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Canadian Cooperative Wildlife Health Centre

Centre Canadien Coopératif de la Santé de la Faune

Newsletter Volume 6 - 1, Summer 1999

In this issue:

News from the CCWHC

Message of Appreciation: NonToxic Shot

Dan Bondy, Director, National Wildlife Research Centre, Canadian Wildlife Service encouraged CCWHC to share the following message:

"Lead, in the form of lead shotshell ammunition, is a toxic substance estimated to kill many thousands of waterfowl each year in Canada. Many eagles and other predatory and scavenging birds also suffer lead poisoning by consuming lead shot embedded in tissues of game animals killed or wounded with lead ammunition. In response to these concerns, Canada is prohibiting the use of lead shot for hunting most migratory game birds across Canada beginning September 1, 1999. It was largely through cooperative efforts in the investigation of this problem by researchers within the Canadian Wildlife Service, Provincial Natural Resource Departments, Universities, and the Canadian Cooperative Wildlife Health Centre, that the toxic effects of lead shot and the need for action were identified. The National Wildlife Research Centre of the Canadian Wildlife Service would like to express their appreciation to the CCWHC for its efforts in this important wildlife toxicology issue, and we look forward to a continuing partnership with the CCWHC in this and other conservation issues. For more information about the non-toxic shot regulation, visit the Canadian Wildlife Service website.

International News

Since 1994, pathologists at the USGS National Wildlife Health Center have diagnosed a previously unrecognized neurologic disease among wild birds. The condition was first recognized in bald eagles (Haliaeetus leucocephalus) in Arkansas and then in American coots (*Fulica americana*) from the same locations. More recently, in cooperation with the Southeastern Cooperative Wildlife Disease Study, University of Georgia, affected eagles and coots have been found in North and South Carolina, and Georgia. Similar lesions have been found in mallards (*Anas platyrhynchos*), American wigeon (*Anas americana*) and ring-necked ducks (*Aythya collaris*) from one site in North Carolina. The condition

has been called "vacuolar myelinopathy", because the lesions consist of microscopic vacuoles in the white matter of the brain as a result of separation of the myelin layers that surround axons. Very extensive investigation has failed to identify a cause, although some form of toxin is suspected. It is unclear whether this condition is actually a new disease and if it is "spreading", or if the disease is now being detected and diagnosed because scientists are aware of its occurrence and are looking for it.

Affected birds have erratic flight or are unable to fly, swim tipped to one side with one or both legs extended, or are on their back with their legs extended. Birds on land stagger and have difficulty walking, and may fall over and be unable to right themselves. Despite these changes, the birds usually appear alert. [*The clinical signs are not specific for this disease. Birds with Newcastle disease, lead poisoning or other conditions that affect the nervous system could have similar signs*].

At present, the only way to diagnose the disease is through examination of brain tissue that has been removed from very recently dead birds and fixed for light and electron microscopy. Birds that are decomposed or that have been frozen are unsuitable, because decomposition and freezing produce changes in the brain that mask the lesions. If sick birds showing this type of clinical signs are encountered please contact either CCWHC headquarters (1-800-567-2033) or the nearest Regional Centre for advice on how to handle the specimens. Recently dead birds should be kept refrigerated but not frozen until they can be submitted to a diagnostic laboratory. (Information was abstracted from a Wildlife Health Alert produced by the USGS National Wildlife Health Center).

Cooperative Research with Aboriginal Groups

Like other First Nations, many members of the Innu Nation of Labrador spend long periods at "outpost" camps in the country, where they harvest a wide variety of game for food, some of which they bring back from the camps for distribution in their communities. According to Innu elders and hunters, during the past 50-70 years, there has been a noticeable decline in the abundance of some animal populations, in the health of individual animals demonstrated by increased parasitic loads anddecreased fat reserves, and in the quality of the meat harvested. They suspect that these changes reflect increasing environmental pollution from either local or distant sources, and they are concerned that this may translate into increased exposure to contaminants from the country food that they consume. However, as compared to other regions of the North, there have been few studies done on contaminant levels and their potential effects on the health of ecosystems and human populations in the interior of Labrador.

Recently, funding from the federal government was approved to support a 3-year project aimed at addressing the concerns of the Innu Nation. This project will make use of standard scientific methods in order to critically evaluate the observations of Innu elders and hunters, more specifically whether a correlation exists between the health status of the animals harvested and their burdens of environmental contaminants. Traditional ecological knowledge of aboriginal people increasingly is viewed by scientists as an important source of information that can help them in better understanding the natural

world. Partners in this project include the Innu Nation of Labrador (particularly, Larry Innes, environmental advisor to the Innu Nation, and Sarah McGillivray, physician in the Innu village of Sheshatshit, Labrador), Pierre-Yves Daoust and Scott McBurney, from CCWHC - Atlantic region, John Van Leeuwen and Andy Tasker, respectively epidemiologist and toxicologist at the Atlantic Veterinary College, University of Prince Edward Island, and Neil Burgess, wildlife biologist at the Canadian Wildlife Service, Sackville, New Brunswick.

