Fur Animal Research

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It is encouraging to hear that prices at the first sale of 2004 at American Legend were strong, indicating that the 2003 pelt crop was a profitable one. I was intrigued, in advance of the sale, at plans to introduce a new, electronic bidding system. Apparently, this has been delayed and further remarks on it will have to wait.

I have been asked to index the various items in the newsletter, to make it easier to find all we have included on any topic. This necessitated numbering the pages, which we began last year, and then indexing them under appropriate topic headings. The topic areas we have chosen are:

(1) Diseases/Stress,
(2) Nutrition/Feeds,
(3) Physiology/Hormones,
(4) Management/Environment,
(5) Genetics/Selection, and
(6) Awards/Reports

We were able to index all the material in last year's newsletters under these headings and we can add others, if necessary. The index for last year's newsletters (volume 11) is included later in this issue. I'll be interested in your reactions - do you find this helpful, in locating specific items, and whether some changes might be useful.

This issue includes a short biography and a photo of this year's winner of the G.R. Hartsough memorial scholarship at Michigan State University. She is Bronwyn Williams and she will be working under the direction of Dr. Steve Bursian. Dr. Bursian has been looking into the possibility of irradiating mink feed mixes and reports that this may be economically possible. If feasible, this should be an effective means of controlling bacterial growth in feeds and would eliminate the need for antibiotic addition, which has been a controversial issue.

Since our last newsletter, several members of our Board traveled to Toronto where they met with Ted Parkinson, who heads the Research Committee of Canada Mink Breeders (CMB). It was a productive meeting and both the Americans and CMB members got a better idea of the others' research programs. The Canadians continue to have some problems with the feeding of seal meat, and they devote much of their funding to that issue. There appears to be little duplication of effort between our two research programs.

The University of Victoria, Canada, celebrated its 100th anniversary this last year and honored one person from each decade with a Legacy award. I represented the decade of the 1930's and was the oldest graduate to climb up on the stage without assistance. This brought back many memories, including my first contacts with the fur industry. A Mr. Shaw ran a small fox farm about two miles from my home and visits to it began my long and enjoyable contacts with the fur animal business.

I wish you all every success in the upcoming breeding season and the continuing market sales.

J. E. Oldfield

HARTSOUGH AWARD WINNER, 2003

Bronwyn Williams, originally from western New York, graduated with a B.A. in organismal biology from Smith College in 1999. She spent a semester in Australia volunteering for various research projects, followed by two years of field and genetic work with bats through Boston University. After four years spent managing a family-run apple orchard and coaching alpine ski racing, Bronwyn accepted a M.S. position in the Molecular Ecology lab of Dr. Kim Scribner, Department of Fisheries and Wildlife, Michigan State University. She is currently working on a management-oriented project in conjunction with the Michigan Department of Natural Resources. This study combines field and laboratory techniques to estimate population structure and abundance of three furbearers in Michigan: bobcats, American martens, and fishers. The resulting data will also enable an assessment of the reintroductions of martens and fishers and provide a database for future wildlife forensics work.

Bronwyn Williams holding an American marten that was trapped and anesthetized during a radio-tracking project in Wisconsin.

ALEUTIAN DISEASE TESTING

Canada Mink Breeders have appointed an Aleutian Disease Task Force which has made some observations about AD control programs. They noted that the AD control program is working in Denmark where the national incidence of the disease has dropped to less than 5%. They stated, however, that the program works there because the Danes have a strong fur breeders' association with adequate funding, and they have made the program mandatory.

They recommend use of the counter-current electrophoresis (CEP) test for Aleutian disease, which they say works well and, if combined with slaughter of positive mink, can get the incidence on a ranch down to 0.7-1.0%. They rate the sensitivity of the CEP test at 98%. Testing should be done prior to breeding and, again, prior to pelting, with pelting-out of any positives. Variation in the antigen source is a point of concern, but comparisons have shown that tests with American and Danish antigens agree about 90% of the time. They feel that production of an AD vaccine is unlikely to happen any time soon. (from a report of the AD Task Force at the annual meeting of the Canada Mink Breeders' Association at London, Ontario, in October, 2003.)

DISTEMPER VIRUS TYPES AND STRAINS

Distemper is still with us, and the following description of the disease by Dr. Gorham is timely.

Since the 1940's, the late Dr. G. R. Hartsough and I were consulted on over 100 mink distemper outbreaks. If the distemper vaccine was not given until the outbreak was underway, or if the vaccine was of poor quality and the losses continued, we were frequently asked if a different type of distemper virus was involved in the outbreak. Similarly, if there were a high number of nervous cases (screaming fits), ranchers again suspected a different type of distemper virus. These are reasonable questions.

