

Polymorphisms in LHCGR and FSHR Genes, and Their Association with Fertility Traits and Average Milk Yield of Crossbred Dairy Cows in Sri Lanka

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Single nucleotide polymorphisms (SNP) analyses of selected hormone receptor genes are useful in improving the genetic potential of dairy cows in Sri Lanka. This study was aimed to screen a population of 153 cross-bred dairy cows from three National Livestock Development Board farms, for SNPs in exon 11 region of luteinizing hormone choriogonadotropin receptor (LHCGR) gene and 5' upstream regulatory region of follicle stimulating hormone receptor (FSHR) gene by target sequencing method. SNPs were detected by Mega 7 software and visual inspection of electropherograms obtained from Chromas software and respective allele and genotype frequencies were calculated. Associations between different genotypes and selected fertility traits (average calving interval, number of services per conception and age at first calving) and average milk yield were determined using General linear Model of SPSS version 26.0. The fixed factors considered were genotype and farm. Parity was included as a covariate. Altogether six SNPs, four in exon 11 region of LHCGR gene (rs41256848, rs41256850, rs465790244 and rs45463781) and two in 5' upstream region of FSHR gene (rs43676359 and G-278-A (GU253337) were detected. Totally different minor alleles were reported for the SNPs in FSHR gene in this population compared to other studies. The SNP, rs45463781 found at LHCGR exon 11 region was significantly associated with the average milk yield ($P=0.036$), while the minor allele A had a negative effect. The other SNPs did not show any association with any of the traits tested in this study. The results of this study indicate the possibility of developing rs45463781 as a marker for milk yield related traits. Further analysis is necessary with a larger population to confirm the effect of detected specific LHCGR and FSHR haplotypes on fertility traits and milk yield of crossbred dairy cows reared in Sri Lanka.

Keywords: Dairy cows, Fertility, Milk yield, LHCGR, FSHR, SNP

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