UNIVERSITÀ DEGLI STUDI DI PADOVA

DAFNAE

Department of Agronomy Food Natural resources Animals and Environment

GenoVal

GENOmic Breeding VALue Estimation in a Native Alpine Cattle Breed

Alpine local native cattle breeds are very well adapted to extensive farming systems, often located in harsh environments; hence, they provide a unique genetic resource to be exploited. So far, the use of genomic information in small cattle breeds for genomic selection has only few applications, due to the limited genotyping activity carried out. Among the Italian native cattle populations, the Aosta one represents a unique source of biodiversity, recently mapped at genomic level. The Aosta cattle, selected for years to improve milk and meat production and to optimally perform in range land and pastoral systems, owns now more than 6500 individuals genotyped with dense SNP chips byseveral projects since 2009. This makes possible the application of genomic approach for selection and management of genetic variability. The main objective of GENOVAL is to develop a genomic evaluation approach with dense SNP genotypes in the Aosta population. The following specific objectives will be addressed: 1) to identify specific structural genomic variation in the Aosta population using WGS and dense genotypes; 2)to produce a specific Aosta reference population for imputation of genotypes to at least 777,000 SNP; 3) to develop a routinary genomic evaluation process based on wide genotyping for efficiency (production) and resilience (health and functional) traits; 4) identify QTLs and genes for efficiency and resilience traits; 5) exploit, disseminate and communicate new advancements to the research community and to the cattle farming and breeding sector, assuring practical applications and a long-term impact of GENOVAL results to a broad audience. The main impact of GENOVAL is the direct implementation of new breeding strategy for Aosta breeds based on the introduction of genomic data in breeding values estimation for more efficient and resilient animals and in management ofthe genetic variability. Therefore, from a technical point of view the project will provide i)directly dissemination of any deliverable from GENOVAL project to the Aosta cattlebreeders and ii) the translation of these results into new breeding opportunities with respect to the current selection scheme.

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