

The Use of Genomic Tools for Animal Improvement and Conservation

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The global population will approach 10 billion people by the year 2050 according to the FAO. As a result, of that, it will have an increase in the demand for animal products. In the last decades, we have already observed an improvement in animal production, in response to the increase in global demand for animal products. This was possible due to several factors including a better understanding of nutrition, health, management, welfare, reproduction, and genetics.

The use of animal breeding technologies has helped to increase the production efficiency of animals, reaching impressive cumulative gains across the years. In addition to that, the use of genomic information has allowed a better understanding of genotype-by-environment interactions, enabling the selection for animals in different environments. However, to increase animal production a deeper understanding of the biological functions of the animal genome and their interactions is needed. At the same time, producers will have to deal with emergent and reemergent viral and bacterial diseases and their implications with the increased use of antimicrobial drugs and their resistance issues.

The use of genomics has helped the intensification in the animal selection, which has led to the fixation of specific alleles in the genome involved with production traits. This has raised concerns among the losses of genetic diversity in the livestock sector. Nevertheless, the inclusion of genomic information for breeding decisions has ensured faster genetic progress in different populations while restricting the inbreeding levels to maintain the ability for genetic change in future generations. The genetic diversity among animals plays an important role in meeting human needs and it is

essential to maintain the efficiency of production systems, associated with the evolution caused by environmental changes.

The understanding between the animal genetic makeup and the animal phenotype and how they interact with non-genetic factors will allow for this improvement in animal performance. Further work will be needed to continue to improve the knowledge to meet the challenges of animal production. This will accelerate animal breeding decisions to implement growth rates, reducing feed intake, improving fertility, and enhanced resistance and tolerance to diseases.

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