

Comparison of Three Terminal Sire Breeds for Growth Rate of Lambs Kept Under Upland Grassland Conditions in the Northeast of England

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ABSTRACT

Crossbred females and castrated male progeny of three terminal sire breeds, namely Charollais, Suffolk, and Texel were compared. Suffolk sired lambs had faster growth rate as compared to Charollais and Texel sired lambs. Breed of sire did not significantly affect growth of lambs from birth to cutting and clipping to weaning whereas a significant effect was observed from birth to slaughter, birth to weaning and from cutting to clipping. Suffolk sired lambs had faster growth as compared to Texel and Charollais sired lambs; whereas, the growth of Charollais and Texel was similar from cutting to clipping and birth to weaning, the Charollais being slightly faster as compared to Texel sired lambs. The Charollais sired lambs grew significantly faster than the Texel sired lambs from birth to slaughter. Growth rate of lambs from birth to cutting, clipping to weaning and birth to slaughter was significantly faster during 1987 and 1989 as compared to 1988. Birth weight of lambs was a significant ($P \leq 0.001$) source of variation for GR1, GR2, GR4 and GR5. A one-kilogram advantage at birth translated into an advantage of 0.022, 0.013, 0.014 and 0.016 kg per day in growth of lambs for GR1, GR2, GR4 and GR5, respectively.

Key Words: Terminal; Lambs; Grassland; England

INTRODUCTION

The hill sector plays a vital role in the sheep industry in the UK and Ireland. In Northern Ireland approximately 26% of all lambs are produced from hill breed ewes (DARD, 1999). In total it has been estimated that over 75% of all lambs produced contain some proportion of hill breed genes. Improvements in lamb output and carcass quality are important to maintain the competitiveness of the hill sheep industry in UK. Breed substitution has been shown to be a rapid, cost effective means of improving lamb carcass quality (Carson *et al.*, 1999). Stratified crossbreeding programmes are used in the sheep industry in the UK and Ireland. Texel sires have been shown to improve lamb carcass quality in the UK (Latif & Owen, 1980; Ellis *et al.*, 1997; Carson *et al.*, 1999). The information on the effects of using Charollais, Suffolk and Texel sires on lamb output under upland grassland environmental condition is needed. In view of this background a research programme was set up to compare three terminal sire breeds for growth rate of lambs kept under upland grassland conditions in the northeast of England.

MATERIALS AND METHODS

The lambs used in this study were produced on the Experimental Husbandry Farm of the Agricultural Development and Advisory Service at Redesdale, Otterburn in Northumberland, UK. Crossbred females and castrated

male progeny of three terminal sire breeds, namely Charollais, Suffolk, and Texel, out of Mule ewes (Bluefaced Leicester sires x Scottish Blackface or Swaledale dams) were compared. Birth weight records on 1042 crossbred lambs obtained during three years period from 1987 to 1989 were used. In the first year of the trial, ewes of both dam types were represented with about two-thirds being of Blackface origin and one-third Swaledale. In the subsequent two years no Swaledale crosses were used.

The ewes were mated to Suffolk, Texel and Charollais rams. A total of 10 unrelated rams of each breed were used. In the first year two sires of each breed were used while during second and third year four sire of each breed were used. Thus individual sires were confounded with years but the aim was not to look at individual sires. The Texel sires used in this study were largely descended from animals of Dutch origin, although animals from French importation were also represented.

Ewes were divided into balanced groups according to dam type, age, live weight and body condition and each group was randomly allocated to an individual ram for a 22-day mating period, beginning in early November each year. These groups comprised 58 ewes in the 1st year and 29 ewes in the 2nd and 3rd year each. Only lambs that were born and reared as twins were used in this study.

After the initial mating period, the test rams were removed and the groups combined, with commercial rams being allowed to mate any ewes returning to estrus. Lambs, which were born more than 140 days after the test rams had

been removed, were considered of uncertain pedigree and were not included in the analysis.

