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Canadian Cooperative Wildlife Health Centre

Centre Canadien Coopératif de la Santé de la Faune

Newsletter 1 - 2, Spring 1993

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News from the National Wildlife Health Research Center, U.S. Fish & Wildlife Service, Madison, Wisconsin. Contributed by T. Roffe.

CCWHC NEWS

Wildlife Disease Investigation Manual

Two new projects are underway at headquarters in relation to our mandate to provide information and assistance. The first is development of an Investigation Manual, which will be a "how-to" book for dealing with diseased wild animals. This booklet is to be in looseleaf form so that we can get the initial and most critical portions into the field as soon as possible, with additions to follow; and so that we can revise and update the manual periodically.

Some subjects to be covered include: - how to kill sick animals humanely, and in a manner that causes minimal damage; - sample collection for various types of testing; - how to ship samples/specimens to a laboratory; - regional contacts (where to seek assistance); - collecting specimens for forensic (medico-legal) purposes; - protecting yourself from infectious diseases; - special sampling procedures for major environmental events, eg. oil spills.

Directory of Wildlife Health Expertise

The second project is a "Directory of Wildlife Health Expertise in Canada". Experts in wildlife health are widely dispersed across Canada in government laboratories, universities, and other institutions; but, there is no single directory in which one can find, for example, an expert in identifying ticks that might be involved in Lyme disease or Rocky Mountain Spotted Fever, or which laboratory can analyze tissues for organochlorine residues or vitamin A content. This directory should be valuable to wildlife managers, as well as to disease investigators and researchers. As an initial step, we have identified about 70 "experts", and asked them to describe their specialty, the types of assistance they can provide, as well as to name other people in Canada they feel should be included in the directory. This directory will be in loose-leaf and electronic format for ease of updating. Readers are welcome to suggest names for inclusion in the directory.

Our Information Specialist

In Newsletter #1 we introduced the Regional Coordinators and we will continue to provide information on personnel. Dwight Welch, the information specialist at Headquarters in Saskatoon, is developing the central computer database and coordinating all data input and output, as well as managing other items related to information. Dwight is a graduate in Wildlife Management from the University of Maine, and completed a M.Sc. in Zoology at the University of Alberta, working with Dr. Bill Samuel on the

effects of winter ticks (Dermacentor albipictus) on moose. Following completion of graduate training, Dwight had extensive experience as a research associate, consultant and analytical biologist working on a variety of wildlife health problems in Alberta and Ontario. In the three years before joining CCWHC, he authored or co-authored nine papers on wildlife problems, with emphasis on the meningeal worm and winter tick. Two of these papers, dealing with evaluation of methods for sampling of parasites, demonstrate the importance of analytical thinking to the field of wildlife health. Dwight can be reached at (306) 966-5152, or by E-mail at CCWHC@SASK.USASK.CA

DISEASE UPDATES

Atlantic Region

Newfoundland and Labrador

Rabies has re-appeared in Labrador in 1992, as a result of expansion of the disease from arctic foxes on Baffin Island, and has extended also into Nouveau-Québec. The last outbreak in Labrador was in 1988 and was, at that time, the largest seen since the late 1940s. The present outbreak has moved even further south than the previous one and has extended further into the year than previously recorded. All cases in Labrador were in either red foxes or arctic foxes. Fox populations are very high in Labrador this year, due to a peak in their cycle but also due to the minimal trapping pressure caused by low pelt prices (Investigated by Dr. Hugh Whitney, Animal Health Division, Department of Forestry & Agriculture, St. John's, Newfoundland) .

Nova Scotia/New Brunswick

A nonsuppurative encephalitis of undetermined cause was diagnosed in a cormorant from southern Nova Scotia. This bird showed clinical evidence of leg paralysis. Newcastle disease virus was not isolated from this bird. A nonsuppurative encephalitis of undetermined cause was also diagnosed in a cormorant from northern New Brunswick. This bird came from a colony in which mortality of at least several dozen birds had been reported. Septicemic salmonellosis was diagnosed in another cormorant submitted concurrently from the same colony. In both provinces, the birds were submitted by members of the provincial Department of Natural Resources.

