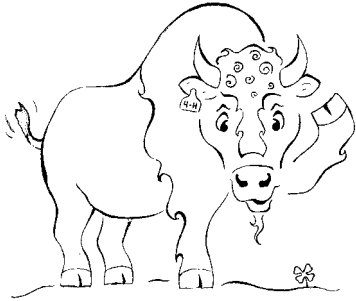


Breeding and Reproduction



Roll Call:

List one thing you must consider when managing your bison herd for fertility.

Selecting males and females with desirable traits that can be passed on to the next generation is a very important responsibility of livestock producers. To make good selections, and to understand why, you'll need to have a working knowledge of genetics, the science of heredity.

Heredity and how it works

An animal's appearance and characteristics are inherited equally from both parents. Units of inheritance called genes cause these visible characteristics. The genes are located on chromosomes that may control one or many characteristics. Bison have 30 pairs of chromosomes. Each parent contributes one half of the genes to the new animal.

As a livestock producer, you will be interested in the heritability of traits of economic importance. We can note several improvements that have been made in other livestock sectors as a direct result of genetics. Here are a few:
Average milk production of dairy cows increased 1700 pounds per cow since 1906!
In 1950 hogs required 4 pounds of feed per pound of gain and it took 8 – 9 months to reach a market weight of 200 pounds. Today hogs will reach 200 pounds in only 5 months with a feed efficiency of only 2.5 pounds of feed per pound of gain!
In the poultry industry egg production is up 84% in the last 30 years!
Researchers at the University of Saskatchewan continue to work on isolating the "tenderness" gene in beef genetics.

Heritability

Heritability is how often we will get a certain trait as we breed animals. For example, a trait that is highly heritable will appear more often than one with low heritability. The heritability of a trait is determined by the degree of change from the average inheritance of the trait in the herd. Since the environment affects many traits more than they are by heredity, heritability can only be determined accurately in animals within the same herd.

The heritability of a trait is the sum of qualities and potentials an animal has received from its ancestors. The inheritance of each trait is not passed on equally. Genes are what determine hereditary characteristics such as rate of gain. Pairs of genes are located on chromosomes, which are part of the nucleus or center of each body cell. In genetics, pairs of letters are used to represent pairs of genes. Genes are usually either dominant or recessive in nature. A dominant gene within a pair will exert its influence over a recessive gene. Recessive genes only express themselves if both genes in the pair are recessive.

Let's look at an example involving dwarfism:

Imagine we had the normal growth gene that is dominant and is written with a capital D, the dwarf gene is recessive and is written with a small d. A cow with no dwarf genes would be designated DD, indicating both genes are dominant and the cow would have normal growth. A dwarf cow would be dd with both genes being recessive in nature. A cow with both dominant and recessive genes would be Dd. This cow would be normal in appearance because the dominant D gene exerts its influence over the recessive d gene.

Assume we cross the pure DD cow with a dwarf dd bull.

DD x dd = all expected progeny would be Dd

Alberta 4-H Bison Project – Member Level Three

The following chart is the expected frequencies of calves from the 6 possible matings for 2 alleles at a single locus.

First Parent		Second Parent	Expected frequency of calves
DD	X	DD	All DD
DD	X	Dd	$\frac{1}{2}$ DD + $\frac{1}{2}$ Dd
DD	X	dd	All Dd
Dd	X	Dd	$\frac{1}{4}$ DD + $\frac{1}{2}$ Dd + $\frac{1}{4}$ dd
Dd	X	dd	$\frac{1}{2}$ Dd + $\frac{1}{2}$ dd
dd	X	dd	All dd

Research on heritability of bison is a new topic, and as a result there is a lot yet to learn. One theory about the genetic inheritance of bison that may be of interest is the theory of temperament and size. Some believe that the bison that were able to survive being slaughtered had to be the sligher, and by nature more nervous animals. Because many in the 1800's deemed shooting bison a sport, the larger bison were often the original targets. Likewise the slower animals were at a greater risk of being hunted than those that were cautious and had a strong instinct of flight.

For most bison herds the major principle of selection is

- Fertility
- Fleshing ability
- Carcass quality
- Longevity

The bull contributes half of the genetic potential of each annual calf crop. Bull selection is one of the most important management decisions you will have to make because he will be responsible for 50% of the calf crops genetic makeup. There are a number of factors that are extremely important to consider when selecting a herd sire.

