

Origins of CWD

Like the entire class of TSE diseases, CWD in all likelihood has existed in wild animals for hundreds of years. Most of the CWD in farmed elk appears to trace back to the Colorado Division of Wildlife research pens where CWD first appeared in 1967. 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 and Canada can be traced to this South Dakota herd, and from that herd to the Colorado Division of Wildlife.

The Colorado Division of Wildlife has tried to mislead the public by shifting the blame to the elk industry for a problem of their creation. This may destroy the livelihoods of many family farmers who are in the elk ranching business. By failing to accept responsibility for its actions in a timely manner, the Division of Wildlife has only served to exacerbate the problem of CWD in both domestic and wild animals.

In contrast, elk breeders have taken proactive steps to halt the spread of CWD and to eradicate it completely from domestic herds. All of the herds in Saskatchewan with CWD cases have been depopulated or will be very soon. According to the CFIA, out of 6700 samples submitted as of October 1, 2001, 5300 were tested, with 159 positives confirmed. Of those positives, 52 came from the source herd, which received a CWD-positive elk from South Dakota in the 1980s.

What are the risks of CWD?

Scientific research and real-life experiences indicate that CWD does not affect humans.¹² Since CWD was first observed in the late 1960s, no cases have been discovered linking any disease in livestock and

humans to CWD. John Pape, an epidemiologist with the Colorado Department of Health, stated, "There is no indication that CWD is a threat to human health." Others who are involved in researching and monitoring CWD echo these sentiments. "I've lived here a long time. I've hunted here. I just have not seen any credible evidence that it's going to kill me or anyone else," said Tom Thorn, a Wyoming state veterinarian.¹³

On January 19, 2001, scientific advisors to the U.S. Food and Drug Administration TSE Advisory Committee ruled that unlike mad-cow disease, there is no evidence that people can contract the disease. "There is no evidence for transmission," said David Bolton of the New York State Institute for Basic Research.¹⁴

"To date, there's no identified instance of disease in human beings attributable to chronic wasting disease, either through contact (with sick animals) or through consumption," said Advisory Committee Chairman Paul Brown, MD, of the National Institutes of Health. Among evidence the panel considered was biological testing of three CJD patients who consumed elk venison.¹⁵ According to Ermias Belay, MD, of the Center for Disease Control, the brain tissue sampling and genetic and diagnostic testing of the CJD strains indicated classical CJD, not variant CJD linked to diet as in mad-cow disease.¹⁶

Furthermore, a species barrier prevents the transmission of CWD. In a study conducted in July 2000 at the Rocky Mountain Laboratories, a center of the National Institutes of Health, Byron Caughey, Ph.D. reported evidence of a molecular barrier that limits the susceptibility of cattle and human to CWD.¹⁷

Real-life conditions support the presence of a species barrier. Beth Williams, DVM, Ph.D., of the Wyoming State Veterinary Laboratory and leading expert on CWD, said that researchers have

found no evidence that CWD can be transmitted from deer and elk to cattle under natural conditions and provided an interim report on two studies supporting these findings. In a 10-year study involving 12 cattle that were orally fed CWD-infected deer brain one time in 1997, all of the cattle are healthy. In a contact study also begun in 1997, 24 cattle are being kept alongside CWD-infected deer, and all 24 are healthy.¹⁸

In addition, a wide-ranging survey of cattle in contact with free-ranging deer supported the presence of a species barrier. In 1998, Dr. Daniel H. Gould of Colorado State University conducted a geographically targeted survey of adult-age cattle (five years or older) on 22 ranches where cattle mingled with free-roaming deer. None of the 262 cattle brains analyzed had any indications of chronic wasting disease, and no evidence of prion proteins was detected in any animal tissue.¹⁹

In contrast, in a study where 12 cattle were injected intracranially with CWD-infected deer brain, three cattle became sick and were euthanized.²⁰ This type of transmission, however, would never happen under natural ranching conditions or in the wild.

Elk products are safe

Prions, the protein agents that cause CWD, concentrate in the brain and central nervous system of infected animals. There is no evidence that muscle tissue, antler or other parts of the animal contain prions.

Dr. Richard Rubenstein at the Institute for Basic Research in Developmental Disabilities in New York City tested eleven elk antlers from CWD-positive and CWD-negative elk. None of the samples had any detectable presence of prions.²¹

There are no government restrictions against consuming deer and elk meat or antler products, but

some states have issued common sense recommendations against consuming animals that appear to be diseased as well as minimal handling of spine and brain when dressing carcasses, especially in areas where CWD has occurred.

