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## Genomic Selection for Growth, Reproductive and Conformation Traits in Zebu Brahman in Colombia

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### Abstract

Colombia is the fourth largest producer of beef cattle in Latin America. The meat production is based on Zebu breeds and their crossbreeds, with about 80 % of the population residing in tropical lowlands. Currently the selection process is based solely on pedigree, without consideration of inbreeding, which can subsequently threaten the genetic variability. These developments motivated the establishment of the genomic selection programme in Colombia. The aim of this work was to estimate the increase of breeding value accuracies compared the more traditional pedigree scheme. Pedigrees and production phenotypes from about 120,000 animals from 35 farms, distributed in the three main Colombian regions were used for the analysis. The weight traits were evaluated in different age groups: at birth, at four months, at weaning, at 12 months and at 18 months. For the reproductive traits age at first calving (AFC) and calving interval (CI) were considered. Finally conformation traits loin eye area (LEA) and dorsal fat (DF) were evaluated by ultrasound. Genotypes from 4,250 animals were used as the reference population when estimating genomic breeding values and their accuracies with single step Genomic BLUP. A substantial increase of accuracy was shown in growth traits, where the accuracies were on average 32 % higher when genomic information was used, compared to an estimation without genotypes. This increase was the highest for the weight measurements at four months (around 66 %) and the lowest for the measurements at 18 months (9–18 %). For reproductive traits the accuracy increased by 22 % for AFC and by 13 % for CI. The additive genetic variance was also the lowest for these traits. For the conformation traits our results showed an increase of 18 % for LEA and 19 % for DF. In conclusion, the use of genomics resulted into a substantial increase breeding value accuracies. This increase was higher in growth traits, where the additive variance was also higher. This study also confirms the importance to consider genomic data in the modern breeding programs, such as the one for Colombian Zebu Brahman cattle, in order to obtain higher accuracy breeding values with a subsequent increase in genetic gain.

**Keywords:** Accuracy, breeding values, Colombia, genomic selection, Zebu Brahman