Fertility is important – bulls should have viable semen by the age of 18 months and at the very oldest 22 months.

Alberta 4-H Bison Project – Member Level Three

Weaning weights should be at least in the top 10% of sire group. The dam's actual weaning weight should be the average of all calves and higher than the average weight of the herd. This is very important because the dam contributes 50% of her genetics to this potential herd sire.

Fleshing ability is an important factor for feedlot handling and since bison are raised for meat, this must be considered important. Yearling weight, average daily gain and weight per day of age are instrumental as a tool for selection.

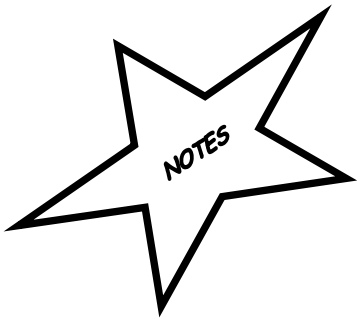
Progeny records will help you to keep track of the offspring of certain genetic lines and can be used as a tool in decision-making. Paper cannot completely replace your eye for an animal, but EPD's (expected progeny differences) can be a useful tool in predicting the potential in an animal.

Word Search

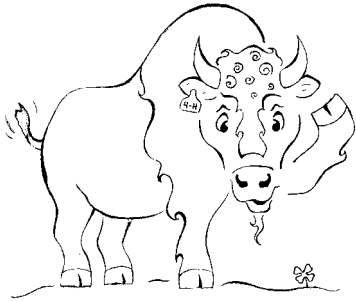
Look forwards, backwards, up, down and diagonally to find twelve words related to this unit.



R	A	I	M	S	W	N	O	I	T	C	U	D	O	R	P	E	R
N	N	V	D	R	C	E	S	L	H	H	A	O	T	R	N	I	F
N	I	S	N	N	Y	R	A	D	B	S	M	T	T	B	T	E	R
S	C	N	C	A	N	S	I	N	A	T	S	T	S	O	R	V	E
H	A	M	E	R	E	O	T	R	I	H	E	H	E	T	Y	R	M
R	T	A	H	H	G	N	A	E	A	N	I	M	I	L	E	L	Y
O	H	S	U	H	O	C	L	C	W	U	G	L	O	C	D	T	E
R	D	S	O	A	R	R	L	N	F	K	I	B	E	O	I	S	M
N	M	E	H	N	P	U	E	S	S	T	N	S	M	V	E	D	D
S	A	O	T	T	T	A	X	I	Y	O	S	I	E	L	C	H	U
H	R	F	A	H	L	W	R	U	E	I	N	G	L	C	I	R	C
U	L	N	A	E	E	D	V	R	V	A	N	A	V	R	T	E	I
T	O	E	R	O	E	P	A	E	N	O	S	G	R	D	E	C	S
U	C	R	A	S	B	E	C	T	L	I	E	D	A	V	N	E	S
E	U	I	I	E	P	R	D	W	A	R	F	I	S	M	E	S	E
E	S	R	D	A	S	D	E	E	Y	P	E	T	A	L	G	S	C
U	E	C	T	E	C	R	E	C	E	S	S	I	V	D	D	I	E
J	I	S	S	E	C	E	R	U	D	R	A	F	C	T	O	B	R



The Newborn Calf



Roll Call:

Use one new word to describe a newborn calf.

The first few days

As we have learned in the previous levels, to raise a healthy bison calf, it must first have a healthy beginning. During calving season, it is important to keep a distant watchful eye over the calving herd. This will allow the bison the privacy to calve without undue stress, but it will also allow you to ensure a successful healthy calf crop.

On rare occasions, the bison cow may be unable to nurse the calf, or the calf is unable to nurse.

This may happen if:

- the cow has twins and does not claim one
- it was a difficult calving
- the cow rejects the calf for some reason
- the calf is sick or unable to get up

In these cases, you will need to feed the calf colostrum. Using a bottle and nipple, feed the calf between 500 – 800 mL per feeding. If the calf will not, or is unable to suck, use an esophageal tube feeder to give it the needed colostrum.

It will likely be difficult to obtain bison colostrum, however cattle colostrum is an acceptable replacement. Many cattle producers will collect colostrum and freeze it so they will always have some on hand. It is very important to remember to slowly heat the frozen colostrum. If it is heated too much, it will turn out looking just like an omelet!! This is because of the extra fat and other ingredients in the colostrum.

