



Tropentag, September 15-17, 2021, hybrid conference

“Towards shifting paradigms in agriculture
for a healthy and sustainable future”

Identification of Close Relatives of Crossbred Dairy Cattle in Ethiopia

SELAM MESERET¹, ASRAT TERA², GEBREGZIABHER GEBREYOHANES¹, CHINYERE
EKINE-DZIVENU³, JULIE OJANGO³, ALI MWAI OKEYO³, RAPHAEL MRODE³

¹*International Livestock Research Institute (ILRI), Ethiopia*

²*National Animal Genetic Improvement Institute, Ethiopia*

³*International Livestock Research Institute (ILRI), Kenya*

Abstract

Correct pedigree is essential to produce accurate genetic evaluations and positively affect genetic gains of dairy cattle. However, close relatives were not fully documented in dairy herds registered under Ethiopian dairy cattle database. Therefore, genetic data was used to identify close relatives and parentage reassignments. African Dairy Genetic Gains (ADGG) project led by International Livestock Research Institute has generated a medium density SNP dataset with Illumina BovineSNP50 BeadChip, which consists of 6821 animals collected from six regions and one city administration in Ethiopia. The final dataset used for analysis passed through quality control pipeline, included SNPs above 80 % genotyping rate and missing rate per animal with less than 20 %. Thus, the final dataset consisted of 46,882 SNP and 6802 animals. Kinship coefficients and inferring identity by decent segments estimated using KING software to assign degree of relationship between pairs of dairy animals across the country. The inbreeding coefficient calculated based on the observed versus expected number of homozygous genotypes in PLINK software. A total of 75 pairs were identified as potential duplicate, 2133 pairs of parent-offspring, and 689 pairs of full-sibs relationship. Whilst 125,929 pairs are sorted under second degree relationship, contributed about 0.5 % of the total pairs of 23,130,202. In addition, nearly one tenth of the population had above 10 percent inbreeding coefficient and the population average inbreeding coefficient was 0.02. In conclusion, drawing relationship inference for close relatives in the crossbred cattle population provides complementary information for genetic evaluation to estimate highly reliable breeding value. Additionally, the current inbreeding coefficient status requires action in the national breeding plan to ensure sustainable genetic improvement program.

Keywords: Dairy cattle, inbreeding coefficient , relationship