

BISON: CLINICAL EXAMINATION AND TREATMENT



BASICS

OVERVIEW

- Plains bison (*Bison bison* spp *bison*) and woods bison (*Bison bison* spp *athabasca*) may both require examination and treatment.
- Historical information about events leading to a disease outbreak in a bison herd can be invaluable for establishing a clinical diagnosis. It is not always possible or practical to perform a hands-on physical examination, and historical information can often guide the practitioner to a reasonable list of differential diagnoses.
- Bison are stoic animals, readily able to mask signs of disease. They do not display obvious signs of disease, such as listlessness, depression, or separation from the herd until shortly before death. This behavior has developed as a herd survival strategy, to decrease predator attraction and also to decrease the chance of being ostracized by other healthy herd mates.
- It is important to be knowledgeable about the normal behavior of bison, specifically calves at weaning (due to stress and mixing predisposing them to disease), in order to remedy stressful situations and to identify disease processes early when they are most amenable to correction.
- Information supplied by owners and producers regarding the onset, duration, or severity of the clinical condition of their bison can be of questionable value due to bison's innate ability to mask clinical signs until the disease is advanced. Morbidity is often underestimated, as less severely affected bison may not be identified as sick or diseased.
- Only individuals with a strong background in bison behavior can pick up the subtle clinical signs that bison develop during disease. Each owner's abilities should be evaluated and the information supplied by them judged accordingly.
- Establishing a clinical diagnosis in a sick bison is challenging; physical examination is difficult to perform, and clinical data is often difficult to interpret.

CLINICAL HISTORY

- Exposure to sheep in the months prior to the onset of an outbreak of sudden death in bison is a strong indicator of malignant catarrhal fever
- A sudden reduction in the quality or quantity of nutrition in the face of an outbreak of mortality and abortion in fat, late-pregnant bison cows suggests possible hepatic lipidosis
- Anorexia is a difficult clinical sign to identify in bison until the individual is extremely depressed or even non-ambulatory. During less severe stages of disease, anorexic bison might mimic normal feeding behavior by standing with their head in a feed bunk or mimicking grazing.
- The long hair coat covering the thoracic area make it difficult to assess abnormalities in respiratory rate by observation alone.
- Bison cows often are over-wintered in large pastures where abortions are difficult to detect due to scavenging of aborted fetuses.

- Bison on large pastures or ranges, especially in summer months, are infrequently observed and some animals, especially calves, may die and be scavenged without being identified by the producer.
- It can be difficult for bison owners to accurately estimate the number of calves born in the herd due to the large size of calving pastures, and the dangers of approaching recently calved cows. The calves are often not counted until weaning in the fall, and spring/summer calf losses are unidentified.