Even though no evidence exists that CWD is a threat to humans and no evidence exists that CWD can even infect antlers, elk and deer ranchers have acted ethically, responsibly and proactively, taking all possible precautions to ensure that velvet antler and meat from affected herds does not enter the marketplace.

The Canadian Cervid Council has reported that no velvet antler products from herds known to have at least one CWD case have been sold in Canada or elsewhere. It is policy of the CFIA to eradicate the entire herd if even one elk is diagnosed with CWD. In the United States, a ban on selling meat and velvet products from infected herds is part of the proposed CWD eradication and control program being implemented by the United States Department of Agriculture (USDA).

In the past, elk ranchers have voluntarily agreed to ban sales of antler or meat from infected herds. Mark Limpert, chairman of the South Dakota Elk Breeders

Association, says that even though the sale of velvet antler out of quarantined herds was not prohibited, because there is no evidence that CWD is a threat to humans, owners of the herds voluntarily decided not to sell this antler. More than 1000 lbs. of antler have been destroyed.

Summary

CWD is a rare disease that affects deer and elk. The elk industry, having a successful track record of eliminating disease in captive herds, is confident that they will likewise eradicate CWD. Not long ago, the elk industry took similar measures to eradicate tuberculosis and brucellosis in domestic elk herds. Most positive herds were identified and eliminated in the first few years. TB was eradicated in record time, only nine years after the initial outbreak. As a result, today, no farmed elk have tuberculosis or brucellosis.

However, the absence of a CWD eradication and control program for wild cervids poses yet another challenge for the domestic elk industry. While elk breeders have

taken a leading role to protect their animals from CWD, state wildlife agencies have done little, other than Colorado which issued more hunting permits and hired snipers to kill animals in endemic areas. NAEBA is urging the appropriate state and federal government agencies to adopt a comprehensive and effective strategy for eliminating CWD from all cervids, especially those living in the wild, and NAEBA has pledged their cooperation. Without appropriate measures being instituted, CWD will continue to be a threat to both domestic and wild cervid populations.

Despite the absence of a CWD eradication program for wild cervids, NAEBA is confident that its CWD program, in partnership with local and federal agencies in the United States and Canada, will eliminate the disease in domestic elk herds. In so doing, millions of consumers can continue enjoying the health benefits of elk venison and velvet antler, and family ranches throughout North America will continue to thrive in partnership with nature for many years to come.



CHRONIC WASTING DISEASE

Introduction

In the great Canadian and American West, elk have roamed the land for thousands of years. They display an uncommon level of intelligence and adaptability and are regal and graceful in their appearance. Because the North American wilderness is so harsh, most elk face high stress factors—drought in the summer, hunting season, and bitter cold winter—making it necessary for elk to forage for food over great distances, sometimes leading to mass starvation.

While the average wild elk bull doesn't live beyond three years, domesticated elk bulls live to be twelve or even fifteen years old. Ranched elk are raised for their meat and for their velvet. (The antlers are harvested annually from male elk.) Elk ranches are clean, environmentally friendly places where elk receive excellent care—plenty of high-nutrition, chemical-free food, and immediate veterinary treatment in case of illness.

Elk ranching creates a viable means of sustenance for North American ranchers who have suffered from reduced income from grain crops and other livestock. The Elk Quality Assurance Program supported by the North American Elk Breeders Association sets high standards for ranchers to ensure that domesticated elk are treated with utmost care, dignity and respect.¹



Aside from their economic advantages, elk products offer many health benefits. Elk venison provides a low-fat, healthy, red meat alternative to beef. Velvet antler, considered a cornerstone of Traditional Chinese Medicine, has been used for more than 2,000

years in Asia and Europe and is gaining popularity in North America as a dietary supplement. Olympic athletes, bodybuilders and active people of all ages use velvet antler, which has been shown to improve joint health, increase muscular strength, accelerate muscle recovery after workouts, support the immune system and improve overall energy and stamina.²

Velvet antler is comprised of more than 40 naturally occurring nutrients, including glucosamine sulfate and chondroitin sulfate, as well as collagen, insulin-like growth factor (IGF-1), anti-inflammatory

prostaglandins, amino acids, essential fatty acids including Omega 3 and Omega 6, and important minerals and trace minerals. Numerous clinical studies have validated the effectiveness of glucosamine and chondroitin sulfate in the treatment of arthritis. A recent randomized, double-blind, placebo controlled study published in The Lancet indicated that glucosamine sulfate improved joint health and can slow the progression of osteoarthritis.³

There has been increased consumer alarm and media attention about a family of diseases called transmissible spongiform

encephalopathies (TSEs) that can affect livestock. Most of the alarm has focused on bovine spongiform encephalopathy (BSE), more commonly known as mad-cow disease.