CCWHC as Observers on Eastern Canadian Harp Seal Hunt

In March 1999, Trent Bollinger, from CCWHC - Western/Northern region, joined Dr. Keith Campbell, member of the Animal Welfare Committee of the Canadian Veterinary Medical Association (CVMA), as observer on the harp seal (Phoca groenlandica) hunt in the Gulf of Saint Lawrence. In early April, Pierre-Yves Daoust, from CCWHC - Atlantic region, joined Dr. James Wong, also from the CVMA's Animal Welfare Committee, as observer at the "Front" (east of Newfoundland). The purpose was to assess whether the animals harvested (all "beaters", i.e. approximately 3-4 weeks old) are killed humanely and swiftly. The harvesting method differs between the two locations. In the Gulf, most seals are clubbed on the head, whereas at the Front, they are shot in the head with high-power rifles. Regulations concerning the length of the clubs and the caliber of the rifles to be used during the hunt are very strict, and enforcement is provided by officers of the Department of Fisheries and Oceans (DFO) on board Coast Guard vessels patrolling the hunting grounds.

The CVMA representatives accompanied the DFO officers during their visits to the sealing ships and had the opportunity to examine many carcasses and to witness the harvest of some animals. A report on these observations is being prepared by the CVMA's Animal Welfare Committee.

"Emerging" Diseases

Writing and broadcasting about "*emerging diseases*" has become a growth industry. The media and bookstands regularly feature sensational and sometimes apocalyptic reports about new diseases. Often, these are exaggerations, but they are not pure fiction. The last decade has seen a resurgence of diseases, particularly infectious diseases, as a global public health concern. Many major infections of humans and domestic animals have been controlled through improved sanitation and living conditions, together with effective vaccines and treatments. Despite this success, approximately one-third of human deaths still are due to infectious diseases.

Disease "emergence" is not a new phenomenon. *"Infections have been emerging since the first microbe tried to climb the food chain ladder, preying on the protoalgae who were the primary producers of photosynthate. . . ."* (J. Lederberg, 1998, Foreword. *Emerging Infections* 1, ASM Press, Washington, D.C.). "Emerging" diseases, in current medical

jargon, include those caused by newly-identified infectious agents as well as diseases that appear in new geographic areas or that abruptly increase in occurrence. Some diseases that were thought to be under control are "re-emerging"or gaining new prominence, such as human tuberculosis caused by strains of the causal bacterium that have become resistant to the antibiotics used to treat the disease. The emergence and re-emergence of diseases in people have been linked to alterations in human numbers, settlement patterns and behavior, changes in land use, increases in travel and commerce, adaptation and changes in disease-causing microbes, deterioration in public health systems, and better technology for identifying different diseases.

This phenomenon of "emerging" diseases also is occurring among wild animals. For example, two diseases of wild deer have "emerged" in the United States during this decade: a new, hemorrhagic disease caused by an adenovirus was identified in California and bovine tuberculosis has been found entrenched in deer in one area of Michigan. Approximately half of "emerging" human diseases are infectious diseases that affect animals as well as people, and wildlife species are the animal reservoirs for many of these. For instance, Lyme Disease "emerged" as a human disease in North America in the 1970's when suburban settlement brought people into close contact with the disease-causing bacterium that lived normally among deer mice, white-tailed deer and their ticks. In South America, a new hemorrhagic fever has been identified approximately every 3 years since 1956. Each has been found to be caused by a species of arenavirus, with each virus being carried by a different wild rodent species. In 1994, a new disease emerged in Australia, killing 13 horses and their trainer in the first recognized outbreak. Its cause is a previously unrecognized virus (now called "Hendra virus") of wild fruit bats. Only this year, another newly discovered "Hendra-like "virus killed at least 95 people in Malaysia. These people appear to have caught the disease from domestic pigs, and the search now is on for a wild animal reservoir from which the pigs may have become infected.

Why are so many diseases suddenly "emerging?" In general, diseases change in rate of occurrence, geographic distribution or range of host species because of changes in the ecological relationship that exists among disease-causing agents, their animal or human hosts, and the environment in which the pathogens and the hosts live together. This three-way, triangular relationship (symbolized by the triangle on the CCWHC logo) determines whether or not disease will occur and the extent of outbreaks. As the human population of the world rises to unprecedented levels (5.5 billion) and continues to grow at an unprecedented rate (doubling time approximately 40 years), ecological changes of every sort are occurring at rates that can hardly be imagined. Thus, it is not at all surprising that patterns of disease are changing rapidly as well, and in animals as well as in people.

