

Abstract :

Twinning is one of the most important economic trait in sheep and goats which in addition to the influence of small effect genes can be influenced by major gene effects. In recent decades, it has been characterized that three members of oocytes derived growth factor belonging to a family named GDF9, BMP15 and ALK6 are essential for follicular development and ovulation planning. Oocyte family derived growth factors (TGF- β) are the most important growth factors in ovarian. In this study, blood samples were randomly taken from 50 Markhoz goats and DNA extraction was performed using a modified salting-out method. Polymerase chain reaction was performed to amplify 862 bp fragment of exon 2 of BMP15 gene and 995 bp fragment of exon 2 of GDF9 gene. PCR products after digestion by *Hinf*I enzymes for both BMP15 and GDF9 genes were genotyped using a 3% agarose gel electrophoresis and the banding patterns for animals. In the BMP15, frequency of alleles B and b were 0.96 and 0.04 respectively, and the frequency of genotypes BB, Bb and bb were 0.94, 0.04 and 0.02 respectively. Whereas, GDF9 showed a good polymorphism having the frequencies for A and a alleles 0.68 and 0.32 respectively, and the genotypic frequency were 0.60, 0.16 and 0.24 respectively for AA, Aa and aa genotypes. Statistical analysis of the results showed significant differences between dominant position heterozygous and homozygous genotypes for weight at the age of 4 month in both GDF9 and BMP15, but there was no significant difference between recessive heterozygous and homozygous genotypes. Also the results of studying the relation between the genotypes loci and twinning trait showed that the GDF9 genotypes influence on this trait is not significant, but the influence of BMP15 genotypes and also BMP15 and GDF9 haplotypes on twinning trait is significant. According to the results obtained in this study it can be concluded that although GDF9 gene had high polymorphism in Markhoz goat breeds, it could not affect on twinning trait individually. While, BMP15 was played an important role in the twinning rate despite having a low polymorphism status. Haplotype combination of the two positions played a prominent role in the twinning rate. Thus, this information is useful in selecting programs and beneficial mutations can be selected in the coming years to have a major impact on the increase in twinning in Markhoz goats.

Key words: Markhoz Goats, Polymorphism, Association analysis, Genotype



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**Association of polymorphism in fecundity
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size in Markhoz goats**

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