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IN THIS ISSUE

1. BROADER IMPLICATIONS AND ISSUES OF A DISEASE OUTBREAK

Chronic Wasting Disease (CWD) was found in 16 elk on eight farms in the western Canadian province of Saskatchewan. Considering CWD is a very rare disease (see next article), does not spread quickly and poses no danger to humans, what is the big deal?

In the neighboring province of Manitoba, around Riding Mountain National Park, some 5 elk have tested positive for tuberculosis. Extensive testing of other cervids in the region showed no evidence of the disease (see article below). Again, what's the deal?

Unfortunately, it is a big deal! Even though from a production point of view, these disease outbreaks are insignificant, they do have major implications for the deer and elk farming industry. Let's examine and discuss some of the ramifications.

1. *Loss of herds*: in an attempt to eradicate CWD, the Canadian Food Inspection Agency (CFIA) has ordered whole-herd "depopulation" on the farms where CWD was found. Some 1,500 elk were slaughtered. Although some compensation was paid, the affected farms obviously suffered significant economic losses as a result. Also, a considerable number of animals were taken out of production.

2. *Loss of markets*: shortly after the CWD incident, Korea, the largest buyer of elk velvet antler, placed a "temporary" ban on imports of elk products from Canada. As of this writing (mid Jan.

2001), Canadian officials are negotiating with Korea to get the ban lifted, claiming the stoppage is based on false information, and that the Canadian elk products are safe. There is always a risk that this ban may be expanded to all North American sources and/or other countries may also ban imports. If continued or expanded, these bans would be a disaster for the elk industry.

3. *Bad PR*: interestingly, the media headlines tended to say something like "1,500 mad elk had to be killed." The point that only 14 animals were actually affected, that the disease is not Mad Cow Disease, and that there is minimal danger to humans, seems to have been lost. The industry got a lot of free publicity, but not the kind we wanted.

4. *Consumer concerns*: as a result of this publicity, it is going to more difficult to expand existing markets, and develop new ones for velvet and venison. Consumers are going to think twice before taking elk velvet antler, or giving it to their pets.

5. *Ammunition for opponents to game farming*: opponents are going to use these incidents in support of their arguments to abolish game farming. They will say, "If the farm in Saskatchewan hadn't imported elk from the United States, the province would be CWD free. Also, there is a risk of CWD now spreading to the wild elk and populations."

6. *Loss of confidence in the industry*: it is going to be more difficult to attract new deer/elk farmers and investors to the industry. People are going to be concerned as to how fragile the industry is, and how easily it could collapse based on spread of disease, and erosion of major markets. Bankers are going to be less generous with the lines of credit.

These events also raise issues that need to be addressed. These include:

1. *Appropriate response*: when a disease such as CWD or TB is discovered, what is the appropriate response by authorities – remove infected animals, quarantine and test suspected animals, or whole-herd "depopulation"? Who makes these decisions and based on what criteria? What are the appropriate roles of the affected parties – government, farmers and industry associations in these decisions and actions?

2. *Consumer confidence*: how do we overcome consumer/buyer concerns about the potential risks of disease on deer and elk products? How do we reassure the public that strict quality assurance measures are in place to protect them? Do we have adequate QA systems in place?

3. *Communications with public*: how can we make it easy for the public to get the "true facts" about diseases and any incidents in our industry?

4. *Communications within the industry*: how can we improve communications within the industry so that the producers, the associations, and related agencies can keep abreast of what is going on, and respond appropriately and quickly?

5. *Compensation*: what is the appropriate level of compensation for animals destroyed due to disease control efforts? Who pays? Who should determine the values? (Inadequate compensation is more likely to encourage producers to NOT report suspicious symptoms).

6. *Jurisdiction*: as is demonstrated in the Manitoba incident, different government agencies often have responsibility for farmed and wild animals. Provincial/state and federal agencies are often involved as well. This makes it more difficult to co-ordinate programs for disease control and eradication. Differing interests, strategies and policies often result in conflicts, delays and inaction. Who should have responsibility for disease management programs?

7. *Working together*: the elk/deer industry in North America is extremely fragmented. We have numerous industry associations representing differing geographical locations and cervid species. All have their own agendas and priorities. It is very difficult as a region to develop and implement strategies that would benefit us all.

8. *Guilt by association*: even though CWD was only found in a few Saskatchewan elk, Korea banned all Canadian imports. So even though Alberta had not allowed any importation of elk outside the province, and is totally CWD-free, it was still affected by the ban as were producers in all the other Canadian provinces. Therefore, regional or local disease control initiatives may not be enough to protect the industry.

9. *Wildlife diseases*: what should public policy be regarding diseases in wildlife cervid populations? How much testing should be done? Who should be responsible for testing, monitoring and responding to disease outbreaks? Who should pay for these programs?

10. *Movement of animals*: protocols for inter-state and cross-border movement of cervids have been in place for some time. What is the appropriate balance in regulations to protect local populations from disease, and at the same time allowing importing/exporting that is so essential to the economic well-being of the industry?

11. *Capture of wildlife*: many of the native cervid species farming industries were originally populated from wild stock. What are the risks (regarding diseases) and benefits of continuing this practice?

12. *Politics*: as the numbers of farmed deer and elk grow, there will be increased competition for markets. There will be a temptation for governments to protect their local industries by looking for excuses to ban imports of deer/elk products. What can be done to keep markets open and politics out of the picture?