A common factor in the emergence of many diseases is an increased density of animal or human hosts, resulting in enhanced disease transmission. Many human diseases emerged as humans aggregated in dense populations in cities. Plague, the "black death" of history, swept through Europe only at peaks of extreme human over-population and ecological stress. Bovine tuberculosis never became established in free-ranging deer at natural population densities, even when infection was common in domestic cattle in the same habitat. However, tuberculosis persists in a population of white-tailed deer aggregated at

high density by artificial feeding. Similarly, bovine brucellosis in elk appears to persist only in the few populations maintained at artificially high density by winter feeding.

Disease also can "emerge" because of a change in host behavior. For instance, plague in people in the USA became more common as people built homes in natural areas where the causative bacterium is present in wild rodents and their fleas. The parasite *Metorchis conjunctus*, a common liver fluke that parasitizes fish-eating wild mammals in much of Canada, would seem an unlikely disease to affect humans in cities. However, an outbreak of human illness has occurred in Montreal among people who ate raw fish (sashimi) prepared from white suckers (*Catostomus commersoni*), the fish species in which the infectious larvae of the parasite reside. This is just one example of a more general phenomenon of emerging parasitic diseases due to consumption of raw or undercooked fish, a new behavior now being adopted in western society.

Many types of environmental change influence disease occurrence. Pollution is a well-known example; some marine mammal populations living in heavily polluted waters have high rates of cancer, poor reproductive success and outbreaks of infectious disease attributed in part to suppressed immune systems. Several human diseases have emerged after construction of dams and irrigation projects which created new habitat for various pathogens and the invertebrate vectors that spread them. Some environmental changes have had disease-related outcomes that were totally unanticipated. For example, the relatively new practice of packaging consumer goods in plastic and the associated world-wide littering is a major factor in the global resurgence of dengue fever, a human disease transmitted by mosquitos. Discarded containers collect rainwater, providing new habitat for larval mosquitos, and, thus, allowing the disease to flourish and expand geographically.

Disease-causing agents themselves also may change, for example by becoming resistant to antibiotics or able to infect new host species. Canine distemper is a well-known virus disease of canids, mustelids and raccoons, but quite recently it has emerged as a cause of death of seals in Lake Baikal (Russia), lions in the Serengeti (Tanzania), and bobcats in eastern Canada. Sometimes, truly new disease agents emerge. For example, canine parvovirus, a new virus that appeared in the 1970's and produced severe disease in members of the dog family, evolved from a virus of domestic cats and spread worldwide in dogs within a very short time. Infection was not present in coyotes and wolves prior to its emergence in domestic dogs, but now it is widespread among wild canids.

"Emerging" diseases are of major importance to wildlife management and conservation. Changes in animal populations, translocation of animals, loss of habitat and the normal co-evolution of pathogens andtheir hosts all produce changing patterns of disease that must be understood and incorporated into management and conservation plans. **The key to dealing with emerging diseases is vigilance, achieved through disease surveillance.** The inventory of diseases, affected host animal species and their geographic distribution is an ever-changing tableau. Knowledge of these disease patterns can be kept current only through constant monitoring that will detect both known and unknown diseases in wildlife. This is the fundamental purpose of the core surveillance program of the

CCWHC: to monitor the occurrence of wildlife diseases and to recognize "emergence" of disease when it occurs. Only with such information is it possible to make sound wildlife management decisions, or informed policies regarding public health and the health of domestic animals. Wildlife diseases have indeed "emerged" in Canada this decade. Newcastle Disease in cormorants, iridovirus infection in tiger salamanders, canine distemper in bobcats, mycoplasmosis in house finches, insecticide poisoning of eagles and cancer in beluga and fish in the St. Lawrence estuary are examples that have been discovered through wildlife disease surveillance. **Naturalists and wildlife personnel, both professional and non-professional, who work in the field are absolutely essential to disease surveillance**. Only through their observations, reports and specimens can emerging disease in wildlife be recognized and its implications included in management decisions.

Suggested sources of further information:

Emerging Infectious Diseases is a scientific journal published on the Internet and accessible free of charge at **http://www.cdc.gov/ncidod/eid/index.htm**

ProMED-digest is an e-mail listing of current information on occurrence of human, animal and plant disease worldwide (many of which are "emerging"). Information is screened by a moderator but not peer-reviewed. To subscribe, send a message to "majordomo@usa.healthnet.org" and then type"subscribe promed-digest"

Emerging Infections, published by the American Society for Microbiology Press, Washington, D.C., provides review articles on many recently emerged human diseases. Volumes 1 and 2 were released in 1998.