In January 1993, a farmer from Nova Scotia pleaded guilty to having poisoned wild birds with Carbofuran liquid, about a year previously. This had been mixed with potato paste in order to prevent the birds from feeding at his cattle feedlot. Several hundred starlings, lesser numbers of sparrows, and at least twelve hawks, mostly red-tailed, were killed. Birds examined were all in excellent body condition. The starlings and sparrows had pasty white contents, compatible with potato paste, in their crop and stomach, while the hawks had ingested bird parts, often obviously from starlings. Pooled stomach contents of

sparrows had 195 ppm Carbofuran, two pooled samples of starling stomach contents had 135 ppm and 3500 ppm, respectively, and two pooled samples of hawk stomach contents had 7.1 and 7.5 ppm, respectively. Carbofuran is widely known among farmers in the area as poison for wild birds, and the wide publicity surrounding this case has likely spread the knowledge. This case was investigated by members of the Nova Scotia Department of Natural Resources.

An emaciated common loon from south-central Nova Scotia had lead poisoning caused by the ingestion of lead sinkers.

PEI

Two emaciated Canada geese had moderate to severe encephalomyelitis and ganglioneuritis (inflammation of the brain and ganglia). In one bird, this was accompanied by marked proventricular dilatation/impaction. A third goose had a severe encephalomyelitis which was considered subacute, based on the good body condition of the bird. Virus isolation has not yet been attempted on tissues saved from these birds. We have seen a few other similar cases in Canada geese in the past (Journal of Wildlife Diseases 27: 513-7, 1991). One important aspect of the chronic disease is that, grossly, it can easily be confused with chronic lead poisoning. Two of the three birds submitted this year were collected by members of the provincial Department of the Environment. An adult female right whale was necropsied on Grand Manan Island, Bay of Fundy, New Brunswick. Although the animal was very decomposed, there was evidence of internal hemorrhage compatible with trauma (i.e. collision with a ship). The necropsy of this animal was of interest to several groups, since this species is on the list of endangered species.

Québec Region

Pathology and Toxicology of Beluga Whales from the St. Lawrence Estuary, Quebec, Canada. Past, Present and Future. (Abstract of paper presented at the International Symposium on Marine Pollution, Kamaguwa, Japan, February 5, 1993)

The St. Lawrence Estuary is the major effluent of one of the most industrialized regions of the world. An indigenous population of 450-500 beluga whales constitutes the southernmost population of this species. This geographically "captive" population has been exposed chronically for more than 50 years to a complex mixture of industrial pollutants including organochlorines, aromatic hydrocarbons and heavy metals. Considering that the lifespan of this species, 30 years, is comparable to that of humans, long term effects of this contamination are likely to resemble those observed in human populations exposed to similar levels of contaminants through their diet. From 1983 to 1990, we have necropsied 45 well preserved carcasses out of a total of 111 beluga whales reported dead over this period. Seventeen animals were affected by neoplasms, both

benign and malignant. Of these 17 animals, 10 were affected by 11 malignant neoplasms (22% of necropsied animals) of which most (7) had an epithelial origin. Out of the 45 whales, 38 were mature and thus 26% of necropsied mature animals had malignant neoplasms. The digestive system was the site most frequently involved by non-neoplastic lesions (14 animals with gastric ulceration, 3 with oral ulcers, 7 with periodontitis). In contrast with Arctic animals of which the number of teeth ranges from 24 to 44, 34 of 78 St. Lawrence animals (44%) of which the teeth were enumerated had less than 24 teeth. Fifteen animals (33%) were affected by pneumonia. Milk production was compromised in eight of 17 mature females (41%) by inflammatory changes (7 animals) and cancer (1 animal) which affected the mammary glands. Opportunistic bacteria were found in pure culture, and/or in significant amounts in at least two organs in 20 belugas (44%). Total DDT was the most abundant organochlorine found in St. Lawrence beluga whales. PCB loads increased logarithmically with age; males were more contaminated than females. The concentrations of both total PCBs and highly chlorinated PCB congeners were much higher in our animals than in Arctic beluga whales. Organochlorine-induced immunosuppression has been repeatedly demonstrated in the wide variety of animal species studied in that regard. Therefore, it is probable that the immune functions of St. Lawrence beluga whales are impaired. Accordingly we plan to compare the immune functions of this population to those of Arctic beluga whales, contaminated at much lower levels. Benzo( )pyrene adducts (benzo( )pyrene tetrahydrotetrols) were detected in eight of the nine St. Lawrence beluga whales of which tissues (6 livers, 10/11 brains) were analyzed by a method based on HPLC. No such adducts were fond in 4 Arctic animals. Since benzo( )pyrene is one of the most potent chemical carcinogens known by man, we suggest that these compounds are responsible for at least some of the cancers observed in that population. Overall our findings contrast vividly with those of others who found that the major etiological agents for mortalities in odontocete populations are bacteria, parasites, and trauma whereas cancers are exceedingly rare.

