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Assisted Reproductive Technologies Facilitate Reintroduction of *Brucella abortus*-Free, Genetically Pure Lineage of *Bison bison* to Northern Colorado

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Abstract

Researchers at Colorado State University have partnered with the United States Department of Agriculture to reintroduce *Bison bison* to northern Colorado for the first time since the 19th century. Assisted reproductive technologies have been employed to ensure that the bison are of genetically pure lineage and brucellosis-free. The herd is set to be released onto Red Mountain Open Space, owned by Larimer County, and Soapstone Prairie, owned by the city of Fort Collins, in November 2015. Research will also be conducted on the ecological and social impacts of the reintroduction.

Discussion

The North American bison (*Bison bison*), which once numbered in the millions, were diminished to a point of near-extinction by the latter half of the 19th century [1]. A subspecies, found in the United States, known as plains bison (*Bison bison bison*), has survived primarily as a reduced herd located in Yellowstone National Park. It is estimated that the current American bison population was derived from fewer than 100 animals [1]. The population of bison in the United States has since grown to over half a million, including the Yellowstone herd which is the largest group of bison which are known to be free of hybridization with domestic cattle.

Using assisted reproductive technologies, researchers at Colorado State University (CSU) are building a herd of genetically pure plains bison by drawing upon the genetic lineage of the Yellowstone herd. These technologies ensure, that newly developed herds of bison are free of *Brucella abortus* which is known to infect some existing bison populations. For years, the reintroduction of pure bison has been slowed by fears that the animals will bring brucellosis to their new environments. Thus, the development of a brucellosis-free herd has vaulted conservationists over what was a daunting obstacle related to concerns over public health.

In addition to longitudinal studies related to the health of the new herd, CSU researchers will monitor ecological impacts, and collaborate with Denver Zoo researchers to evaluate the social effects of the bison reintroduction. For example, to assess impacts on bird, mammal, and vegetation communities, researchers are employing methods and tools such as point counts, wildlife cameras, vegetation transects, and grazing enclosures within fenced bison reintroduction sites, versus adjacent cattle-grazed and non-grazed sites. Likewise, structured visitor intercept interviews and surveys are being used to measure visitor experiences and place attachment. Collectively, this information will be used to inform future reintroduction initiatives. Over time, it is expected that data and experience gathered from the reintroduction of plains bison in northern Colorado will facilitate similar efforts in other locations throughout the United States, thereby ensuring the long term sustainability of genetically pure, brucellosis-free North American bison.

Table 1:

Reintroduction Leads	Affiliation
Jennifer Barfield	Colorado State University
Jack Rhyan†	Wildlife and Livestock Disease Investigation Team for USDA-APHIS
Pauline Nol†	Attending veterinarian for the bison, from USDA-APHIS
Matt McCollum†	Wildlife biologist for USDA-APHIS
Daylan Figgs	City of Fort Collins Natural Areas
Meegan Flennikan	Larimer County Natural Resources
†USDA-APHIS leads also contribute to managing the bison for the reproductive research	

Table 2:

Research Leads	Affiliation
Jennifer Barfield (bison reproduction research)	Animal Reproduction and Biotechnology Laboratory, Colorado State University
Liba Pejchar (ecological research)	Warner College of Natural Resources, Colorado State University
Rebecca Garvoille (social science research)	Denver Zoo

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Key partners associated with the reintroduction are listed in Table 1. Project leads for the project research are listed in Table 2. A special commentary by project partners, with an update on the reintroduction efforts, will be highlighted in a forthcoming issue.

Reference

1. Hedrick PW (2009) Conservation genetics and North American bison (Bison bison). J Hered 100: 411-420.

Acknowledgements

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