Disease Updates

Atlantic Region

Spinal Cord Degeneration in a Bald Eagle

Spinal cord degeneration in a bald eagle In September 1998, an adult male bald eagle (*Haliaeetus leucocephalus*) was found standing in a field, in Pictou county, Nova Scotia. It was captured easily and brought to a rehabilitation centre. During the following few months, its behavior gradually deteriorated. Although it gained some weight, it could not fly, its walk was unsteady, and it kept hitting the walls of its large flight cage, thus chronically injuring both wrists. With no hope of rehabilitation in sight, it was euthanized in mid- January 1999 and submitted for necropsy. The only significant lesion in this bird was microscopic and consisted of severe loss of white matter accompanied by an infiltration of inflammatory cells in the cervical and thoracic portions of its spinal cord

(more specifically, their ventral region), with milder inflammatory lesions in the base of the brain. Interestingly, in 1991, a single Canada goose found in eastern PEI, staggering and unable to fly, had similar neurological lesions.

Since 1994, at least 55 bald eagles and a lesser number of American coots and other waterfowl have died from a neurological disease highly suggestive of toxicity, in the states of Arkansas and North Carolina (see "International News", pg. 1). Despite very extensive toxicological analyses on these birds, the cause of this disease remains undetermined (Veterinary Pathology 35:479-487, 1998.) Although the specific nature and distribution of the lesions in this particular bald eagle are different from those originally reported in bald eagles from Arkansas, it is tempting to draw a parallel between these two conditions. The results of the investigation in Arkansas indicate the difficulty of identifying causes of mortality associated with intoxication in wild animals. (P-Y Daoust, CCWHC; Doug Archibald, Nova Scotia DNR).

Common Loon Killed by Bald Eagle

On an early morning in November 1998, two residents on the shore of a lake east of Halifax, Nova Scotia, observed a bald eagle swooping down and hitting a swimming adult male common loon (Gavia immer). According to these witnesses, the loon died instantly and was retrieved by them shortly thereafter. The carcass was frozen and submitted for necropsy in January 1999. This bird was in moderate body condition. The traumatic injury inflicted by the eagle consisted only of an almost complete transection of the trachea, about 4 cm from the larynx. The actual cause of the bird's death was not obvious, since no major blood vessel appeared to have been damaged. The bird may have drowned from aspiration of water through the large gap in the trachea, although there was no clear evidence of water in the lungs or air sacs at the time of necropsy. This bird also had what was tentatively diagnosed as a tumor of the cortical tissue of one of its adrenal glands, with spread to the liver and one of the lungs. (Changes caused by the long period of storage prevented a definite identification of this tumor.) Its kidneys contained a large amount of mercury (46 ppm on a wet weight basis, as compared to a mean of 3 ppm in a group of loons in good body condition and 19 ppm in another group in poor body condition, in a study on causes of mortality in common loons from the Maritime provinces - Journal of Wildlife Diseases 34:524-531, 1998.

Common loons can display marked aggression against conspecifics during the breeding season. Little is known about predators of adult loons, although there is a recent report of unsuccessful attacks on adult loons by bald eagles. (Canadian Field-Naturalist 111:656-657, 1997). The suboptimal health status of this particular bird may have helped the bald eagle in its successful attack. Although the amount of mercury in its kidneys was considered very high, the significance of such a burden in loons, in particular whether it may translate into dysfunction of the nervous system and associated behavioral changes, remains unclear. (Joe Kerekes, CWS; P-Y Daoust, CCWHC)

Mass Stranding of Long-Finned Pilot Whales on PEI

On December 29, 1998, two pilot whales (*Globicephala melaena*) were reported dead on the beach at Cabot Provincial Park, on the eastern shore of Malpeque Bay, the largest bay on the north shore of Prince Edward Island. No abnormality was found in these two whales; and stranding by mishap was suspected because a big storm with strong northerly winds had occurred 10 days previously. In mid- January 1999, four other carcasses were found on the beach on the north shore of the province, about 2.5 km east of Cabot Park. Detailed examination (in March) of two of these carcasses showed no abnormalities. In early February 1999, a snowmobiler reported 9 more carcasses on the south side of Hog Island, a long sand bar that separates much of Malpeque Bay from the Gulf of Saint Lawrence. Thanks to the cooperation of the Department of Fisheries and Oceans and Coast Guard Canada, two pathologists landed by helicopter on the island and recorded basic information on seven of the carcasses, all of which were frozen. The distance between these carcasses and those found at Cabot Park was approximately 6 km. In total, eight females, varying in length between 2.8 and 4.5 m, and five males, varying in length between 2 and 5.4 m, were recorded. All these animals were assumed to have belonged to the same pod and to have stranded during the mid-December storm, since ice started forming on the north shore of PEI in late December, preventing unrelated animals from stranding, and since no other storm occurred in the interval. Strong waves and shallow waters with numerous sand bars, as are typically found around PEI, would have combined to disorient these animals during the storm. Mass strandings of whales can go unnoticed for a considerable amount of time, even in a well settled region like PEI, when they occur in winter. (P-Y Daoust, CCWHC; María Forzán, AVC) snowmobiler reported 9 more carcasses on the south side of Hog Island, a long sand bar that separates much of Malpeque Bay from the Gulf of Saint Lawrence. Thanks to the cooperation of the Department of Fisheries and Oceans and Coast Guard Canada, two pathologists landed by helicopter on the island and recorded basic information on seven of the carcasses, all of which were frozen. The distance between these carcasses and those found at Cabot Park was approximately 6 km. In total, eight females, varying in length between 2.8 and 4.5 m, and five males, varying in length between 2 and 5.4 m, were recorded. All these animals were assumed to have belonged to the same pod and to have stranded during the mid-December storm, since ice started forming on the north shore of PEI in late December, preventing unrelated animals from stranding, and since no other storm occurred in the interval. Strong waves and shallow waters with numerous sand bars, as are typically found around PEI, would have combined to disorient these animals during the storm. Mass strandings of whales can go unnoticed for a considerable amount of time, even in a well settled region like PEI, when they occur in winter. (P-Y Daoust, CCWHC; María Forzán, AVC).

