



CHRONIC WASTING DISEASE POISED TO CROSS SPECIES BARRIER

By Vivian Pharis, AWA Board Member

With many chronic problems facing us, few will want to know of another, but since Canada's epicentre of chronic wasting disease (CWD) is Alberta and Saskatchewan, it may pay off to be alert, especially to dirt.

CWD, which infects cervids (deer, elk, moose, and maybe caribou), and its cousin sheep scrapie are both transmissible spongiform encephalopathies (TSEs). TSEs are produced by misshapen small pieces of protein called prions. Different prions are responsible for producing related diseases such as mad cow (BSE) and the human Kreutzfeldt-Jakob and kuru diseases. All these diseases result in wasting of the nervous system and are incurable.

Chronic wasting disease was first detected in North America in 1967 on a research facility in Colorado, appearing in a mule deer that had been kept in proximity with sheep, some of which carried scrapie. By 1996 CWD had been found in farmed elk in several U.S. states including South Dakota. That same year it was detected in the wild in Nebraska, as well as on a Saskatchewan game farm amongst a herd that had come, in part, from South Dakota.

Like wildfire, by 1997 CWD had spread to 19 Saskatchewan game farms, requiring the subsidized destruction and incineration of 3,500 elk. An additional 5,000 elk were slaughtered and incinerated on infected Saskatchewan game farms in 2001. The first CWD case in the Canadian wild turned up in 2000 in a Saskatchewan mule deer near Lloydminster, on the Alberta border. By 2004, 40 game farms in Saskatchewan and three in Alberta had incurred CWD, and it was now in the wild in three parts of Saskatchewan.

In 2004 game farms reached a high in both provinces, with 800 farms (60,000 fenced animals). Although some persist and continue to contribute diseases such as CWD, many have folded – anyone



Fenced elk on an Alberta game farm PHOTO: J. SWITZER

who travels Alberta's back roads will find deer fences but no deer. Unfortunately, to get actual numbers of remaining game farms and animals is politically difficult.

The natural atrophy of game farms is due mainly to export bans on meat and velvet antler because of CWD. The sad thing is that even if all remaining farms were to fold tomorrow, they have already inflicted a terrible blight on our native wildlife that may well have become uncontrollable and increasingly dangerous.

We are told CWD cannot infect us, so why the concern? Apart from the toll it is taking on our wildlife and the possibility of its spread to species like moose and caribou, there are disturbing new reasons for humans to be vigilant for their own safety.

Velvet antler, full of blood and nerve tissue, was the lucrative product of Canada's game farms, marketed mainly to South Korea for medicinal uses. But Korea, which had taken 86 percent of Canada's velvet antler, said no to Canadian velvet in 2000 after CWD was discovered on game farms in Saskatchewan. Since then it has been a downhill slide for the game industry,

which is now largely upheld through penned hunts in Saskatchewan and government subsidies in both provinces.

What remains of the industry is making a desperate bid to sell velvet within North America, and plenty of websites extol its medicinal virtues. Since its efficacy has never been shown scientifically despite decades of research, the sales pitch has broadened from humans to the pet market. Type in "deer velvet" and "pets," and hundreds of websites appear trying to sell velvet cures for Fuzzy and Fido's various ills.

CWD Infection

Nerve and blood are among tissues where CWD disease agents known as prions can be found. Even though the related mad cow disease (bovine spongiform encephalopathy, or BSE) was not at first considered dangerous to humans, it did "cross the species barrier" into non-bovines such as cats, mink, and humans. Some scientists warn that if CWD reaches a critical exposure mass, it too might jump to new species. It has already been found in a moose in Colorado. Now new soil studies are showing how that critical exposure mass may be accelerated



Deer hunters in certain Wildlife Management Units in Alberta are required to submit the heads from all deer “harvested” for CWD testing. Fish and Wildlife freezers are located within and near the target areas. PHOTO: C. OLSON

and compounded in ways that sound more like science fiction than fact.

The pace of CWD infection startled scientists and lay people alike. Between 2001 and 2005, 68 cases of CWD were found in wild Saskatchewan mule and white-tailed deer. Alberta began mass slaughtering along the Saskatchewan border in a bid to lower the deer population and detect CWD. It wasn't until 2005 that the first wild case appeared in Alberta. Hunters had been required to submit the heads of deer taken along the eastern border for several years, and extra deer permits were issued to try to reduce the population. As well as the hunter kills, Alberta sponsored government culls of thousands of deer in the suspect region.

