



Bison Health

BY HUNTER, DVM, AND MURRAY WOODBURY, DVM

INTRODUCTION

Animal health is more than just the absence of disease. The presence or absence of disease is usually not the best measure of individual or herd health. Every producer should have well defined production goals. The best indicators of a truly healthy herd are whether these production goals are being met. If the herd is a cow-calf operation, the weaning percentage might be a good indicator. In a feeding operation, rate of gain might be the best gauge of health. Subclinical disease like parasitism or trace mineral deficiency can often reduce production indices in a herd and yet there is no real “disease” in the obvious sense. If a calf producer’s weaning rate is only 60% then there’s a problem whether there is mortality in the cow herd or not. In a herd with optimal health there is optimal production; regardless of how it’s measured, in pounds of meat or number of calves. Productivity is the best overall measure of health. Therefore, optimizing herd health leads to maximum productivity and profitability.

It is important to remember that disease occurrence is more complicated than just a bison meeting a disease-causing organism (a pathogen). Understanding the exposure to pathogens and the outcome of the exposure in your herd is important. Whether or not disease results from the exposure is determined by a complex interaction between the animal, the environment, and the pathogen. Healthy bison are disease resistant, and clean healthy environments don’t support pathogenic organisms. The nature and strength of pathogen exposure is more difficult to control and so it’s easier to avoid the pathogens than to modify or neutralize them.

Health is an expression of many interrelated factors, each one contributing to the well-being of the animal. Similarly, disease is almost always the result of many contributing factors. Some factors are “necessary” or specific to a disease before it can occur and others are only “sufficient” or general causes for disease occurrence. For example, a necessary factor for Malignant Catarrhal Fever (MCF) is the presence of the virus

OvHV2, which causes MCF. If that specific virus isn't present, then whatever the disease affecting the animal, it's not MCF. On the other hand, "sufficient" causes are more complicated and usually have several components or factors. In the example of MCF disease, the OvHV2 virus is necessary to cause MCF, but it usually isn't sufficient or enough to cause disease in a herd all by itself without other factors like suitable environmental conditions for transmission from sheep and a compromised immune system in the host bison; perhaps from stress.

Environmental factors that can become sufficient cause for disease include climate extremes (too hot or too cold), wet and/or dirty conditions such as those found in poorly drained pastures with heavy fecal contamination, and overcrowding the herd. Environmental factors exert their effects on the bison by causing stress, which decreases resistance to disease. Stress can have a cumulative effect and may involve nutrition, physiology, environment, social order, and management such as handling events. Bison health is dependent on all of these factors and minimizing stress on your animals will be a major factor in the well-being of your bison.

In summary, productivity is a better indicator of bison herd health than disease occurrence and mortality. When disease appears in herd it is the result of a complex interaction between animal (host), environmental and pathogen factors. To some extent environmental influences can be minimized but the main disease prevention strategy should be to create disease resistance in bison through minimizing stress, the presence of sub clinical diseases like parasitism, and optimizing nutrition.

BISON ARE NOT CATTLE

Bison are a unique species when fenced and raised for production or as a recreational herd. In the past they have been treated and managed by cattlemen and have been considered by many who did not understand their biology and nature to be a "bad ruminant" because of temperament and manageability issues. We have learned much about bison management over the years.

The first lesson we have learned is that bison are not cattle. This fact is easy to forget because they are ruminants like cattle and form herds like cattle. But sheep and deer are also ruminant animals and nobody is tempted to compare the two. The problem lies in the fact that bison look roughly look like cattle and have similar looking calves. There are significant physiological and behavioral differences between cattle and bison that are important to bison health and productivity.

Differences include the age at which first breeding occurs in bison (2.5 years), nutritional requirements over winter, nutrition for slaughter animals, social structure and longevity. For example, bison are seasonal breeders and eaters whose metabolism slows in the

winter to accommodate the relative scarcity of food for growth and lactation. Bison have relatively good resistance to many pathogens that affect cattle, but are naïve to more recently introduced microbes. Bison are susceptible to some cattle diseases because they did not co-evolve with these pathogens and have no innate or genetic resistance to them.

Secondly, we still have much to learn about what makes a bison a bison. Bison are still behaviorally wild animals. Keeping them behind fences for a few generations without deliberately selecting quiet, tame temperament for breeding has not served to make them domestic animals. They are genetically hard-wired to defend themselves when trapped or threatened and have well developed survival instincts that create dangerous situations for nearby humans. Bison are not yet domesticated and many bison owners are reluctant to do so.