Ewe and lamb management was in line with normal commercial procedures for an upland flock. The management of the ewes, and subsequently the ewes with their lambs, was the same throughout, except for the initial division into mating groups. The flock was out-wintered on improved hill grazing and was given *ad libitum* access to baled silage from approximately mid December each year. Compound feed was introduced approximately 8 weeks before the start of lambing and was offered at a maximum daily rate of 900 grams per ewe. This level of feeding was maintained for about 4 weeks after lambing.

Statistical analysis. The data on growth rate of multiple born, twin reared lambs were analysed. Records were analysed for lamb daily live-weight gains for the following rearing periods; Birth to cutting (GR1), Cutting to Clipping (GR2), Clipping to Weaning (GR3) and Birth to weaning (GR4) and Birth to slaughter (GR5). Cutting date coincides with the first time the lambs are wormed and clipping dates coincides with shearing. The age of lambs at the time of cutting, clipping, weaning and slaughter was 30, 84, 112 and 147 days, respectively. Lambs gains per day were calculated using individual weights and ages. All the data were analysed by General linear regression using Genstat V (Payne *et al.*, 1993).

RESULTS AND DISCUSSION

Breed of sire. The breed of sire did not significantly affect the growth of lambs from birth to cutting (GR1) and clipping to weaning (GR3). However the GR1 of Suffolk sired lambs was slightly faster as compared Charollais and Texel sired lambs. It was found that the GR2 of Suffolk sired lambs was significantly faster by 0.011 kg per day than Texel sired lambs. The GR2 of Charollais sired lambs was not significantly different than the Suffolk and Texel sired lambs (Table I).

The growth of Suffolk sired lambs from birth to weaning (GR4) was significantly faster by 0.007 kg per day than the Texel sired lambs. The GR4 of Charollais sired lambs did not vary significantly than the Texel and Suffolk sired lambs (Table I). The growth of Suffolk sired lambs from birth to slaughter (GR5) was significantly faster by 0.006 kg per day than the Texel sired lambs. The GR5 of Charollais sired lambs did not vary significantly than the Texel and Suffolk sired lambs (Table I). Results from other studies (Rastogi *et al.*, 1993; Laes-Fettback & Peters, 1995) showed that the pre-weaning daily weight gain and body weight of the offspring were significantly influenced by breed.

The growth of a sheep is affected by its breed, as is the case in other farm animals. Some breeds show faster growth than the others when reared under the same conditions. In this study GR2, GR4 and GR5 were significantly affected by breed of sire and during these periods the Suffolk sired

Table I. Effect of breed of sire on the growth rate of lambs

Breed of sire	Growth rate from birth to cutting (GR1)		
	N	LSM	SE
Suffolk	347	0.3471	0.0037
Texel	330	0.3439	0.0037
Charollais	364	0.3413	0.0036
Growth rate cutting to clipping (GR2)			
Suffolk	333	0.287 ^a	0.003
Texel	332	0.276 ^b	0.003
Charollais	351	0.279 ^{ab}	0.003
Growth rate clipping to weaning (GR3)			
Suffolk	333	0.1688	0.0053
Texel	321	0.1673	0.0053
Charollais	350	0.1725	0.0051
Growth rate birth to weaning (GR4)			
Suffolk	346	0.277 ^a	0.002
Texel	329	0.270 ^b	0.002
Charollais	363	0.273 ^{ab}	0.002
Growth rate birth to slaughter (GR5)			
Suffolk	348	0.259 ^a	0.002
Texel	330	0.253 ^b	0.002
Charollais	364	0.256 ^{ab}	0.002

