

Public Abstract

First Name:Dennis

Middle Name:James

Last Name:Fennewald

Adviser's First Name:William

Adviser's Last Name:Lamberson

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:GENOTYPE BY ENVIRONMENT INTERACTIONS FOR GROWTH AND STAYABILITY IN RED ANGUS CATTLE

Reproduction and production of livestock animals can differ depending on management and/or environment. The change in magnitude or rank in performance across environments compared to another animal is known as genotype by environment interaction (GxE). These differences can be characterized by a statistical technique called regression and the results (slopes) are termed reaction norms. The average reaction norm is expected to be one. Steeper reaction norms describe bulls whose progeny are more responsive or sensitive to environmental changes. Bulls with flatter reaction norms are considered more "stable". The objectives were to evaluate the presence of GxE by comparing reaction norms of Red Angus bulls in the US. The traits evaluated were birth weight, weaning weight, post-weaning gain and stayability. Stayability was the probability of having a calf at four years of age, given the females had a calf at 2 years of age. Offspring of bulls were included if specific criteria had been met. Environments were defined as nine climatic regions in the US. The mean performance of all offspring of all bulls in one region was the environmental mean. The mean performance of offspring of each bull within each region was the progeny mean. Progeny means were regressed on the environmental mean and showed bulls differed depending upon the environment. Estimates of genetic merit for reaction norms were estimated and were found to be heritable. These results suggest that bulls differ in their rank across environments and that reaction norm breeding values may be useful in bull selection.