FIGURE 12.1

Bison are not domesticated animals. (Internet photo)

THE BISON ADVANTAGE

Bison have some advantages over domestic livestock species. We call it “the bison advantage”. The term has been tossed around for many years by some producers and has even been incorporated into scientific journal publications. When it comes to health and disease the bison advantage can be found in the fact that fewer than 1,000 bison survived the introduction of new diseases and market hunting during the late 1800’s and early 1900’s. Arguably, the remaining bison had a genetic resistance to the diseases introduced by European cattle and sheep. Over the last 25 years many wild ungulates across the Western States have been tested for evidence of infections. All wild populations show exposure to these introduced pathogens without major detrimental effects, yet these same pathogens remain of importance to the domestic livestock industries. This may be because producers have arguably never bred cattle, sheep or other domesticated species for disease resistance. The creation of vaccines has diminished the need for such selection in these species. The natural evolution of genetic disease resistance in bison has allowed those remaining bison to thrive in a world of novel diseases and we believe the resistance persists to this day. Some pathogens such as malignant catarrhal fever, anthrax, and tuberculosis are problematic, but bison are

generally very hardy animals, genetically equipped to handle exposure to many cattle and sheep pathogens.

STRESS IN BISON

Farming bison as if they were cattle creates stress in the bison. As explained above, because of the wild nature of bison when we restrict their movement with fences, feed them forage instead of allowing them to graze freely, mix up their social groups for management purposes, and interact with them frequently we create physical and psychological stress in them. Stress is one of the sufficient or general causes for disease discussed in previous paragraphs. Not all stress is obvious or observable and over time stress can lead to decreased immune function and increased susceptibility to disease and death.

Stress has two components, acute and chronic. Acute stress causes the adrenal gland to secrete adrenalin and corticosteroids (cortisol) causing the body to shunt blood to heart, muscle, brain and lungs. All of the other body systems, such as the digestive system, are put on hold. Bison are great at handling acute stress that creates the “fight or flight” response to a stimulus. They can fight or run from grizzly bears or humans and when all threats are passed, go back to grazing and the adrenalin and cortisol levels return to normal.

Chronic stress is more subtle. Adrenalin for fighting or fleeing is less significant and cortisol becomes the important hormone. Research has shown that during rut bison can double their cortisol levels and they don't return to normal until post-rut. Among other things such as needlessly making energy available to muscles, cortisol depresses the immune system and can make animals more susceptible to health issues. It “wears them out”. Our farming systems impose multiple chronic stressors on our bison. In confined situations during their catabolic period (winter), constant changes in social structure and, with or without adequate nutrition, we may place our bison in a situation that overrides the bison's innate ability to deal with stress. The bison advantage of easily coping with acute stress to fight predators becomes a disadvantage when dealing with persistent or chronic stress. Unlike other domesticated species we have not, and hopefully will not, breed the wild out of our bison. The more we can let bison be bison, the better for both of us.

MAJOR DISEASES OF BISON

This chapter is simply an overview and is not intended to address all health issues that you might encounter when raising bison. The factors important to best management practices for raising bison are all inter-related and involve the whole operation on your property. Maintenance of health and prevention of disease is not just based on your vaccination programs, but must involve the chapters on nutrition and handling.

Diseases discussed below are for information and not to be used to diagnose health/disease issues with your animals. Additional information on common diseases of bison can be found through the National Bison Association resource pages. A more comprehensive list of health problems seen in farmed bison can be found at <http://www.usask.ca/wcvm/herdmed/specialstock/bison/bisondis.html>. There may be newer information available on many of the health issues in this chapter as researchers are constantly learning more of how these diseases impact bison. When problems arise, consult with your veterinarian.

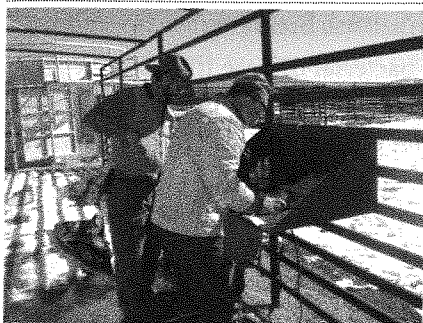


FIGURE 12.2

Your large animal veterinarian is an important partner in helping you develop a heard health management plan. (Photo: Dave Carter)

Bison are exposed to a wide variety of pathogens that are part of the landscape and many will never negatively impact your herd. Several pathogens are important in that they are production limiting diseases causing reduction in reproduction or feed conversion, or are diseases of regulatory importance. These diseases include bovine TB, brucellosis, Bovine Virus Diarrhea (BVD), Malignant Catarrhal Fever (MCF) and now *Mycoplasma pneumoniae*. If you suspect any of these diseases in your herd, contact a veterinarian immediately.

