Relative performance of meat breeds of sheep in New Zealand and overseas

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ABSTRACT

Overseas comparisons have indicated sheep breeds and strains with improved growth rates and lean meat production to those currently available in New Zealand.

Most studies in U.K. and Eire have generally shown fastest growth and lean tissue gain amongst offspring by the large down breeds, the Suffolk and Oxford. These results are generally comparable with New Zealand studies. In addition, there has been considerable European interest shown in the Texel for its high yield of lean relative to fat and bone, including lean yield in high value areas of the carcass. The white fleece and moderate fecundity of this breed also favour its maternal use to improve flexibility of lean lamb production.

In most studies in the U.S. crossbred lambs sired by Suffolk rams grew fastest to reach slaughter weights before other meat breeds. This breed is of widespread popularity for lamb production in the U.S. Indirect comparisons suggest a greater growth superiority (5%) of crossbred lambs sired by U.S. Suffolks overseas compared with those sired by New Zealand Suffolks in this country.

Keywords Meat breeds; growth; carcass weight; carcass composition

INTRODUCTION

The recent MAF Report of the Lean Meat Working Party suggested that during the next 15 years New Zealand should aim to achieve a 1.5 kg increase in average carcass weight and a 1% decrease in average (chemical) fat content, from 25% to 24% of carcass weight. Because genetic change is permanent, the report suggests it will become a major element for the future both through selection within breeds and through exploiting differences among breeds and strains, including those available overseas.

One of the major difficulties in achieving the target proposed is the basic developmental antagonism between carcass weight and carcass fat content. Typically, 1.5 kg carcass growth tends to be associated with a developmental increase of about 2.5% in carcass fat percentage (Bennett and Clarke, 1984) making combined improvements more difficult than progress in any one of them alone. Antagonisms involving growth rate, size and lamb survival may also be important (Bennett and Kirton, 1983). Genetic resources also need to be examined for their suitability for variation in pasture production patterns on different farms and in the requirements of different markets.

REVIEW AND DISCUSSION

New Zealand Studies

The relative performance of our present meat breeds has been the subject of a number of studies and reviews the most recent being those of Clarke and Meyer (1982) and Bennett and Kirton (1983). These reviews have concentrated most heavily upon the extensive series of trials conducted at Ruakura (Carter and Kirton, 1975). The overall production summary for various sire breed crosses out of Romney ewes and relative to straightbred Romney lambs, shows several important features. Firstly, no breed was best for all performance traits. Although those sire breeds with the fastest growth rate tended to produce the leanest lambs, lamb survival and lamb fleece weight variation altered breed rankings for particular production objectives. Carcass results from other experiments based on the same sires have also revealed this association (Kirton *et al.*, 1978). Secondly, there was not a large range in carcass fat percentage (at 20 kg) among the faster growing breeds. Thirdly, many of these were down breeds whose black wool fibres and low fleece weights limit their overall value for dual-purpose meat and wool production, especially for maternal breed development.

Breed rankings for growth and carcass fat from this and other New Zealand trials are summarised in Table 1. They are presented relative to Southdown crosses (the common sire breed for most trials) using body weight per day of age as a measure of carcass production and percent carcass fat (adjusted for carcass weight) as a measure of carcass composition. The range in results illustrates the variation among trials arising from the combined effects of chance including breed sampling, environmental conditions, age and methods of sampling lambs for slaughter and from changing breed rankings with time as a result of selection. For example, the Ruakura and recent

Lincoln trials have generally shown less growth inferiority of Southdown crosses relative to lambs sired by Suffolk, Romney, English Leicester and Border Leicester sires (and to a lesser extent over lambs sired by Poll Dorset, Cheviot and Ryeland sires) compared with the earlier results from Ruakura published by Walker (1949). Relative rankings for carcass fat involving the Ryeland breed are especially different in the 2 trials.

Overseas Comparisons

Most studies in the U.K. and Eire have generally shown offspring of the large down breeds, especially the Suffolk and the Oxford Down, to have fastest growth rate and lean production and seem to have identified breeds superior to those available in this country.

Table 2 presents results for growth (carcass weight/day of age) and carcass composition (lean tissue weight

TABLE 1 New Zealand breed comparisons for meat production (sire breed differences or half purebred differences)

	Carcass wt/age					Adjusted % fat			
	Mana[a]	Lincoln[b]	Templeton[c]	Ruakura		Ruakura		Lincoln	Templeton
	1978	1979	1979	1949[d]	1974[e]	1974[f]	1949[d]	1979[b]	1979
Oxford Down	115								
Suffolk	115	109		115	108	83	84	81	
Hampshire					108	83			
Dorset Down		112			106	83		81	
Border L.				112	106	84			
English L.				107	101	84	89		
P/H Dorset		109	109	110	107	85	87	83	83
South Suffolk					105	86			
Coopworth		100						100	
Romney			100	101†	93†	86†	89†		100
Cheviot				103	101	86	79		
South Dorset					103	89			
Corriedale			105						96
Ryeland				101	98	101	84		
Southdown	100	100		100	100	100		100	

† Purebred *v* other crossbreds
[a] Meyer *et al.* 1978
[b] Coop *et al.* 1979
[c] Geenty *et al.* 1979
[d] Walker 1949 (age constant fat)
[e] Carter *et al.* 1974
[f] Kirton *et al.* 1974

TABLE 2 UK/Eire sire breed comparisons (live weight end-points)