Heartworm in Quebec Wildlife

The heartworm, Dirofilaria immitis, infects the heart and arteries of dogs and other canids and is transmitted by mosquitos which carry the microfilaria larvae released by D. immitis into the blood. Heartworm has been enzootic (of regular occurrence) in dogs in Quebec for more than 10 years. The prevalence of heartworm in wild canids in Quebec was studied from 1990-92. A total of 573 red foxes, 158 coyotes and 23 wolves, all provided by trappers, were examined. Seven coyotes, all young animals from the Farnham (Estrie) region, and one red fox from the Rigaud region (west of Montreal) were infected. The coyotes were heavily parasitized (6 - 54 adult worms per animal) and the prevalence of infection in Estrie was 8.75% or 7/80. These studies indicate that heartworm is enzootic in coyotes in Estrie and that coyotes can serve as bioindicators of the availability of infectious microfilaria in mosquitoes in a local environment. Red foxes appear relatively resistant to infection with heartworm. (Drs. Sylvie Fortier and Allain Villeneuve, Faculty of Veterinary Medicine, St. Hyacinthe (514) 773-8521, ext. 341)

Ontario Region

Lyme borreliosis (Lyme Disease)

Lyme borreliosis is a tick-transmitted infection caused by the bacterium Borrelia burgdorferi. In people, it causes rash, arthritis, heart complications and, occasionally, debilitating disease of the central nervous system. It may also cause disease, especially arthritis, in dogs. B. burgdorferi is maintained in nature by tick transmission among small mammals, especially Peromyscus spp. The disease is transmitted to people accidentally bitten by an infected tick. Two ticks implicated in this cycle are found in Canada: the northern deer tick Ixodes dammini, and I. pacificus. The latter is restricted to coastal southern British Columbia and Vancouver Island. Because of its host preferences, it tends not to be as significant a vector of Lyme borreliosis as is I. dammini.

I. dammini has been encountered at scattered localities in Manitoba, Ontario, Quebec, and the Maritime provinces but it does not appear to be common except at Long Point, Lake Erie, in Ontario, where a dense population is present. It has not been detected on the "mainland" adjacent to Long Point, nor at any of 25 other localities in southern and northwestern Ontario examined intensively for ticks by small mammal survey. Areas where I. dammini populations were not found include: Presqu'ile Provincial Park, Rondeau Provincial Park, Point Pelee National Park, several conservation areas along the north shore of Lake Erie, and a number of other sites throughout southern Ontario, Muskoka District, and in northwestern Ontario. Other than at Long Point, fewer than 100 I. dammini have been recognized in Canada in the past decade. Evidence indicates that these ticks are carried north in the spring on migrating birds, which pick them up in areas to the south, mainly New England, downstate New York, Minnesota and Wisconsin, where the tick is common. A population may be established in southern Manitoba, perhaps as a northward extension from Minnesota, and over 50 I. dammini have been found in PEI and Nova Scotia, probably brought in on birds from New England. One of these ticks, recovered from a cat in Cape Breton, laid eggs, indicating that it had been fertilized. However, most ticks dropping from birds would be so scattered that they would have difficulty finding a mate. The likelihood of encountering I. dammini in Canada seems to be very low, except at Long Point. This correlates with the low prevalence, and scattered distribution, of Lyme borreliosis in people in Canada; it seems to be most common in Ontario, where the single locality to which cases can clearly be connected is Long Point.

Other ticks commonly encountered on people and dogs east of Saskatchewan (the American dog tick or wood tick Dermacentor variabilis, and the groundhog tick I. cookei) are not capable of transmitting Lyme borreliosis. Nor is the moose tick D. albipictus likely a vector; it is a one-host tick, and B. burgdorferi is not passed through the egg, a necessity for a one-host tick to transmit it from animal-to-animal. The rabbit tick Haemaphysalis leporis-palustris has not been demonstrated to be a vector, and rarely attaches to people. Hence, it apparently poses no concern.

Outdoor recreationists or workers can reduce their risk of exposure to Lyme borreliosis and other tick-borne diseases, such as Tularemia, Rocky Mountain Spotted Fever, and Q Fever, by avoiding known "ticky" areas; by using insect repellants on their outer clothing (DEET repels I. dammini very effectively); by wearing long pants tucked in at the socks; and by checking the body (including scalp, armpits and groin) over carefully for ticks each evening after an outing. Any ticks found should be removed by grasping the mouthparts at the skin with tweezers and pulling them out slowly (bits left behind may fester, like a sliver). Lyme borreliosis is not transmitted until the tick has fed for over 24 hours, so daily tick checks are adequate.