Types of Distemper Virus

Our observations, research and the investigations of others involving distemper in mink, dogs, foxes, ferrets, and raccoons have shown that there is only one type of distemper virus. And this single type can cause nose and eye signs as well as nervous signs.

Strains of Distemper

While there is only a single type of distemper, there are many different strains that can be identified clinically as to their virulence and to their ability to invade the brain and cause death.

An example of how one strain of distemper protects against another strain was illustrated in Denmark in an outbreak of seal distemper off the island of Jutland. A mink farmer was hired to remove the dead seals from the beaches. The mink farmer did not feed the seal carcasses to his mink, but he apparently carried the seal distemper virus back to his mink on his clothes or hands and started an outbreak on his farm. He did not vaccinate as quickly as he should have and he lost several mink. However, following vaccination with the Onderstepoort vaccine distemper strain, the distemper losses subsided.

Three mink distemper vaccine strains have been used in vaccines. Lederle and Onderstepoort are in use today; the Wisconsin strain was employed in the past. All three were attenuated by passage in chick embryo cell cultures and will protect mink, dogs, ferrets, and foxes against all known virulent strains of distemper.

In a recent experiment to examine different strains of distemper, we vaccinated a group of ferrets with the Onderstepoort vaccine strain and later challenged the ferrets with the virulent African distemper virus that was isolated from lions. None of the ferrets showed signs of distemper, which indicates the close relationship between the Onderstepoort vaccine strain and the lion distemper strain. It should be pointed out that domestic cats found on almost all mink farms are not susceptible to the distemper virus strains.

There are high and low virulent strains. In research supported by the Mink Farmers' Research Foundation, we have obtained distemper virus strains of low, high, and medium virulence by many transfers of the virus in ferrets. No doubt these strains would behave similarly in mink. While there is no research to verify recent field observations, it would appear that the distemper virus strain carried by raccoons to unvaccinated mink is a highly virulent strain.

In some distemper outbreaks, there is a definite increase in proportion of nervous cases to the usual number of catarrhal cases. In one Wisconsin outbreak, the unvaccinated mink showed only mild nose and eye exudates but a very high number of screaming fits. To our knowledge, no one has studied these neurotropic mink strains to determine why they attack the brain.

The Genotype of the Mink and Distemper

All veterinarians familiar with mink diseases and mink farmers who have had a distemper outbreak have noticed that pastels bb or bgbg seemed to be more susceptible to distemper than other genotypes. Moreover, on farms where a variety of mink were raised - darks, blue iris, etc. - the greatest mortality was in the pastels. Therefore, when discussing virulence of a particular strain of virus, the color phase of the mink must also be considered.

Summary

In the future, molecular biologists will identify the genes of the distemper virus that control virulence, transmissibility, and neurotropism. This research is not done on a Sunday afternoon. I will leave these sophisticated investigations to others who are much younger and brighter than I am.

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SOYBEAN PROTEIN

We have, rightly I believe, filled a number of pages in this newsletter with discussions of the protein requirements of mink. I have pointed out that, in terms of percentage of the total diet, the protein requirements of mink are much higher than those of other domestic animals. This is true, and much of this protein needs to be high quality from animal, fish or poultry sources. But, not all of the protein needs to be of high quality and, in the interests of lowering diet costs, we can include some plant protein in the diet mix. One of the better sources of plant protein is the soybean and soybean meal often finds its way into mink diet mixes. Dr. Anders Skrede, of Norway, who has visited us on several occasions, has recently conducted some feeding trials using different soybean meals available to him in Europe.

He fed three different soybean meals at two levels (15% and 30% of the total diet protein) to groups of 32 mink — half males and half females. The experiments were run with dark mink, during the late growth and furring periods. There are many different kinds of soybean meal on the market, prepared using varying heat treatments, which facilitate the extraction of the oil, and to drive off the solvents used in the oil extraction. The following specific soybean meals were used in the Norwegian experiments: (1) Hexane-extracted, not dehulled (SBM), (2) A special soybean meal developed for feeding baby pigs by Hamlet Protein A/S, Horsens, Denmark (SHP), and (3) Full-fat, heat-treated soybeans produced by Shouten Products BV, the Netherlands (SSP). Products 1 and 3 were ground finely before use. Each meal was put in the diet in place of Norwegian fish meal to supply either 15% or 30% of the diet protein.