You can thaw the colostrum a couple of different ways. The colostrum will have been stored in a heatproof container, so all you have to do is place the container in

Alberta 4-H Bison Project – Member Level Three

the sink. Then run hot water over the container. Another method of heating the colostrum is to place the frozen colostrum in the top of a double boiler and gradually heat. Be sure to stir it constantly as not to over heat it. Slowly bring the colostrum to a temperature slightly above body temperature that is 38 degrees Celsius. If you do not have a thermometer you can test the temperature on your wrist. You don't want to burn the baby's mouth or throat!!

If natural colostrum, either bison or cattle, is not available then the commercial dried colostrum can also be used as a substitute.

Let's review:

What is colostrum?

Using each of the words on the left only once, fill in the blanks to complete each of the statements below.



Absorb

Vitamin A

Yellowish

Antibodies

Meconium

1. Colostrum is important for newborn calves because it supplies disease fighters called _____.
2. Colostrum is also high in _____ and protein.
3. Colostrum contains a laxative that helps the newborn pass the first manure called _____.
4. The newborn calf can only _____ the nutrients from the colostrum for first 4 - 12 hours after birth.
5. Colostrum is thick, rich and _____ in colour.

Raising the bottle fed baby

Bison calves, like all baby animals, are adorably cute! Because of this, there is a huge temptation to want to play with, and make a friend of the bottle fed bison calf. However this is an extremely dangerous thing to do.

Bison are only semi-domesticated. We say this because although they have been around for thousands of years, they have only been under the "farming" type management of people for about a hundred years. That may sound like a long time, but in the life of evolution that is not long at all!

Alberta 4-H Bison Project – Member Level Three

Raising a bottle fed bison calf is a lot of work, and you should seriously consider whether or not you have the time, facilities and knowledge before deciding to do this.

First you must ask yourself, why is this calf orphaned? By understanding the reason, it will help you to make a decision as to the future of this calf. If there is a genetic reason that it was abandoned, then you should consider raising this animal for slaughter. This is a much easier decision to make before you grow attached to the bison calf. If it was abandoned because it is a twin and the mother accepted one and will not take the other, then genetically it is as sound as the other and you may wish to keep her in the herd. Whatever the reason, you should consider all the options before you start this huge undertaking.

There have been cases of producers using cattle as surrogate mothers. If you have access to a cow that is willing to take a calf of a different species it is well worth exploring. Although the composition of the domestic cows milk is slightly lower in protein than that of the bison cow, the quantity of milk received is higher and should result in a perfectly healthy calf.

Finding a surrogate mother may not be an option for you and hand rearing may be your only choice. There is a commercial brand of milk replacer sold in Alberta for bison calves; however if this is not available to you then you may consider using sheep or foal milk replacer as the composition of it is very similar to that of bison.

As we have learned, bison are social animals and it is very important that you never raise one bison by itself. Often, the larger herd does not socially accept bison calves that are hand raised by people. The danger in raising bison bottle babies occurs when they no longer have a respect for humans, and if the larger herd does not accept them it will cause social problems for the calf. For this reason, it is important to have appropriate housing available to the bison calf you are feeding.

If possible, raise the calf with other bison and don't befriend the calf yourself. You should remain nothing more than the provider of food, and all social bonding should be with other bison. Taking this approach will not only result in a safer bison for you, but it will also make for a well-adjusted mature animal.

Alberta 4-H Bison Project – Member Level Three

How much should you feed?

This will vary from calf to calf, but as a general rule the calf should remain slightly hungry at the end of each feeding. Allowing the calf to fill up may cause diarrhea and other digestion problems.

Most calves require between 10 – 20 % of their body weight in milk. When the calf is young it will need to be fed small amounts frequently throughout the day, however as it gets older these feedings can move to larger quantities a couple times a day. If you get the calf use to consuming chilled milk, then you can put the milk out and allow the calf to come for the milk, as it desires.

If you have the calf in with older bison, it will automatically be introduced to solid foods. By the time the calf reaches three to four months of age it can be weaned off the milk altogether and should be provided a good quality diet.

Following are a few tips on raising a healthy bottle fed bison calf:

- Always thoroughly wash the bottles, nipples and pails after each feeding. This
- will prevent contamination from occurring.
- Provide salt and mineral licks to ensure the calf receives the required amount.
- Having access to soil will allow the calf to get the nutrients it needs.

