Fur Animal Research

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Since the last issue of this newsletter, I have had a most worthwhile and enjoyable experience attending the annual meeting of Canada Mink Breeders' Association (CMBA) in Ontario, Canada. I was invited to speak on mink nutrition, and as I left PDX, en route, I was reminded of the last time I had been invited by CMBA. That was when the meeting was held in Winnipeg and it involved travel on that terrible day, September 11th, 2001, when the World Trade Center in New York was demolished by terrorists. Needless to say, I never got there, but this time travel went smoothly and my bag even arrived at the same time that I did. I have learned, from long experience, never to pack my toothbrush or my lecture slides, but to keep them with me at all times. Beyond my speaking engagement, the trip was a valuable one, for several reasons. I met, for the first time, Dr. Kirsti Rouvinen-Watt, of the Nova Scotia Fur Institute, at Truro, whose work I have admired for some years, and I was able to learn a bit more about her on-going studies. It was good to hear what research CMBA is sponsoring, because this enables us to avoid duplication of effort. Ted Parkinson, who was President of CMBA, presided at the meeting. Ted had previously headed their research committee meetings and had attended some of our Mink Farmers' Research Foundation meetings.

It was also a pleasure and a most interesting experience to meet and to listen to Dr. Shelly Newman, who spoke on Aleutian Disease (AD). Dr. Newman is based at a laboratory in New York City. She gave a most thorough and informative review in which she referred to studies done by Drs. Gorham and Bloom, who we support. I am including in this issue a brief summary of Dr. Newman's comments.

Several years ago, the U.S. Department of Agriculture, responding to questions raised by certain public groups, published a booklet titled "Animal Welfare Issues Compendium" in which they included some general comments about "animal rights" and "animal welfare" and some more specific ones directed towards individual animal enterprises. I was asked to contribute a statement about issues involving the fur industry. I wrote that two main issues were involved: that of confinement of the animals and euthanasia, or humane killing. I pointed out that these same issues were faced by producers of all species of domestic animals. The fur industry, in fact, was ahead of some other animal industries, having taken the initiative to certify methods used, including caging, through the Fur Farm Animal Welfare Coalition. The matter of euthanasia had been referred to the American Veterinary Medical Association's Panel on Euthanasia, whose guidelines were generally followed. I felt then and I still do, that the fur industry deserves credit for studying these issues and taking appropriate action.

Ted Parkinson

From time to time, as you all know, we in agriculture are faced with questions raised by people who have no experience in, and little knowledge of, farming. I was reminded of this by a recent newspaper report that the New Zealand government was considering levying a tax on emissions of gases from sheep, cattle and deer farms which they claimed were contributing to the so-called "greenhouse gases" causing global warming. The proposal would have raised about 8 million N.Z. dollars a year for researching the situation. Fortunately, common sense prevailed and the proposal was dropped, to the satisfaction of the New Zealand animal industries, which are the major contributors to the country's economy.

As we approach the holiday season, I wish you continued success and happiness in the years ahead.

J. E. Oldfield

DOWNER COWS

On November 6th, the U.S. Senate approved an amendment to prevent downer livestock from entering the human food chain. This seems pretty straightforward but it's really somewhat complicated. Opponents of the amendment point out that when these animals show up at a slaughterhouse, that is where veterinarians inspect them and ensure that animals that are not healthy don't get into the food chain. In other words, the critics feel that this may encourage farmers to dispose of such animals on the farm and conceivably could prevent BSE cases from being identified. Although this bill was clearly aimed at human food use, mink farmers should be advised to avoid such downer livestock as feed items. Mink are susceptible to a BSE-like infection, as we have noted earlier in this newsletter. (from: Feedstuffs 75(46):6, November 2003)

ALEUTIAN DISEASE - A DIAGNOSTIC DILEMMA

Aleutian Disease (AD) has troubled the mink industry for many years and has been the topic for a good deal of research sponsored by the Mink Farmers' Research Foundation. Dr. Shelley Newman gave a comprehensive review of the AD situation at the annual meeting of the Canada Mink Breeders' Association last month. She characterized AD as a chronic, progressive, non-treatable immune-mediated disease of adult mink and ferrets caused by a parvovirus that particularly affects the kidneys, blood vessels, brain, eyes and lungs. High mortality follows immune failure and terminal kidney failure. The virus that causes AD is similar to the parvovirus that causes viral enteritis (diarrhea) in mink but it produces the disease in a different way: causing proliferation of plasma cells which infiltrate into lymph nodes, spleen and liver.

Mink and ferrets are the primary species affected by AD, but it is occasionally seen in wild mink, martens, raccoons, skunks, mice and otters, so fencing mink farms to keep wild animals out is strongly recommended. The disease is spread through contact with the virus, which can be spread by contamination of needles used in vaccination, toe clippers and melatonin implant needles.