In 2007 and early 2008, more than 5,000 deer were killed by hunters and another nearly 3,500 through culls in wildlife zones that lie roughly between Wainwright and Empress. Twenty-one mule and three white-tailed deer were found with CWD, bringing the total in the Alberta wild to 53 cases since first detected just over two years earlier. In 2008 the first wild Saskatchewan elk were found with CWD.

A January 2008 Alberta government bulletin tried to put a positive spin on the situation, claiming that because the number of new CWD cases remains “low,” their culling programs are effective in their “aim to reduce and eventually eliminate CWD in Alberta.” AWA seriously questions such optimism in light of research which increasingly indicates that once contamination of soils occurs, CWD will persist and will spread from the environment to animals. Its

expanding range in the U.S. wild despite hunter and official culls, and even the banning of game farms in some states, fuels our fears.

A new live-animal test being trialed in 2008 on captured elk in Colorado's heavily elk-populated Rocky Mountain National Park indicated an astounding CWD infection rate of 11 percent, or 13 of 117 animals. The area's typical disease rate is 1 to 2 percent. CWD appears thoroughly ensconced in Colorado's wildlife and has even crossed the Continental Divide to the west.



The red areas show CWD-infected wild cervid populations. The grey provinces and states are those where CWD has been found in captive populations. As of August 2008, three captive herds were infected in Alberta, 40 in Saskatchewan, and 39 in the U.S. Map last updated August 26, 2008.

MAP: CHRONIC WASTING DISEASE ALLIANCE

The Dirt on Dirt

Transmissible spongiform encephalopathies (TSEs, which include CWD and scrapie), mad cow disease (BSE), and Kreutzfeldt-Jakob and kuru diseases all result in wasting of the nervous system and are incurable. But only the two TSEs can be transmitted either from live animal to live animal, or from animal to environment to animal. Thus, TSEs are truly insidious because of their ability to persist in the environment and be transmitted.

Two years ago, AWA reported on a group of Wisconsin molecular and soil scientists who found that CWD prions not only can survive in soils but also have a chemical affinity that allows them to attach to clay particles (WLA, June 2006). We already knew from studies in Colorado that soils could harbour infective CWD agents for five or more years. Now the Wisconsin team has released 2007 information indicating that common soil particles like bentonite, kaolin, and silica are able not only

to attract and hold CWD and scrapie prions but also to magnify their oral infectiveness by up to a whopping 680 percent relative to unbound agents. The soil particles appear to increase disease penetration and shorten incubation periods in infected animals.

The researchers, who released their findings in *PLoS Pathogens* (July 2007), postulate that “enhanced transmissibility of soil-bound prions may explain the environmental spread of some TSEs despite the presumably low levels shed into the environment.” Work by a California group appearing in *The Journal of Infectious Diseases* (July 2008) indicates the likelihood that the “transmission of disease among herbivores may occur through the consumption of feces or foodstuff tainted with prions from feces of CWD-infected cervids and scrapie-infected sheep.” Prions may enter soil through decay of infected carcasses, saliva excretions, and possibly urine and feces.

The world outside our Alberta and Saskatchewan backdoors has gotten scarier. And it's looking more likely that Alberta government attempts to eradicate CWD from the wild through deer culling have about as much hope of success as does a deer that eats dirt-clinging prions.

If your heart rate is still normal, then extrapolate from the conclusion of the Wisconsin group's paper, and you may feel your hair stand on end. The group realized that all three soil types that act to enhance the effectiveness of TSE prions – bentonite, kaolin, and silica – are common food additives in our Western diet. They are used as fillers and stabilizers in everything from pills to puddings. In their words, “Our data suggest that the binding of [TSE prions] to dietary microparticles has the potential to enhance oral prion disease transmission and warrants further investigation.”

We again call on concerned Canadians to contact elected representatives, federally and provincially, and to press for an end to game farming. Continuing to fuel an already bad situation with constant new infection is dangerous to our wildlife, and perhaps even to human health. 🍄