Artsob, H. et al. 1992. Isolation of Lyme disease spirochetes, Borrelia burgdorferi, from Ixodes dammini (Acari: Ixodidae) collected on Prince Edward Island. J. Med. Entomol. 29: 1063-1066.
Barker, I.K. et al. 1992. Distribution of the Lyme disease vector, Ixodes dammini (Acari: Ixodidae) and isolation of Borrelia burgdorferi in Ontario, Canada. J. Med. Entomol. 29: 1011-1022.
Bell, C.R. et al. 1992. The search for Ixodes dammini and Borrelia burgdorferi in Nova Scotia. Can. J. Infect. Dis. 3: 224-229.

Western and Northern Regions

Salmonellosis in Pine Siskins in B.C.

An alarming increase in wild bird mortality was reported to the Animal Health Centre in Abbotsford, in mid-November, 1992. Over a two week period, 75 birds were submitted by the Canadian Wildlife Service, the B.C. Ministry of Environment, Lands and Parks, local wildlife rehabilitation centres and concerned private citizens. Species affected were primarily pine siskins with a lesser number of evening grosbeaks, house sparrows and purple finches. The area reporting mortality extended from Chilliwack to Squamish with initial reports from Vancouver Island coming in late in December. All birds had died from Salmonella typhimurium septicemia. Affected birds were thin, fluffed up and easily approached, making them easy prey for house cats. Although S. typhimurium has the potential to cause disease in both humans and other mammals, such as cats, to date there has not been any increase in confirmed Salmonella cases in these species. Despite intensive antibiotic and supportive therapy, affected birds invariably died within 24-36 hours of capture. The extremely poor prognosis prompted the general recommendation that sick birds should not be brought inside, but should be either humanely euthanized or left where they would quickly succumb to the cold weather. Gross lesions were consistent in all birds. Firm, variable-sized caseous granulomas were present throughout the liver, spleen, crop mucosa and occasionally in joints. Evening grosbeaks tended to have caseous granulomas in the wall of the colon and to be without crop lesions. Salmonella typhimurium was isolated from all tissues.

Public concern generated further investigation into the possibility that susceptibility to infection was somehow related to pesticide exposure. Brain cholinesterase levels were normal and no pesticides were detected in liver and kidney. Since Salmonella contamination of animal protein based feeds is a common livestock industry problem, we also sampled several unopened packages of bird seed; these were negative for Salmonella sp. Feed samples taken directly from backyard bird feeders were positive for the bacterium. In an effort to control the outbreak, a disease alert bulletin was released in mid-December outlining practical sanitation recommendations for backyard bird feeders. Infection with S. typhimurium is common in passerine and pigeon populations and usually exists in a latent state, with stress a major factor in precipitating disease. Mortality due to Salmonella is usually seen in late winter following fecal contamination and build-up on platform bird feeders and long cold winter conditions.

This recent epornitic is unprecedented in B.C. A telephone survey was conducted at the end of January to document the extent of mortality. Input from wildlife rehabilitators and veterinarians, the Canadian Wildlife Service, the Ministry of Environment and retail wild bird centres indicated that private citizen inquiries, rehabilitation centre admissions and Animal Health Centre necropsy submissions represented a total of 3100 dead birds. This can only be a fraction of the true mortality and it is likely that the outbreak has affected tens of thousands of pine siskins. As of the beginning of February, 1993, reports of excessive pine siskin mortality have come from wildlife agencies in Washington, Idaho and California.

It is unclear why pine siskins were severely affected by a pathogen that commonly crosses species barriers. Siskins feed on birch and alder seeds and yearly populations are directly related to the abundance of this primary food supply. During winter they are attracted to backyard feeders containing thistle seed. They feed selectively on the ground beneath feeders and it may be this behaviour which exposes them to more bacteria. It may also be that last year's mild winter and early spring lead to a high number of breeding pairs successfully raising double and triple clutches, which in turn drastically increased the number of susceptible juveniles by the fall. One local avid birder stated that the October pine siskin count was extraordinarily high but the Christmas count was excessively low. This may have been due to the epornitic but it must be noted that pine siskin counts on any given day are extremely erratic. This has been a very significant die-off. It was hoped that the recent period of cold weather would eliminate the remaining sick birds; and reports of mortality have sharply dropped off. It will be interesting to continue to monitor mortality in pine siskins over the next several months, since any survivors of this outbreak may serve as next year's adult carriers. I would appreciate any comments or ideas regarding the selective susceptibility of pine siskins to Salmonella (Reported by Dr. Victoria Bowes, B.C. Ministry of Agriculture, Fisheries and Foods, Animal Health Centre, Abbotsford, British Columbia).