SIGNS OF POOR HEALTH IN BISON

The signs of potential health issues created by disease are, at times, subtle or hard to recognize. Any producer or veterinarian who has investigated and done post mortem examinations on bison understands that a bison can be walking around and seem bright while suffering with severe disease or trauma. Close observation of the herd is critical for you detect disease.

Health issues manifest themselves in several ways. This chapter will not list specific diseases, treatments or vaccinations. Instead it will cover some signs of disease and potential causes for those signs.

One of the critical signs you might notice in your bison is coughing, extended neck breathing, salivating and isolation from the herd. There are many potential causes for these behaviors and they can be physical, bacterial, viral or traumatic.

Physical causes include foreign material stuck in the esophagus or throat. Bison are usually very selective in their diet. However, bison have been known to ingest twine, sticks or other items not easily swallowed. Trauma from working chutes, fighting other bison or entanglement in fence lines have also caused the extended neck breathing.

Bacterial diseases causing these signs include pneumonia, necrotic laryngitis and oral abscesses. The most critical and potentially zoonotic diseases include bovine tuberculosis and rabies. Yes, bison can get rabies.

BOVINE TUBERCULOSIS (TB)

Bovine tuberculosis (TB) is a slow, progressive bacterial disease that is difficult to diagnose in the early stages. As the disease progresses, animals may exhibit emaciation, lethargy, weakness, anorexia, low-grade fever, and pneumonia with a chronic, moist cough. It usually is transmitted through contact with respiratory secretions from an infected animal. TB is a “zoonotic” disease meaning it can be transferred to other species, including man and is therefore of regulatory importance.

Free-ranging and privately owned bison in the U.S. have been free of TB for several decades. TB testing in bison has proven to be effective in diagnosing infected animals and managing the disease. If you are buying animals to start or augment your herd where TB is endemic in wild deer or other species, have animals over 12 months old tested for TB.

MYCOPLASMA

Mycoplasma pneumonia has become the most important disease affecting the bison industry. It is different from other bacterial diseases in that it has no cell wall components for the bison immune system to recognize, making them slow to respond to infections. The onset of observable disease may be slow or relatively rapid. Herds across the western portion of North America have been severely affected, some losing 40-50 percent of their animals. Antibiotics may slow the course of the disease but when the treatment regimen is complete, the disease process continues. This is a disease that must be diagnosed by post mortem examination and laboratory culture. At present there is no blood test available in the live animal. Researchers are working to develop a blood test for bison.

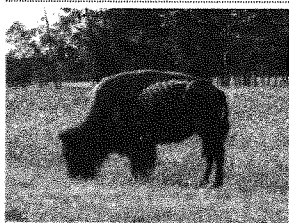


FIGURE 11.4

Mycoplasma bovis (*M. bovis*) has become a major herd health issue for bison producers in the United States and Canada. (Internet photo)

PASTEURELLA AND MANNHEIMIA

Pasteurella and *Mannheimia* bacterial organisms have been considered part of the normal bacterial population found in the upper respiratory tract of many bison and other ruminant species. However, they are not normally found in the mid and lower respiratory tract (bronchial tree and lungs). Once in the lungs these bacteria can be deadly. Bison respiratory disease (BRD) associated with either *Mannheimia haemolytica* or *Pasteurella multocida* is often due to their role as secondary bacterial invaders following extreme stress, or viral or other bacterial diseases. Pneumonia associated with either organism often occurs when the animal's normal defenses are compromised. Examples of compromised defense mechanisms include damage to the cells lining the upper respiratory tract by viruses such as infectious bovine rhinotracheitis virus (IBR), parainfluenza virus (PI-3), or bovine respiratory syncytial virus (BRSV). Damage to the tracheal lining could also occur due to inhaled irritants such as exhaust fumes, smoke or dust. These are diseases that are best handled by changes in management. Vaccines against Mannheimia and Pasteurella are mildly effective in bison. (See vaccination section below)

Another bacterial disease sometimes found in bison feeding operations is caused by *Histophilus somni* (formerly *Haemophilus somnus*). It can also be found in the urinary and reproductive tracts. It is most commonly seen in the fall and winter months and is associated with cold weather and stressful situations.

