Hogget fleece weight and fleece characteristics of Texel x Romney, Texel x Coopworth, Romney and Coopworth sheep.

T. WULIJI, R.N. ANDREWS, G.H. DAVIS AND P.A. FARQUHAR

MAF Technology, Invermay Agricultural Centre, Mosgiel.

INTRODUCTION

Several exotic sheep breeds were introduced into New Zealand in 1985 and are due to be released to industry in November 1990. Preliminary investigations of growth performance and carcass composition in exotic crossbreds have been documented (Clarke *et al.*, 1988; Allison *et al.*, 1989). As in the longer term some of these breeds may have an impact on the New Zealand wool clip, it is essential to determine the effects of exotic crossbreeding on wool so that breeders can make best use of these new breeds. The objective of this study is to provide preliminary information on wool of Texel crosses in comparison with Romney and Coopworth sheep.

MATERIALS AND METHODS

All Texel cross fleece samples were obtained from the Invermay secondary quarantine farm. Fleece weights of 52 Texel x Romney and 9 Texel x Coopworth ram hoggets born in 1987 were recorded and midside fleece samples were collected at hogget shearing in October 1988. The fleeces of a further 82 Texel x Romney, 58 Texel x Coopworth and 14 $^{3}/_{4}$ Texel x $^{1}/_{4}$ Romney ram hoggets born in 1988 were weighed and sampled at hogget shearing in 1989. Also, 19 Texel x Poll Dorset and 15 Oxford x Suffolk ram hoggets were sampled in 1989 but no Poll Dorset or Suffolk controls were available. All sheep were shorn as lambs and as hoggets carrying 10 months wool growth. As there were no pure Romney or Coopworth sheep kept at the quarantine farm live weight and fleece data from 50 Romney ram hoggets and 30 Coopworth ram hoggets born in 1988 from selection programmes on Woodlands Research Station were included in the comparison. Washing yield, staple length, staple strength, the position of break, mean fibre diameter (sonic fibre fineness tester), tristimulus colour (X, Y, Z and Y-Z) and loose wool bulk were measured for each sample at the Invermay wool metrology laboratory. Clean fleece weight was calculated.

Romney and Coopworth live weight, fleece weight and other related wool characteristics such as staple length were adjusted to the same fleece growth period as on the quarantine farm by statistical estimation of post shearing growth rate in a corresponding period. Data were analysed by least squares methods using a model containing date of birth, birth and rearing rank and year of birth as well as breed cross. Two factor interactions were considered but discarded as none were significant.

RESULTS AND DISCUSSION

At hogget shearing, Texel cross and Oxford cross ram hoggets were significantly heavier than pure Romneys and Coopworths ($P<0.001$). As the purebred Romneys and Coopworths were not run with the exotic crosses these differences have arisen from environmental as well as genetic factors. Oxford cross Suffolk ram hoggets were also significantly heavier than Texel crosses ($P<0.01$). There were no significant live weight differences between Texel crosses. These liveweight differences between crosses are similar to terminal sire progeny test results reported by Wolf *et al.* (1980). Fleece weights of exotic crosses were significantly lower than the two local breeds ($P<0.05$). From a comparison of the adjusted fleece weights it was estimated that crossing the Texel over the Romney reduced clean fleece weight by 31% for the Texel x Romney and 33% for the $^{3}/_{4}$ Texel x $^{1}/_{4}$ Romney. Crossing the Texel over the Coopworth reduced clean fleece weight by 3%. Texel cross Poll Dorsets grew heavier fleeces than Oxford x Suffolk cross ram hoggets ($P<0.05$). Romney ram hoggets were significantly higher yielding ($P<0.05$) than other breeds, while Oxford x Suffolks were the

TABLE 1 Mean live weight, fleece weight and yield of Romney, Coopworth and Texel cross and Oxford cross ram hoggets (SE in parenthesis)