CLINICAL EXAMINATION

- Bison and cattle are closely related and similar in many ways, but there are sufficient differences in their behavior and management to require different approaches to disease diagnosis and examination.
- Handling of bison is typically minimal, perhaps occurs only at weaning time, and rounding up/processing bison through a handling facility can therefore be very difficult. Handling-associated injuries are common.
- External observation is best performed before attempting to separate and corral sick bison. They suffer stress readily, which can exacerbate disease processes and can also cause sudden death. Veterinarians are often called to examine free-ranging bison – this provides an opportunity to observe affected individuals and the herd mates. Other affected bison can be identified this way, body condition scores estimated, pasture/feed/management practices assessed, and the problem discussed with the owner before continuing.
- Bison have a very strong herd instinct, which can make it difficult to separate an individual from the herd. In many cases, corralling a larger group of bison (or in some cases, the entire herd) may be necessary to capture a single animal. This increases the likelihood of injury to numerous individuals, and can precipitate disease.
- In some situations, it can be physically impossible to corral a bison. They are athletic and intelligent, and easily able to dodge people pursuing them on foot or in vehicles. If chased for an extended period of time, both bulls and cows may become angry and stand to face their pursuers, charging them or their vehicles.
- Just because a bison is successfully corralled alone for examination does not mean that successful physical examination is possible. It is not uncommon for exhausted bison to stand with the hind end in a corner charging anyone who approaches. A proper lane and chute system is crucial to ameliorate this roadblock.
- It is important to balance the value of a hands-on physical examination against the risk of stressing diseased bison. It may be best to desist when it becomes apparent that capture will be difficult or unsuccessful. This is a decision the veterinarian should not be afraid to make for the sake of the bison's health and well-being.
- For healthy bison with injuries, dystocia, or minor surgical interventions, sedation can be administered by hand injection in a chute system or, for a less stressful administration technique, by dart gun.
- Examining ambulatory neonatal calves or calves on pasture can be impossible, and very dangerous for the veterinarian. Bison cows with calves are highly protective and will not allow humans to approach the calf.
- Corraling bison cows with calves at foot is a dangerous situation, as calves can be trampled during the process of corralling and sorting.
- Calves that are minimally or non-ambulatory may be able to be hand-caught by one person whilst a second person drives the cow away with a vehicle. At this point, the calf can be moved to a safe place for examination and necessary treatment. At times, however, the dam refuses a calf upon re-introduction, even after just a short removal period. In these situations, the producer must be prepared to hand-rear the calf.

- Hand-rearing calves that have recovered from illness can be successful, but requires considerable long-term commitment of time and resources by the owner, and owners should be cautioned of the long-term consequences of hand rearing bison. Behaviors of hand reared male bison calves can often be more aggressive as they reach sexual maturity than dam-raised bison due to the lack of appropriate wariness and fear of humans. Some adult males that were hand-reared charge people and equipment at every opportunity, and become a danger to herd-mates and handlers alike. These hand-reared bison bulls should be finished for slaughter, and not kept or sold for breeding. Female calves often remain pets for life, and can be a wonderful addition to the breeding herd.

RESTRAINT

- Physical or chemical restraint is absolutely necessary to examine bison of any age. Both may be required for some procedures.
- Physical examination can be successfully performed, but it can be very challenging to ensure the safety of all individuals involved: the bison, the handlers, and the veterinarian.
- Even when restrained in a squeeze chute, bison are rarely motionless. They often will lunge forward and backward or bounce up and down on their hind limbs.
- If they do become motionless, they often assume a dog-sitting position or lay down, making oral and rectal examinations, auscultation of the chest/abdomen, and other procedures difficult and dangerous. Bison often will jump up unpredictably and kick back with both legs. Do NOT lean into a squeeze through a side panel or reach into a squeeze over the back or at the rear of a bison, as this can be very dangerous.
- Handling-associated deaths, especially trauma, is an important cause of mortality and can often be precipitated by suggestions by the veterinarian to allow closer examination. Weighing all options and risks must be done carefully and considerately.
- Individuals who have experience working cattle do not necessarily have the skills to work bison. Veterinarians new to bison handling are often best advised to stand back and watch rather than accidentally precipitating a handling-associated mortality.
- The safe and successful completion of any procedure, for both the bison and the examiner, will depend on the handling facilities available, the skill and experience of the handlers and veterinarians, and the temperament of the bison.
- Restraint for any procedure is extremely stressful for bison, and should not be taken lightly.
- While normal pulse and respiratory rates have not been reported in bison, both of these rates are of little value during an examination as they are most always increased during handling.
- While cattle rectal temperature values are often used as a reference range for bison, the accuracy of these values is unknown since normal body temperature values of bison have not been reported.

