

# RESEARCH FACTS



UNIVERSITY OF SASKATCHEWAN

Livestock and Forage  
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## IN PROGRESS

Development of germplasm biobank for Canadian bison

### PROJECT TITLE

Development of germplasm biobank for Canadian bison

### In progress:

*Results expected in 2021*

### RESEARCHERS

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### Background:

Plains bison (*Bison bison bison*) and wood bison (*Bison bison athabasca*) are classified as threatened species. Two main threats against them today are: 1) the bovine diseases of tuberculosis and brucellosis that have infected bison herds and represent a health risk to the remaining healthy bison populations, cattle, deer and elk; and 2) hybridization with cattle and between subspecies that risks the genetic integrity of the species.

The transport of live animals can be complicated and expensive due to factors associated with trucking, animal welfare and disease-related biosecurity. *In vitro* production of embryos (IVP) is a proposed technique for rescuing the genetics of valuable plains and wood bison.

For more information on the project, go to: <https://wcv.m.usask.ca/research/bison.php>

## Objectives:

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### Minimal-handling protocols for use in free-roaming and captive herds

- A. Compare oocyte collections at random stages of the follicular cycle (non-synchronized) to synchronized collections
- B. Compare ovarian superstimulation with a single-dose of equine chorionic gonadotrophin (eCG) to no superstimulation for oocyte collection and embryo production.
- C. Test transvaginal ultrasound-guided oocyte collection procedures on sedated, recumbent bison to mimic field conditions in the wild versus bison collected in a chute.
- D. Compare the superstimulatory response of FSH and eCG administration by manual injection (restrained) to field darting (unrestrained)

### Post-thaw survivability of vitrified bison embryos in vitro and in vivo

- A. Compare post-thaw survivability (apoptosis, nuclear morphology and cell counts) at one hour versus 36 hours in culture
- B. Compare pregnancy rates after transfer of in vitro-derived embryos frozen:
  - i. at different stages of development (morula, early blastocyst, blastocyst and expanded blastocyst)
  - ii. with differing grades (1, 2 and 3)
  - iii. on different days (7, 8, 9, 10; Day 0=fertilization)

## What They Will Do:

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To accomplish our objectives, we will be collecting oocytes (eggs) through non-surgical means from the bison. The oocytes are then matured, co-incubated with sperm and cultured in the lab to produce embryos. The embryos are then frozen and thawed at a later date to be transferred into surrogate bison.

## Implications:

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The use of advanced reproductive techniques in wild species is an important tool for the conservation of species. The use of germplasm (embryos and semen) can connect fragmented populations in a biosecure manner. Unlike domestic species (i.e. cattle), little is known about the reproductive details of wild species such as bison. Therefore it is essential to gain an understanding on how to control and utilize the reproductive system (freeze semen, produce embryos) before a species becomes endangered or disappears all together.

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