Electrophoretic Variants of Sheep Salivary Proteins

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Some new genetic polymorphic systems revealed by acid-urea starch-gel and alkaline slab polyacrylamide-gel electrophoresis of human salivary proteins were demonstrated by several investigators(Azen, 1972: Merrit et al., 1973: Azen and Oppenheim, 1973: Balakrishnan and Ashton, 1974: Friedman et al., 1974: Ikemoto et al., 1977: Ikemoto et al., 1979). In mouse, Karn et al.(1982) and Matsushima and Ikemoto(1982) reported on inherited electrophoretic variants of salivary proteins. There was, however, not any electrophoretic and genetical researches for salivary proteins of domestic animals. This report describes the electrophoretic variants of salivary proteins in sheep and genetical analysis of the distribution of the variants in some breeds of the species.

Whole saliva samples from Corriedale, Suffolk and Border Leicester sheep, maintained on Happy Sheep Farm in Hokkaido, were used. These samples were collected from oral cavity with filter papers before giving food in the morning. The salivary

proteins were separated by using horizontal starch-gel electrophoresis in 5M acid-urea continuous buffer system with lithium lactate-lactic acid buffer at pH 2.5, referring the method described by Azen(1972).

The acid-urea starch-gel electrophoretogram of sheep salivary proteins is illustrated in Fig. 1.

Fig. 1. Starch-gel electrophoretogram and schematic diagram of sheep salivary proteins
WB; white band

They gave at least eight bands on the gel and designated SP-1, SP-2, SP-3, SP-4, SP-5, SP-6, SP-7 and SP-8 in order of decreasing electrophoretic mobility. In the region from SP-1 to SP-5, there were able to be classified into three phenotypes by combining with SP-2 and SP-4 and they were named A, B and AB. For type A, it was consisting of SP-2, for type B, consisting of SP-4, and for type AB, consisting of SP-2 and SP-4.

The distribution of three types in the three breed populations of sheep are shown in Table 1. The expected values for each type were estimated on the basis of Hardy-Weinberg law for alleles controlled on autosomal locus. The observed values of

three types in the populations used well approximated with the expected values. This result suggested that three types are controlled by two codominant alleles, named SP^A and SP^B , autosomal locus.

Table 1. Comparison of observed and expected values of salivary protein phenotypes and frequencies of the gene postulated, in the three breeds of sheep

Breeds	No. of animals		Phenotype			Gene frequencies		χ^2	P
			A	AB	B	SP^A	SP^B		
Corriedale	36	Obs.	6	22	8				
		Exp.	8.03	17.94	10.03	0.472	0.528	1.839	0.1-0.2
		Inc.(%)	16.7	61.1	22.2				
Suffolk	19	Obs.	7	11	1				
		Exp.	8.22	8.55	2.23	0.658	0.342	1.556	0.2-0.3
		Inc.(%)	36.8	57.6	5.6				
Border Leicester	12	Obs.	5	5	2				
		Exp.	4.68	5.63	1.69	0.625	0.375	0.149	0.5-0.7
		Inc.(%)	41.6	41.6	16.8				

Obs.:observed value, Exp.:expected value, Inc.:incidence

In comparison of the gene frequencies of the three breeds, the gene frequencies of SP^A in Suffolk and Border Leicester sheep were higher, but in Corriedale sheep the gene frequency of SP^A was the same as the SP^B . There might be several genetic markers in sheep saliva, as well as human. Further genetical researches including this protein are necessary in future.

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