Congenital Limb Deformity in a Red Fox

In February, a resident of Cape Breton, Nova Scotia shot a red fox (Vulpes vulpes) because it had an abnormal gait and appeared sick. The animal was estimated to be a young-of-the-year male, based on the prepubertal testicular tissue and lack of tooth wear. The most remarkable finding was marked flexure of the carpal and tarsal joints of all four

limbs. The animal was walking on the dorsal surfaces of the distal limbs with extensive callus formation in the affected skin. The right 3rd and 4th metacarpals were fractured and partially resorbed. The claws on all digits were long and often disfigured. Despite the limb deformity and the time of the year (midwinter), the animal weighed 3.8 kg and had normal muscle mass and a small amount of fat tissue in the coronary groove and bone marrow fat. The stomach contained the remains of two rodents and bones from a larger mammal mixed with partially digested apple, suggesting that the limb deformity did not preclude successful hunting and foraging.

Arthrogryposis (persistent flexure or contracture of a joint) is described in a variety of animals; however, the cause of these conditions remains obscure. Arthrogryposis has been associated with ingestion of toxic plants during pregnancy and embryological developmental defects. Vertebral column deformities and neuromuscular abnormalities often accompany the limb deformities. These additional lesions were not identified in this fox. Congenital flexures are thought to relate to the affected joints being held in flexion without relief during late gestation. One can only speculate on the origin of the problem in this fox, but it is surprising how well the animal was doing, in spite of what should have been a debilitating lesion. (Scott McBurney, CCWHC, Atlantic Region).

Quebec Region

Mycoplasmosis Epidemic in Evening and Pine Grosbeaks

An epidemic of mycoplasmosis affected evening grosbeaks (*Coccothraustes vespertinus*) and pine grosbeaks (*Pinicola enucleator*) at feeding stations in Quebec this winter: the first cases were observed on February 7 1999 in the Saguenay region (North-East Quebec), and again repeatedly in the same region and in the Mauricie region (North central Quebec). Sick birds were still present in May in the Saguenay region. Ornithologists reported that 10 to 20 % of individuals from these two species were sick at 14 feeding stations, which represents more than one hundred sick birds. The disease was not reported from other areas of Quebec.

Sick birds had unilateral or bilateral catarrhal conjunctivitis and infra-orbital sinusitis. In a few birds, these lesions were severe and the birds behaved as if they were blind. The weakest birds could be captured by hand. At necropsy, the birds were thin and, in addition to conjunctivitis and sinusitis, had mild inflammation of the thoracic and abdominal air sacs. Main histologic lesions consisted of multifocal to coalescing lympho-plasmacytic conjunctivitis, syalodacryoadenitis and rhinitis (inflammation of the conjunctiva and glands of the eye and the nasal mucosa).

Bacteria could not be grown from the tissue but were identified, using PCR reaction, as being *Mycoplasma gallisepticum*. Two types of bacteria cause similar lesions in wild birds: *Mycoplasma gallisepticum* in the house finch (*Carpodacus mexicanus*) and American goldfinch (*Carduelis tristis*), and *Mycoplasma sturni* in the European starling

(*Sturnus vulgaris*), blue jay (*Cyanocitta cristata*) and northern mockingbird (*Mimus polyglottos*). The bacteria do not represent a zoonotic hazard but are a potential threat to the poultry industry. (Igor Mikaelian (CCCSF-Quebec), David Ley (College of Veterinary Medicine, North Carolina State University), Raynald Claveau (Clinique vétérinaire Claveau-Dubord-Blue, Chicoutimi), Michel Lemieux (MEF-Shawinigan), Daniel Martineau (CCCSF-Quebec).

Fatal *Sphaeridiotrema* sp Infection in Lesser Scaup

Five lesser scaup (*Aythya affinis*) were found dead in November 1998 on the shores of the Saint-Lawrence river, in a park in metropolitan Montreal. Another bird, which looked sick, was captured a few days later and submitted frozen to the CCWHC-Quebec region. Five additional sick birds could not be captured.