Viruses that may cause respiratory signs include Parainfluenza-3 (PI-3) and Bovine Respiratory Syncytial Virus (BRSV). These viruses usually infect the upper airways. They are frequently mild subclinical infections but can cause fever, depression, increased respiratory rate, cough and nasal discharge. Young animals are more susceptible to infection. Resulting secondary bacterial infection is the main concern during these viral infections as this can lead to pneumonia caused by Pasteurella, Mannheimia or Mycoplasma organisms. Since antibiotic drugs don't kill viruses, the treatment for these viral diseases is based on the secondary infectious processes. Without secondary infections recovery from these viral infections occurs in 4-7 days. These viruses have been implicated in abortive events linked to the high fever subsequent to infection in cattle. Cattle vaccines appear to be protective from severe infection.

INFECTIOUS BOVINE RHINOTRACHEITIS

Infectious Bovine Rhinotracheitis (IBR), caused by bovine herpes virus-1 also infects the upper airways but can have more serious consequences. It can cause the same signs as PI-3 and BRSV but herpesvirus infection also causes small lesions on the membranes of the mouth, nose, and conjunctiva and creates corneal opacities. Like the other upper respiratory viruses, secondary infections are the major concern. Bovine Herpesvirus-4 has also been found in bison with mycoplasma infection. Cattle vaccines for PI3 and

BRSV are available. (See vaccination section).

LUNGWORM

Lungworm (Dictyocaulus, Muellerius and Protostrongylus) infestation can also cause respiratory issues in the form of chronic coughing. It can also be a common cause of secondary pneumonia. Fecal exams to detect these parasites should be done regularly on your bison herd.

PARASITES

Poor body condition, dull hair coat, weight loss and diarrhea

Parasitism is a problem in many cases of poor body condition and poor hair coats. There are several parasites that can cause these signs. A list of intestinal worms is listed below.

SCIENTIFIC NAME	COMMON NAME
Haemonchus	Barberpole worm
Ostertagia	Brown stomach worm
Cooperia	CCooper's worm
Trichostrongylus	none
Oesophagostomum	Nodular worm
Nematodirus	NThread-necked worm
Bunostomum	Hookworm
Toxocara vitulorum*	TRoundworm
Dictyocaulus	Lungworm
Moniezia T	Tapeworm
Fasciola hepatica	Liver flukes

**T. vitulorum* has been found in Canada but is usually found in tropical or sub-tropical environments. *T. vitulorum* is the only roundworm or ascarid parasite with a normal host cycle found in ruminants. It is a calf parasite but is spread by adult female animals. It is commonly seen in water buffalo and cattle from tropical and subtropical climates but has been found in bison herds in Manitoba and Minnesota as well as North Carolina and Florida. Clinical signs associated with heavy parasitism include loss of appetite, intermittent colic, bloat, diarrhea resembling white scours, weight loss, rough hair coat, loss of plasma proteins and death. Treatment is centered on treating young calves which creates a problem in bison herds.

Internal parasites are a manageable problem in bison. Time of year and diet of the bison are important for the internal parasites to produce eggs. One negative fecal exam is not 100% effective in addressing internal parasite loads. Producers should

check for parasite eggs in the feces a minimum of twice a year. Many internal parasites can become problematic because of inadequate pasture or paddock management. All of the parasites listed above have a specific life cycle. Many can complete life cycles quickly and re-infect the bison within days. Bison with parasite problems can often have poor, dull or excessive old hair coats. If the problem persists poor condition and calving percentages will follow. If your veterinarian identifies these parasites in your herd, ask to address the lifecycles and management changes that will minimize future infestation.

Another cause of poor hair coats are the external parasites. Your area may include one or more of the external parasites. Ticks and lice have been identified on bison and could potentially be detrimental. Bison have a thicker hair coat and skin and identification of lice in bison is rare. Ticks have been found on bison around the tail head. In many areas where elk and deer are infested with ticks, bison sharing the same habitat are tick free. When working your animal check for these external parasites.

If you find bison in the herd that lag behind, become isolated from the others, and has a noticeable change in body condition or diarrhea there are many potential causes. It is important to examine the animal in a timely manner. Antemortem (before death) examination would include blood and fecal sampling along with a physical examination of the overall physical condition of the animal.