Table II. Effect of Year of lambing on the Growth rate of lambs

Year of lambing	Growth rate from birth to cutting (GR1)		
	N	LSM	SE
1987	442	0.340 ^b	0.003
1988	362	0.331 ^b	0.003
1989	237	0.373 ^a	0.004
Growth rate cutting to clipping (GR2)			
1987	411	0.284 ^a	0.003
1988	359	0.281 ^a	0.003
1989	236	0.274 ^a	0.004
Growth rate clipping to weaning (GR3)			
1987	442	0.194 ^a	0.004
1988	362	0.131 ^b	0.005
1989	234	0.190 ^a	0.006
Growth rate birth to weaning (GR4)			
1987	442	0.272 ^a	0.002
1988	362	0.277 ^a	0.002
1989	234	0.272 ^a	0.002
Growth rate birth to slaughter (GR5)			
1987	442	0.265 ^a	0.002
1988	362	0.246 ^c	0.002
1989	238	0.255 ^b	0.003

lambs had faster growth as compared to Texel and Charollais sired lambs; whereas, the growth of Charollais and Texel was almost similar, the Charollais being slightly faster as compared to Texel sired lambs. The Charollais sired lambs grew significantly faster than the Texel sired lambs from birth to slaughter. Merrell *et al.* (1990) while exploring a smaller version of the same data found that Suffolk sired lambs tended to grow fastest up to weaning. The superior growth rate of the Suffolk sired lambs compared with those sired by Texel is in agreement with findings of More O' Frrall and Timmon (1977), Leymaster and Jenkins (1993) and Johnston *et al.* (1999). Since the faster growth rate is always a desirable character, because of its marked effect on the financial efficiency, Suffolk sires

are widely used in Britain and other countries.

Some workers have found no difference between the growth rate of Suffolk and Texel sired lambs (Latif & Owen, 1980; Cameron & Drury, 1985; Kempster *et al.*, 1987) in terms of growth rate. These differences could be due to different strains of either the Suffolk or Texel breeds being used by these workers. Kempster *et al.* (1987) mentioned that lower growth rate of Texel compared with Suffolk sired lambs may reflect a generally lower appetite or the difficult of maintaining a sufficiently high nutrient intake towards the end of growth period when the nutrient concentration in the grass is lower. In general the breeds of heavier mature weight tended to take longer to reach the constant fatness slaughter point as found by Wolf *et al.* (1980), and Cameron and Drury (1985). There have been few studies carried out under UK conditions involving the Charollais breed. This study suggests that this breed is similar to Suffolk in terms of growth of lamb.

Year of lambing. The growth of lambs from birth to cutting (GR1) during 1989 was significantly faster than lambs born during 1987 and 1988. There was no significant difference between the growth rate of lambs from birth to cutting during 1987 and 1988 (Table II). The lambs born during 1987 and 1989 grew significantly faster by 0.063 and 0.059 kg per day during GR3 than the lambs born during 1988

Fig. 1. Effect of birth weight on growth of lambs from birth to cutting (GR1).

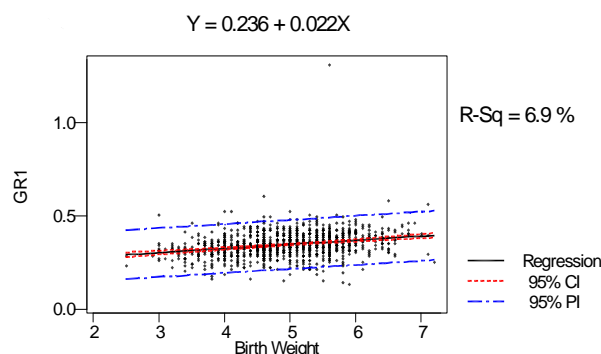


Fig. 2. Effect of birth weight on growth of lambs from cutting to clipping (GR2).

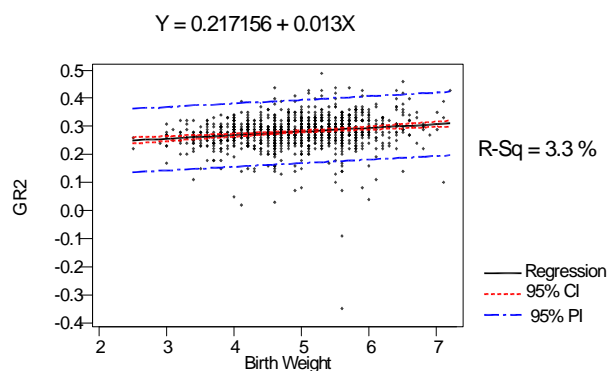


Fig. 3. Effect of birth on the growth of lambs from birth to weaning (GR4).