13. *Conservation fall-out*: I find it very interesting that the conservation initiatives at Riding Mountain National Park – banning of logging, no haying and fire suppression – actually had a detrimental impact on elk habitat. Lack of suitable forage drove them to nearby farms where they came in contact with TB infected cattle. Perhaps it is time to re-evaluate some of our conservation assumptions and programs.

So what can be done to address the issues? Here are my suggestions:

1. *Cooperation*: Co-operation among the various major players is going to be a challenge, but is essential for the long-term well-being of the industry in North American and the world. The major associations should strive to meet at least once a year to address common issues, develop strategies and review initiatives. On-going communications via the Internet will fill in between meetings. An appropriate venue may be the World Deer Congress in 2002 being held in the Texas USA.

2. *Common strategy*: This will also be difficult to achieve, but a common regional disease management strategy should be developed and implemented. A "master plan" for Canada and the United States would go a long way toward rationalizing regulations and programs.

3. *Quality assurance*: consumer confidence can be regained by developing and implementing a Quality Assurance program for the industry. The QA program must have the involvement of the producer, processor, distributor and retailer. QA should be mandatory and compliance strictly enforced at all levels.

4. *Information site*: the public (and media) needs one, easy-to-find place to go to find out more, and get accurate information about news items and topics relevant to our industry. We (Deerfarmer.com) have proposed the establishment of a common gateway website – "*deerfarming.org*" and "*elkfarming.org*" – that would provide this information. So far, only one association has expressed any interest, a few have said they have their own sites, and we haven't heard from the rest. To support my case, I could not find the following excellent article on CWD on any of the websites of the major deer or elk associations!

5. *Trace-back*: allows people to easily determine where a food product originated. For example, the British "farm-to-plate" program was designed to reassure consumers after the Mad Cow scare. We (Deerfarmer.com) are going to make a start in this direction with our new and expanded World Deer and Elk Farm Directory that will be up shortly. Each farm in the Directory will be assigned a unique DFUID (Deer Farm Universal Identifier). These can be used on product labels and literature. By going to the www.dfuid.com website, information about the producer can be easily obtained. (See Deerfarmer.com News below for more information).

6. *Training*: as an industry, we don't do much to train our producers in the fields of animal care, disease management and quality assurance. Most deer farmers have to learn this on their own. To implement QA at all levels, more training will be required. Again, by working together, costs of learning resources development and delivery can be shared and spread out over a larger client base.

7. *Research*: on-going research into identifying, controlling and treating cervid diseases is required. New tests will be able to identify animals at risk and control spread of disease. Better tests are also critical to facilitate the safe movement of animals across borders and regions. However, research is expensive. Working together to raise funds and share results will enhance efficiencies. Also, steps must be taken to disseminate the results of research finding. This is not being done very well right now – especially making producers aware of the research and its implications.

We all have a lot to do. So let's get started.

[*My thanks and appreciation to the following people who have kept me in the "information loop" and provided the background material and source of ideas for this article – Serge Buy (Executive Director of the Canadian Cervid Council), Paul Southman (Editor/Communications Manager for the North America Elk Breeders Association), Bill Buchta (Executive Director of the Alberta Elk Association), Ian Thorleifson (former Executive Director of CCC and AEA), Tracey Hagedorn (Alberta White-tail and Mule Deer Association) and Dan Marsh (Executive Director of the Michigan Deer and Elk Breeders Associations*).

2. THE LATEST ON CHRONIC WASTING DISEASE (CWD)

[*This document is funded and prepared by North American Elk Breeders Association. It represents a compilation of the most recent facts about this rare disease. Much of the information on CWD which has appeared in the media is incorrect or sensationalized. The following document represents our industry's efforts to make the truth readily available.*]

What Is It?

Chronic wasting disease (CWD) is a progressive, fatal disease of the nervous system of cervids such as mule deer, white-tailed deer and elk. A report from the World Health Organization indicates that there is some evidence of genetic resistance to CWD among elk/wapiti, but not among the other deer species. It is a type of transmissible spongiform encephalopathy (TSE). Although several scientists disagree, the leading theory is that the infectious agent is a prion.

Prions have been defined as "small proteinaceous infectious particles which resist inactivation by procedures that modify nucleic acids." Prions (pronounced pree-ahns) enter cells and apparently convert normal proteins found within the cells into prions just like themselves. The normal cell proteins have all the same "parts" as the prions—specifically the same amino acid building blocks—but they fold differently. They are like the toy "Transformers" that intrigued children in the 1980s. A car could become a robot; a bug could become a warrior. Nothing was added; nothing was subtracted.

Prion diseases are called spongiform encephalopathies because of the postmortem appearance of the brain, which exhibits large cavities in the cortex and cerebellum (like a sponge). Most mammalian species, including humans, develop prion diseases. Examples include:

- Scrapie: Sheep
- Transmissible mink encephalopathy (TME): mink
- Bovine spongiform encephalopathy (BSE): cows
- Creutzfeld-Jacob disease (CJD): humans
- Gerstmann-Straussler-Scheinker syndrome (GSS): humans
- Fatal familial insomnia (FFI): humans
- Kuru: humans

Diagnosis

The clinical signs of CWD include emaciation, excessive salivation, behavioral changes (i.e., loss of fear of humans), ataxia, drooping of head and ears, weakness, bugged-out eyes, and increased thirst and urination. Clinical signs may last for weeks to months before the animal dies, with most elk succumbing in less than 12 months. At death, other signs noted will be generalized absence of external and internal fat**,** serious atrophy of the bone marrow, and a dry, rough hair coat.

