

**Ecotypes - breed variants adapted to different environments, in example of Tsigai
haemoglobin genotypes**

by

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Summary

Organisms must survive in an environment given. The term of environment consists of two parts as external and internal ones. From other aspects it can be split into natural and artificial or permanent and temporary parts, respectively.

The major breeding aim of our rare breeds is the maintenance of the genetic equilibrium situation which means the constant gene- and genotype frequencies from generation to generation. The crucial question is whether does the new (or altered) environment result phenotypic changes (modification) only or cause genetic response (adaptation) too. Nevertheless, disturbed genetic equilibrium is often the consequence of adaptability, mostly due to reproductive fitness (natural selection).

Haemoglobin (Hb) genotypes adapt differently by altitudes; HbA allelic form enjoys advantage over HbB at higher altitude because of a stronger oxygen-binding-ability. The previously known fact that frequency of HbA is higher in mountain sheep than in lowland sheep became proven in Tsigai ecotypes: the newer lowland ecotype is characterized by a well reduced presence of HbA ($f=0.0661$, while in mountain ecotype: $f=0.1611$). The frequency alteration of Hb genotypes came together with the alteration of many constitutional and productional features. The changed environment formed the requested type of animals by itself. Ecotypes should be evaluated in their complexity, because the characteristics are in close connection with each other. The differences of ecotypes call also the attention to the genotype-environment interaction.

However, the consequences of the Hb genotypes in the sheep are not unambiguous. One concludes the respiratory functions of Hb variants do not differ from each other, at least at sea level. The evidence that animals with HbA are less fertile than those with HbB is not proven by all the authors. Others say the Hb genotype is one of the relevant functional markers to monitor animal well-being; and animals with BB genotype are more resilient to parasites and climatic stress.

Over and above the blood typing of the animals remains important, and the development of newer ecotypes because of the environmental change cannot be excluded in the future of a rare breed too.