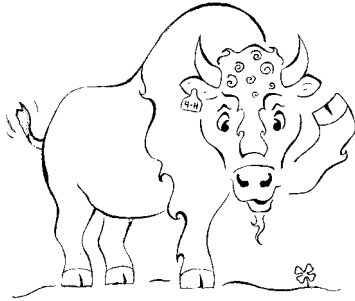
Creep feeding calves

Some bison producers have looked at the option of creep feeding their calves. Creep feeding becomes an advantage when:

- there is a need to conserve pasture due to drought or poor pasture
- young cows or low producing cows can be separated from the rest of the herd
- you are using it as part of a preconditioning program for feeder calves

There is no need to creep feed if your cows are milking well, or if there is lots of good quality pasture available to them. If you are going to be backgrounding your calves over the winter there is no need to push them to early.

Bison Handling



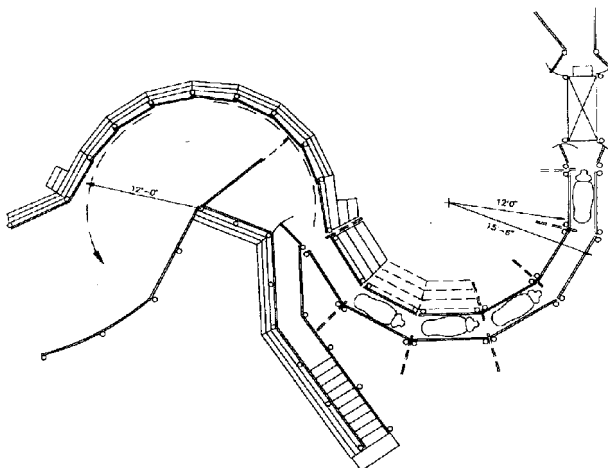
Roll Call:

List one thing you must remember when working with bison.

Good facilities for handling and housing bison are simple, strong and durable. If you recall from the history section in this level, we learned that the Native American Indians had four key components in their complex kill sites. These consisted of the collecting area, the drive lanes, the cliff and the butchering site. If you think about it you can probably see that our modern system, although a little more elaborate, still follows the same principle of maneuvering the bison through! As a review, try to name the various components of the following handling system.

Handling facilities

As we discussed in level two the handling facility when working bison needs to be well constructed, solid and safe for both the bison and the handler. At the back of the chapter on handling facilities in level two there are a number of different designs for bison handling. Review those designs and then see if you can see any advantages or disadvantages to one design over another. Have you worked bison through a system? Can you think of any experiences that you have had, either positive or negative, with working bison through that system? How would you change it?



Fencing on the range

In Alberta, bison are considered to be domestic livestock and as a result there are no special regulations, beyond those for all livestock, controlling the perimeter fencing of bison.

Alberta 4-H Bison Project – Member Level Three

The purpose of building a fence is really to keep your animals in and others out. As many have said in the past, content bison don't want out. Bison are often persuaded with food or curiosity when producers want them to leave one pasture area for another, but rarely would they challenge the fence of a pasture that contains a good supply of food and water. The fence is simply a physical barrier that defines their space.

This provides as much security to them as our environment does for us. Your perimeter fence is going to be a long-term investment.

Before you just jump into building it you should consider doing the following things to ensure you make the best possible decisions concerning your fence:

- Aerial photo – A photo will give you a full view of the land, creeks, roads or coulees that make up the topography of the land.
- Drawing in all fence lines, gates and facility locations on your photo will help you to see the physical landscape of your new system. This will help you to decide whether or not you have any potential problems or any natural draws that will assist you in moving the bison from pasture to handling facilities with ease.
- Stake it out to see what it looks like on the ground. Does your fence line seem to flow? Do you need to do any tree removals before you begin? Are there any natural barriers?
- Prepare for the pasture and building the fence. Do you need to seed the area? What materials have you selected to build your fence out of? Have you considered the cost of the materials and the size of the area you plan to fence?
- If you choose to do a wire fence you will need to decide how many strands you will use and you will want to compare the costs for smooth wire, game fence or electric.
- Decide if you want to use wood or steel poles. Researching and talking with other producers, and shopping around, before you begin will save you time, headaches and money in the long run.

