7 lambs/ewe mated compared with 3.9 lambs/ewe mated for the other crosses over the three years of the study. Taking this into account, Blue-faced Leicester X Blackface ewes have a lamb output worth *£30 more* than the crosses despite the poorer conformation of the lambs.

BUT

- o Replacement costs must also be taken into account in view of the fact that a slightly greater percentage of Blue-faced Leicester X Blackface ewes had to be culled (32%) compared with the average for the other crossbred ewe types (25%).

- o Despite the poor conformation of lambs from Blue-faced Leicester X Blackface ewes, a greater financial output is obtained using the latter ewes due to the greater number of lambs produced.

Effect of Ram Genetics

Ram breed

- o Crossing Texel rams with Suffolk cross ewes produced lambs with greater growth rates than those produced by crossing Suffolk rams with Suffolk cross ewes.
- o Crossing Suffolk rams with Texel cross ewes produced lambs with greater growth rates than those produced by crossing Texel rams with Texel cross ewes.
- o A greater percentage of Texel-sired lambs achieved the top E and U grades (28%) compared with Suffolk-sired lambs (18%).

Recorded rams

- o Lambs sired by sire reference scheme rams reached fat class 3 up to 1 week earlier than control-sired lambs. These findings could have important implications for producers in terms of the length of time the lambs are on the farm and associated feeding costs.
- o A greater percentage (29%) of sire reference scheme-sired lambs achieved E and U grades compared with 17% of control-sired lambs. In addition lambs sired by sire reference scheme rams were 0.5 kg heavier at fat class 3. If it is assumed that a ram sires 300 lambs over the course of its life, on average sire reference scheme rams produce additional output to the value of £500 more than control rams.



PROCEDURE

- o The experiment was carried out over three years on five lowland farms located throughout Northern Ireland.
- o Each farm received 20 of each of the following four crossbred ewe types, as ewe lambs in the first year of the study.
 - Blue-faced Leicester X Scottish Blackface
 - Texel X Scottish Blackface
 - Suffolk X Cheviot
 - Texel X Cheviot
- o Additional ewes were introduced in the second and third years so that over the three years of the study the performance of a total of 500 ewes and over 100 of each of the crosses was assessed.
- o Prior to mating the ewes were divided into four groups and allocated to one of four ram types:
 - Control Suffolk } Selected on the basis of visual appearance, non-recorded
 - Control Texel }
 - Sire reference scheme Suffolk } Selected on the basis of estimated breeding values
 - Sire reference scheme Texel }
- o Details of the estimated breeding values (EBV's) and scheme indices for the sire reference scheme Suffolk and Texel rams are given below. Scheme indices and EBV's can only be compared within breeds and not between breeds.

Estimated breeding values and scheme indices for Suffolk and Texel rams obtained from sire reference schemes.

SUFFOLK		EBV'S	Scan Weight (kg live weight) Positive values indicate animals which will reach slaughter earlier
Scan wt		+7.5 kg	
Muscle depth		+3.20 mm	
Fat depth		+0.09 mm	Muscle depth (mm eye-muscle area) Positive values indicate higher muscularity within a breed
Scheme index		241	
Scheme average		168	

TEXEL		EBV'S	Fat depth (mm backfat depth) Negative values indicate animals with lower fat content which produce leaner carcasses or can be taken to higher weights without becoming over-fat
Scan wt		+4.89 kg	
Muscle depth		+2.28 mm	
Fat depth		-0.17 mm	
Scheme index		210	
Scheme average		150	

REVIEW OF FINDINGS

Which ewe breed?

Feed intake

- o When housed indoors during the winter, Suffolk X Cheviot ewes consumed 17% more silage than Blue-faced Leicester X Blackface ewes and 12% more than Texel X Blackface ewes.
- o The greater intakes of Suffolk X Cheviot ewes may explain why these ewes experienced a slight increase in live weight compared with losses observed for Blue-faced Leicester X Blackface, Texel X Blackface and Texel X Cheviot ewes in the period from pre-lambing to post-lambing.



Ewe productivity

- o Blue-faced Leicester X Blackface ewes were the most prolific of the four crossbreeds of ewes (Table 1) producing 24% more lambs per ewe lambing as ewe lambs and 18% as hoggets or 3-year-old ewes.
- o A greater percentage of Suffolk X Cheviot (75%) ewes lambing without assistance compared with the other crossbred ewe types (64%).
- o A greater percentage of ewe lambs required assistance at lambing (45%) compared with hoggets or 3-year-old ewes (28%).
- o Blue-faced Leicester X Blackface ewes reared 17% more lambs than the other crossbred ewe types.
- o Ewe replacement rate was greater in Blue-faced Leicester X Blackface ewes compared with the other crosses. After three years of the study 32% of all Blue-faced Leicester X Blackface ewes had been replaced either through culling or death compared with 26% of Texel X Blackface ewes, 26% of Suffolk X Cheviot ewes and 22% of Texel X Cheviot ewes.

Table.1 Effect of crossbred ewe type on prolificacy, lamb viability and weaned lamb output (from lambs and hoggets & 3-year-old ewes).