Diarrhea is a common finding. There are many causes including nutritional, toxic plants, parasitism, viruses and bacterial pathogens. Nutritional diarrhea can come in many forms. Excessive protein levels had caused loose stools and diarrhea in bison yearlings. Toxic plants signs have been both as an irritant or severe diarrhea in bison that can be deadly. Parasitism mentioned above can be a major cause of diarrhea in bison along with weight loss and poor reproductive rates.

JOHNE'S DISEASE

Johne's disease in bison has been well documented in several free-ranging and captive bison herds. The tests currently available to detect *Johne's disease* in bison are poor and unreliable on an individual basis. Detection of positive herds is easier than detection of individual animals. *Johne's disease* is caused by a bacteria named *Mycobacterium avium subsp. paratuberculosis*, and is an infection primarily of ruminants. It has been documented in a majority of ruminant hoof stock species, including bison. As bison mature, it is thought that their resistance to infection increases, although complete resistance is unlikely. In most cases, adults serve as the source of infection to young animals, shedding the organism in manure, and possibly milk and colostrum as well. It is a direct fecal-oral cycle. Most bison calves acquire the organism by suckling from manure-soiled teats, by licking contaminated flooring/fencing/feed bunks or by eating

off of ground contaminated by manure from an infected animal. They also can take up the organism by drinking water contaminated by manure from infected animals. There is a long duration between infection and identifying the diseased bison since signs in bison are only seen when the animal reaches 6-8 years of age.

CLOSTRIDIAL DISEASES

Clostridial diseases occur in bison. There are several species of Clostridia that cause disease in bison and other ruminants. These organisms are ubiquitous throughout North America. *Clostridium chauvoei* (Blackleg), *C. perfringens* (Enterotoxemia or Overeating Disease), *C. septicum* (Malignant Edema) and *C. tetani* (Tetanus) are all non-contagious infections (don't spread from animal to animal) and these organisms are normally found in the soil or intestine of normal animals. Several of the diseases caused by this group of organisms occur through wound infections e.g. dehorning, castration, poor vaccination techniques and animal handling accidental wounds. *Enterotoxemia* or overeating disease is caused by one of several exotoxins of *C. perfringens*. This is induced by producers through providing rich diets during feeding operations or placing bison on "hot" pastures with rapidly growing alfalfa. Cattle and sheep vaccines appear to be effective against Clostridial disease (see vaccines section). *Blackleg* (*C. chauvoei*) is another bacteria in this family causing disease in cattle, but *C. chauvoei* is the only one that has been reported in bison. *C. chauvoei* is a soil borne bacterium and can survive in the environment for many years. The bacterium enters the body through consumption of contaminated grass or hay and disease is usually seen in the late summer.

There are several species of *Leptospirosis* bacteria that cause disease in bison and other free-ranging and captive ruminants. This is a group of organisms that infect many body systems and are excreted by the kidneys and spread through the urine. Feed contaminated by rodents or infected animals urinating next to water sources is the most common means of spread. Overcrowding bison in confined, wet pastures can exacerbate the disease in a herd.

Many viral diseases can cause poor body condition, dull hair coat, weight loss and diarrhea. These include but are not limited to BVD, Bluetongue, Epizootic Hemorrhagic Disease (EHD) and several of the upper respiratory viruses.

Anywhere in the world there are cattle, there is *Bovine Virus Diarrhea* (BVD). This worldwide distribution makes this disease important to cattle and other susceptible species. BVD has not been well described in bison. BVD is a complicated disease to discuss as it can result in a wide variety of disease problems from very mild to very severe. There may be high morbidity (number affected) and mortality (number dead) in an infected herd.

Both *Bluetongue* and *EHD* viruses are Orbiviruses and are very similar in modes of spread and signs of disease seen in bison. Both diseases are spread around water sources by insects often called “no-see-ums” because of their small size (*Culicoides veripenis*). The viruses infect bison with minimal clinical signs most of the time, but several of the mutated strains of EHD have had serious effects on bison. Once infected, bison can run a high fever for 18-36 hours, present with signs of temporary lameness and show swelling of the mucus membranes of the gums and tongue. Infections usually occur in mid to late summer when water sources are visited by deer, elk, and bison. If infection with one of these viruses occurs after breeding, the fever from the infection can cause damage to a fetus in the first trimester causing re-absorption or abortion of the fetus. The severe consequences of Bluetongue and EHD have been known to cause permanent lameness and chronic poor body condition, making these bison non-productive members of the herd. Vaccination is ineffective for these diseases.

SUDDEN DEATH

When the first signs of disease seen in a bison herd is rapid or sudden onset of death, there are several important disease pathogens that must be ruled in or out. Toxic ingestion of *poisonous plants* is the first assessment to be made on your pastures. A list of these plants can be found through your county agent or university.