Alberta 4-H Bison Project – Member Level Three

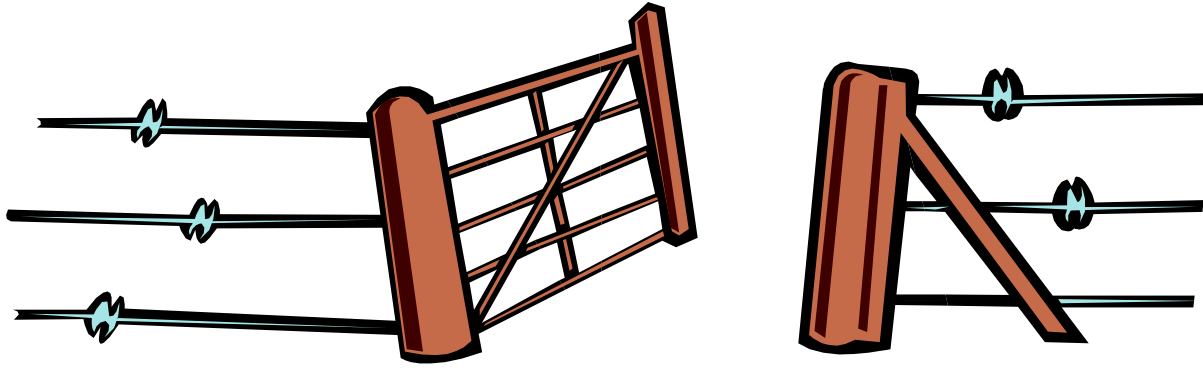
- Call before you dig!! As always you must call to be sure you know the location of all gas, phone and hydro lines before you start digging on a site.
- It is best to install all corner posts and gate poles first. Because these are high stress poles they should be twice the length of the height of your fence. Use larger diameter poles in this area so that it can endure the pressure that may be put on them.
- To ensure that you are in a straight line, run a single strand of tensioned wire as a guide.

You are ready to put up the fence! Get all wires as tight as possible, and remember to do regular inspection of the fence once it is completed to ensure that it is good and in safe repair.

There are an unlimited number of ways that you can construct your pasture or perimeter fencing. Do a little research and see what is best for your budget and location.

- Interview local producers to see what their fence is constructed from.
- Obtain an aerial photo of a piece of land. You may be able to get a scanned copy from the Public Lands office in your region. With this picture design what you think would be the best solution.
- Price out the various fence materials that could be used to build the fence that you have designed.





Training bison calves

An important research study was conducted (Training American Bison Calves – by J. Lanier, T. Grandin, A. Chaffin, and T. Chaffin) to attempt to train bison calves to remain calm in the handling facility.

The following is a reprint of the research paper that was published as a result of this study.

Training American Bison (Bison bison) Calves

By J. Lanier, T. Grandin, A. Chaffin, and T. Chaffin

Reprinted from *Bison World*, Oct/Nov/Dec 1999, pages 94-99

Summary

This article describes how a group of bison calves were trained to remain calm in the handling facility. The calves were conditioned by rewarding them for good behaviour and by exposing them to novel experiences. The training made the calves easier to move between pens and through a squeeze chute.

Introduction

Bison, like cattle, are routinely handled to maintain herd health and meet the requirements of various regulatory agencies for diseases such as tuberculosis and brucellosis. Injuries and death during handling are more frequent in bison than in cattle, which have been bred for calm temperaments. Bison often break off a horn cap, gore one another, attempt to jump out or smash through a holding pen, and even die due to excessive stress caused by handling.

Alberta 4-H Bison Project – Member Level Three

These bison are termed “self-culling,” for if they manage to survive the experience, their owners are likely to sell them. Calm handling of bison, an excitable animal, requires attention to detail and strategies that differ greatly from traditional animal handling, including cattle handling.

Habituation (training) changes the animal’s perception of a frightening experience or novelty to either a neutral or positive experience. Habituating bison to routinely accept handling procedures in a squeeze chute will help reduce injuries, thus allowing the wild genetic type to remain in the herd. Bison habituated to enter a handling facility are not tame animals, nor are they domestic in nature. They are simply conditioned to respond to a particular situation in a calm manner. If these same animals are confronted with a new novel experience, they will still respond as wild bison. Short training sessions, similar to the training discussed in this paper, can reduce the overall level of aggression in an animal. Reduction of stress experienced by an animal increases the value of the animal by decreasing abnormal behaviors, and improving health, reproductive success, and overall growth. Bison that are habituated to being handled are invaluable. Dead or injured bison have relatively little value.

