

COMPARISON OF THREE TERMINAL SIRE BREEDS FOR BIRTH WEIGHT OF LAMBS KEPT UNDER UPLAND GRASSLAND CONDITIONS IN THE NORTHEAST OF ENGLAND

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ABSTRACT

Crossbred females and 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. Analysis of variance revealed that breed, sex and the year of birth were significant sources of variation ($P \leq 0.05$) for birth weight. Suffolk sired lambs were significantly heavier than the Charollais sired lambs at birth (5.04 ± 0.04 versus 4.88 ± 0.04 kg), whereas they were not significantly heavier than the Texel sired lambs (5.04 ± 0.04 versus 4.93 ± 0.04 kg). There was no significant difference between the birth weights of Texel and Charollais sired lambs. The lambs born during 1989 were significantly heavier (5.12 ± 0.05 kg) than the lambs born during 1987 (4.92 ± 0.04 kg) and 1988 (4.86 ± 0.04 kg). Sex and birth date were significant sources of variation as well. It was concluded that breed of sire can affect the birth weight of lambs and this factor should require careful consideration in practical lamb husbandry.

Key words: Breed, sex, terminal sire, Suffolk, Texel, Charollais, birth weight.

INTRODUCTION

The mountainous and Island shore areas having a temperate climate in the United Kingdom (UK) and Northern Europe are suited to grassland production. Much of the land of UK, especially in the northern areas of Scotland, England and Wales, comprises of hilly and rough grazing areas. 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 (Anonymous, 1999). In total, it has been estimated that over 75% of all lambs produced contain some proportion of hill breed genes. Improving the efficiency of meat production is of major importance to the UK sheep industry. Within systems of sheep production in the United Kingdom, choice of terminal sire has major impact on lamb production.

The diversity in the performance traits of sheep may be attributed to several genetic and non-genetic factors. Although any programme of breed improvement is based on the maximum exploitation of genetic variation, yet these traits also vary due to certain environmental factors as well. Furthermore, information on the relative performance of these breeds under hill conditions is lacking. It is, therefore, important to study such factors, so that the genetic variation among animals can be used to devise effective breeding plans

for their improvement. However, a number of sire breeds comparisons have been undertaken in the past (Carson *et al.*, 1999). One of the traits of economic importance in sheep is birth weight. The aim of this study was to compare the birth weights of Suffolk, Texel and Charollais sired 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 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 sires 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 ewe 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 birth weight of multiple born, twin reared lambs were analysed. The lambs from three sires breeds i.e. the Suffolk, Texel and Charollais were the twin lambs, which were male-male (MM), male-female (MF) or female-female (FF). The twin lambs were classified by sex of their womb-mate, generating four groups. The male lambs that belonged to a monosex twin set were designated Mm lambs, while male lambs from mixed sex twin sets were designated Mf lambs. Following the similar pattern, female lambs that belonged to a mono-sex twin set were designated Ff lambs, while female lambs from mixed sex, twin sets were designated Fm lambs. All the data were analysed by General linear regression, using Genstat V (Payne *et al.*, 1993).

RESULTS AND DISCUSSION

Year of lambing

Lambs born during 1989 were significantly heavier at birth than the lambs born during 1987 and 1988 ($P \leq 0.05$). The birth weights of the lambs born during 1987 and 1988 did not vary significantly. The lambs born during 1989 were heavier by 0.20 and 0.26 kg, respectively than the lambs born during 1987 and 1988 (Table 1).

Table 1: Effect of year, breed of sire and sex of lambs on the birth weight

Factors	Number of lambs	Birth weight (kg) LSM \pm SE
Year		
1987	442	4.92 ^b \pm 0.04
1988	362	4.86 ^b \pm 0.04
1989	238	5.12 ^a \pm 0.05
Breed		
Suffolk	348	5.04 ^a \pm 0.04
Texel	330	4.93 ^{ab} \pm 0.04
Charollais	364	4.88 ^b \pm 0.04
Sex		
Mm	255	5.10 ^a \pm 0.05
Mf	244	5.05 ^a \pm 0.05
Ff	282	4.85 ^b \pm 0.05
Fm	261	4.81 ^b \pm 0.05

Mean values with different superscripts within a group differ significantly ($P \leq 0.05$).

Mm-Monosex males, Mf-Mixed sex males, Ff-Monosex females, Fm-Mixed sex females.

The variation in the birth weight during different years reflects the level of management as well as some environmental effects on the ewes during pregnancy. The level of management is bound to vary according to the ability of the farm manager, his efficiency in the supervision of the staff, availability of the financial resources and culling strategies. Sometimes frequent change in the management at farm reflects its effect in the performance traits. Fluctuations in the availability of feed and fodder during different years due to rain and other climatic factors can also affect the production performance of animals. Wojtowski *et al.* (1990) and Unal and Akcapinar (2001) also found that year of birth was among the most influential factors affecting birth weight.

Breed of sire

Birth weight was significantly ($P \leq 0.05$) affected by breed of sire. The average birth weights were, 5.04 ± 0.04 kg for Suffolk, 4.93 ± 0.04 kg for Texel and 4.88 ± 0.04 kg for Charollais. Suffolk sired lambs were significantly heavier by 0.16 kg at birth than Charollais sired lambs ($P \leq 0.05$). The birth weight of Suffolk and Charollais sired lambs was not significantly different from the Texel sired lambs (Table 1).

