

Breeding programs in the South American Creole cattle

G. Mészáros¹, R. Martínez², C. Lucero², W.O. Burgoz Paz², M. Naves³, H. Doekes⁴, J. Windig⁴, T. Pook⁵, H. Simianer⁵

1 University of natural resources and life sciences, Vienna, BOKU, Austria

2 Corporación colombiana de investigación agropecuaria, AGROSAVIA, Colombia

3 Institut national de recherche pour l'agriculture, l'alimentation et l'environnement, INRAE, Route de Godet 97131, Petit-Bourg, Guadeloupe

4 Wageningen University and Research, P.O. Box 338, 6700 AH, Wageningen, the Netherlands

5 University of Göttingen, Albrecht-Thaer-Weg 3, 37075 Göttingen, Germany

The IMAGE project aims to explore novel ways to manage animal genetic resources. Such management in a data driven society is the most efficient using newly developed or improved software tools. The management of the breed is closely interlinked with a design of a breeding program, for which the two main goals are the increase in production and the maintenance of the genetic diversity.

The objective of our work was to enhance the breeding programs of the Creole cattle populations in two steps. The first step was a simulation of the breeding program and the possible increase in genetic gain, given the country specific characteristics. This was followed up with the second step for the optimization of the breeding program to constrain inbreeding levels.

For the simulation of the Creole cattle breeding program the MoBPS (Modular Breeding Program Simulator) software was used. The estimated breeding values for weaning weight were used to demonstrate the projected changes within the Colombian Blanco Orejinegro (BON) population, including the bulls from gene banks. The optimization of the breeding program was done utilizing the optimal contribution methodology with GENCONT software.

With the implementation of selection in the BON population we achieve the expected increase in production levels. In addition, the average heterozygosity also decreases, thus the inbreeding levels increase. Such one-sided selection might lead to unsustainable breeding practices. In a simulation we show that the inbreeding levels of the population could be improved by using the gene bank bulls from the conservation program.

The follow up optimal contribution selection approach was implemented to suggest suitable mating plans for simultaneous increase of production level, while putting constraints on inbreeding levels. The use of gene bank bulls had a clear added value, and enabled an even better management of genetic diversity in the population.