

# Maturity, average daily gain, and body weight can be used to predict reproductive tract maturity score in beef replacement heifers consigned to a heifer development program in the southeastern United States

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## Introduction

Many producers raise their own replacement heifers, and economic models have shown that the cost of raising replacement heifers from weaning to breeding is in excess of \$1,400. Moreover, a heifer must wean 4 to 6 calves over the course of its productive life to offset the initial cost of development. Thus, selection and development of heifers that are likely to remain productive for many years is imperative to the long-term success of the cow herd. Heifers that successfully complete a heifer development program are those that achieve puberty early so that they conceive no later than 15 months of age and deliver their first calf by no later than 2 years of age. Additionally, conception should occur in the beginning of the breeding season to maximize lifetime productivity. Producers can use physical traits such as weight, hip height (HH), and reproductive tract maturity score (RTMS) as selection tools to identify heifers with a greater chance of achieving sustained reproductive success. The RTMS has shown significant promise in identifying heifers more likely to conceive early in a breeding season but, to date, no studies have looked at the factors associated with higher RTMS values. Thus, the objective of this study was to identify variables that can be used to predict reproductive tract maturity score (RTMS) in beef replacement heifers.

## Materials and methods

This retrospective observational study used production records from 2,843 heifers housed at 2 heifer development centers managed by the University of Georgia. Heifers enrolled in this study were consigned to the University of Georgia Heifer Evaluation and Reproductive Development (HERD) program. For this study, 1,336 and 1,507 heifers were assessed at designated HERD facilities in either Calhoun or Tifton, GA between the years of 2012 and 2021, respectively. Age of heifers at delivery, weight at delivery as a percentage of the target breeding weight, hip height 3-4 weeks after delivery, and average daily gain during the 3-4 weeks after delivery were evaluated as potential predictors of the variable of interest

## Results

At Calhoun, the odds of having an RTMS of 1 or 2 were 10% lower for every one cm increase in hip height. Additionally, the odds of having an RTMS of 1 or 2 were 47% lower for every additional one kg/d of average daily gain. Compared to heifers that had attained 90.0-99.9% of their target breeding weight at the time of delivery, the odds of having RTMS 1 or 2 were 3.9 times higher for heifers that had attained 59.5-79.9% of their target breeding weight and 2.1 times higher for heifers that had attained 80.0-89.9% of their target breeding weight. At Tifton, the odds of having RTMS 1 or 2 were 9.2 times higher for heifers that had attained 59.5-79.9% of their target breeding weight and 3.1 times higher for heifers that had attained 80.0-89.9% of their target breeding weight when compared to heifers that had attained 90.0-99.9% of their target breeding weight.

## Significance

Physical traits related to animal maturity, post-delivery average daily gain, and pre-delivery feeding management can be used to predict the likelihood of heifers having an RTMS of 3 or greater in a heifer development enterprise. Focusing on manipulation of these variables in heifer development systems will provide producers with heifers that have the potential to be more productive over the course of a lifetime.