It is difficult to get rid of the AD virus, from a contaminated environment. Freezing won't kill the virus, so winter weather won't solve the problem; neither will moderately hot weather. Composting manure may help, but a minimum temperature of 60°C would have to be reached and this is not always possible.

Dr. Newman lists a number of precautions that can be taken to control AD, including

a. purchase only AD certified negative breeders
b. quarantine newly-bought animals in a separate facility
c. feed new animals after the rest of the herd
d. retest quarantined animals for AD before housing them with the rest of the herd
e. maintain fencing
f. restrict visitor access
g. wear protective clothing
h. use clean needles in vaccinating and implanting
i. disinfect instruments and cages using sodium hydroxide, sodium hypochloride, chlorhexidine or formaldehyde.

In testing for AD, no test can be assured as 100% effective. The CCIP test is probably best, if done by qualified personnel. The antigen used in this test involves infected material, and must be handled carefully.

It will be costly and difficult to develop a vaccine against AD. In other diseases, vaccines are given to produce a protective antibody, but in AD the presence of such an additional antibody worsens the disease.

(from an address by Shelly Newman, DVM, DVSci, DACVP, at the 2003 annual meeting of the Canada Mink Breeders' Association)

FEEDING CULLED HENS OR HEN SILAGE

So-called “spent hens” frequently become available as mink feed, and their use has been studied at the Nova Scotia Fur Research Institute. Culled hens (CH) and hen silage (HS) was fed in diets for growing-furring mink. The silage was preserved by adding 1.5% formic acid and 0.3% sodium benzoate. The hens or hen products replaced either all (30%) or half (15%) of the herring in the control diet. The dietary pH was 6l.1 for the control, 6.2 in the CH30 diet, 6.0 in CH15, 5.6 in HS15 and 5.1 in HS30. The final body weights of the mink did not differ significantly among the test groups, neither did fur quality, as measured by live animal grading and pelt evaluation. It was concluded that raw, ground hens or hen silage would support normal growth and fur development in mink, when added at up to 30% of the diet (from K. Rouvinen-Watt, et al., 2000. Use of culled hens and hen silage in growing-furring diets for mink. In: Nova Scotia Fur Institute 15th anniversary book, p. 29).

EPIZOOTIC CATARRHAL GASTROENTERITIS (ECG) IN MINK

This problem (ECG) which is often called “3-day enteritis” or “Utah enteritis” causes acute diarrhea among commercial mink. Its cause has not been definitely established but there is some evidence that it may involve either a corona virus or a calcivirus. Canadian researchers conducted a survey to determine how commonly the disease occurred in Canada, which identified 55 ECG outbreaks among 300 Canadian mink breeders, over a 2-year period (2001-2002). They described the problem as characterized by an acute, yellow, mucoid diarrhea, occasionally blood-tinged. Affected mink went off feed and became dehydrated. It apparently affected all ages and color-phases of mink and could occur any time, but was more prevalent in the fall. The disease usually lasted from 2-5 days in individual animals and could persist on a ranch from 3-6 weeks. Numerous animals would become sick in an outbreak of ECG, but fortunately the number of deaths was fairly low: about 5% of the herd. Treatment with antibiotics was generally ineffective. If the disease occurred during spring whelping, the females tended to become dehydrated and prone to nursing sickness.

Fecal samples were collected from 15 outbreaks of ECG in Canada and were studied to determine the virus involved. All cases provided negative for corona virus, but were positive for the calcivirus and appeared to belong to the Sapporo family group of the calciviruses. (from Bruce Hunter et al. 2003. Investigation of Epizootic Catarrhal Gastroenteritis of Farmed Mink. Report to the Canada Mink Breeders’ Association. 4 pp.)

SUSCEPTIBILITY OF DARK MINK TO CORONAVIRUS

Although, as the previous item suggests, corona viruses do not appear to be a primary cause of ECG, they do affect mink adversely, and Dr. Gorham has provided the following brief article:

There are at least two viruses that have been reported to cause three-day disease (epizootic catarrhal enteritis). A coronavirus has been reported as a cause and a calicivirus has also been identified by Dr. Bruce Hunter of the Ontario Veterinary College.

Coronavirus disease generally occurs in mink in early fall during molting and occasionally up to the time of pelting in November. Outbreaks may also take place during the spring mating and whelping seasons. The disease frequently occurs during periods of stress and can affect the quality of fur.

The occurrence of coronavirus disease is related to the age of the mink; adults are more likely to show clinical disease. In experiments relating age to disease, organ suspensions of a Colorado isolate were injected into Dark (AA, Aa) and violet mink (aa) that ranged in age from 3 months to 1.5 years. A few mink showed signs of the disease at 5 months of age whereas all mink 6 months of age and older showed signs. The mink will not eat and exhibit a yellow, mucoid diarrhea that may be blood tinged over a two to six day course. Mink farmers often call this disease the "3-day disease."

