



Polymorphism of Leptin Gene and Its Association with Some Growth Traits in Lori Bakhtiari and Lori Bakhtiari-Afshari Crossbreed Sheep

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Background

Leptin, a protein with 146 amino acids has a molecular mass of 16 kDa, which is produced mainly by adipose tissue. This hormone is one of the regulators for food intake, so that a high level of leptin reduces appetite. On the other hand, lack of leptin protein or lack of leptin receptor results in overeating and leads to obesity. The purpose of this study was evaluation of leptin gene polymorphism by PCR-SSCP and its relationship with some growth traits in Lori-Bakhtiari and crossbreed of Lori-Bakhtiari – Afshari sheep.

Materials and Methods

For this purpose, blood samples were collected from 58 sheep (male and female) of Lori-Bakhtiari in Shahr-e-Kord Sholi station and 42 sheep (male and female) of Lori-Bakhtiari – Afshari crossbreeds from villages of Shahr-e-Kord. DNA was separated, using extraction kit of Sinnagen co. Determining the quality and quantity of DNA was performed using agarose gel electrophoresis and spectrophotometry. Polymerase chain reaction (PCR) was performed to amplify 275 bp fragment of exon 3 from leptin gene. Then single strand conformation polymorphism (SSCP) of PCR products was performed and leptin band patterns (genotypes) were obtained using Acrylamid gel and silver staining. To study the correlation between genetic patterns and different traits including BW, WW, W6 and W12 following statistical models were used:

$$Y_{ij} = \mu + S_i + G_j + e_{ij}$$

$$Y_{ij} = \mu + S_i + G_j + \beta(W_{ij} - \bar{W}) + e_{ij}$$

Where Y_{ij} is birth weight and weaning weight, 6 months and 12 month weights in the first and second model, respectively, μ the traits means, S_i was sex effect

G_j was the effect of genetic patterns, β was the regression coefficient of weaning weight on birth weight, W_{ij} as weight at birth time, \bar{W} the average of weaning weight and e_{ij} was the residual effect.

Results

Results of SSCP showed 8 band patterns including L1 to L8 for leptin gene in Lori-bakhtiari sheep and 10 band patterns including L1 to L10, for crossbreeds sheep. The results showed that there was a high polymorphism in exon 3 of the leptin gene in both breeds.

	Traits			
Source of variation	BW	WW	W6	W12
Sex	3.15 ^{ns}	3.29 ^{ns}	17.23 ^{**}	8.76 ^{**}
Genetic Patterns	0.20 ^{ns}	0.57 ^{ns}	1.57 ^{ns}	2.44 [*]

- Association between genotypes and weights at different ages

Also results of statistical analysis showed that the leptin gene was significantly associated with weight at 6 and 12 months. Also results of this research showed that the leptin gene is significantly associated with weight at 6 and 12 months ($p < 0.01$)

Conclusion

The exon 3 of leptin gene is a polymorphic locus and it has a high association with weights at 6 and 12 months of Lori Bakhtiari breed