

Parentage testing, inbreeding, and identification of genetic variants associated with production and meat quality in Senepol breed in Colombia

Miguel Adriano Novoa Bravo

Scientific Director, Genética Animal de Colombia Ltda. miguelnovoa@geneticaanimal.co

Eleonora Bernal Pinilla.

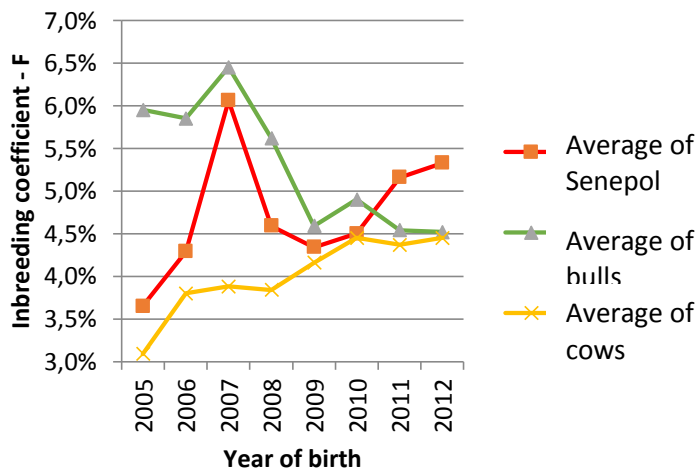
CEO, Genética Animal de Colombia Ltda. eleonorabernal@geancol.com

The Colombian Association of Senepol Cattle Breeders and their crosses - ASOSENAPOL Colombia in conjunction with Animal Genetics of Colombia Ltda. - GAC conducted in 2012 an applied research project funded by the SENA (Colombian government entity), which is entitled "Implementation and Validation of Molecular Tests for Identification of Genetic Variants Associated with Production and Meat Quality in Senepol breed in Colombia. "

This project aimed to analyze the genetic and phenotypic information of the race, including genealogies, biometrics, ultrasound, genetic markers used in parentage testing and presumably associated with quality characteristics, production and reproduction. This to establish the genetic basis for parentage testing to ensure the pedigree of the animals and to assess whether or not these markers are associated with phenotypic characteristics and indeed they are valid on Senepol breed.

Results

- The genealogical database of the Senepol breed in Colombia was completed until its founders. With this it was determined that the average inbreeding coefficient for population is 4.74% and that this is increasing, so the breeders must handling this index through the management of crossings to decrease it, in order to have a positive effect production and fertility and to maintain an appropriate level of genetic variability in the population.



- The generation interval was estimated at 5 years, indicating that it is the expected that may occur genetic changes (improvement or deterioration) in the whole population.

- 413 with 12 microsatellite genotypes suggested by the ISAG (International Society of Animals Genetics) for bovine parentage tests were genotyped. Thus 251 parentage tests (paternity and / or maternity) certifying the pedigree of these animals, thus the genetic identification program of ASOSENAPOL Colombia was

initialized. The analyzed animals are available on the website www.geneticaanimal.co.

- Biometric and ultrasound (Rib eye area, depth of medium gluteus muscle and fat on the rump) parameters were estimated in the population in Colombia. About 1275 data of animals were obtained.
- We identified genetic scores from molecular markers (SNPs) in more than 440 Senepol animals associated with: food efficiency, daily gain, calving ease, Pregnancy Rate daughters, Longevity, rib eye area, thickness fat, carcass yield, Probability of developing type "Choice" beef (according to the USDA), Tenderness, Marmoreal and docility.
- These genetic scores were validated (statistical tests that determine the effectiveness of genetic testing) in the Senepol population.
- The ETH10 marker, casually used in parentage testing, is positively associated with: weight, rib eye area, depth of middle gluteus muscle, fat rump, and back fat.
- We found some other associations among genetic scores and phenotypic traits (Table 1).

Table 2. Genetic scores of molecular markers with statistical association with quality and production meat traits in the Senepol breed in Colombia.

Genetic Score	Associated traits	P value
---------------	-------------------	---------

Daily gain	Rump fat	< 0,05
Marbling	Rump fat	< 0,01
	Rib Eye Area	< 0,05
	Depth of the middle gluteus muscle	< 0,01
Probability of type “Choice”	Rump fat	< 0,01
	Rib Eye Area	< 0,05
	Depth of the middle gluteus muscle	< 0,01
Tenderness	Back fat	< 0,01
Longevity	Depth of the middle gluteus muscle	< 0,05
Calving ease	Seat bones width	<0,1

- Therefore, we obtained a validated molecular tool that allows a prediction of the genetic potential in certain traits of an animal from birth.
- The scientific bases were defined for selecting sires and dams and to implement genetic / genomic evaluation programs of the Senepol in Colombia, EPDs and own genetic catalogs.

Therefore, the development of this project, along with the validation of the molecular test evaluated and quantified under particular environmental conditions, management and health in Colombia, this allows to all breeders, farmers, ranchers breed lovers get a new tool that can accelerate the genetic improvement of the Senepol cattle breed. They can direct crosses, select the animals early and achieve better performances, becoming more competitive and productive in the meat sector.

For more information, info@geneticaanimal.co.