

ABSTRACT

**DETECTION OF QUANTITATIVE TRAIT LOCI FOR MARBLING  
AND BACKFAT IN WAGYU X LIMOUSIN F2 CROSSES  
USING A CANDIDATE GENE APPROACH**

*De, S., Macneil, M.D., Wu, X., Michal, J.J., Xiao, Q., Garcia, M.D., Griffin, K.B., Gaskins, C.T., Reeves, J.J., Busboom, J.R.*

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Marbling is the term commonly used to describe the appearance of white flecks or streaks of fatty tissue between the muscle fibers in meat. Backfat refers to the amount of fat over the animal's back, usually measured in between the twelfth and thirteenth rib in beef. Both traits have attracted a great deal of publicity and interest for many years, since they are two of the major quantitative traits that affect carcass quality and production efficiency in beef cattle. In this study, four candidate gene markers were genotyped on 247 F2 animals from a reference population of Wagyu x Limousin crosses. These four candidate genes were those previously reported to be associated with either marbling or backfat, including thyroglobulin (TG), leptin (LEP), diacylglycerol O-acyltransferase (DGAT1) and growth hormone 1 (GH1) genes. The markers were assayed on a C/T substitution in TG, a C/T substitution in LEP, a C/A substitution in DGAT1 and an MspI polymorphism in GH1, respectively. Statistical analysis revealed that DGAT1 gene had a significant additive effect on backfat ( $P = 0.036$ ), while TG gene showed a dominance effect on marbling approaching to the significance ( $P = 0.061$ ). Our results indicate that the genes that are responsible for marbling and backfat in Wagyu breed might be different from those that were identified in other populations. Therefore, further identification and utilization of alleles for the high marbling and low backfat of Wagyu breed in American beef crossbreeding programs would have obvious commercial value.

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