There appears to be a genetic predilection as the prevalence of coronavirus infection is highest in dark mink. The mortality is low (<5%) unless complicated with a concurrent infection with Aleutian disease virus and/or bacterial infections.

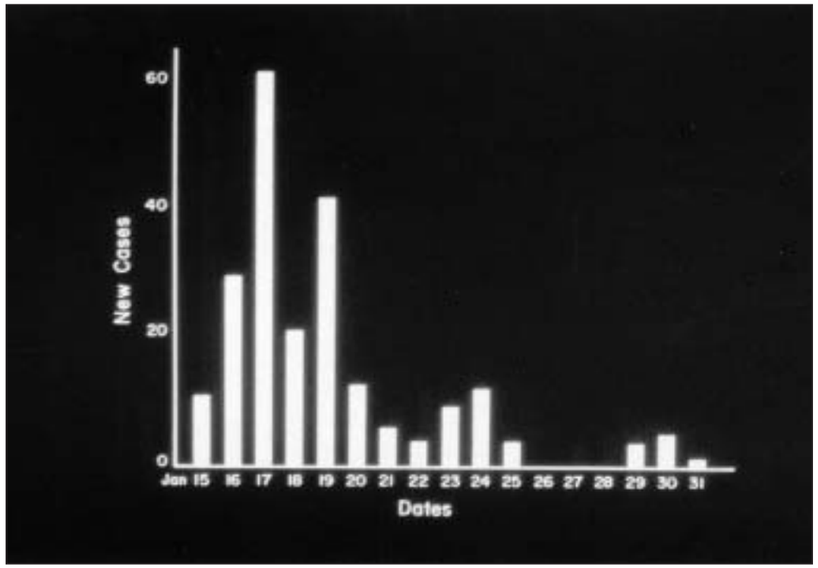
Control is difficult at best. Mink that recover, after being clinically infected, or subclinically infected, most likely harbor the coronavirus for some time. Susceptible mink can be infected either by direct or indirect contact with feces from mink shedding the agent. Although a fecal-oral route is the most likely source of transmission, the rapid spread in natural outbreaks suggests that airborne transmission may also occur. It is possible that birds carry infected mink feces on their feet, thereby setting up new foci of disease on ranches, or starting new outbreaks on farms with susceptible mink.

Because thousands of mink are raised on a single acre of ground, it is doubtful environmental sanitation could break the rapid chain of transmission on farms. Vigorous cleaning using steam, sodium hydroxide, and formalin has not been very effective in preventing outbreaks of the disease.

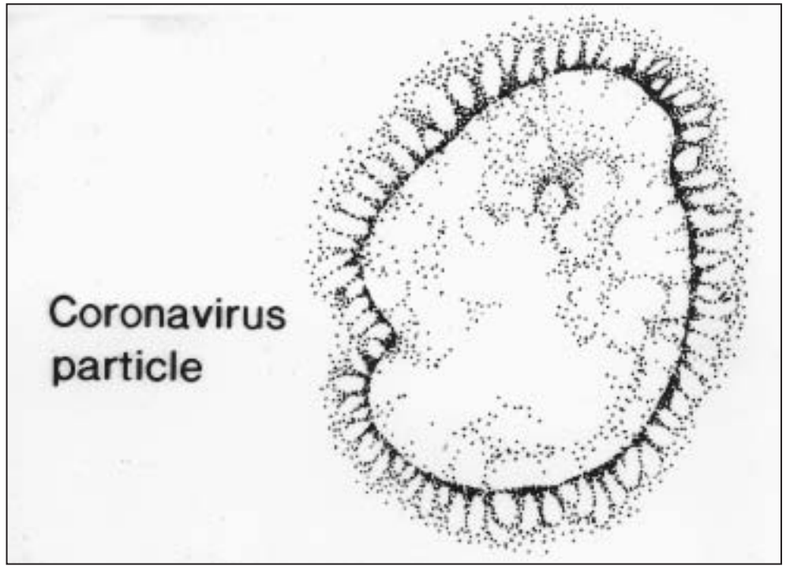
Andrea C. Lantis and John R. Gorham

Department of Veterinary Microbiology and Pathology

College of Veterinary Medicine
Washington State University
Pullman, Washington 99164



This figure shows distribution of cases during an outbreak of coronavirus on the experimental mink farm at Washington State University.



Surface projections on the coronavirus appear like a wreath.