Can these symptoms indicate a disease other than CWD? Whenever nervous signs and excessive salivation are seen, rabies must be suspected; however, clinical signs of CWD are less rapid in onset than those of rabies. Bacterial diseases that affect the central nervous system, such as Listeriosis, also cannot be excluded. Johne's disease causes weight loss, debilitation, and eventual death in

farmed cervids; but it is also accompanied by progressive diarrhea, which is not a symptom of CWD. Meningeal worm may cause loss of fear of humans and loss of condition.

Although progress has been made toward development of a laboratory assay that might lead to the validation of a live-animal diagnostic test for TSEs, there is currently no definitive way to diagnose CWD before death. The diagnosis is based on clinical signs and can only be positively diagnosed by post-mortem examination of the brain tissue of the affected animal. Pathologists look for protease-resistant protein plaques in the brain.

How Are TSEs Transmitted?

The mode of transmission of CWD is currently unknown. In a CWD outbreak occurring in Rocky Mountain elk, it was found that lateral transmission (from animal to animal) seemed the most plausible explanation for the pattern observed. Maternal transmission did not appear necessary to sustain the outbreak. It is thought that the CWD agent is passed in saliva, feces or urine. Once ingested, the disease has an incubation period of 16 to 30 months before the onset of clinical signs.

Other TSEs can be inherited, transmitted between individuals, or sporadic. Dr. Stanley Prusiner won a Nobel Prize for his work in the study of prions. In a 1995 article in "Scientific American," he wrote, "Prions are indeed responsible for transmissible and inherited disorders of protein conformation. They can also cause sporadic disease, in which neither transmission between individuals nor inheritance is evident."

About 10 percent of human prion diseases are familial, or inherited, and kill half of the members of the affected families. The textbook incidence of CJD, a human form of spongiform encephalopathy which can be familial, is about 1 case per million per year across the entire human population. The incidence of GSS, which is familial, is about 1 per 15 million per year.

It is suspected that genotype (genetic makeup) may be a susceptibility factor in other TSEs. For example, some genotypes of sheep have consistently been correlated with susceptibility to scrapie infection. On the other hand, one genotype is so resistant to both a scrapie and BSE challenge that only one case of scrapie has been documented within that genotype. Surprisingly, the scrapie-susceptible genotypes are common in Australia and New Zealand, but are thought to be free of scrapie. When these sheep are brought to the United Kingdom and maintained in quarantine conditions, they do not develop scrapie. In other words, the genotype does not confer scrapie on the animal but susceptibility to scrapie infection.

Can TSEs Be Transmitted to Other Species?

Before a strain of BSE prion apparently infected humans in Europe, researchers believed that a phenomenon known as the "species barrier" would make it virtually impossible for prions made by one species to cause disease in another species. Researchers who intentionally attempted to transmit scrapie to other species found it very difficult. Although scrapie in sheep has been recognized for hundreds of years, it has never crossed the species barrier to humans.

Prion diseases do not move easily between species. Scientists at NIAID's Rocky Mountain Laboratories (RML) in Montana and their colleagues, for example, demonstrated that abnormal protein from a mouse cannot convert normally folded protein from a hamster. The "molecular

dance" that converts normal proteins to prions is most effective when the protein and infecting prion have the same amino acid sequence and are from a single species. (The known prions all have about 250 amino acids. Cow and sheep prions differ by only seven amino acids. Human and cow prions differ by 30.) If the two proteins are not exactly the same, if the prion is from a cow or sheep, for example, and the normal protein is from a person, the transformation takes more time.

A different type of CJD has been linked to BSE in Europe recently. Some call the variant CJD "Human BSE" because the strain is very much like the BSE agent and is very different from "classical" CJD. Scientists have concluded that the most likely cause is ingestion or handling of infected beef. The meat found to be infected was from the brain, spinal cord, eye, and parts of the gut.

BSE in cattle was identified in Great Britain in 1986. It is estimated that a total of one million cattle were affected. The source is believed to be a food supplement that included meat and bone meal from dead sheep. (The method for processing sheep carcasses had been changed in the late 1970s, and the method apparently did not kill the infectious agent.) Scientists speculate that years of exposure to scrapie in cattle feed caused the disease to cross over the barrier to cause BSE. One scientist reasons that the fact that the TSE jumped species from sheep to cattle and from cattle to humans is a result of intensified cycles of evolution due to the recycling of carcasses.

The British government banned the use of animal-derived feed supplements in 1988. To date, there have been 84 CJD deaths in the United Kingdom.

Can CWD Transmit to Other Species?

If BSE apparently transmitted to humans, is it possible that CWD can do the same thing? An article in "Wyoming Wildlife" noted: "Of course, from the standpoint of sensational press, the story is in the similarities between the two diseases, not the differences, but the differences are worth considering. It took a massive contamination of feed to establish BSE in British cattle and contamination of British beef products to produce … the new variant of Creutzfeldt-Jakob disease (in an extremely small percentage of the British population)." The article emphasized that very few cervids carry CWD, compared to the BSE infection of over half of the United Kingdom's dairy herds.

Because of the species barrier, interspecies transmission of CWD is less efficient than within the species. Even in species with closely related proteins, the prions probably will not jump the species barrier unless the prion-infected tissue is injected directly into the brain or there is a huge, continuing exposure such as that experienced in Great Britain. In research published in August of 2000, scientists at the Rocky Mountain Laboratories in Montana reported that they had found evidence of a molecular barrier that limits the susceptibility of humans, cattle and sheep to chronic wasting disease. Strain typing using mice in a laboratory suggests that CWD is unique and does not resemble BSE, CJD, or scrapie.