	Carcass wt/age		Carcass wt	Carcass lean %				
	ABRO[a]	Eire[b]	MLC[c]†	MLC[d]†	ABRO[a]+	ABRO[a]	ABRO[c]	Eire[b]
Texel	93	93	99	102	99	108	107	107
Wensleydale			106	105				
Oxford Down	104	96	104	102	104	100	102	100
Suffolk	100	100	100	100	100	100	100	100
Oldenburg	90				90	102	109	
Border L.			103	100				
Dorset Horn		100						103
Ile de France	93	81	95	96	93	99	104	99
Hampshire		93	92	89				100
Dorset Down	93	83	90	89	89	97	99	98
Cotswold							103	
Cheviot			96	96				
Southdown			85	84			95	

† equal subcutaneous fat
[a] Wolf *et al.* 1980
[b] More O'Ferrall and Timon 1977
[c] Wolf and Smith 1983
[+] kg lean/d
[c] MLC: Kempster *et al.* 1982
[d] MLC: Read 1982

or percent) from several studies conducted in the U.K. and Eire. As pointed out by McClelland *et al.* (1976) and in the recent review of Wolf and Smith (1983), interpretation of these experiments depends upon whether breeds were compared at constant age, weight, level of subcutaneous fat or at a fixed degree of mature size. Several different end-points were chosen in these trials, as shown in Table 3 and in contrast to the New Zealand trials in which animals tend to have been slaughtered as they reached a pre-determined age.

The high lean growth rate of the Oxford Down, Suffolk and Texel is the basis of the high ranking of these sire breeds in the MLC trials in which carcass weights were compared at a level of 12% subcutaneous fat (Kempster *et al.*, 1982). Carcass weight and carcass lean weight showed similar breed rankings on this basis (Read, 1982). On this basis also, breed rankings were found to be similar to those based on the expected mature size of the lambs predicted from their parental breed means.

Breed rankings for carcass weight per day of age at a live-weight end-point illustrate that Texels have a lower growth rate than Oxford Downs and Suffolks but a similar lean production because of their high carcass lean content. This feature is illustrated by the detailed results published by Wolf *et al.* (1980), a summary of which was discussed by Clarke (1984). In line with preliminary reports of the MLC results, Texel cross lambs took 9% longer than Suffolks to reach the live-weight end-point, but similar lean growth per day of age. Oxford Down crosses excelled by about 5% for both of these traits. Given premiums for carcass lean, however, Texel crosses would be more valuable than Suffolk or Oxford crosses, especially if premiums were related to low subcutaneous fatness in the leg and loin region. Lean to bone ratios were also high in Texel crosses (Wolf and Smith, 1983).

Comparative results from 5 different U.S. breed comparisons for meat production are summarised in Table 3. The superiority of the Suffolk for growth rate and leanness is a feature of these results and is reflected in its widespread popularity for lamb meat production in North America. The rankings of this breed for growth rate relative to Hampshire, Dorset Horn,

TABLE 3 U.S. sire breed comparisons (sire breed differences or half purebred differences relative to Suffolk)

Growth rates (kg)								
Lwt/d	0.36[a]	–	0.28[c]	0.33[d]	–	US	NZ	US %
Carcass wt/d	0.18[a]	0.14[b]	–	0.17[d]	0.14[e]	Ave	Ave	NZ
Suffolk	100	100	100	100	100	100	100	100
Hampshire	–	94	–	98	–	96	99	97
Dorset Horn	96	88	–	–	–	92	99	96
Corriedale	–	87	–	–	–	87	95	92
Border L.	94	–	–	–	–	94	98	96
Rambouillet	–	91	–	–	–			
Clun Forest	94	–	–	–	–			
Polypay	92	–	–	–	–			
Oxford Down	–	–	96	97	–	96	100	96
Cheviot	–	–	95	–	–			
Columbia	–	–	–	–	96			
Southdown	–	–	–	–	–			
Fat depth (mm)	4.6	3.8	7.5	7.8	–			
Suffolk	100	100	100	100	100			
Hampshire	–	115	119	199	–			
Dorset Horn	141	92	–	–	–			
Corriedale	–	122	–	–	–			
Border L.	141	–	–	–	–			
Rambouillet	–	98	–	–	–			
Clun Forest	130	–	–	–	–			
Polypay	130	–	–	–	–			
Oxford Down	–	–	122	139	–			
Columbia	–	–	–	–	92			
End-point	Equal Lwt	Equal Age	Equal Age	Equal Lwt	Equal Age			

a Oregon State University; Lambs slaughtered at 52 kg
b Early purebreds at Meat Animal Research Centre (MARC); Lambs slaughtered at 25 weeks; Dickerson *et al.* 1972
c Holtmann and Bernard 1969
d MARC – Dickerson *et al.* 1975
e Leymaster and Smith 1981 – selected sires

Corriedale, Border Leicester and Oxford Down crossbreds common to the U.S. and New Zealand trials (Table 1) reviewed, are also shown in Table 3. U.S. Suffolks consistently showed greater growth superiority than New Zealand Suffolks over each of these base breeds, suggesting an average crossbred growth superiority of U.S. over New Zealand Suffolks of 5%.

CONCLUSIONS

From the results reviewed the Oxford Down, Suffolk and Texel breeds overseas offer promise through improvement of growth rate and carcass leanness for increased efficiency of lamb production and improved market acceptability of lamb meat.

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