MALIGNANT CATARRHAL FEVER

In North America, *Malignant Catarrhal Fever* (MCF) is a generally fatal disease of bison caused by viruses belonging to the Herpesvirus family. MCF occurs in cattle worldwide and is a serious problem, particularly for bison in the United States and Canada. MCF in bison is caused by a virus called ovine herpesvirus-2 (OvHV-2) spread from domestic sheep. Most infections are characterized by depression, separation from the rest of the herd, loss of appetite, and in many cases bloody diarrhea and death.



FIGURE 12.4

Recognizing clinical signs of MCF can be most difficult, even for veterinarians. Your animal may look perfectly fine, yet be infected with the MCF virus. This picture was taken three days before the bull died. (Photo: University of Wyoming)

ANTHRAX

Anthrax is caused by the bacteria *Bacillus anthracis*, and occurs naturally in many locations worldwide. As a part of their life cycle, the bacteria can enter a spore phase and remain viable, but dormant in soil for several decades. Under certain environment

conditions the bacteria emerge from the spore phase and become infective to animals. Anthrax occurs when bison eat activated or vegetative bacteria in soil and on plants as they graze. The organism can also spread in water. The disease kills bison quickly, typically within 24 or 48 hours. Natural anthrax outbreaks are not uncommon in the Western U.S. If anthrax is suspected in your area, call your veterinarian immediately. A vaccine for anthrax is available and offers protection to bison and cattle.

PRODUCTION INDICATORS

Poor pregnancy rates and low calf recruitment is an issue that can have a strong impact on your optimal production goal. There are many causes in apparently healthy herds suffering from poor reproduction. Inadequate nutrition, trace mineral imbalance, pathogens, infertile bulls or management mistakes are all potential causes. Several toxic plants can create infertile, non-productive animals. Check with your county agent about toxic plants in your area.

Nutrition is critical to breeding. A bison cow produces a calf, produces milk for her offspring and strives to put on weight over summer for breeding. Spring and summer are a time when that cow needs to be on a good nutritional plane. (See nutrition chapter).

Pathogens can also cause unapparent infections, leading to reproduction issues.

BRUCELLOSIS

Brucellosis is a disease that has strong regulatory and economic guidelines for all states. Livestock in most states have been brucellosis-free for many years. Notable exceptions are states that border Yellowstone National Park. State and federal regulatory agencies consider the Greater Yellowstone Area (GYA) or the area of interaction with infected wildlife species the last nidus of infection in the U.S. In female bison, infection by *Brucella abortus* causes placentitis and abortion. In male bison, *B. abortus* infection causes testicular problems (orchitis, seminal vesiculitis, and epididymitis). The frequency of abortion in bison may not be as high as in cattle. Disease can only be spread by an infected female through an abortion or birthing event. This is a zoonotic disease that can infect other ruminants and humans. Therefore it is a reportable disease.

Many of the upper respiratory viruses along with Bluetongue and Epizootic Hemorrhagic Disease can cause infertility or early abortions in healthy appearing animals. Many viral infections cause a transient febrile episode and these fevers can cause early losses of a fetus.

VACCINATION RECOMMENDATIONS

(Adapted from Haigh et al, Proceedings of the 2000 International Bison Conference, Edmonton, Alberta)

Every bison herd has specific vaccine requirements, depending on herd management and specific disease risks. Some diseases are known to occur only in particular geographical locations, whereas others, such as blackleg, can occur anywhere. Some diseases are associated with certain methods of production. An example is Histophilosis, which is found to occur most frequently when recently weaned bison calves are maintained in large groups in feedlot like settings, but rarely occurs in cow calf bison operations that wean small groups of calves. Some diseases are associated with certain environmental conditions. Calf scours in newborn bison calves most often occurs when bison cows are tightly confined in wet environments during calving.

The best way to find out which diseases your bison herd may be at risk of contracting is to consult your local veterinarian. He/she will know which diseases occur in your area and will be able to combine this information with an assessment of the way that you manage your bison to come up with a list of diseases that your bison herd may be at risk of contracting. This list may not be the same as a list drawn up for your neighbor 5 miles down the road. The reason for these differences is that you and your neighbor may not be using the same management practices. This is also the reason why one bison producer may have a problem with a disease such as pneumonia in his weaned calves every year, and his neighbor across the road may have never had a problem with the disease.