Beth Williams, a University of Wyoming professor of veterinary science and leading expert on CWD, said that researchers involved in the early stages of a ten-year study found no evidence that CWD can be transmitted from deer and elk to cattle. Diseased tissue was injected directly into the brains of cows or given orally to the animals with no effects.

In the fall of 1998 a geographically targeted survey of adult cattle was initiated to evaluate the possibility of CWD being transmitted from deer to cattle under free-roaming conditions. The brains of slaughtered cattle that had co-mingled with free-roaming deer throughout the years were examined. The Colorado State University Diagnostic Laboratories reported that an analysis of 262 brains showed no indications of CWD or evidence of the prion protein.

Since the differences in the proteins of cervids and the proteins of humans are much greater than the differences between the proteins of cervids and cattle, the probability of transmission to humans would be much lower. John Pape, an epidemiologist with the Colorado Department of Health, stated, "There is no indication that chronic wasting disease is a threat to human health."

The World Health Organization advises that although there is no evidence to suggest that it can be transmitted to humans, any tissue which may come from deer or elk with CWD should not be used in animal or human food. Offal, brain, and spinal cord tissue, as well as all meat from affected animals, should not be used as food or as a protein source in animal food. Contrary to some media reports that suggest that cases of CJD have been caused by consuming venison, NO variant CJD has been identified in North America.

Since August 1997, United States feed companies have been prohibited from feeding ruminant-derived meat and bone meal back to ruminants, including elk. Some scientists believe that this feeding practice in Great Britain set in motion the unusual, intensified cycles of evolution that enabled prions to jump the normally strong species barrier.

Dr. Mike Miller, a wildlife veterinarian with the Colorado Division of Wildlife and one of the world's leading researchers on CWD, said that his work has led him to believe that velvet is safe and that CWD has a very small chance of leaping to humans. He noted that the abnormal prion protein thought to carry the disease is concentrated in the brain, the spinal cord and a few lymph nodes. "Velvet," said Dr. Miller, "is a peripheral tissue like a limb, where the prion protein would barely be detectable." Although there are no studies on the safety of tissues of elk affected by CWD, other species infected with TSEs have been studied. Muscle and skin tissues, and even milk from the animal, were not found to be infectious.

Nevertheless, elk breeders have taken all possible precautions to insure that velvet antler from affected herds does not enter the marketplace. The Canadian Cervid Council has stated that no velvet antler products from herds known to be infected with CWD have been sold in Canada. Elk breeders in the United States have agreed that no antler from quarantined herds is to be sold, and they have requested that the federal program include this prohibition.

Geographic Distribution

Chronic wasting disease is rare and does not spread quickly. CWD occurs in wild deer and elk in northeastern Colorado and southeastern Wyoming (in the areas where CWD first appeared in the department of wildlife research facilities in the late 60s and 70s). CWD has not been reported in wild deer and elk in Canada. The USDA reports that in over 5,000 samples from the free-ranging population examined over the last ten years, approximately 110 clinically affected deer and elk have been identified. The majority of those affected were mule deer. It is estimated that the incidence in the affected counties of Wyoming and Colorado ranges from less than 1 percent of elk to 5 percent of mule deer.

Incidence in domestic herds is even more rare. So far, incidences of CWD have been found in 13 herds of ranched or farmed elk in the United States. Seven have been depopulated or released from quarantine; six remain under quarantine. Canada has found eight herds with cases of CWD, including the Canadian source herd, which has probably been infected for ten years. Only 16 of the elk in the eight Canadian herds actually tested positive for the disease.

Control of CWD

With input from the elk farming industry, both the United States Department of Agriculture (USDA) and the Canadian Food Inspection Agency (CFIA) have developed similar programs for the control and eventual eradication of chronic wasting disease. The programs include surveillance, monitoring, and indemnification. Since 1998, many states and provinces have instituted mandatory and voluntary testing and monitoring programs, based on the recommendations of the North American Elk Breeders Association to the United States Animal Health Association.

The Elk Research Council and others in the elk industry are funding research to develop a live-animal test for CWD and to increase knowledge of the disease. The study will cost $250,000 over a four-year period.

The presence of CWD in wild deer and elk in Colorado and Wyoming is a continuing potential source of infection in farmed elk. Wild deer jumping the fence into a hunting preserve may be the source of one infected herd located in the area of the most heavily infected wild herd in Colorado. Most of the CWD in farmed elk appears to trace back to the Colorado Division of Wildlife research pens where CWD first appeared. Mule deer from this facility were given to the Denver Zoo. The Denver Zoo gave some mule deer to the Toronto Zoo and also sold some animals, which eventually arrived at an elk ranch in South Dakota. It is widely believed that most of the CWD herds in the United States can be traced to this South Dakota herd. Some unfilled gaps remain, and federal and state epidemiologists are working to find these connections.

The Colorado Division of Wildlife has announced plans to reduce by 50% the core CWD deer herd north of Fort Collins. They will issue large numbers of hunting licenses to landowners in this area. Hunters, not licenses, will be the limiting factor. This is a good first step in controlling CWD in the wild cervid population.