The training program

American Plains Bison (*Bison bison*), born in the spring or summer of 1997 to the Rawhide Energy Station herd in Colorado, were conditioned (trained) to some common handling practices. The calves had minimal previous contact with people and had not previously been worked through a squeeze chute. Calves were randomly assigned to either a treatment group (trained) or a control group (not trained). Every other calf exiting the holding pen was assigned to the treatment group. The treatment group was comprised of seven calves: four heifers and five bulls. The control group consisted of two heifers and four bulls.

To prevent bias, people who evaluated bison behavior during handling on January 14, 1998, did not participate in habituation procedures. On January 14, evaluators and handlers were not aware which calves had been trained and which calves were not trained. Habituation of bison to handling was broken down into two phases, 1) initiation of operant conditioning and 2) introduction to novel experiences. The calves underwent habituation for eighteen non-consecutive days, from December 23, 1997, to January 13, 1998. Due to the short training period, the calves were not expected to learn to stand quietly in the squeeze chute while being ear tagged or the like.

Alberta 4-H Bison Project – Member Level Three

The reason for the short training period was due to the animals being weaned on December 22, 1997, and then transported to the National Western Stock Show in Denver, Colorado on January 18, 1998. On January 14 and 17 all thirteen calves were worked through the handling facility for their annual herd maintenance program as governed by the owners, State and Federal regulations, and the National Bison Association Gold Trophy Show and Sale. On both days calf behavior was evaluated during the handling.

Learning to learn

Before the calves could be expected to learn to be calm while being handled, they had to realize that they were safe, and that certain sounds and foods meant that their behavior was acceptable, and that the absence of these sounds and foods meant that they were doing something “wrong.” Operant conditioning was used to teach the calves to stand still. Operant conditioning uses rewards and ‘a bridge.’ A bridge is an auditory sound (i.e. whistle, clicker) or a visual signal (i.e. a hand signal, a flash of light) that connects a desired behavior to a reward. Our bison really liked pretzels, peanut butter and supplemental cake. (The cake used as a treat was not the same brand of cake fed to the animals as part of their daily diet.) Association of the reward with a bridge, and not the handler, is instrumental in reducing potential injuries from overly assertive calves. If a pretzel (reward) is only given to the animal when the whistle is blown (bridge), the animal quickly learns that this is the only time they get a treat.

The use of a whistle as a bridge controlled the bison’s behavior from a distance. This type of conditioning reduces the possibility of the bison rubbing against, nudging or mobbing the handler in expectation of a treat. For example, to get the bison to stand still, we waited until the entire group was standing still, then blew a whistle while tossing a handful of pretzels or ‘cake’ to the bison. The calves quickly learned to stand still in order to hear the whistle and receive the treat. The whistle was always blown before the treat was given. The treat must be given immediately after the whistle is blown for the bison to associate the treat with the whistle. The whistle must be blown as the bison are doing the desired behavior, not before and not after the behavior. Timing is critical for successful training. This type of training has also been found to reduce anxiety in animals that are exposed to sudden noises like slamming gates and people yelling. The calves learned to focus on the trainers, and that the whistle meant tasty treats.

Alberta 4-H Bison Project – Member Level Three

Animals, which have had prior positive learning experiences such as being given treats for standing still, are easier to train and are more capable of further learning, than animals that had a frightening or painful experience. Once the calves had learned to learn, the second phase of the habituation began.

That wasn't so scary!

Now that the calves had learned that standing still caused a whistle to be blown and then a treat to be thrown, it was time to expand their learning. They were now taught to stand still when scared. It is important to note that learning to stand still is very different than “freezing in place” (tonic immobility). The calves were gradually exposed to a variety of new experiences and novelty, such as noises, people in different types of clothes, rattling of squeeze chute gates and bars, and walking through the handling facility. Novelty was gradually introduced to ensure that the animals would not become overly fearful.