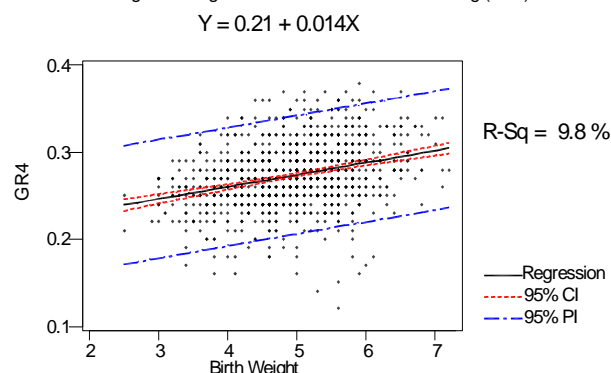
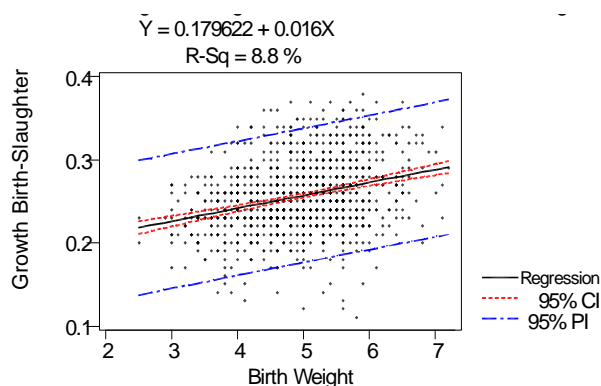


Fig. 4. Effect of birth weight on the growth rate of lambs from birth to slaughter.



whereas there was no significant difference between GR3 during 1987 and 1989 (Table II).

The GR5 of the lambs born during 1987 was significantly faster by 0.019 kg per day and 0.01 kg per day than the lambs born during 1988 and 1989. Difference between the growth rate of lambs from birth to slaughter between 1989 and 1988 was 0.009 kg (Table II).

It is presumed that the year effect on the growth rate of animals operates through the effect of climate on pasture quality and availability, exposure of animals to extreme temperature along with severe rainy winds, housing and feeding management. Seasonal fluctuation in feed availability causes animals to pass through weight gain or weight loss phases (Ehoche *et al.*, 1992; Vélez *et al.*, 1993). Growth rate of lambs from birth to cutting, clipping to weaning and birth to slaughter was significantly faster during 1987 and 1989 as compared to 1988. These differences can be probably due to the above-mentioned factors. Thrift and Whiteman (1969), Bush and Lewis (1977) reported a significant effect of year on the growth of lambs.

Effect of birth weight on the Growth of lambs. Birth weight of lambs was a significant ($P \leq 0.001$) source of

variation for GR1, GR2, GR4 and GR5. A one-kilogram advantage at birth translated into an advantage of 0.022, 0.013, 0.014 and 0.016 kg per day in growth of lambs for GR1, GR2, GR4 and GR5, respectively (Figs. 1, 2, 3 and 4, respectively),

Birth weight of animals is one of the most important factors influencing the pre-weaning growth of the young. Martinez (1983) has reported a positive correlation between birth weight and subsequent live body weight development in sheep. In another study (Gatenby, 1986), it is stated that lambs heavier at birth grow faster than lightweight lambs. Lambs, which are heavier at birth, are usually singles or are those produced by ewes with larger body sizes and good feeding conditions. The indication is that lambs heavier at birth have larger adult weight and a higher growth capacity. Improvement in birth weight is known to have a positive influence on other productivity parameters. The significant effect of birth weight on weaning and six-month weight, growth rate and on weight at slaughter has been reported by Khan and Bhat (1981) who have worked on Muzaffarnagris sheep and their crosses with the Corriedales.

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