

Session 11: Recent developments in genomic evaluations: New traits, new populations. Chairs: Andrew Cromie, María Jesús Carabaño

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THE APPLICATION OF GENOMIC SELECTION IN SOUTH AFRICA; IMPLEMENTATION, ADOPTION, CHALLENGES AND FUTURE PROSPECTS.

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Abstract

Implementation of Genomic Selection, to enhance the accuracy of genetic merit for selection candidates, has had a relatively slow start measured against other leading countries. This can be ascribed to factors such as very limited public funding, local laboratory capacity, the local economy, and weak currency.

Early adoption followed after the investment of the Bonsmara Cattle Breeders' Society in genotyping influential animals to establish the first reference population for a beef cattle breed. The Beef Genomic and Dairy Genomic Programs, funded by the Technology Innovation Agency (a government body) followed, and, together with exchanges of genotypes with other bodies, resulted in the initial establishment of reference populations for two more beef and three dairy breeds and laying the foundation for more. Currently, breeders of seven beef breeds, three dairy breeds, and one woolled sheep breed receive gBLUP from single-step methodology. Routine genetic evaluations are conducted monthly making use of the MIX99 (Strandén *et al*, 2018).

Services include single gene mutation markers for traits related to A2 milk, myostatin variants, coat colour, polledness and others, parentage verification and discovery, homozygosity and relatedness, breed identification, purity and upgrading. Recently evaluations and development also focused on meat quality and scrapie resistance in Merino sheep.

Selection index values stay the main thrust in breeding objectives and are developed, maintained, and refined in collaboration with each breed. The inclusion of sex-limited traits (especially female reproduction and fertility), traits with limited phenotypes in populations (like individual feed intake and real-time ultrasound carcass trait) and traits measured or evaluated late in the productive life (longevity) accentuate the need for gBLUP in selection candidates.

While more breeds are investing in reference populations, model refinement, genetic variance component estimations and the expansion of traits and appropriate selection indices are focused on continuously. Currently, a total of just over 20 200 animals' genotypes are on Stud Books' Logix database, consisting of 7 600 Bonsmara, just over 2 000 each for Jersey and Holstein, and the rest made up from other breeds.

List of References

I. Strandén, Taskinen, M., Matilainen, K., Lidauer, M., and Mäntysaari, E., 2018. Efficient single-step BLUP computations with MiX99 software. Proceedings of the World Congress on Genetics Applied to Livestock Production, vol. Methods and Tools - Software, p. 566.

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