This is the most important part of any conditioning. First experiences are critical. If the first experience is frightening and causes the animal to run, the animal will be harder to convince to re-enter the same situation. However, if the experience is pleasant and does not cause the animal to flee, future encounters with the situation will be relatively smooth. If the animals were about to panic, we temporarily stopped the training, and allowed them to calm down. The novelty was never so great as to cause the calves to panic and run blindly. It was the very small steps used in presenting the object, or situation, which allowed the bison to remain calm enough to learn that it (the novelty) wasn't so scary after all! With this simple training, the calves learned that if they stood still after a “scary” experience instead of crashing into fences, they would receive a treat.

Handlers

Two categories of bison handlers were needed for this research: trainers and workers. Trainers were actively involved in shaping and desensitizing the experimental group to novelty. Workers were the individuals who handled both groups of calves on the 14th and 17th of January, 1998. Workers were assigned specific jobs during bison handling. Throughout the day, each worker performed the same task for all thirteen calves (seven experimental calves and six control calves). Job consistency enabled an accurate measure of the effect of habituation of bison to routine handling. The workers used calm handling techniques for both groups. Every attempt was made to keep all thirteen animals calm during handling. Brooms were used instead of whips and electric prods.

Alberta 4-H Bison Project – Member Level Three

Evaluation of bison behavior

14 January 1998

Prior to working the calves, three evaluators measured each group's flight zone, from fifty feet away, from atop a fence twelve feet away, and from each group's home pen fence. The evaluators then threw a novel object, a plastic bag weighted with a rock, into the middle of the pen. Each group's response to the object was evaluated. Twenty minutes after each group was worked, this sequence was repeated using a white cotton glove as the novel object. The twenty-minute wait allowed the calves time to quiet down after being handled. During handling, the evaluators recorded the time required to move the animals through different parts of the handling facility. Calves were individually separated from the group in their home pen and brought to the working facility. Evaluators also noted any signs of agitation, such as, struggling in the squeeze chute, vocalizations, pacing, head butting the fences, or head butting pen mates.

17 January 1998

Due to a change in protocol by the managers of the bison herd, handling and evaluation of the calves was greatly altered. As a group, the trained calves were brought up from their home pen to the handling facility and held as a group in the crowd pen. Once all the habituated calves had been worked, the control calves then came up as a group and were held in the crowd pen. The evaluators were the first and fourth authors and the handlers were the third author and a CSU employee who had also been a handler on the 14th. No pre- or post-handling evaluation, or timing of animal movement from one area to another, of either group was possible.

Our training worked!

The average weight of trained calves was 503 pounds, while the average weight of the control calves was 498 pounds. Thus, any concerns that training would cause weight loss were quickly dispelled. Habituated calves were easier to handle, were handled with fewer people, and caused fewer injuries amongst themselves on both the 14th and 17th of January. On both days there was no difference between the two groups' reaction to a novel object thrown into their pen, either before or after handling.

Alberta 4-H Bison Project – Member Level Three

14 January 1998

Trained calves moved from their home pen to the working area better than the control calves. Habituated calves walked quietly, without hesitation, milling or fence running, and with no injuries, while all of the untrained calves ran in circles in their pen, ran from their home pen to the working area, and one calf received a bloody nose after running into a fence. The average time required to separate one calf from the group and move him from the home pen to the working area was 41.5 seconds for the trained calves and four minutes for the control calves. After arriving in the working area, the trained calves stood quieter in the holding pens than did the control calves. Habituated calves moved from the crowd pen to the single file alley easier than did the control calves, 27.2 seconds versus 42 seconds on average, respectively.

Group evaluations, before and after working of the calves, showed the conditioned calves were calmer with increasing flight zone pressure than the control calves. The trained calves paced less and were less bunched than the control calves. After handling, the distance between the conditioned calves (one to 15 feet) did not change as the evaluators approached their home pen fence. Control calves were watchful of the evaluators. After having been handled, control calves bunched together as evaluators approached their home pen fence. Distance between the calves went from one to 15 to two feet. Bunching is a sign of fear and vigilance.

17 January 1998

The control calves were so agitated that they required two people to move them out of their home pen. In their home pen the calves ran frantically around the perimeter of the pen and bunched as a group in the furthest corner from the gate. Once they were in the crowd pen, they had to be divided into three small groups in order to prevent them from injuring each other, and to move them into the single file alley. In the crowd pen, the calves attempted to jump out of the pen; they began goring one another and milled continuously. Once the calves had been separated into smaller groups, they decreased the number of escape attempts and were less likely to gore one another. When the gate from the crowd pen to the single file alley was opened, all of the untrained calves “froze in place” and refused to leave the crowd pen, loud noises, touching, and looming over the untrained calves, were needed to move them into the squeeze chute. There were no electric prods on the property. One person fully moved the habituated calves from their home pen and through the handling facility.