The bird submitted to the laboratory had severe hemorrhagic enteritis with numerous digeneans in the intestinal lumen. These parasites were identified as *Sphaeridiotrema pseudoglobulus* (McLaughlin, Scott and Huffman, 1993).

A female mallard (*Anas platyrhynchos*) was found dead a few days later about 10 km from the site where the lesser scaups had been found. Numerous *S. pseudoglobulus* were found in the distal small intestine of this bird. However, we could not determine if these organisms were the cause of the death of this bird because the carcass was too poorly preserved.

Sphaeridiotrema pseudoglobulus is a trematode (fluke) which uses water snails as intermediate hosts. Infected ducks have hemorrhagic diarrhea, ataxia, and drooping wings. These clinical signs are observed 5-6 days after infection and occur 6-12 hours before the bird dies. The lesser scaup seems very sensitive to this parasite (Wobeser GA. 1997. Diseases of Wild Waterfowl. Plenum Press, New York, 324 pp). However, most duck species can be affected.

Mortalities caused by *S. pseudoglobolus* had been observed in spring 1998 in migrating snow geese (*Chen caerulescens)* in North-Eastern U.S. Since then, no additional mortalities had been recorded. (Igor Mikaelian et Daniel Martineau (CCCSF-Quebec), Daniel McLaughlin (Concordia University).

Ontario Region

Aspergillosis in Mallard Ducks

In January, 25-30 mallard ducks (*Anas platyrhynchos*) were found dead on the Rideau River within the city of Ottawa. A mixed flock of more than 200 birds, including black ducks (*Anas rubripes*) as well as mallards, overwinters on the river, but only mallards

were found dead. A sample of recently dead birds collected by the Canadian Wildlife Service (CWS) was submitted to the CCWHC laboratory in Guelph.

Necropsy findings were consistent within this group. All birds had severe granulomatous pneumonia from which the fungus *Aspergillus fumigatus* was recovered. Some birds also had focal yellow caseous foci in the mucosa of the proventriculus and small intestine. In the small intestine, some of the lesions extended deeply into the submucosa, and grossly there was a hyperemic band of inflammation bordering them. These lesions also yielded *A. fumigatus*. The gross lesions were suggestive of duck plague, but no virus was isolated, and no lesions consistent with that disease were seen on histological examination of tissue. All lesions were due to massive invasion of fungal hyphae and inflammatory response to their presence.

Aspergillosis is a common opportunistic disease in birds, often occurring in birds that are immunosuppressed or rendered more vulnerable by concurrent disease or stress. All of these birds, however, were in excellent body condition. This, and the fact that lesions were present in the intestinal tract, suggest that infection was due to a massive exposure, possibly through a contaminated feed source. The mallards came from a group that often received supplementary feeding from well-intentioned citizens, and it is possible that they were exposed to fungus-infected feed in this manner. (Doug Campbell, CCWHC; Ken Ross, CWS, Ottawa).

Septicemic Pasteurellosis-Elk

A mature cow elk (*Cervus elaphus*) that had been translocated to the Burwash area of Ontario from Elk Island National Park in Alberta during January, 1999 as part of an elk restoration project undertaken by the Ontario Ministry of Natural Resources (OMNR) and a large number of private and public collaborators, was found dead in February and submitted to the CCWHC laboratory in Guelph. The elk was pregnant and in poor body condition, weighing 215 kg, with no internal fat stores and depleted femoral marrow fat. The most striking lesion was myositis (inflammation of muscle) that affected both hindlimbs, with obvious muscle necrosis and marked intrafascial and subcutaneous edema. Additionally, there was blood-tinged fluid in the thorax and pericardial sac. Gross lesions were suggestive of clostridial myositis, possibly with an underlying lesion of exertional myopathy. However, bacteriologic culture yielded large numbers of *Pasteurella multocida* (currently *Mannheimia multocida*) from both hind limbs and from the lungs. Histologically, the lesions were consistent with a septicemia, with severe, widespread microvascular damage and myocyte necrosis. Further typing of the organism has not been done, although preliminary testing indicates that it is neither Type A nor D.

Septicemic pasteurellosis has been described previously in wild elk from an episode at Jackson, Wyoming in which the disease was thought to be responsible for the death of 48 elk on the National Elk Refuge during 1986 and 1987 (Journal of Wildlife Diseases, 1988, 24:715-717).

There has been no evidence to suggest that the disease has been responsible for any other deaths in the elk translocated to Ontario from Alberta. Presumably, this animal was rendered more susceptible to the bacterium because of the stresses of transport, pregnancy and adjustment to a new habitat. Septicemic pasteurellosis has occurred in caribou calves in both British Columbia and Newfoundland as the result of abortive attacks by wild felid predators (documented to be lynx in Newfoundland). *Pasteurella multocida* is a common bacterium in the mouths of cats, and infection can spread from contaminated bite wounds. Although such a cause could not be documented in this case, the severely affected hind limbs are consistent with such a source of infection. (Doug Campbell, CCWHC; Rick Rosatte, OMNR; Josef Hamr, Cambrian College).