One of these TSE diseases affects deer and elk and is known as

Aside from their economic advantages, elk products offer many health benefits.

For more information, please contact Paula Southman, NAEBA communications manager, at (816) 431-3605.



North American Elk Breeders Association

Main Office:
1708 N. Prairie View Rd. • P.O. Box 1640
Platte City, MO 64079
(816) 431-3605 • Fax (816) 431-2705
info@naelk.org • www.naelk.org

Copyright © 2001 by North American Elk Breeders Association. All rights reserved. No part of this publication may be used or reproduced in any manner without written permission from the publisher.

- 1 The American Elk Products Board and North American Elk Breeders Association. Elk Quality Assurance Program. Proceedings of a convention. Feb 2000. Platte City, MO: NAEBA. North American Elk Breeders Association. The Velvet Management Handbook. Platte City, MO: NAEBA, 1998.
- 2 These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
- 3 Register, Jean Yves, et. al. "Long-Term Effects of Glucosamine Sulfate on Osteoarthritis Progression: a Randomized, Placebo-Controlled Clinical Trial." The Lancet, 27 Jan 2001. 357:251-256.
- 4 "Chronic Wasting Disease in Deer and Elk: Food Safety Precautions." University of Wyoming College of Agriculture. Online. www.uwoyo.edu. 12 Feb 2001.
- 5 Prusiner, S.B. "The Prion Disease." Scientific American. 1995:48-57.
- 6 "Consultation on Public Health and Animal Transmissible Spongiform Encephalopathies: Epidemiology, Risk and Research Requirements." World Health Organization. Online. www.who.int. 1-3 Dec 1999.
- 7 "Fact Sheet on Bovine Spongiform Encephalopathy." World Health Organization. Online. www.who.int. Dec 2000.
- 8 USDA. "Chronic Wasting Disease in Captive Elk: An Update on Surveillance and Program Development." APHIS. Jan 2001.
- 9 Sam Holland, DVM. Telephone Interview. 13 Feb 2001.

- 10 "Fact Sheet on Chronic Wasting Disease of Deer and Elk." Canadian Food Inspection Agency. Online. www.cfia-acia.agr.ca. 12 Feb 2001.
- 11 Thoreifson, Ian. "Chronic Wasting Disease of Deer and Elk." Canadian Cervid Council. Aug 2000.
- 12 "Chronic Wasting Disease." Colorado State University College of Veterinary Medicine and Biomedical Sciences. Online. www.cvms.colostate.edu. 12 Feb 2001.
- 13 "Wasting Away the West." CBS Evening News with Dan Rather. Prod. Barbara Pierce. CBS. WCBS, New York. 30 Jan 2001.
- 14 Richwine, Lisa. "Mad Deer Disease No Threat to U.S." Reuters. 19 Jan 2001.
- 15 "FDA: 'Mad Deer' Not Risk to Humans." Associated Press. 19 Jan 2001.
- 16 Belay, Ermias, M.D. "Testimony to the FDA TSE Advisory Committee." Committee Meeting. Bethesda, MD. 19 Jan 2001.
- 17 Raymond, C.J., et al. "Evidence of a Molecular Barrier Limiting Susceptibility of Humans, Cattle, and Sheep to Chronic Wasting Disease." The Embo Journal. 19.17 (2000):4425-4430.
- 18 Williams, Beth, Ph.D., DVM. Telephone Interview. 6 Jan 2001.
- 19 Zebarth, Glen, DVM. "Industry Perspective." FDA TSE Advisory Committee Meeting. Bethesda, MD. 19 Jan 2001.
- 20 Hamir, A.N., et al. "Preliminary Findings on the Experimental Transmission of Chronic Wasting Disease Agent of Mule Deer to Cattle." Vet. Diagn. Invest. 13 (2001)
- 21 Rubenstein, Richard, Ph. D. Letter to Sam Holland, DVM. 25 Sept 1998.

chronic wasting disease (CWD). Though the incidence of CWD is extremely low in nature and has never been known to transmit to cattle or humans, the alarm over mad-cow disease has raised concerns about the potential impact of CWD on people who consume products derived from elk and deer.