FIGURE 12.5

A good vaccination program can prevent disease outbreaks in your bison herd.

Bison producers should be aware that some vaccines can cause adverse reactions when they are used in a species for which they were not intended. All of the vaccines that are currently being used in bison have been developed for use in cattle. There have been no safety trials conducted on any of these vaccines in bison. Pharmaceutical companies make no claims about, and are not responsible for the safety of any bison to which these vaccines are administered. Bison producers who use a cattle vaccine

in their bison herd must be aware that they are assuming the risk for any losses that may occur from adverse vaccine reactions. It is true that many bison producers have been using cattle vaccines on their bison for years with no adverse reactions. Although this past experience may make us think that cattle vaccines are safe for use in bison, it does not necessarily mean that all cattle vaccines are safe to use in bison under all conditions. Modified live virus BVD vaccines have caused outbreaks of diarrhea when they have been administered to recently weaned bison calves. Certain respiratory vaccines are not designed for use in beef calves that are very young or are under certain body weights. These vaccines may precipitate outbreaks of pneumonia in beef and bison calves when used on very young or small calves. Some modified live virus respiratory vaccines are not recommended use in pregnant beef cows and certainly should not be used in pregnant bison cows. For these reasons it is important to consult someone who has some knowledge of cattle vaccines before using these vaccines in your bison.

While most cattle products are safe for bison, they may not produce a protective immune response in bison. In other words, does the vaccine induce the production of antibodies or cellular responses in bison that are capable of inactivating an invading bacteria or virus? In general, bison producers use cattle vaccines on their bison with the same dose and re-administration recommendations that are used for cattle. However, there have been no experimental trials conducted on any of these vaccines in bison. Therefore it is not known whether any cattle vaccines can produce an immune response in bison. The dose and frequency of re-administering these vaccines to bison is also not known. Because we have no information about these vaccines in bison it is important to use them with caution. Only vaccinate your bison against those diseases that pose a definite risk to your herd. Vaccinating your bison against diseases for which they are not at risk is at best a waste of money, and it predisposes your bison to any adverse reactions that maybe associated with the vaccine.

MANAGEMENT ISSUES, STARTING A BISON HERD AND PURCHASING BISON

There are many ways to assess the health of your bison herd. Bison are tough animals and you may only identify sick animals when they are close to death. Frequent observations of the herd and their environment is critical, but here are additional recommendations for bison health management.

- Be aware of any history of pertinent diseases in your area.
- Identify disease sources and bison populations at risk.
- Assess the potential for contact between disease sources and your herd.
- Evaluate the potential consequences of transmission to your herd.
- Develop strategies to minimize risk of introduction of disease to your herd.
- Assess potential preventive actions and collateral impacts to your operation.
- Stocking density is important in disease spread within a herd.

Other factors can contribute to the introduction and prevention of disease in the herd. A short list of factors that influence disease introduction and spread in bison are listed below.

FACTOR	DISEASE EXAMPLES
Regional history of pathogen	Anthrax, parasites, brucellosis, TB
Proximity of bison to potential disease sources	MCF, bovine TB, Brucellosis, Johne's disease, BVD, Bluetongue, EHD, foreign animal diseases e.g. foot-and-mouth disease
Weather patterns and environmental suitability	Anthrax, parasites
Presence and abundance of mechanical or biological vector(s)	Anaplasmosis, Bluetongue, EHD, Pinkeye
Bison stocking density affecting level of infectious contacts)	Most infectious diseases
Season	Diseases with unique transmission patterns (e.g. Brucellosis, Bluetongue, EHD, Pinkeye
Nutritional and other environmental stresses to bison	Infectious diseases that capitalize on depressed immunity e.g. respiratory viruses
Geographic location and climate	Pathogens capable of surviving climate extremes e.g. winter

If a risk assessment indicates the need for a disease management plan, the manager should include the help of a veterinarian to evaluate strategies for the health of the herd and plan for the “worst case” issues.

Other considerations

Purchasing new stock. When going to a ranch to purchase bison ask to see the whole herd, not just the ones being offered for sale. Look at the condition of every animal in the herd and make mental notes of the calf crop, yearlings, etc. Ask about management techniques regarding vaccination, worming and if health problems were identified in the herd over the past several years. After your purchase of new stock the first thing to do is process them with your worming, vaccination protocol and apply your unique permanent identification. If possible quarantine the newly purchased animals from your main herd for three weeks.