Conclusion

Chronic wasting disease is very rare in farmed elk and appears to transmit only to cervids, but the elk breeding community is treating its control very seriously. They understand the importance of protecting the health of the world's animals and people. They also recognize CWD's economic ramifications. It is financially devastating to elk farmers who must eliminate all animals in a herd when a case of CWD is found, and government also experiences the costs of eradication.

Although chronic wasting disease first appeared — not on elk farms or ranches — but in department of wildlife research facilities and in wild populations, elk breeders are taking the lead in the fight against the disease. The industry's associations have been key forces in initiating regulations, testing and other actions that will eliminate this difficult and elusive disease. Further control activities will be developed and implemented as our knowledge of CWD continues to increase.

3. TB IN RIDING MOUNTAIN NATIONAL PARK

[By Dr. George Luterbach, veterinarian with the Canadian Food Inspection Agency]

Riding Mountain National Park (RMNP) is an area of almost three thousand square kilometers in western Manitoba (Canada). It was designated as a National Park in the 1930's, to represent and protect the forest, parkland and grassland ecosystems it includes. RMNP is an upland "low mountain" area that was largely excluded from agricultural development largely because its cooler and wetter microclimate had allowed maintenance of an island of forest in a sea of prairie grassland. Fires maintained the surrounding grasslands, and made the open prairies much easier to cultivate. By the late 1870's, most of the agricultural lands in the new province of Manitoba had been surveyed into townships. By the early 1880's, claims were staked along the proposed rail routes into Saskatchewan.

The forested uplands of Riding Mountain served as a source of timber for buildings, railway ties and fuel wood. Much of the bur oak on the river valley slopes was harvested during the late 1800's, to the extent that no undisturbed stands remained. Large logging camps used the big stands of spruce, while others took pine, oak and poplar.

To reduce pressure on the timber resources, the federal government in 1895 established the Riding Mountain Forest Reserve, withdrawing the land from settlement. Controlled harvest of timber continued, and haying and grazing of the Reserve were encouraged. Park management philosophy slowly excluded these activities, with a complete cessation by around 1970.

As long as history has been recorded or remembered, RMNP has been home to elk, deer and moose populations. When logging, hay cutting and grazing activities were allowed in the Park, these activities contributed to maintenance of excellent habitat for elk in particular, and population estimates reached almost 12,000, with several thousand deer and moose besides. Although the effect on habitat was positive, this situation put the wild ungulates in immediate contact with domestic cattle, and some of those cattle were infected with Bovine Tuberculosis, caused by the organism known as Mycobacterium bovis.

In the late 1800's, TB was the greatest killer of humans in North America. No evidence exists to suggest that TB of any kind troubled humans or other animals in North America prior to the arrival of Europeans in the 1500's, but the disease was devastating to the human populations of North Americans once introduced.

M. bovis had been causing TB in the animal kingdom long before invading humanity. However, after the domestication of cattle between 8000-4000 BC, there is evidence of human infection by M. bovis, likely through milk ingestion. M. bovis was the likely pathogen in human TB until about 1000 BC. After 1000 BC, widespread pulmonary TB emerged. In fact, M. tuberculosis – the more common agent in the human form of the disease - probably is an evolved, specialized form of M. bovis developed among milk-drinking Indo-Europeans who then spread the disease during their migration into Western Europe and Eurasia. By the 1st millennium BC, M. tuberculosis causing pulmonary TB had spread throughout the known world. The earliest tangible record of pulmonary TB in humans was noted in Egypt between 668-626 BC.

Tuberculosis has been recognized in wild cervids in North America since at least 1934, primarily in white-tailed and mule deer but never has the disease been regarded as being endemic or even prevalent in these wild cervids until recently. A large area in Michigan is now regarded as having TB endemic in wild whitetails.

Records of M. bovis in cattle are scattered throughout the history of their introduction to North America. Testing and eradication efforts began in the 1900's, but TB was endemic in cattle until at least 1970, and the disease is still found sporadically throughout the world's cattle populations. Canada's cattle herds are considered "TB – free" as long as the incidence rate remains at below 1% of bovines tested, a situation that currently exists.

Agriculture Canada moved to a policy of TB "Eradication" rather than "Control" in the 1970's. The cornerstone of this policy was the complete depopulation of all infected or exposed animals, with compensation paid to the owners of those animals.

In the area surrounding RMNP, several outbreaks of M. bovis were identified in cattle in the 1950's and 1960's, resulting in depopulation of the infected herds. No widespread surveillance was undertaken of the wildlife populations, but a study of the ecology of wolves in the Park in the 1960's resulted in the incidental confirmation of M. bovis in two timber wolves.

In December 1991, a hunter noted abnormalities in an adult male elk shot near RMNP. This elk was positively diagnosed with Bovine TB. The location where it was harvested was in near proximity to a farm where a herd of beef cattle had very recently been depopulated for the same disease. Genetic testing confirmed that the TB in both the cattle and elk were the very same strain. At the time, 55 other hunter-killed elk from the same vicinity were examined and no evidence of TB was found.

In 1997, more TB was found in beef cattle in a herd from the same vicinity. That herd had been tested twice in 1991 and 1992, and was completely depopulated in 1997. Extensive testing of thousands of cattle and hundreds of elk resulted in no more evidence of TB until September of 1998, when an adult bull elk was found recently dead from natural causes. Autopsy revealed suspicious lesions, and a culture yielded M. bovis. This elk was found about thirty kilometers from the area where TB had been diagnosed in the cattle and the single elk as described. Extensive Skin Testing work on cattle herds in the vicinity failed to identify any more positive cattle.