The North American Elk Breeders Association, or NAEBA, provides you with this overview of the history and the most recent scientific research about CWD. This paper also covers the proactive measures NAEBA is taking, in conjunction with government agencies, to ensure the safety of elk products and to eradicate the disease in their livestock.

NAEBA is a non-profit organization with more than 1800 members that was founded in 1990 to promote and protect the elk farming and ranching industry. NAEBA works closely with the Canadian Food Inspection Agency, the U.S. Food and Drug Administration, the United States Department of Agriculture, members of Congress, state veterinarians and wildlife agencies, the public, and the media to promote and facilitate a proactive approach to CWD eradication.

Defining CWD

CWD affects elk and other deer species, a family of animals referred to as cervids. CWD is one of several brain diseases collectively called transmissible spongiform encephalopathies (TSEs). TSEs also include scrapie, a disease widely found in domestic sheep and goats; bovine spongiform encephalopathy (BSE) that has affected some European cattle; and Creutzfeldt-Jakob disease (CJD); an extremely rare but fatal disease in humans. TSEs have also been shown to affect cats, minks and squirrels.

How CWD is transmitted from one

animal to the other is not completely understood. It is generally thought to be transmitted maternally as well as laterally through the saliva, feces or urine of animals in proximity. Once ingested, the disease has a generally accepted incubation period of 16-30 months before the onset of clinically observed symptoms.

Animals may show a number of different signs as the disease slowly damages their brains. Affected deer and elk become listless, lack coordination, lose significant weight, suffer from depression, exhibit unusual behavior, become paralyzed, show increased thirst and urination and eventually die. Positive diagnosis of CWD is achieved postmortem upon examination of the animal's brain tissue.

The brains of animals with TSE develop many microscopic-size holes, which give the brain a sponge-like appearance.⁴ TSEs are caused by destructive brain proteins that damage healthy brain proteins. These proteins are called proteinaceous infection particles or prions.⁵

The alarm over mad-cow disease (BSE) in Europe has raised concerns about whether other TSEs like CWD could impact humans. According to the World Health Organization, the dynamics of CWD most closely resemble those of scrapie in sheep.⁶ Scrapie has been widespread in domestic sheep in Europe for hundreds of years and for at least fifty years in North America. Scientists have studied scrapie in sheep for more than 200 years. Despite the consumption of scrapie-infected sheep products for hundreds of years, scrapie has never

transferred to humans.

BSE has not been found in North America. BSE in European cattle is believed to have been caused by the continual feeding of cattle with meat from sheep and cattle infected with BSE and scrapie. It was then passed to humans when they ate beef nerve or spinal tissue from an infected animal, and became a variant of a rare but naturally occurring TSE in humans called Creutzfeldt-Jakob disease (vCJD). Contrary to some irresponsible and misleading media reports, no human has ever contracted vCJD by consuming venison or velvet antler products.

In contrast, the American Elk Products Board and the FDA instituted a ban on feeding meat (mammalian) tissue to elk and deer livestock, which are only fed grain to eliminate any possible exposure.

Incidences and geographic locations of CWD

As of the revision of this paper, CWD has been found in free-ranging mule deer, elk and white-tailed deer in Colorado, Wyoming, Nebraska, and Saskatchewan, as well as in domestic herds in Colorado, Montana, Nebraska, Oklahoma, South Dakota, and the Canadian province of Saskatchewan. Incidences of infection in wild cervid populations are generally between one and five percent, but there are endemic areas in northern Colorado where the incidence of CWD infection is as high as 15 percent. In contrast, only approximately 259 out of an estimated 160,000 domestic elk, or less than 0.01 percent, have tested positive for CWD in North America.

Recently, there have been isolated cases of CWD in domestic herds in Colorado. There have been reported incidences of one or two CWD-infected elk on three separate ranches. Affected ranchers, in compliance with state and federal regulations, have initiated the mandatory depopulation and disposal protocols of their herds as



outlined in the CWD Surveillance Program. These ranchers, in accordance with the USDA CWD Surveillance program, will receive indemnity funding at fair market value of up to \$3000 per animal in compensation. Trace-forward elk, (animals that were potentially exposed to a CWD-infected elk or elk herd within the past five years), have also been tracked from the affected ranches in Colorado to ranches in fifteen states.

Due to the vigilance of elk breeders, NAEBA's state-of-the-art registry system, and the stringent monitoring protocols set forth in the CWD Surveillance Program, these trace-forward animals have been quickly identified, illustrating the program's effectiveness. Ranchers in possession of these animals have two potential courses of action, as outlined in the USDA

CWD Surveillance Program. The first is to depopulate the trace-forward animal and conduct a post-mortem test for signs of CWD. If the animal

quarantine and will be depopulated as a precaution. Ranchers who destroy any animal because of potential exposure to CWD will receive indemnity funding.