Polioencephalomalacia (PEM) in White-tailed deer and Pronghorns

PEM was diagnosed in pronghorn antelope and white-tailed deer, submitted by staff of the Saskatchewan Department of Natural Resources, during the fall and winter of

1992/93. Affected animals were staggering, or recumbent and unable to rise; most were found dead. PEM is a non-infectious disease which has lesions of necrosis, hemorrhage and swelling of the brain. Its cause and progression is poorly understood. In domestic ruminants it has been associated with altered rumen flora caused by a high concentrate or grain diet. As well, it has been associated with water deprivation, rations high in sulfates, and the ingestion of certain plants (eg. bracken, Pteridium aquilinum, and horse-tail, Equisetum arvanse). Most of the deer and antelope diagnosed with PEM in 1992/93, and those previously reported in the literature, had grain in their rumen; it is thought, but not proven, that high grain diets may be contributing to this disease. Several other diseases, including brain abscesses, trauma, poisoning, and rabies, can produce nervous signs. The diagnosis is made by eliminating other diseases after examining the entire carcass, and by microscopic examination of the brain. Sick animals should be humanely killed with a shot to the base of the neck, to allow examination of the brain, and care should be taken to prevent contamination of hands with blood or saliva to minimize the risk of exposure to rabies. (T. Bollinger, CCWHC Pathologist)

Canine Parvovirus (CPV) Enteritis in Two Coyotes

Two young male coyotes found dead at separate locations near Nipawin, Sask., were submitted to the Health Centre by staff from the Saskatchewan Department of Natural Resources. The first, found on Sept. 15, weighed 5.5 kg. The other found near the end of October, weighed 6.3 kg. Both were in good body condition and were frozen prior to submission. At necropsy, one coyote had an inflamed intestine while the other had no obvious abnormalities. Both coyotes had microscopic necrosis of crypt epithelium consistent with CPV infection. Fluorescent-labelled antibody was used to identify CPV in one of the coyotes; tissues from the other coyote were not tested. Canine parvovirus is thought to be a newly evolved virus which was responsible for a panzootic of disease in wild and domestic canids in 1978. Although serological surveys of wolves and coyotes indicate widespread exposure to CPV, mortality due to this virus is rarely confirmed in the wild. (T. Bollinger)

News from the National Wildlife Health Research Center, U.S. Fish & Wildlife Service, Madison, Wisconsin. Contributed by T. Roffe.

Avian Pox and Histomoniasis in Trumpeter Swans

Between 1989 and 1991, avian pox was confirmed by the National Wildlife Health Research Center in 2 trumpeter swans and suspected in several others from swan release sites in Wisconsin. The swans were part of the swan restoration project utilizing Alaskan trumpeters as the source population. Aside from the health risk to the trumpeters, the finding is significant in that avian pox is rarely reported in free-ranging waterfowl. The hazard that infected released swans may pose for endemic species is unknown. Following identification of the problem, the Center specifically requested Wisconsin field biologists to submit any waterfowl with suspected pox lesions for laboratory confirmation. This resulted in confirming avian pox in 9 waterfowl collected in Wisconsin between 1989 and 1992 (4 Canada geese, 2 BW teal, 1 each mallard, wood duck, redhead). Unusual

mortality occurred in trumpeter swans at Fish Springs National Wildlife Refuge, Utah during the winter of 1991-92. Swans at the Refuge had been translocated from Idaho and Montana during the winters of 1990-91 and 1991-92. Lesions consistent with histomoniasis were present in the livers, spleens, and/or ceca of 16 of 19 birds necropsied. Light and electron microscopic examination also disclosed lesions and organisms which supported a presumptive diagnosis of histomoniasis (a protozoan parasite). Attempts to culture the organisms were unsuccessful.

Infectivity studies are planned, including inoculation of chicken eggs, turkey poults, and trumpeter swans, to identify the histomonad-like organism. Mortality occurred over a 5 week period and only trumpeter swans were affected although other waterfowl species, including tundra swans, were present. There has been no known mortality in trumpeter swans at the original capture sites or at other translocation sites. There was no known exposure of the affected trumpeter swans to gallinaceous birds, Heterakis sp. (host), or earthworm paratenic host of Histomonas meleagridis, the histomonad that causes disease in galliforms. Translocation of trumpeters to Fish Springs has been temporarily suspended until more is known about this potential disease threat to swans. Recommendations designed to minimize disease risks were made regarding the handling of swans in the translocation process. In addition, collection of samples from trumpeter swans used in the translocation program was initiated to try to provide health survey information on swans used in translocation efforts.

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