GUIDANCE ON USE OF DEER AND ELK IN ANIMAL FEED

Occurrence of chronic wasting disease (CWD) in wild deer and elk populations has motivated the U.S. Food and Drug Administration (FDA) to issue guidelines on their use in animal feed. This recommends that any material from animals either suffering from CWD or considered to be at high risk to it should not be used in any animal feed. Under the FDA's current regulations, most material from deer and elk is already banned in feed for ruminants. The FDA proposes extending its ban to other species of animals because the potential risks of CWD spreading to other, non-ruminant species and to humans are not well understood, and because it has recently been learned that CWD appears to be spreading rapidly among white-tailed deer. Copies of the guidance document are available on the CVM (Center for Veterinary Medicine) home page, at www.fda.gov/cvm (from Render, August, 2003. p. 31).

TEMPERAMENT AND BEHAVIORAL REACTIONS IN MINK

Finnish investigators looked at the relationships between temperament and pre-mating behavior on reproductive performance in female mink. Their subject animals were 100 each, scan black "confident" and "fearful" female mink. In each group, 58% of the females were kits (K) and 42% had had one or more litters (A). Length and timing of mating periods and the length of gestation were the same in all groups. Litters produced were 81% and 74% for the confident and fearful kit females (K), respectively, and 80% and 81% in the adult females (A). The number of kits both at birth and at weaning was significantly higher among the confident females. Early kit loss was higher, however, in the confident than in the fearful kit females (K). In view of these interesting results, it may be useful to consider temperament and behavior when selecting females to be kept as breeders (from: H. T. Korhonen, L. Jaukainen and T. Rekila. 2002. Effect of temperament and behavioral reactions to the presence of a human during the pre-mating period on reproductive performance in farmed mink. Can. J. Animal Sci. 82:275-282).

DIET AND REPRODUCTION

It is evident that reproductive performance in female mink has improved over the years since mink were first domesticated. Danish workers estimate that the number of kits per litter was about 5 in 2001, whereas in the wild, females produced only 2-3 kits. The increased kit numbers put a nutritional burden on the females and this has been met by diet changes during the breeding, gestation and lactation periods. Over a 5-year period (1997-2002), the Danes investigated the effects of various diet changes on the breeder females. They found that the females tolerated diet changes over these important time periods very well and they now intend to focus attention on the best diet formulations to support reproductive physiology in female mink. (from: B.M. Daangaard, C.F. Borsting and R. Fink. 2003. Effects of dietary composition and feeding strategy on health and performance of mink females. Scientifur 26(3):80-81)

MYCOTOXINS: A CONTINUING PROBLEM

Mycotoxins, which are produced by fungi, have been troublesome to the fur industry for many years. The Mink Farmers' Research Foundation has recognized this and has funded some research to deal with them. Dr. Dick Aulerich, at Michigan State University, directed a most productive program of mycotoxin research in which he has identified different toxic products and in some cases has provided means of neutralizing them.

An Indian scientist has recently provided a useful run-down on the mycotoxin problem. He notes that out of the vast number of fungi existent (there are over 10,000 known species) only about 50 have been shown to be harmful to animals and humans. Mycotoxins are formed by these species when fungi grow on crops in the field, during harvesting, or in processing or storage. The United Nations Food and Agriculture organization (FAO) estimates that, world-wide, about 25% of the worlds' grain supply is contaminated with mycotoxins. Moisture content of the grain during growing and harvesting is a key factor in the extent of fungus infestation of field crops, but drought stress and breakage of kernels can also lead to penetration of the grains by fungi. Recent global weather patterns, with heavy rainfall and flooding in some areas, along with drought and frost in others has led to an increase in reports of mycotoxin problems. Some important mycotoxins in feeds include: Aflatoxins, Ochratoxin, T-2 toxin, Fumonisin, Vomitoxin and Zearalenone and some of the conditions they cause are:

Aflatoxin: Liver damage and growth suppression
T-2 toxin: Oral lesions
Ochratoxin: Kidney damage
Nomitoxin: Feed refusal
Zearalenone: Causes reproductive difficulties due to its estrogenic effect.
May cause abortions.

(from G. Devegowka. 2003. Mycotoxins: A Worldwide Threat. Feeding Times 7(3):2-3).

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8700 South 700 West
Sandy, UT 84070
(801) 255-4228
FAX: (801) 255-4678

DIRECTORS:

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Dept. of Animal Sciences
Oregon State University
Corvallis, OR 97331-6702
(541) 737-1894
FAX: (541) 737-4174

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9762 S. Tayside Drive
South Jordan, UT 84095
(801) 280-1428
FAX: (801) 255-4678

Jim Wachter
N5350 Country Aire Road
Plymouth, WI 53073
(920) 892-4287
FAX: (920) 892-4287

Paul Westwood
8137 South 1800 West
Spanish Fork, UT 84660
(801) 798-1786
FAX: (801) 298-1482

Dr. Robert Westlake
701 Highway 10 East
PO Box 420
Detroit Lakes, MN 56502
(218) 847-5674
(218) 547-2533