The second course of action that breeders with trace-forward animals can pursue is to quarantine the entire elk herd for five years (60 months) and monitor the animals for signs of CWD. After five years, if the elk show no signs of CWD, they are declared "CWD free" and are available for sale and transfer. Should any elk show signs of CWD during the five-year period, it will be destroyed and tested for signs of infection. The five-year quarantine is instituted from the date that the trace-forward animal arrived on the ranch.

Eradication programs in the U.S. and Canada

CWD was first identified in farmed elk in the United States in December

of 1997. Although the first case in Canada is now believed to have occurred in 1990, it was first noted in 1996. The control and eradication of the disease became a top priority for elk ranchers and government agencies. The Canadian Food Inspection Agency (CFIA), the United States Department of Agriculture (USDA), and individual states have adopted aggressive programs for the control and eradication of CWD, based on the model developed by NAEBA in 1998. The CFIA's nationwide program for CWD was put into place in late 2000.

In America, the U.S. Senate Appropriations Subcommittee on Agriculture recently approved \$1 million line item funding for the CWD program for the 2002 fiscal year. Line item funding is expected to be approved by Congress and the president. This set-up of a Congressionally-funded program will make it easier for the industry to expand the program in successive fiscal years. This funding is in addition to emergency funds of \$2.6 million allocated by the USDA for fiscal year 2001. An additional \$12.5 million emergency funding is expected for fiscal year 2002. Emergency funds will provide for the costs of diagnostic testing, surveillance, research, carcass disposal and indemnity.

The USDA CWD surveillance and indemnity program sets forth protocols that ranchers must adhere to when transporting animals between states, while individual state programs outline protocols for intrastate movement. Over 80 percent of farmed elk in the United States have been covered under programs in Colorado, Connecticut, Iowa, Idaho, Indiana, Maine, Minnesota, Missouri, Montana, Nebraska, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, Texas, Utah, Vermont and Wisconsin. Other states were waiting for the direction of a federal program and will soon have state

programs in place.

The main components of the CWD eradication programs are

1. Verified inventory records on herds and animals.

2. Required examination of the brains of all animals that die at over 16 months of age, regardless of their cause of death.

3. Certification of herds with CWD-negative status.

4. Depopulation of herds with one case of CWD.⁸

Instituting these programs is made easier by NAEBA's regulatory efforts. The elk industry is one of the most highly regulated agricultural industries; there are many requirements and records concerning the interstate movement

and veterinary health history of these animals across the United States. In addition, NAEBA provides an excellent registry system for the individual identification and pedigree history of the animals.

"NAEBA is at the cutting edge of livestock technology and also provides a DNA registry system for these animals," says Mike Kilpatrick, NAEBA's president.

Removing all suspect elk from a herd when their symptoms first appear seems to have contained CWD in infected herds. In South Dakota, the CWD surveillance and eradication program has proven to track and eliminate the spread of CWD. "This program with mandatory surveillance offers a degree of confidence, comfort and documented evidence that CWD can be contained and controlled," said Dr. Sam Holland, State Veterinarian for South Dakota's Animal Industry Board.⁹ In Canada, the Canadian Food Inspection

Agency (CFIA) routinely monitors for CWD by examining animals every three years during tuberculosis testing and by screening all deer and elk harvested in herds positively identified with CWD have been destroyed and owners have been fully indemnified.¹¹

World scientists are working diligently to develop a live-animal test for the entire class of TSE diseases, and an accurate test is generally thought to be close at hand. NAEBA continues to be proactive in CWD eradication, by providing financial support of ongoing scientific research, by supporting the search for better

diagnostic tools and by developing quality processing and manufacturing standards for elk products. It is funding research, expected to cost \$250,000, to develop a live-animal test and to increase knowledge of CWD. The Elk Research Council, which is funded by NAEBA members, has already spent \$180,000 on

research and has maintained a research herd for three years.

NAEBA supports depopulation of infected herds with indemnity for ranchers at fair market value, now a part of the USDA's program. Indemnity will provide incentive for ranchers to participate in the program, and like the TB eradication program implemented in the 1990s, it will add market value to CWD-negative elk products. These factors will serve to accelerate eradication and prevent the disease from "going underground."

Less than 0.01 percent of elk in North American domestic herds have tested positive for CWD.