Public Abstract
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Graduation Term:SS 2008
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Degree:MS
Title:Genotype by Environment Interaction Estimated By Using Reaction Norms

Livestock animals can differ in reproductive and production performances depending on their geographic location and/or management. This concept is known as genotype by environment interaction (GxE). The differences can be characterized by use of statistical technique known as reaction norms. A reaction norm is a line that has a slope component that depicts any performance changes across environments. The objective of this study was to evaluate GxE by comparing reaction norms among U.S. Angus bulls. The traits of interest were birth, 205 d weaning, and 365 d yearling weights. The offspring from bulls were grouped based upon data record location and defined as environments. For the offspring to be included in the analyses, specific criteria had to be met. The environmental mean was defined and estimated the average performance of progeny within each herd environment. Four statistical models were analyzed using herd environment or environmental mean for estimating breeding values and heritabilities (ability for traits to be passed from parents to offspring). The reaction norm model showed bulls differed in performance depending upon environmental mean. The slope of the reaction norm was heritable. These results suggest that bulls differ in the consistency of their offspring's performance across environments. The breeding values from the slope of the reaction norms may be a useful selection tool for ranking bulls to be used across diverse environments.