In response to these discoveries, an extensive program of surveillance of hunter kills and natural deaths has been undertaken. In the winter of 1998/1999, samples were collected a total of 580 animals as follows: 278 elk, 149 moose, 153 deer, several coyotes, raccoons and wolves. Of these, one was determined positive for M. bovis, a rising yearling male elk that was shot in February 1999, with culture positive results in October 1999.

A total of 165 cattle herds, 1 farmed elk herd, and one bison herd located in the vicinity of the 1999 positive were all tested negative by Skin Test during 1999.

In the winter of 1999/2000, 239 elk and 129 white-tailed deer samples were collected – a total of 368 to add to the hundreds from previous years. To date, culture is not complete on all of these samples, but initial results suggest that the results will be as follows: a) all the deer are still negative, as they have all been to date; and b) two elk will be confirmed positive for M. bovis.

One of these positive elk is particularly interesting, as it is a mature male shot by a hunter in December 1999 near Grandview, Manitoba, about four miles north of the RMNP boundary, near the northwest corner of the Park, and less than an easy day's walk from Duck Mountain Provincial Park and Forest. Duck Mountain extends into Saskatchewan as well, and provides habitat for another three thousand wild elk, none of which have ever been found infected with TB. In fact, these five are the only wild elk ever found infected with TB outside of Yellowstone National Park in Wyoming.

It is worth noting that hunters who had harvested wild animals and noted abnormalities made the initial recognition of TB infection in Michigan whitetails and in RMNP elk. The RMNP periphery has been a very popular hunting area since long before the Park was created, with annual harvests of elk, moose and deer totaling hundreds and often thousands. Not until 1991 was TB ever noted by any of these active and observant hunters.

An aerial survey of RMNP and surrounding area in spring 1999 showed 5500 elk and 4800 moose. This is substantially higher than estimates in previous years, but much lower than the high estimates of the 1960's. The short–term increase is probably the result of recent milder winters and lower wolf populations. The long–term decrease is more interesting, as it is almost certainly due to the changes in policy instituted by Parks Canada. In particular, the exclusion of logging, grazing and hay harvesting, and more importantly the suppression of forest fires, has resulted in a decrease in the amount of quality elk habitat in the park.

This has resulted not only in a reduction in the number of elk in the RMNP ecosystem, but also a change in their habits. In order to secure sufficient feed for the winter, a large proportion of these elk use the agricultural land surrounding the Park, especially the stored hay that farmers are feeding their cattle. This results in more exposure for both the elk and the cattle, if either is infected with TB. A program of fencing of haystacks has been ongoing for many years, but this does not help when farmers are actually feeding their cattle, and the elk come out at night to help themselves. Elk farmers in the RMNP ecosystem are actually much better off than the cattle farmers, as their livestock are behind elk–proof fences!

The ramifications and policy adjustments of this "TB in Wildlife" situation are many and not near completion. The Canadian Food Inspection Agency (CFIA) is mandated by the federal Health of Animals Act to control and eradicate M. bovis in Canada. However, Cabinet Policy has established that CFIA steps aside in the case of disease in National Parks, and allows Parks Canada to take control. This policy was questioned and subsequently affirmed in Wood Buffalo National Park. There, an introduced herd of Plains Bison infected with TB, Brucellosis and Anthrax has been allowed to continue roaming with virtually no successful control efforts.

The CFIA position is that the RMNP wild elk population does not fit the definition of a "herd" for purposes of disease control, and there is not sufficient evidence to declare it "TB infected". In fact, this position is backed up by the "TB–Free" criteria for cattle – Five positives out of more than 1200 animals tested equals less than half of one percent! An additional benefit of all this postmortem activity has been in the results of searches for other diseases and parasites. Absolutely no positives have been found for Chronic Wasting Disease, and no elk has been found to be infected with P. tenuis, the endemic meningeal worm of white-tailed deer.

Over 640 live captured elk and all other farmed elk in the Province have been tested at least twice, and some as many as five times, with all results being negative to date.

About three hundred elk have been live captured from RMNP over the last number of years. 160 of these are still being held and tested. The remainder has been dispersed to farms in Manitoba, Saskatchewan, Ontario and the United States. Several have died and been autopsied, and all have been subjected to skin testing for TB, with no evidence of M. bovis detected. The fate of the 160 RMNP elk captured but not dispersed to farms has not yet been determined.

One enhancement to the testing program has already been implemented for this particular group, whereby any that react to the MCT test are immediately destroyed & subjected to post mortem examination. There is no longer any provision to qualify MCT test reactors by CCT for any such reactors identified during the qualifying period. Culture results for all 20 of the captives slaughtered as non- specific reactors in winter 1999/2000 are now complete, and all are negative. Other enhancements being explored include adding a requirement for one or more herd tests to augment the current requirement for two whole herd tests, and completion of experimental blood tests with negative results, before Negative Status can be attained for these elk and movement permits issued.

CFIA, the Manitoba Elk Growers Association and the Canadian Venison Council all expressed opposition to any capture from RMNP after the September 1998 positive. However, the Manitoba Government proceeded to capture 160 elk from RMNP.