Alberta 4-H Bison Project – Member Level Three

To move the conditioned calves from the crowd pen to the squeeze chute, the handler walked past their point of balance, and/or made small noises.

Habituated calves stood calmly in the squeeze chute before being head restrained, while the control calves jumped, kicked, and backed up in the squeeze chute before being head caught. Since there was not enough time to habituate the calves to restraint in the squeeze chute, all thirteen calves struggled when caught in the headgate. The habituated calves were much calmer than the control calves until they were suddenly confronted with the new experience of being caught in the headgate. We are confident that the calves could have been habituated to head restraint with more time.

Notes on the training

The experimental group walked through the squeeze chute approximately 60 times and was exposed to many novel situations throughout the experiment without injury to calves or people. Training animals with prior squeeze chute experience would be more difficult and require an extensive timetable. Research with other species has shown that if an animal's first experience with novelty is frightening or painful (i.e. ear tagging in a squeeze chute), the animals will balk or refuse to enter in the future. This held true for this study, as the control calves were very difficult to move from their pen to the handling facility on January 17, 1998. Once in the crowd pen, they gored one another, attempted to escape, and finally froze in their tracks.

It was important to desensitize the calves to different sounds of the squeeze chute. From outside of the squeeze chute the authors rattled the chute, worked the levers, and slammed gates. The authors then stood inside the squeeze chute and shook the chute. While someone was inside the squeeze chute shaking the bars, another person operated the levers from the outside. Although it was difficult for the trainers to tell a difference in sound between shaking the squeeze chute from the outside or from within, it was evident that the bison could distinguish between the two sounds. Habituation, to shaking the squeeze chute from the outside and working the levers of the chute, took one day. Shaking the squeeze chute, while standing inside the chute, took three days to habituate the calves to the noise of the chute.

Alberta 4-H Bison Project – Member Level Three

The types of problems encountered in this project are discussed in the order that they occurred.

- The calves initially ignored the treats thrown into their pen, either due to fear of the treats or the presence of the trainer. A variety of possible treats was provided in the feed trough overnight to allow the calves to investigate and sample them. Food that was eaten overnight (pretzels, peanut butter and supplemental pellets (cake) was used as training treats.
- The calves tended to “lose” their flight zone to people who entered their pen. This presented a safety hazard to the handlers that was overcome by the establishment of the “ten foot rule.” When a calf came within ten feet of a trainer, the trainer used sudden jerky motions and (or) vocalizations to prevent the calf from coming closer.
- The more confident calves were more willing to approach novel situations. Therefore, these dominant calves received more conditioning than the subordinate calves. Splitting the calves into smaller groups solved this problem.
- After calves began moving through the squeeze chute, the dominant calves, which tended to be in the lead, would stop in the alley when they exited the squeeze chute. This resulted in a pile-up of subordinate calves in the squeeze chute. Solving this problem was accomplished by splitting the calves into smaller groups, and delaying the reward until all bison exited the single file alley following the squeeze chute, and were standing still in the holding area.
- It was not possible to differentiate individual calves that voluntarily wandered through the chute. The trainers intentionally did not try to distinguish individuals, since this might lead to biased training. Therefore, it was not known if all calves were comfortable walking through the squeeze chute, or just the confident animals. This problem was not solvable in the context of this experiment.
- The dominant bull calf behaved independently of the other calves, which turned out to be beneficial in one aspect, as he progressed more rapidly than the rest of the group. The downside to this was that it was not possible for one person to move all seven calves as a group into the training area. Therefore, two people were used to move the group from their home pen to the training area. Dominant animals tend to have a lower fear level than subordinate animals.

Alberta 4-H Bison Project – Member Level Three

- During the last week of training, aggression between the calves increased when the entire group was worked, versus splitting the group into subgroups. When the calves were split into two or more groups, the calves waiting to be worked always fought with each other. Placing fresh hay in the holding pen solved this problem.
- Have you ever witnessed the use of food as an incentive for bison to cooperate with handlers?

How do you think the information gained from this research study could be used in the average producers herd?