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Polymorphism of Candidate Genes for Meat Production in Lori Sheep

Shahram Nanekarani^{a*}, Majid Goodarzi^a

^a*Department of Animal Science, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran*

Abstract

Calpastatin and callipyge have been known as two of the candidate genes in meat quality and quantity. Calpastatin gene and callipyge gene has been located to chromosome 5 and 18 of sheep. The objective of present study was to identification of calpastatin and callipyge genes polymorphism and survey of genotype structure in population of Lori sheep kept in Iran. Blood samples were taken from 120 Lori Sheep breed and Genomic DNA was extracted by salting out method. Polymorphism was identified applying the PCR-RFLP technique. The PCR products were digested with MspI and FagI endonucleases for calpastatin gene and callipyge gene, respectively. In this population, three patterns were observed and genotype frequencies for AA, AB and BB detected 0.32, 0.63, and 0.05 for calpastatin gene respectively. The results obtained for the callipyge gene revealed that only the wild-type allele A was observed indicating that, only genotype AA was present in the population under consideration. So, the results confirmed that PCR-RFLP technique can be used to identify genetic variation in this breed and is a useful tool for selection plans based on marker-assisted selection.

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* Corresponding author. Tel.: +989123359120; fax: +982632728772
E-mail address: sh.nanekarani@gmail.com

1. Introduction

The amount of genetic gain that can be obtained in direct election for Characteristics of a meat is depends on genetic variation. Improvement comes from the use of markers in selection programs depends on a variety of candidate genes that are expressed. (John L. Williams, 2008).

Identification of major genes affecting a trait variation provides Conditions to use genetic data in election schemes. Selecting animals with the most desirable genes at worthy genes, the amount of animal gain could be dramatically raised. Indeed, genomic procedures have the suitable capacity for easier to the development of traits that are problem to select via the conventional procedures. The knowledge on polymorphisms in genes influencing Special traits, and comprehension the biological effects of these Variations, will allow genomic data to be applied most effectively in animal selection Protocols. Genetic markers close to the genes for economically important traits have the potential to be used in selection programs which are called marker-assisted selection (Dekkers, 2004). The first stage is the recognition of mutations in interested major genes that can be surveyed in association studies in particular picked examinations. Based on role play, calpastatin (CAST) and callipyge (CLPG) genes can be considered desirable genes for meat Characteristics.

Calpastatin gene is placed on 5 chromosome of sheep and has important functions in foundation of skeletal muscles, degradation and meat tenderness after carnage. Calpastatin function is significantly related to the rate of muscle protein operation and amount of postmortem tenderization (Goll et al., 2003; Amanda et al., 2004). Calpastatin, which is an interior repressor (Ca^{+2} dependent cysteine proteinase), has a remarkable impress in alignment of calpain function in cells and is weighed to be one of the key regulator of the calpains (Forsberg et al., 1989). So, calpastatin may alter proteolysis of myofibrils because of regulation of calpain, which can commence postmortem erosion of myofibril proteins (Goll et al., 1992; Hufflonergar et al., 1996).

Callipyge gene is placed in the telomeric zone on ovine chromosome eighteen, within a class of imprinted alleles. The Callipyge (CLPG) shape in sheep is a muscular hypertrophy that is most apperceived in the muscles of the pelvic limb. Callipyge lambs display several favorable production properties and meat quality properties. Superior dressing percentages, major longissimus (loin eye) region, preferable lean composition, and higher leg scores Specified for Callipyge carcasses. Also Callipyge animals produce leaner, higher construction cadavers, but there is some relevance with reduced tenderness of the loin [Jackson et al., 1997 and Koohmaraie et al., 1995]. The Callipyge phenotype in sheep illustrate A new model of inheritance called “polar overdominance” where only heterozygous individuals having inherited the callipyge mutation from their sire represent the phenotype (i.e. the +M/CLPG genotype). The other genotypes are natural in appearance. (Cockett et al., 1996).

The name of this breed is derived from Lori tribe, which is one of the main nomadic groups of Zagros Mountain in western parts of the country. This sheep have strong constitution, good traveling ability with suitable conformation as a mountain sheep (Mansouri et al., 1995).

Meat production in Iran is one of the most valuable traits for livestock Breeders. Also, Sheep meat has tremendous values that rather than the meat of other animals and is popular between people. So, the purposes of present study were to distinguish the genetic diversity of the CAST and CLPG genes can be considered as interested genes for meat yield in Lori sheep population.

2. Materials and Methods

2.1. Genomic DNA extraction

In this study, the blood samples of 120 Lori sheep were randomly collected from Lorestan Province of Iran. About 5 ml of blood were gathered from each animal in vacutainer including EDTA and stored at 4°C.

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