Manitoba Government officials have also changed policy regarding these elk as regards their legal status. Initially, Manitoba officials agreed that these elk would remain as "wildlife" until they achieved Negative Status. In 1999, the official status of all these elk became "agricultural animals" and privately owned, and ownership of many of these was assigned to capture contractors and First Nations, even though none have achieved Negative Status. CFIA, on the other hand, has maintained their position that these elk are still "wildlife", that they are simply co-operating with the Manitoba Government in attempting to qualify them as "Negative Status", and that if there is a TB positive amongst these captive "wild" elk or their offspring, that CFIA will not issue a destruction order nor pay compensation.

RMNP officials have proposed to enhance surveillance by building five capture sites in the Park, to bait and capture elk. CFIA will then be requested to test these elk with reactors to MCT being slaughtered and examined. The remainder would be released back into RMNP with small ear tags, which would provide opportunities to study movements of these RMNP elk through reports of hunter kills or recaptures in future monitoring efforts. Some will also be radio collared. Key questions to be addressed will include the movements, makeup of the herds at different times of the year, habitat use at different times of the year, and extent of mingling with cattle herds. In addition to these proposals, prescribed burning of carefully selected sites is enhancing elk habitat in RMNP. This action will improve habitat within the Park, and reduce pressure on the elk to leave the Park and interact with privately owned livestock.

Both the Manitoba Elk Growers Association and the CVC are considering issuing a request to the Manitoba Government to deal with all RMNP elk currently in captivity and not yet dispersed to farms by releasing them back into RMNP with small ear tags, to remove concern of transfer of disease and interference with industry. This release would also add a large number of identified elk into the Park and assist with the objectives mentioned above.

The Canadian Venison Council, as the national representative body for deer and elk farming associations across Canada, has taken the following positions re: the RMNP situation: a) first, a resolution was accepted in the early 1990's that opposed any capture or movement of cervids from the wild to any elk or deer farms in Canada, and b)when TB was identified in RMNP elk, the CVC forwarded these recommendations to RMNP and CFIA officials:

1. That the Canadian Food Inspection Agency (CFIA) be designated the lead Agency responsible for the control and eradication of tuberculosis in Riding Mountain National Park (RMNP TB Program), with full responsibility and authority for all necessary actions.

2. That all levels of Government with an interest in the RMNP TB Program support the establishment of an advisory committee to include livestock producers drawn from the periphery area of RMNP, Wildlife Association representatives and representatives of the First Nations resident in the RMNP area.

3. That this Advisory Committee has input to the development of all action plans and final review and approval privileges for all actions and information releases related to the RMNP TB Program.

4. That the objectives of the RMNP TB Program be established as follows: a) to establish the extent of infection in the wildlife within RMNP; and, b) to eradicate Bovine TB from all animals within RMNP and within the periphery area surrounding RMNP.

5. That CFIA directs the appropriate personnel to immediately begin the collection of samples from a statistically significant proportion of adult elk in various locations throughout RMNP to begin the process of establishing the extent and rate of TB infection in the Park.

6. That an extensive program of further surveillance begin immediately, to include these actions: a) mandatory reporting and postmortem of all elk, moose and deer harvested by all hunters, both licensed and unlicensed, in the RMNP Periphery area; b)an extensive program of capture and testing of elk, both in the periphery area and within the boundaries of RMNP. All responders to the Mid Cervical TB Test would be slaughtered and cultured. Once cleared, these elk should be returned to RMNP.

7. That the CFIA establish a comprehensive program of adequate compensation for all livestock producers affected by any impacts generated by the existence or perception of the existence of Bovine TB in RMNP.

Why is it that only elk are showing as positive? Several theories are circulating: Whitetails are found at lower densities in RMNP. Elk are more concentrated, in 5 general areas in the Park. Moose are less herd oriented than elk and even less than whitetails.

How will we deal with the presence of TB? Many proposals, ranging from kill all the elk, kill all the cattle, fence the Park, kill all the elk outside the Park, fence all the winter feeding areas for cattle. Most popular theory: Reduce the elk population to a lower level, then disease will die out in response to the lower densities.

Other models in dealing with TB include:

1. Wood Buffalo National Park – here the bison are infected with tuberculosis, brucellosis and anthrax. During the last twenty years, the estimated population within the Park has dropped from 12,500 to 2,500. However, the disease incidence level has stayed the same.

2. TB in Whitetails in Michigan – here the deer are infected with TB, and the theory is that concentrations at winter supplemental feeding sites has spread the disease.

3. TB and brucellosis in bison and elk in Yellowstone National Park in Wyoming/Montana.

4. TB reservoir in wild marsupial "possums" in New Zealand, contributing to an endemic infection in deer, cattle, sheep and other livestock.

5. TB reservoir in wild European badgers in Britain.

TB in cattle around RMNP is a similar surveillance situation to CWD in elk. Will we establish zones with differing requirements for testing? Will cattle be restricted if they originate from RMNP periphery?

Many questions to be discussed. Few conclusions as yet.

4. EVENTS CALENDAR

Here is a list of upcoming events of interest to deer and elk farmers.

ANTLERS INTERNATIONAL'S SECOND ANNUAL WHITETAIL SEMINAR will be held on Jan. 18, 2001. This is an excellent opportunity to listen to some of the top authorities in whitetail breeding and management. One full day of sharing and visiting with the experts. A seminar you do not want to miss! Call us at 573-392-2997, fax 573-392-6926, e-mail us, or visit our website at *http://antlersinternational.com* for more information.

ALBERTA ELK ASSOCIATION ANNUAL CONVENTION will be held at the Mayfield Inn, in Edmonton, Alberta, Canada on Jan. 26 and 27, 2001. For more information, contact AEA at *info@albertaelk.com* or visit their website at *http://www.albertaelk.com* (List of speakers and sessions can be found in the Deerfarmer.com Calendar at *http://events.deerfarmer.com*).