Crossbred ewe type	No. lambs born/ewe lambled	% ewes lambing without assistance	No. lambs reared/ewe lambled	Wt of lambs at weaning (Kg)
Ewe lambs				
Leicester X Blackface	1.40	52	1.04	26
Texel X Blackface	1.18	56	0.84	21
Suffolk X Cheviot	1.10	62	0.80	22
Texel X Cheviot	1.09	52	0.82	22
Hoggets & 3-yr-old ewes				
Leicester X Blackface	1.90	66	1.58	34
Texel X Blackface	1.62	66	1.39	33
Suffolk X Cheviot	1.64	82	1.42	32
Texel X Cheviot	1.57	74	1.37	32

Carcass characteristics

- o Lambs from each of the crossbred ewe types were of a similar age and carcass weight and had a similar killing out percentage when slaughtered at fat class 3 (Table 2).
- o Lambs from Blue-faced Leicester X Blackface ewes had a poorer conformation classification. Only 10% of Blue-faced Leicester X Blackface ewes achieved the top E and U grades from the EUROP classification scheme compared with 31% with lambs from Texel X Blackface ewes, 26% with lambs from Suffolk X Cheviot ewes and 28% with lambs from Texel X Cheviot ewes.

Table 2. Effect of crossbred ewe type on carcass characteristics for lambs slaughtered at fat class 3.

Crossbred ewe type	Age at slaughter (days)	LWG (birth to slaughter) (g/d)	Killing out %	% E & U grades	Cold carcass weight (Kg)
Leicester X Blackface	202	202	43.7	10	19.1
Texel X Blackface	205	194	44.2	31	18.9
Suffolk X Cheviot	202	202	43.9	26	19.1
Texel X Cheviot	206	193	44.4	28	19.4



Which ram breed?

Matching ewe and ram breed

1. Lamb growth rate

- o Crossing Suffolk rams with Suffolk cross ewes (Suffolk X Cheviot) produced lambs with a lower growth rate than those produced by crossing Texel rams with Suffolk cross ewes (Table 3).
- o Crossing Texel rams with Texel cross ewes (both Texel X Blackface and Texel X Cheviot ewes) produced lambs with a lower growth rate than those produced by crossing Suffolk rams with Texel cross ewes (Table 3).
- o Lower growth rates are associated with increased feeding costs due to the longer time taken to reach the allocated slaughter end-point and although not significant, the results of the current study indicate that there was a tendency for Suffolk-sired lambs from Suffolk X Cheviot ewes to be 12 days older at slaughter compared with Suffolk-sired lambs from Texel X Cheviot ewes while Texel-sired lambs from Texel X Cheviot ewe were 16 days older at slaughter compared with Suffolk-sired lambs from Texel X Cheviot ewes.

Table 3. Effect of ewe and ram breed on lamb live weight gain from birth to slaughter (kg/day).

Crossbred ewe type	Liveweight gain birth to slaughter (g/day)	
	Suffolk	Texel
Leicester X Blackface	203	199
Texel X Blackface	201	188
Suffolk X Cheviot	193	210
Texel X Cheviot	207	184



2. Carcass quality

- o Only 12% of Suffolk-sired lambs and 9% of Texel-sired lambs from Blue-Leicester X Blackface ewes achieved the top E & U grades of the conformation classification scheme (Table 4).
- o When crossed with Texel X Blackface, Suffolk X Cheviot or Texel X Cheviot ewes, on average 35% of Texel-sired lambs achieved the top E & U grades compared with an average value of 20% for Suffolk-sired lambs.

Table 4. Effect of crossbred ewe type and ram breed on the percentage of lambs achieving the top E and U grades of the EUROP classification scheme.

Crossbred ewe type	% E & U grades Ram breed	
	Suffolk	Texel
Leicester X Blackface	12	9
Texel X Blackface	23	40
Suffolk X Cheviot	17	32
Texel X Cheviot	21	34

Benefits of recorded rams

Carcass characteristics

- o Lambs sired by sire reference scheme rams were on average 9 days younger at slaughter than control-sired lambs and this is a direct reflection of the greater live weight gains from birth to slaughter of the sire reference scheme-sired lambs (Table 5).
- o Sire reference scheme-sired lambs were 0.5 kg carcass weight heavier than control-sired lambs at the same fat class.
- o A greater percentage of sire reference scheme-sired lambs achieved the top E and U grades (29%) of the EUROP classification scheme compared with control-sired lambs (17%).

Table 5. Effect of ram source on carcass composition for lambs compared at fat class 3.

Ram source	Age at slaughter (days)	LWG (birth to slaughter)	Killing out %	% E & U grades	Cold carcass weight (kg)
Sire reference scheme	199	203	44.3	29	19.4
Control	208	192	43.8	17	18.9

Meat quality

- o Meat from lambs sired by sire reference scheme rams was more tender than that from control rams. This is likely due to the fact that these lambs had faster growth rates from birth to weaning and therefore were younger at slaughter.