



INTRODUCTION

- Temperament has been identified as a key breeding goal for the beef cattle industry
- Temperament is directly related to productive performance, longevity, carcass and meat quality, animal welfare and handlers work safety
- Various temperament indicator traits have been proposed over time
- In the United States, the beef cattle industry has adopted the docility score to measure temperament

The goal of this study was to better understand the underlying biology affecting the phenotypic expression of temperament by identifying genomic regions and candidate genes related to the trait

MATERIALS AND METHODS

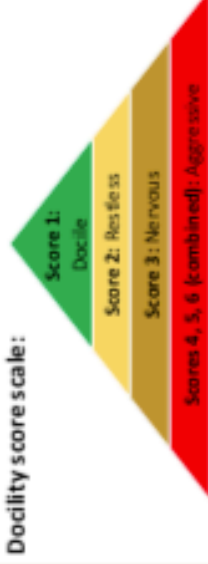


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MATERIALS AND METHODS (continued)

- Animal multinomial threshold model was used to fit the docility scores into a liability scale
- The top 10 SNPs with the largest effects were selected as relevant SNPs and used to perform the functional analyses of positional candidate genes

Docility score scale:



CONCLUSIONS

- This study helps to better understand the underlying biology affecting the phenotypic expression of temperament
- The identification of important genes associated with temperament contributes to biologically validate this trait
- Information on candidate genes can be used to optimize genomic prediction of breeding values by giving higher weights to important genomic regions

NEXT STEPS

- Investigate the use of other statistical models and different statistical approaches
- Perform genomic predictions for temperament using greater weights for SNPs identified in this study

RESULTS

- Temperament was observed to be a moderately heritable trait (heritability estimated was 0.44)
- Important Quantitative Trait Loci were identified on chromosomes BTA5, BTA6, BTA10, BTA16, BTA24, BTA26, and BTA27
- Candidate genes included *ACO2*, *CASC4*, *CTDSPL2*, *PRDM6*, *PSD3*, *TEF*, and *VPS13C*
- Previous studies in the literature have reported that some of these genes are associated with traits of interest in humans and livestock animals, for instance:

- *PRDM6*: Suicidal behaviors (Sokolowski et al., 2015)
 - *PSD3*: Neuron differentiation and anxiety (Papale et al., 2017)
 - *TEF*: Stress (Linnstaedt et al., 2018)
- Depression (Kripke et al., 2009; Hua et al., 2014; Rao et al., 2017)
Sleep disturbances (Hua et al., 2012)

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