RESEARCH FACTS

UNIVERSITY OF SASKATCHEWAN
Livestock and Forage Centre of Excellence
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IN PROGRESS

Genetic and genomic factors influencing gestational length in beef cattle

PROJECT TITLE

Genetic and genomic factors influencing gestational length in beef cattle

In progress:

Results expected in 2022

RESEARCHERS

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Background:

Reproductive success is of major economic importance in the beef cattle industry and is impacted by both genetic factors and management. Identifying genetic influences on reproductive performance that lessen the incidence of negative factors (eg. calving difficulty or dystocia) will improve reproductive health in the herd. Gestation length is a prime candidate, primarily due to its direct genetic associations with calf birth weight. Gestation length is therefore a trait which could be used as selection criteria to reduce calving difficulty in beef cattle populations.

Heritability estimates indicate that a proportion of a trait is influenced by genetics, in addition to environmental factors such as nutrition. Gestation length is a trait which is influenced by genetics with a moderate to high heritability. Several differences in the genetic makeup of beef and dairy cattle have been reported to associate with the length of gestational period in large populations. This project examines those genomic associations in an *in-vivo* beef cattle study.

Objectives:

Our research aims to identify the genes and genetic changes that may result in differing gestational periods of calves. As a result of these genetic differences producers can aim to decrease the gestation length in their herd resulting in a greater economic return. Our goal is to investigate the selection success, specific genetic contributions to gestation length, and effect of gestation length differences on beef cattle profitability.

What They Will Do:

An *in-vivo* study will be completed, where five bulls who have been identified as having gestation lengths ranging from short (280 days) to long (288 days) will be bred to heifers using fixed-time artificial insemination. Gestation lengths of the offspring will be documented in addition to other traits including calf sex, calf birth weight, calving difficulty score and weaning weight. Data collected from each calf will be input into a cost/benefit analysis to determine the potential economic impact of gestation length on producers.

Five candidate genes involved in gestation length will be examined through DNA sequencing and analysis in the five sires with varying gestation lengths. Single nucleotide polymorphisms (SNP) will be examined for association to gestation length and allow further investigation into genetic influence on gestation length of our animals.

Implications:

This project will investigate genetic factors that influence gestation length and identify potential genes that are involved in its regulation in beef cattle. By determining genomic associations, a selection tool may be developed to help Saskatchewan beef producers easily identify and select for gestation length on farm. This could help to improve reproductive success and productivity and ultimately result in a greater economic return for cow-calf producers.

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