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The effect of variation at the retinoic acid receptor-related orphan receptor C gene on intramuscular fat percent and marbling score in Australian cattle

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Abstarc :

Variation at the retinoic acid receptor-related orphan receptor C (RORC) gene was previously associated with marbling score in a large sample of Australian taurine feedlot cattle of Angus and Shorthorn breeds. The T allele at the SNP RORC:g.3290T > G increased marbling score in Angus and Shorthorn cattle. We genotyped this SNP in an independent sample of 2,741 Australian cattle of Angus, Brahman, and Hereford breeds, and tested the association of this SNP with marbling score in all animals and with intramuscular fat (IMF) measurements in 2,104 animals. We found an allele frequency of the G allele of pG = 0.57 in Angus, pG = 0.09 in Hereford, and pG = 0.64 in Brahman. The regression of marbling score against number of copies of the G allele was significant (P = 0.033) in the combined sample after accounting for ancestry, breed, and the contemporary group structure of the data. All breeds had the same favorable homozygote; the regression on alleles showed a trend in Angus and Brahman cattle (P < 0.1), but not in Hereford cattle (P = 0.912). The regression of IMF against number of copies of the G allele was significant (P = 0.018) after accounting for ancestry, breed, and contemporary group structure. All breeds had the same favorable homozygote and the regression on alleles was significant (P = 0.024) in the Angus breed. In all breeds tested in this study, the T allele increased both marbling score and IMF. This polymorphism explained 0.3% of the phenotypic variance for IMF in this sample.

Key Word :
Bos taurus chromosome 3, cattle, deoxyribonucleic acid, intramuscular fat, quantitative trait loci, retinoic acid receptor-related orphan receptor C gene

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