LABORATORY ANALYSIS

- There are very few reports describing reference values for complete blood count and serum chemistry variables for healthy bison. Normal values established for cattle have been used, but physiological differences could cause certain values to be substantially different. The best values to compare to would be those established from samples obtained from other healthy animals within the herd.
- It is best to sample a number of healthy animals within a herd of bison in order to establish a herd reference value against which bloodwork values from sick bison may be compared.
- Normal values established in one diagnostic laboratory cannot necessarily be used as the standard for other laboratories due to variation in test results across laboratories.
- The metabolic rates of bison change considerably throughout the year. During late fall and winter, there is a decrease in metabolic rate of bison that can cause changes in fat metabolism,

leading to elevations of serum liver enzyme activities, and concentrations of cholesterol, lipids, and other indices. These changes are especially prominent in pregnant bison. Care should be taken to consider the animal as a whole, especially regarding these values, as some could be considered normal and some could indicate hepatic lipidosis.

- Few serological tests have been validated for use in bison. Although some laboratories have conducted in-house validation studies, most laboratories use reference values established for cattle to classify bison as either exposed or not exposed to particular pathogens.
- For some pathogens, cattle reference values may be valid – especially if the bison that has been tested produces an extremely high or low value. However, caution is advised in interpretation of these values.
- Sub-clinical infections with pathogens may produce antibody responses in bison that are detected by the test, causing spuriously elevated test results.
- Some pathogens may not stimulate similar immune responses in bison and cattle, resulting in much lower test results for bison. Interpretation of serological test results is difficult without field validation studies conducted on groups of infected and un-infected bison. Interpretation should be done in consultation with laboratory personnel who are familiar with the test.
- Pathogen identification techniques such as bacterial culture, virus isolation, and polymerase chain reaction (PCR) assays are, in general, pathogen specific and useful at identifying specific pathogens in bison and cattle alike.
- Culturing *Mycobacterium avium* spp. *paratuberculosis* from bison may require different culture media than for culturing this pathogen from cattle.
- Similarly to cattle, clinical signs of disease may be common to multiple etiologies, and therefore represent one small piece in the diagnostic puzzle. For example, diarrhea is common in adult bison that are stressed, or sick from a variety of conditions such as malignant catarrhal fever and hepatic lipidosis.
- Complete necropsy examination with submission of samples from one or more dead bison to a diagnostic pathology laboratory is often the best way to establish a true diagnosis of disease.
- If outbreaks of disease or mortalities occur, it is crucially important to perform a complete necropsy examination on as many dead bison as possible. A single dead bison is often inadequate to firmly establish an etiology. Necropsy should be performed shortly after death, as tissue autolysis can occur more quickly than in cattle due to the bison hair coat that prevents cooling of the carcass following death. At even very low ambient temperatures, carcasses of bison, even calves, will quickly deteriorate following death. This considerably reduces their value for diagnostic purposes.



TREATMENT

TREATMENT AND MANAGEMENT OF CLINICALLY ILL BISON

- Approaches to the treatment and management of sick bison must consider their unique behavior, their stressors, and the conditions under which they are managed.
- On large pastures or ranges, it may be impossible to treat sick bison without injectable antibiotics because it may be impossible to corral them.
- Roping bison from horseback or motorized vehicle is not an option as it is for cattle, due to the potential for injury of both bison and handler.
- Minor conditions may often be handled by either darting an individual bison with medications or tranquilizing a bison with a dart gun to restrain the animal for treatment.

