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## Docility and heifer pregnancy estimates in Angus heifers

### Abstract

Reproductive success is economically relevant in beef cattle operations because the number of calves born influences the value of calves sold at weaning. Improvements in reproductive performance can be up to four times more important than improvements in end-product traits in an operation selling calves at weaning. Selecting for fertility is difficult because it is influenced by a variety of factors. Temperament is one of the factors affecting fertility that requires further investigation. Researchers report that physiological responses associated with temperament can influence the probability of cows becoming pregnant. Stress hormones such as cortisol in the bloodstream can negatively affect the release of vital reproductive hormones. Methods have been developed to assess temperament in cattle. Beef Improvement Federation guidelines describe a temperament scoring system that has been adapted by breed associations for genetic evaluation of docility in cattle. The chute scoring system ranges from 1 to 6. A 1 or 2 score indicates highly acceptable behavior, 3 is average, and 4-6 is unacceptable. Studies have shown selection for cattle with a more favorable docility (chute) score would be effective in producing cattle with more acceptable dispositions. The docility expected progeny differences (EPD) reflect the probability that offspring will inherit genes for acceptable behavior, with a greater EPD associated with progeny exhibiting calmer behavior. Some breed associations have produced EPD rankings for docility. Docility measured by chute score has been found to be moderately heritable. The purpose of this research was to estimate the heritability and variance parameters for heifer pregnancy and docility in Angus cattle.

### Keywords

Cattlemen's Day, 2014; Kansas Agricultural Experiment Station contribution; no. 14-262-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1101; Beef Cattle Research, 2014 is known as Cattlemen's Day, 2014; Beef; Heifers; Fertility; Temperament; Heritability

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# Docility and Heifer Pregnancy Estimates in Angus Heifers

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## Introduction

Reproductive success is economically relevant in beef cattle operations because the number of calves born influences the value of calves sold at weaning. Improvements in reproductive performance can be up to four times more important than improvements in end-product traits in an operation selling calves at weaning. Selecting for fertility is difficult because it is influenced by a variety of factors.

Temperament is one of the factors affecting fertility that requires further investigation. Researchers report that physiological responses associated with temperament can influence the probability of cows becoming pregnant. Stress hormones such as cortisol in the bloodstream can negatively affect the release of vital reproductive hormones.

Methods have been developed to assess temperament in cattle. Beef Improvement Federation guidelines describe a temperament scoring system that has been adapted by breed associations for genetic evaluation of docility in cattle. The chute scoring system ranges from 1 to 6. A 1 or 2 score indicates highly acceptable behavior, 3 is average, and 4–6 is unacceptable. Studies have shown selection for cattle with a more favorable docility (chute) score would be effective in producing cattle with more acceptable dispositions. The docility expected progeny differences (EPD) reflect the probability that offspring will inherit genes for acceptable behavior, with a greater EPD associated with progeny exhibiting calmer behavior. Some breed associations have produced EPD rankings for docility. Docility measured by chute score has been found to be moderately heritable. The purpose of this research was to estimate the heritability and variance parameters for heifer pregnancy and docility in Angus cattle.

## Experimental Procedures

Data for this study included approximately 26,878 records for only heifer pregnancy and 113,412 records for only docility, with 7,849 animals having both docility and heifer pregnancy records. Pedigree information was also obtained on approximately 508,015 animals over 30 generations, which included 49,091 sires, 292,715 dams, 9,802 paternal grand sires, and 35,068 maternal grand sires. For animals with performance records, 10,137 sires and 92,471 dams were represented. Contemporary groups were formed by the concatenation of weaning contemporary group, yearling contemporary group, and breeding contemporary group. There were 12,782 contemporary groups for heifer pregnancy, with an average of 24.33 records per contemporary group, and 12,954 contemporary groups for docility, with an average of 10.59 records per contemporary group. Heifer pregnancy variance components were estimated from a univariate threshold model, with pregnancy outcome as the dependent variable. Animal and contemporary groups were random effects, whereas age at first breeding was a covariate. Docility was fit as a univariate, linear animal model with docility score as the dependent variable. Animal and contemporary groups were both modeled as random effects.

## Results and Discussion

The heritability of heifer pregnancy was estimated as  $0.16 \pm 0.02$ . These findings are within the range reported by other researchers who found that heifer pregnancy has an estimated heritability between 0.14 and 0.21. The heritability of docility was estimated to be  $0.22 \pm 0.03$ , which is lower than the heritabilities for docility reported by the North American Limousin Foundation (0.40) and the American Angus Association (0.37). The heritability estimate for docility obtained from this data is also low compared with the findings of another research group that reported a direct heritability of 0.37 for docility as measured by the chute score. The heritability estimate from this study does, however, fall within the moderately heritable range.

## Implications

This study has shown low to moderate heritability estimates of heifer pregnancy and docility, indicating that although progress may be slow, genetic improvement through selection can be made on these traits.