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Genetic Diversity Study using Microsatellite Marker in Changthangi Pashmina Goats of Ladakh

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The present study was undertaken to study the genetic diversity among different subpopulations of Changthangi goats of Ladakh. To study the diversity 15 highly polymorphic microsatellite markers from the list suggested by ISAG-FAO were used. The maximum no of alleles (15) was observed for locus ILSTS-087 and minimum (4) observed for ILSTS-005. The overall mean observed number of alleles across all loci was 9. The average observed homozygosity and heterozygosity was 0.25 and 0.75 respectively indicating selection process favoring heterozygosity over a period of time. The overall mean of Shannon's Information Index for the whole population and polymorphism information content value (PIC) observed was 1.66 and 0.7117 respectively, indicating presence of wide diversity among Changthangi Goats of Ladakh. The mean FIS, FIT and FST values for the whole population are found to be -0.0433, 0.0121 and 0.0531, respectively with a gene flow rate of 4.4601. The low FIS and FIT values indicate low level of inbreeding within the population and also point towards low genetic differentiation within the populations. Multilocus FST values indicated that around 5.31% of the total genetic variation was explained by a population difference, the remaining 94.69% corresponding to differences among individuals. Estimation of genetic distance using Nei's genetic distance method between different clusters shows that the Changthangi goat has a diverse population with great scope for improvement. Deviations from Hardy-Weinberg equilibrium were noted for most of the locus. Bottleneck analysis revealed no bottleneck for Changthangi Goat population under all the three mutation models for sign test, the standardised difference test and Wilcoxon rank test. The overall result of the study indicate a highly diverse Changthangi goat population and the genetic distance computed from the present study can be utilized for implementing a sound future breeding programme for the genetic improvement of this goat for pashmina production.

Keywords: Allele, Changthangi goat, Genetic diversity, Microsatellite markers, Pashmina