- When dealing with diseases that affect large groups of bison, medication may be administered via feed or water. During summer, medications administered through feed may be unsuccessful because bison often choose lush pasture over grain or other supplements. Medicating water in the winter months may be ineffective if snow is available because bison have been known to eat snow rather than drink medicated water. One good way to administer oral medications is through salted mineral supplements. Using loose minerals, first determine average individual intake over the course of a day or week. After the amount taken in per day is quantified, medication of appropriate concentration may be added. Salted minerals are often something bison will feed on regardless of the availability of lush pasture or water elsewhere.
- There must be adequate feed bunk space available if the producer is to successfully administer medications through feed to penned bison.
- The feeding and drinking behavior of the group of bison should be closely monitored during medicating periods.
- Queuing behavior that arises from dominance relationships within the herd can leave less dominant bison with reduced or no access to medicated feed, while dominant bison over-dose on medicated feed. This is especially true for medicated supplements provided in small quantities. This uneven distribution of medication across the group has various implications.
- When dosing bison with drugs is necessary, it is often best to use a long acting preparation since daily handling of sick bison increases the risk of injury and stress. Bison can quickly become refractory to handling, and can become incredibly difficult and dangerous to work with.
- Bison have a very strong herd instinct, so it is ideal to include a couple of healthy bison in the pen with a diseased one to provide comfort and to keep the animal calmer. Individually separated animals often neglect to eat or drink and may constantly run or pace their perimeter fence for days. Adding herd-mates to the individual's pen can decrease this behavior.
- Bison respond less favorably to handling than cattle do, and can take several days to return to normal behavior after a stressful handling event. Monitoring programs involving minor handling of sick bison can potentially be unsuitable due to the stress involved.

PHARMACOLOGY

- There are no published reports describing the efficacy of any antimicrobial drugs in bison for any diseases or disease syndromes. There are few published reports describing the pharmacology of any medications in bison.
- Most veterinarians extrapolate dosages recommended for cattle, which may or may not be appropriate for bison.
- All medication prescribed for bison is used "off label" and places the veterinarian in the position of assuming full liability for any adverse effects associated with the medication.
- Extra caution should be practiced when prescribing medications for bison destined for slaughter, as withdrawal times established for cattle may be inappropriate for bison. A clinical pharmacologist should be consulted to estimate potentially safe withdrawal times under these circumstances.

VACCINATIONS

- Vaccination programs for bison herds should be developed with a thorough understanding of the potential risk associated with each pathogenic agent under consideration for prophylactic vaccination
- Some diseases affecting cattle have not been reported to affect bison, while the risk of other diseases may be low or specific to certain geographic locations or management practices.
- Bison have demonstrated antibodies (and presumably exposure) to bovine respiratory syncytial virus (BRSV), infectious bovine rhinotracheitis virus (bovine herpes virus-1, IBR), and

parainfluenza-3 virus (PI-3), though disease has not been reported for these pathogens. Bovine viral diarrhea virus (BVDV) has been associated with significant mortality in bison, but outbreaks are uncommon. It is thought that BVDV plays a significant role in disease by subclinical immunosuppression.

- Bison are commonly affected by infectious keratoconjunctivitis and sometimes a foot-rot like syndrome, but the causative agents have not been determined, making the use of bovine vaccines for these agents inappropriate at this time.
- There have been no commercial vaccines developed specifically for bison, and no published studies demonstrating immunogenicity, efficacy, or adverse effects of any bovine vaccines for bison. More specifically, it is not known whether vaccines developed for cattle will stimulate an appropriate protective immune response in bison. Specific vaccination recommendations for cattle, including age at first vaccination and frequency of boosting, may be inappropriate for bison. In spite of this, many bison herds are currently being vaccinated according to cattle standards against specific disease agents.
- Blanket vaccination programs should not be made for bison herds. Rather, each herd should be evaluated for potential disease risk and vaccinated appropriately. If the risk of a specific disease is high, a bovine vaccine may be selected. Bison producers should be warned that vaccination provides no guarantee of disease protection, nor any assurance of safety.



MISCELLANEOUS

SEE ALSO

- Bison: Bacterial Diseases
- Bison: Management (www.fiveminutevet.com/ruminant)
- Bison: Parasitic Diseases
- Bison: Viral Diseases

ABBREVIATIONS

- PCR= polymerase chain reaction
- BRSV = bovine respiratory syncytial virus
- IBR = infectious bovine rhinotracheitis
- PI-3 = parainfluenza-3 virus
- BVDV = bovine viral diarrhea virus

SUGGESTED READING

Feist, M. "Growing & Finishing Bison: Principals and Practices." *Smoke Signals* 1 Dec. 2000: 4-9.
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