Bison are highly social herd animals. Never place just one bison in a corral or pasture for extended periods. Solitary bison are problematic as bison are a very social species with strong matriarchal divisions. Bulls separate from the herds after breeding and only young bulls are allowed to stay with the cows and calves. Post breeding, the bulls

have been nutritionally and physically stressed and should be checked for wounds or other forms of trauma.

HOW TO IDENTIFY SICK BISON

Many of the diseases affecting bison produce a fever. Typical signs of fever include animals spending additional time at water sources, more frequent trips to the water source, drooping ears, mouth breathing and separation from the herd. Bison that lag behind when bison move to graze new pastures are suspect as this might indicate either problems with locomotion or rejection by other herd animals. (Bison have a very strong social order and behavior.)

Bison are tough. Frequently, bison that appear sick from a distance are hard to assess due to their strong predator avoidance behavior when you try to get “a closer look.” A sick bison can run with the herd when aroused. It is often best to maintain your distance or assess the animals when performing normal management procedures (feeding, checking water, putting out supplement, etc.). Spend extra time in observing your bison. At times the first sign of illness in bison is a moribund or dead animal.

Key points regarding detection of disease in your herd:

- Spend time with your herd – observe daily
- Have a veterinarian that has worked with bison and understands that bison respond differently to ill health than cattle
- Information to share with your veterinarian
- Recent changes in diet
- Recently acquired animals
- Past history of health issues
- Changes in pasture rotations
- Climate factors – moisture, drought
- Any stressors on bison
- Other species on property (please no goats or sheep)

BISON ARE DANGEROUS WHEN SICK OR CORNERED FOR EXAM. You should have a good working facility or do not commercially raise bison!

As mentioned earlier in the chapter, historically bison have a genetic ability to handle many of the common disease pathogens. But do not have a false sense of security when health issues arise. Many, if not all, of the diseases in bison involve inadequate management of the bison herd. When issues arise or you identify the signs of disease, look closer at the disease. Explore who, what, when, why and how issues. Don't just treat the signs, find and treat the actual problem.

MEDICATIONS

Several medicines approved for cattle have been used extensively with no ill effects reported in bison or cattle. REMEMBER - Most medications and vaccinations used in bison are not listed on the label. Therefore, when medicating and vaccinating your bison it is considered an "off label" use on the product and the responsibility is on the veterinarian or the owner. The company will accept no responsibility if issues arise from use of their product.

There are three basic ways to give medications--orally, topically or injection. Orally medications can be given as a bolus (pill) or drench (with or without a stomach tube), or in the feed or water. Topically they can be sprayed on, rubbed on (salve), or poured on (such as wormers, grub, and lice preparations). Injections can be given subcutaneously under the skin (SQ), in the muscle (IM) or intravenous (IV) depending on the drug you are using. If the animals are going to the meat market all injections should be in the neck. Any residue or abscess in the rump, leg or back can create a loss of income from discarding those cuts at slaughter. Subcutaneous injections are given along the side of the neck and intramuscular injections are given deep into the muscled portion of the neck.

CONCLUSION

We must do all we can in this industry to better understand this amazing creature under our care and not be afraid to implement those changes that benefit both - the bison and us.

Please read the chapters on handling, managing and nutrition in this handbook. The secret to understanding your bison's health is to understand all the aspects of how they are managed. Small changes in rotations, time of year and time of day when working your bison, calving pastures, breeding pastures, and supplementation can make big changes in costs and health of your herd.

You have many allies who are learning to raise bison in North America - so do not be afraid to ask questions. The National Bison Association and its members are a great resource. Question everything when issues arise. Many producers and veterinarians treat the symptoms of disease and not the problem. If you have disease issues in your herd, ask how to prevent this from happening again.

The only constant in this world is change. We must do all we can in this industry to better understand this amazing creature under our care and not be afraid to implement those changes that benefit both - the bison health and us.

APPENDIX OF DISEASES DISCUSSED IN THIS CHAPTER.

This chapter mentions only a few of the most important disease issues in farmed bison. A more comprehensive list with information concerning specific diseases known to

occur in bison can be found at <http://www.usask.ca/wcvm/herdmed/specialstock/bison/bisondis.html>

Dave Hunter, DVM, is the chief veterinarian for Turner Enterprises, Inc. He previously served as the Wildlife Veterinarian for the state of Idaho.

Murray Woodbury, DVM, is an associate professor and the Agri-Food Innovation Fund (AFIF) Specialized Livestock Health and Production Research Chair at the Western College of Veterinary Medicine, University of Saskatchewan in Saskatoon, Canada.