

Analysis of genetic differentiation of a sheep population by Cluster Analysis on milk serum proteins: preliminary results

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ABSTRACT

The aim of this research was to evidence if the animals with similar phenotypic quantitative expression of milk whey proteins, present also a high genetic similarity and some alleles with a particularly high frequency. In a previous work several microsatellites with alleles significantly linked to milk whey proteins have been pointed out. A cluster analysis, with the link “Sum of Square” method, has been made on milk serum proteins of 68 Massese ewes reared in a farm of Tuscany. Besides the serum protein content, also standard chemical analysis, casein and its fractions, pH and rheological parameters were considered. For this study 17 microsatellites were analyzed using an ABI PRISM 310 automated sequencer. Genetic similarities within and among clusters were estimated using the Individual Multilocus Genotype (IMG) and the differences in milk quality among groups were tested by ANOVA. Three clusters respectively of 33 (group 1), 15 (group 2) and of 20 subjects (group 3) have been highlighted. Significant differences in milk traits were found mainly between the group 3 and the other groups, for serum proteins, with the exception of the β -serumalbumin, and also the majority of the parameters. In particular group 3 has a greater significant value of total serum protein, α -lactoalbumin, immunoglobulin, β -CN, γ -CN, lactose, and fat. The average similarities within the groups resulted respectively of 0.410, 0.410 and 0.442 (total average similarities 0.416). The group 3 presented not only a high genetic homogeneity, but also some alleles with different frequency in comparison with the other groups. In particular such group presents a higher percentage of the OMHC1, allele 4 associated with a low immunoglobulin value, of the OIFNG allele 1 associated with a higher content of α -lactoalbumin value, and of the BL4 allele 10 associated with low immunoglobulin value and high γ -CN value. None of the subjects of group 3 presents the allele 2 of OIFNG, allele linked with low α -lactoalbumin and lactose values, and high immunoglobulin, β -CN and fat values. The study has allowed to point out a subpopulation more genetically and phenotypically differentiated from the other groups.