NEW YORK STATE FARMED DEER SEMINAR will be held at Cornell University on Saturday, Jan. 27, 2001. Fee is $40 in advance or $50 at the door. For more information, contact Martha Goodsell, 125 Williams Road, Candor, NY 13743, phone 607-659-4635 or *info@fallowhollow.com* (List of speakers and topics can be found in the Deerfarmer.com Calendar at *http://events.deerfarmer.com*

NORTH AMERICAN ELK BREEDERS CONVENTION will be held in Toronto, Ontario, Canada on Feb. 21-24, 2001. Call 888-431-3605, fax 306-924-9792 or *info@naelk.org* for more information.

NADEFA ANNUAL CONFERENCE AND EXHIBIT – Deer Farming in the 21st Century - will be held in Albuquerque, New Mexico, USA on Feb. 28 – March 3, 2001. Call NADeFA's National Office at 301-459-7708, fax 301-459-7864 or visit our website at *http://www.nadefa.org* for more information.

SASKATCHEWAN WHITETAIL AND MULE DEER CONVENTION will hold their 2001 Convention on March 23 and 24, 2001 at the Saskatoon Inn, in Saskatoon Saskatchewan Canada. For more information, e-mail Lisa at *info@saskdeer.com* or phone 306-783-5257 or visit *http://www.saskdeer.com*.

SASKATCHEWAN ELK BREEDERS ASSOC. CONVENTION will be held in Saskatoon, Saskatchewan, Canada on March 29 to 31, 2001. Please call 306-924-9790, fax 306-924-9792 or visit our website at *http://www.ranchernet.com/SEBA* for more information.

AWMDA ANNUAL CONVENTION & TRADESHOW. The Alberta Whitetail and Mule Deer Association Annual Convention and Tradeshow will be held April 6 to 8, 2001 at the Ramada Inn, Edmonton Alberta Canada. Contact: Alberta Whitetail and Mule Deer Association 5102 - 54 Avenue, Camrose Alberta T4V 3C9 Phone: 780-672-5988; Fax: 780-672-5978 *info@albertadeer.com* web: *http://www.albertadeer.com.*

Many more events, including deer/elk sales, tradeshows and workshops are listed in the Calendar section of Deerfarmer.com that can be found at *http://events.deerfarmer.com.* Take advantage of this free service to list your upcoming events.

5. DEERFARMER.COM NEWS

Here are some of the recent developments at Deerfarmer.com:

1. *More newsletter choices*: you can now download and print a Microsoft Word formatted copy of each issue of the Digest. Simply go to *http://digest.deerfarmer.com* and click on "MS Word Version".

We are also offering a hard-copy subscription service. For $36 a year we will send you via first-class mail your monthly issue of the Deer Farmers' Digest.

With all these choices to read our newsletter, I are wondering why we are sending you a 14 page e-mail every month? One option we are considering is to send you only an e-mail notice (with links) that the new issue of the Digest is available on our website. Let us know what your preferred method of getting this newsletter is.

2. *Photo Gallery a hit*: our improved, expanded photo gallery is the most popular part of our website as it gets the most visitor traffic. We really need more quality photographs for species other than whitetail.

Because of the traffic, and mention (and links to) of your farm, the Gallery is an excellent way to increase the exposure to your deer or elk business. However, the Gallery is not for blatant

advertising e.g., “fawns from this buck for sale”. Also, the photos must be of good quality – technically and artistically. We all want the Gallery to exhibit our best work.

3. *New Farm Directory coming*: we are getting closer to developing and setting up our new, expanded Deer Farm Directory. The new directory will include all deer and elk species, and will be expanded to include farms in the U.K., Europe, Australia and New Zealand (and perhaps others). In addition to the usual contact information, the enhanced Directory will also capture detailed information on products and services that you offer.

A new, and very exciting feature of the new Farm Directory will be the Deer Farm Universal Identifier (DFUID). Each farm and ranch in our Directory will be assigned a unique ID. This ID can then be used in your information, advertising, marketing and customer service programs. For example, if you sell venison, you can put your DFUID on your products. Consumers can then go to *www.dfuid.com*, search for your DFUID, and find out information about the farm from which the products originated. This will allow for a “trace-back” system – something the industry has been talking about for a long time, but has never gotten around to implementing. Watch for more in future newsletters.

A copy of the proposal for the new “World Deer and Elk Farm Directory” is being sent to the industry associations for their information and comments. If you would like to see a copy, please e-mail me.

6. SUBSCRIPTION SERVICES

We respect your right to privacy. If you wish to be removed from our mailing list at any time, simply send an e-mail to *editor@deerfarmer.com* with REMOVE in the Subject line.

If you want your name ADDED to our mailing list, please sign our Guest Book form that can be found at *http://www.deerfarmer.com/forms/guest.htm*

The Digest is available in a printed format. A $3 per issue ($36 per year) fee applies to cover postage, paper and handling costs.

As per Privacy Policy, your name, e-mail address and any other information you provide us will only be used by Deerfarmer.com. This information will not be shared with any third party unless we get your permission first!

7. CONTACT INFORMATION

We are always looking for articles and news about deer and elk farming that we can print in this newsletter. E-mail, fax or mail your ideas and articles to the Editor as per below.

For more general information, comments and suggestions, please contact:

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