Breeds	No of animals	Live weight (kg)	Greasy fleece weight (kg)	Yield (%)	Clean fleece weight (kg)
Romney	50	45.0^{a} (1.2)	4.94^{c} (0.09)	69.87^{d} (0.86)	3.48^{d} (0.77)
Coopworth	30	50.9^{b} (1.5)	3.89^{d} (0.11)	63.63^{ab} (0.02)	2.49^{c} (0.08)
Texel x Romney	134	65.5^{c} (0.7)	3.72^{d} (0.06)	63.80^{a} (0.51)	2.39^{c} (0.04)
Texel x Coopworth	66	65.9^{c} (1.0)	3.69^{cd} (0.07)	65.26^{b} (0.71)	2.42^{c} (0.06)
$^{3}/_{4}$ Texel x $^{1}/_{4}$ Romney	14	63.3^{c} (2.6)	3.37^{c} (0.19)	69.12^{cd} (1.78)	2.33^{c} (0.15)
Texel x Poll Dorset	19	67.8^{c} (1.6)	2.96^{b} (0.12)	65.81^{bc} (1.11)	1.93^{b} (0.09)
Oxford x Suffolk	15	74.4^{d} (1.9)	2.61^{a} (0.15)	62.39^{a} (1.33)	1.61^{a} (0.11)

Means bearing different superscripts in columns differ significantly at P<0.05.

lowest yielding (Table 1).

Staple length of Texel crosses was significantly reduced (P<0.05) compared with pure Romney or Coopworth (Table 2).

As expected the Texel cross longwool breed hoggets (Texel x Romney and Texel x Coopworth) had longer staples than the terminal sire breed crosses (Texel x Poll Dorset and Oxford x Suffolk) (P<0.05). Staple strength was significantly higher for Romney and Coopworth ram hoggets (P<0.05) which may be partially due to different grazing conditions, however, there was no difference between Texel crosses. Texel crosses had 2 to 3.5 microns finer fleeces than the other breeds (P<0.05). The most important attributes of Texel cross fleece characteristics were the higher loose wool bulk and resilience. Texel x Romney and Texel x Coopworth cross fleeces had 13 to 14% higher loose wool bulk (P<0.05) than the other breeds. The $^{3}/_{4}$ Texel $^{1}/_{4}$ Romneys showed a further 7% increase in loose wool bulk compared with Texel x Romneys (P<0.05). Texel x Poll Dorset fleeces recorded higher resilience values than Oxford x Suffolks but they were not statistically significant. This trend indicates there may be advantages of using Texel to improve the bulk character in New Zealand crossbred wool, but it is likely to be associated with a significant reduction in fleece weight.

ACKNOWLEDGEMENTS

Authors wish to thank Dr Ken G Dodds for statistical analysis, Mr Iwar Treskon for wool measurements and Dr Doug R Lang for discussion of the manuscript.

TABLE 2 Mean wool characteristics of Romney, Coopworth, Texel cross and Oxford cross ram hoggets (SE in parenthesis).

Breeds	n	Staple length (mm)	Staple strength (N/ktex)	Fibre diameter (μm)	Loose wool bulk (cm^3/g)	Resilience (cm^3/g)	Brightness (Y)	Yellowness (Y-Z)
Romney	50	154^{c} (3)	33.55^{c} (1.38)	36.9^{d} (0.4)	24.46^{a} (0.62)	9.84^{b} (0.27)	59.99^{ab} (0.51)	1.65^{a} (0.31)
Coopworth	30	135^{d} (4)	32.25^{c} (1.64)	35.9^{c} (0.5)	23.65^{a} (0.75)	9.19^{a} (0.32)	61.01^{ab} (0.61)	1.32^{a} (0.37)
Texel x Romney	134	117^{c} (2)	19.58^{ab} (0.81)	33.4^{a} (0.2)	28.18^{b} (0.36)	10.53^{c} (0.16)	60.73^{ab} (0.30)	2.94^{b} (0.18)
Texel x Coopworth	66	120^{c} (3)	21.36^{b} (1.14)	34.1^{a} (0.3)	27.43^{b} (0.51)	10.22^{bc} (0.22)	61.03^{ab} (0.42)	2.49^{ab} (0.25)
3/4 Texel x 1/4 Romney	14	113^{c} (6)	21.93^{ab} (2.86)	35.4^{bc} (0.8)	30.47^{c} (1.28)	10.77^{c} (0.16)	61.77^{bc} (1.06)	2.49^{ab} (0.64)
Texel x Poll Dorset	19	85^{b} (4)	21.36^{ab} (1.78)	33.9^{ab} (0.5)	32.29^{c} (0.80)	10.32^{c} (0.35)	62.61^{c} (0.66)	2.13^{a} (0.40)
Oxford x Suffolk	15	67^{a} (5)	17.36^{a} (2.14)	33.2^{a} (0.6)	32.69^{c} (0.96)	9.30^{ab} (0.42)	59.92^{a} (0.79)	1.51^{a} (0.48)

Means bearing different superscripts in columns differ significantly at $P<0.05$.

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