

**GENETIC PARAMETERS FOR DAILY GAIN, MUSCLE AREA
AND FAT THICKNESS IN SHEEP****T. Liboriussen****Summary**

The purpose of this analysis was to estimate appropriate genetic parameters (heritabilities and genetic correlations).

The edited dataset included complete test results from 1534 animals which had been performance tested from 1983 to 1994. The relationship matrix also included 3053 ancestors without records. The animals belonged to six different breeds (*Texel, Oxforddown, Leicester, Shropshire, Marsh and Dorset*).

Direct selection for each trait individually will be highly effective in altering the genetic level for that particular trait. Correlated responses in the other traits will be very small. In order to obtain higher growth capacity, increased muscularity and reduced fatness, selection of performance tested rams should be based on a selection index, which includes the performance for Daily gain, LD-area and Fat thickness.

Introduction

Breeding programmes for meat sheep breeds in Denmark have included central performance testing of young rams since 1979. In 1995 the procedure for calculation of performance test indices was changed from being based on precorrected phenotypic expressions to application of BLUP estimates from an animal model.

The purpose of this analysis was to estimate appropriate genetic parameters (heritabilities and genetic correlations).

Material

The edited dataset included complete test results from 1534 animals which had been performance tested from 1983 to 1994. The relationship matrix also included 3053 ancestors without records. The animals belonged to six different breeds (*Texel, Oxforddown, Leicester, Shropshire, Marsh and Dorset*).

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The analyzed traits were:

Initial weight (IW): Weight at start of test period, at approx. 2 mth's of age.

Daily Gain (DG): Average daily gain during test period of approx. 9 weeks.

LD-area (MA): Cross section area of M. long. dorsi, obtained as the mean of four ultrasonic scannings.

Fat thickness (FT): Thickness of backfat, obtained as the mean of four ultrasonic scannings.

Methods

Variance components were estimated by means of the DMU-package (Jensen and Madsen 1994), assuming an animal model. The model for IW and DG included fixed effects of year, breed, and month (March, April of May) and age at start (regression), while the model for MA and FT included year, breed and date and weight at scanning (regression). MA and FT are regressed to constant weight because the breeding goal is to improve the *relative* amount of lean in the carcass.

Results

Means and standard deviations are presented in table 1. Heritabilities, and genetic - and phenotypic correlations in table 2.

Table 1. - MEANS AND STANDARD DEVIATIONS

	Mean	SD
Initial Weight, kg	25.88	3.47
Weight gain, g/day	411.0	61.3
Muscle area, cm ²	15.28	1.48
Fat thickness, mm	6.07	0.98

Table 2. - HERITABILITIES (DIAGONAL), GENETIC (ABOVE DIAGONAL) AND PHENOTYPIC CORRELATIONS

	IW	WG	MA	FT
IW	0.54±0.08	-0.03	-0.05	0.20
WG	0.14	0.44±0.09	0.22	0.01
MA	-0.19	0.13	0.70±0.08	0.18
FT	0.00	-0.06	0.03	0.68±0.09

Discussion

Heritabilities are higher than expected, particularly those for muscle area and fat thickness. All correlations are low. This was expected for relations between growth traits and quality traits, since MA and FT were expressed at constant weight. We had, however, expected high positive genetic and phenotypic correlations between initial weight and daily gain.

Conclusion

Direct selection for each trait individually will be highly effective in altering the genetic level for that particular trait. Correlated responses in the other traits will be very small. In order to obtain higher growth capacity, increased muscularity and reduced fatness, selection of performance tested rams should be based on a selection index, which includes the performance for Daily gain, LD-area and Fat thickness.

REFERENCES

1. Jensen J, P. Madsen (1994): A Users guide to DMU. A package for analysis of multivariate mixed models. Proc. of the 5'th World Congress on Genetics Applied to Livestock Production, Guelph, vol. 22, p 45-46.

GENETSKI PARAMETRI ZA DNEVNI PRIRAST, POVRŠINU MIŠIĆA I DEBLJINU MASTI U OVACA

Sažetak

Uzgojni programi za pasmine mesnih ovaca u Danskoj od 1979. godine uključuju centralno testiranje proizvodnosti mladih ovnova. Godine 1995. izmijenjen je postupak izračunavanja pokazatelja testa performance od postupka koji se temeljio na unaprijed ispravljani fenotipskim izrazima, na primjenu procjene BLUP-a na modelu životinje.

Svrha ove analize bila je procijeniti odgovarajuće genetske parametre (heritabilnost i genetske korelacije).

Direktna selekcija za svaku osobinu posebno bit će vrlo djelotvorna u mijenjanju genetske razine, odnosno osobine. Usporedne reakcije u drugim osobinama bit će vrlo malene.

Da bi se postigla veća sposobnost rasta, povećana mišićavost i manja debljina, selekciju ovnova testiranih na proizvodne osobine valja temeljiti na indeksu selekciju, što uključuje dnevni prirast, površinu MLD i debljinu masti.

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