Trumpter Swans-Wye Marsh

Wye Marsh, near Midland, Ontario, is one site used in an attempted reintroduction of trumpeter swans (*Cygnus buccinator*) to Ontario. The marsh has been a popular waterfowl hunting site for many years, and its substrate is heavily contaminated with lead shot, which has produced problems in this reintroduction.

During the past winter, the CCWHC laboratory in Guelph examined all or parts of 11 swan carcasses either found dead on the marsh or that died while being treated for lead poisoning. Of these, two died as the result of collision with power lines, one had been shot, three died of acute lead poisoning, and three died due to complications of lead poisoning while under treatment. In two other birds, only bones were available. These bones contained 20 and 14 parts per million lead, indicating at the very least a significant lifetime exposure to lead.

Southern Ontario experienced below average precipitation over the past year, and water levels in the Wye Marsh, as elsewhere in the province, are low. The low water levels may have made heavily contaminated areas more accessible to the swans, resulting in a higher rate of lead poisoning this winter than in other years. (Doug Campbell, CCWHC; Michelle Knegt, Wye Marsh).

Long-Eared Owls

In January, 1999, five long-eared owls (*Asio otus*) found dead or in weakened condition from different locations in southern Ontario, were submitted to the CCWHC laboratory for examination. At post-mortem, there were no significant findings in the birds beyond those of emaciation. All birds were in extremely poor body condition, with no subcutaneous or internal fat. These five birds, submitted in a span of less than 1 month, represented more long-eared owls than usually are seen in an entire year. Long-eared owls are relatively secretive forest dwellers that hunt small rodents. It seems likely that emaciation and an inability to find food drove these birds into circumstances where they came into contact with people. There was a mixture of snow and rain in early winter this year that left a thick crust of ice on the snow cover, perhaps making foraging difficult or impossible for these owls. (Doug Campbell, CCWHC).

Canada Geese-Unusual Cases

In January 1999, a Canada goose (*Branta canadensis*) was found in weakened condition on the ice in the Nith River, near New Hamburg. It died soon after discovery. At necropsy, the bird had obvious multifocal hepatic and splenic necrosis, leading to concerns about diseases such as duck plague and fowl cholera.

Microscopically, in addition to the liver and spleen lesions, there was inflammation of arteries affecting many tissues, including brain and heart. No inclusion bodies typical of duck plague were found, and no fungal or bacterial organisms were evident on special stains. Bacteriological and virological culture failed to isolate any organisms. The cause of this condition remains unknown.

In March, a Canada goose was referred to the Ontario Veterinary College Wild Bird Clinic. The bird had swollen, misshapen feet and was unable to stand. Following routine diagnostic work-up and a tentative diagnosis of osteomyelitis, the bird was euthanized. At post-mortem, there was pus-like material within numerous joints and tendon sheaths of the lower limbs.

As well, there were numerous fatty nodules in the muscles of the thigh and shoulder. Bacteriological cultures were negative. Histologic examination confirmed the presence of inflammation of tendons and tendon sheaths, as well as osteomyelitis. The muscle lesions consisted of invasion of islands of fat cells into muscle and connective tissue. These were reminiscent of a condition, of unknown cause, called " multicentric intramuscular lipomatosis/fibrosis" that has been described in white-fronted (*Anser albifrons*) and Canada geese in Saskatchewan and Prince Edward Island (Journal of Wildlife Diseases, 1991, 27:135-139). (Doug Campbell, CCWHC).

Western and Northern Regions

Poisoning of Bohemian Waxwings

In early April, six Bohemian waxwings (*Bombycilla garrulus)*, found dead in a yard in the city of Estevan in southeastern Saskatchewan during late March, were submitted for examination by a conservation officer of Saskatchewan Environment and Resource Management. Dead waxwings had also been observed in a neighboring yard. The officer reported that there were numerous fruit trees in the vicinity. The birds were in good body condition with abundant Mountain Ash (*Sorbus sp.*) berries in their crop and proventriculus. No lesions were found to account for the bird's death. An initial concern was that the birds might have been intoxicated by alcohol produced in fermenting berries; however, the birds had severely depressed brain cholinesterase levels, indicating poisoning by a cholinesterase-inhibiting insecticide. Further investigation revealed that approximately 60 waxwings died in the area. No source for an insecticide has been identified. Bohemian waxwings winter in prairie cities and towns, flying in large swirling

flocks to feed on fruit that remains on trees over winter. This case was unusual because it occurred at a time of year when no insecticide use would be expected. (T. Bollinger, G. Wobeser, CCWHC).