While comparing the Texel and Suffolk sired crossbred lambs for survival, growth and compositional traits, Leymaster and Jenkins (1993) also observed that Suffolk and Texel had similar birth weights. However, when compared as purebred, McEwan *et al.* (1988) found that Texel lambs were 19% heavier than the Suffolk lambs at birth ($P \leq 0.05$).

Sex of lambs

The birth weight of the twin lambs born as male (Mm) was not significantly higher than the mixed sex male (Mf) twins. Similarly, the birth weight of the twin lambs born as female (Ff) was not significantly higher than the mixed sex female twins (Fm). Mono-sex males were significantly heavier by 0.25 kg than the mono-sex female twins, whereas a difference of 0.29 kg was observed between the birth weights of mono-sex male and mixed sex female twins. The mixed sex male twins were heavier by 0.20 kg than the mono-sex females, whereas they were 0.24 kg heavier than mixed sex females (Table 1). Difference between the birth weight of males and females in unlike sex pairs can be due to *in utero* competition where males may derive nutrients at the expense of females. Results of the present study are similar to those of Notter *et al.* (1991), Burfening and Kress (1993) and Wojtowski *et al.* (1990).

Effect of birth date on birth weight

The lambing started in the first week of April and was completed within 22 days. It was noted that birth weight was significantly ($P \leq 0.01$) influenced by birth date. There was an increase of birth weight with advancing date up to 29 g per day. This increase in birth weight with advancing date can be due to prolonged gestation or the environment under which dams are maintained, notably availability of adequate feed supply (Notter and Copenhaver, 1980; Burfening and Kress, 1993; Bathaei and Leroy, 1996). On the basis of approximate calculations it was concluded that extra 0.19 days of fetal growth increased birth weight by perhaps 0.02 kg giving an estimate of fetal growth rate just before parturition of 0.10 kg/day (Mourice, 1985).

It can be concluded that breed of sire and sex of lamb can affect the birth weights of lambs and the factor should require careful consideration in practical lamb husbandry. The variation in birth weights of lambs during different years of lambing reflects the level of management, as well as some environmental effects, on the ewes during pregnancy.

REFERENCES

- Anonymous, 1999. Statistical Review of Northern Ireland Agriculture. A Government Statistical Publication. DARD Economics and Statistics Division, UK.
- Bathaei, S.S. and P.L. Leroy, 1996. Growth and mature weight of Mehraban Iranian fat-tailed sheep. *Small Ruminant Res.*, 22: 155-162.
- Burfening, P.J. and D.D. Kress, 1993. Direct and maternal effects on birth and weaning weight in sheep. *Small Ruminant Res.*, 10: 153-163.
- Carson, A.F., B.W. Moss, R.W.J. Steen and D.J. Kilpatrick, 1999. Effect of percentage of Texel or Rough de l'Ouest genes in lambs on carcass characteristics and meat quality. *Anim. Sci.*, 69: 81-92.
- Fraser, A., J.T. Stamp and J.M.M. Cunningham, 1989. *Sheep Husbandry and Diseases*. BSP Professional Books, Blackwell Scientific Publications Ltd. London, UK, pp: 106.
- Leymaster, K.A. and T.G. Jenkins, 1993. Comparison of Texel sired and Suffolk-sired crossbred lambs for survival, growth and compositional traits. *J. Anim. Sci.*, 71(4): 859-869.
- McEwan, J.C., J.P. Hanrahan, J.M. Fitzsimons and P. Allen, 1988. Growth and carcass traits of purebred Texel and Suffolk sheep. *Proc. New Zealand Soc. Anim. Prod.*, 48: 41-47.
- Mourice, S.H., 1985. Lambing performance in a Scottish Blackface hill flock. PhD Thesis, Dept. Agri., Univ. Newcastle upon Tyne, UK.
- Notter, D.R., R.F. Kelly and F.S. McClaugherty, 1991. Effects of ewe breed and management system on efficiency of lamb production. II. Lamb growth, survival and carcass characteristics. *J. Anim. Sci.*, 69: 22-33.
- Notter, D.R. and J.S. Copenhaver, 1980. Performance of Finnish Landrace crossbred ewes under accelerated lambing. II. Lamb growth and survival. *J. Anim. Sci.*, 51(5): 1043-1050.
- Payne, R.W., P.W. Lane, A.E. Ainsley, K.E. Bicknell, P.G.N. Digby, S.A. Harding, P.K. Leech, H.R. Simpson, A.D. Todd, P.J. Verrier, R.P. Whiter, J.C. Gower, G.T. Wilson and L.J. Paterson, 1993. *Genstat V, Reference Manual for Genstat*. Oxford University Press, Oxford, UK.
- Unal, N. and H. Akcapinar, 2001. Some important production traits of central Anatolian Merino sheep and possibilities of improving through selection of these traits. I. Important production traits. *Lalahan Hayvancilik Arastirma Enstitusu Dergisi*, 41(1): 45-58.
- Wojtowski, J., A. Sonne and R. Wassmuth., 1990. Genetic and non genetic effects on growth of Merino, Landsehaf and Rlion sheep. *Zuehtungskunde*, 62(3): 234-240 (*Anim. Breed. Abstr.*, 58: 5968, 1990).