Polioencephalomalacia in Deer and Pronghorns

During fall and winter, the Western/Northern Regional Centre occasionally receives ungulates suffering from a disease called polioencephalomalacia. This past winter, two cases were submitted by conservation officers of Saskatchewan Environment and Resource Management. An adult female white-tailed deer (*Odocoileus virginianus*) was observed unable to move in a farmer's yard one day in October and was found dead the following day. An adult male pronghorn (*Antilocapra americana*) was found in a field near Zealandia, SK. It had difficulty standing and moved in circles before collapsing. Lesions were restricted to the brain in each animal, with evidence of brain swelling in the deer and hemorrhage in the ventral portion of the cerebellum in the pronghorn. Both animals had microscopic evidence of necrosis of brain tissue. Polioencephalomalacia (which means softening of the grey matter of the brain) is a non-infectious degenerative disease that occurs in cattle, sheep and many other ruminants. The cause is unknown in wild ruminants but is likely similar to that in domestic livestock, in which the disease is associated with deficiency or disturbed metabolism of thiamine (vitamin B1). Thiamine is very important for energy metabolism in the brain. If inadequate, the brain swells, resulting in increased pressure within the cranium, reduced blood supply and cell death. Thiamine is produced in the rumen, but its production may be interfered with by rapid changes of diet (particularly to a grain diet) or by intake of water with a high sulfide content. We believe the disease occurs in fall and winter because wild ungulates use waste grains extensively at that time of year. (T. Leighton, G. Wobeser, CCWHC).

Brucellosis in Marine Mammals of Arctic Canada

There has been considerable interest by marine mammologists and animal disease researchers in the last few years regarding reports of previously undiscovered species of *Brucella* occurring in marine mammals. Recent papers have described serologic evidence of infection as well as isolations of *Brucella* spp. from a number of species of seals and whales. Scientists agree that these isolates are indeed members of the genus *Brucella* and constitute at least one new species. Isolations have been made from apparently healthy animals but have also been made from an aborted dolphin fetus and from various cetacean species with subcutaneous lesions. It is not known what effect, if any, *Brucella* infection has on marine mammal populations but there is a report of one marine mammal isolate infecting and causing disease in a laboratory worker in the United Kingdom.

Since marine mammals constitute a considerable portion of the diet of northern Canadians and several species of terrestrial *Brucella* are known to be pathogenic for humans, the presence of brucellosis in marine mammals may pose a food safety risk for northern Canadians. Therefore, work was initiated by personnel from the Department of Fisheries and Oceans Canada, in conjunction with personnel with the Canadian Food

Inspection Agency, to determine if marine mammal Brucella are present in the Canadian Arctic.

Initially, a serologic survey was undertaken on archived blood samples from hunter-killed animals using a competitive ELISA test. Seventeen of 876 (1.9%) ringed seals (*Phoca hispida*), 11 of 229 (4.8%) walrus (*Odobenus rosmarus*), five of 77 (6.5%) narwhal (*Monodon monoceros*) and 19 of 448 (4.2%) beluga (*Delphinapterus leucas*) sampled between 1984 and 1997 were positive for antibodies to *Brucella*-specific antigens. Sampling sites were located throughout the Canadian Arctic from Holman, NWT in the west, to Eureka, Nunavut in the north, to Baffin Island in the east. Hunters had reported no gross lesions or abnormalities in any of the sampled animals.

It was then decided to try and isolate the bacteria responsible for these positive serologic reactions. In 1995, paired blood and lymph node samples were obtained from 100 hunter-killed ringed seals from Pangnirtung, Nunavut. Six seropositive animals were identified and isolations of *Brucella* sp. were made from the lymph nodes of four of those animals. Subsequently two more isolations were made from a similar sampling at Arctic Bay, Nunavut in 1997. All these isolates were of *Brucella* and also were similar to isolates reported from the United Kingdom and the United States in regards to their biochemical reactions. Attempts to isolate the bacteria responsible for positive reactions in beluga, narwhal, and walrus have so far been unsuccessful.

Antibodies to *Brucella* sp. Also have been found in harbour seals (*Phoca vitulina*) in southern Canada and the adjacent USA. Seven of 33 seals from Vancouver Island (1992-93), 4 of 8 from the US east coast (1987-93), 3 of 96 from the St. Lawrence estuary (1995-96) and 7 of 26 from Sable Island (1992, 1994) 2343 positive. From these data, the overall prevalence of sero-positive harbour seals was 21 of 163 or 13%. (Ole Nielsen, Fisheries & Oceans Canada, Central & Arctic Region, Winnipeg, Manitoba, Lorry Forbes, Canadian Food Inspection Agency, Saskatoon, Saskatchewan and Klaus Nielsen, Canadian Food Inspection Agency, Nepean, Ontario).

Credits

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