The diet composition is shown in Table 1 below:

	Control	SBML	SBMH	SHPL	SHPH	SSPL	SSPH
Ingredients							
Cod byproducts	17.15	16.70	16.40	17.85	17.60	17.90	18.80
Fish meal	8.65	5.60	2.80	6.00	3.00	6.00	3.20
SBM	-	4.45	8.45	-	-	-	-
SHP	-	-	-	4.00	7.90	-	-
SSM	-	-	-	-	-	6.25	13.15
Salmon byprod.	2.60	2.50	2.45	2.60	2.65	2.65	2.80
Slaughter byprod.	8.65	8.30	8.20	8.95	8.80	8.95	9.40
Blood	2.65	2.50	2.45	2.60	2.65	2.65	2.80
Animal fat	3.00	3.10	3.20	3.30	3.35	2.60	2.25
Salmon oil	2.75	2.85	2.95	3.00	3.05	2.35	2.05
Precooked cereals	13.75	12.70	11.90	13.30	13.30	13.25	13.45
Hemax	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Vitamin mix	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Water	39.60	40.10	40.00	37.20	36.50	36.20	30.90
Diet composition							
Dry matter	35.4	33.7	35.1	34.2	32.5	34.0	35.4
CP (N x 6.25)	13.2	11.9	12.2	12.4	11.7	12.6	12.8
Crude fat	9.3	8.2	8.8	9.1	7.9	8.1	8.5
Ash 2.3	2.0	2.2	2.2	2.1	2.1	2.3	
Carbohydrates	10.6	11.7	11.8	10.5	10.8	11.3	11.8
ME (kJ/100 g)	672	627	656	650	602	628	652
From CP (%)	30	29	29	29	30	31	30
From fat (%)	50	47	48	50	47	46	47
From carb. (%)	20	24	23	21	23	23	23

The overall finding from this study was that such finely-ground soybean products can be used to supply up to 30% of the diet protein during the fall months with only minor effects on late weight gains, pelt size and fur characteristics. Such weight gains that did take place were probably mostly fat since most of the animals' muscle growth had already occurred before these feeding trials started. Soybean protein is one of the better plant protein sources, but it tends to be deficient in the sulphur amino acids, cystine and methionine, which are required for fur growth and quality. So, it would probably be advisable to restrict the soy protein to the lower level (15% of the protein) used in these trials (from: Skrede, A. and O. Ahlstrom, 2000. Soybean products in fur animal diets. Seminar no. 347. Nordiske Jordbrugrforsherer Forening.)

DIET SALT CONTENT

The amount of salt in mink diets has been a matter of concern for a number of years, particularly during lactation where it is thought it may help prevent nursing sickness among females. Some Swedish investigators have looked into the salt situation and possible need for supplementing diets with additional amounts of salt. They note that supplementation is only needed when the major diet ingredients are low in salt and point out that animal feedstuffs are generally higher in salt content than are plant materials. Fish, fish silage, and fish meal are comparatively rich in salt; slaughterhouse by-products usually contain about half as much as the fish products and plant-source feeds are lower still.

The National Research Council's (NRC) recommended nutrient allowances suggests that mink diets should contain about 0.5% salt, on a dry matter basis, year around, but that they should have higher levels (ca. 1.2-1.3% salt) during lactation.

In the Swedish study, a number of commercial mink diets were analyzed for salt content, which was found to vary from 0.36% to 0.89%, with the higher levels occurring during the periods of lactation or early kit growth. They noted that considerable salt is lost by the female in her milk and that increased salt helps the females' appetites, ensuring that they maintain their level of feed consumption which is important during this critical period (from Alden, Eva, in Seminar No. 354, Lillehammer, Norway, 8-10 October, 2003).

CHANGE IN VACCINE AVAILABILITY

United Vaccines, Inc. will not be selling Four-Way vaccine in North America for the 2004 summer vaccine season. All other vaccines that we normally produce are anticipated to be available, however, we strongly suggest that you contact us and order early.

TRANSMISSABLE MINK ENCEPHALOPATHY (TME)

With all the attention focused on “mad cow disease” (B.S.E.), it is timely to include information on the similar disorder found in mink.

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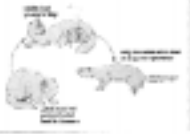
TME is a rare non-contagious invariably fatal food-borne neurologic disease of farm-raised adult mink.
First seen in 1947 in Wisconsin, U.S.A. There have been five outbreaks involving 11 farms in the United States in the last 50 years.
TME has been reported in Canada, Finland, Germany and Russia

THE SOURCE OF THE DISEASE IS UNKNOWN



A typical TME outbreak. The adult mink fed cattle or sheep by-products containing the TME agent. The young are not infected. The exposed adults die after an incubation period of 7 to 12 months.

CLINICAL SIGNS

Hyperexcitability – increased aggressiveness
Exaggerated responses to sound and touch
Incoordination of hind limbs
Compulsive biting of self and objects

Somnolence (sleepy attitude)
Terminal stupor
Convulsions rarely occur
Death in 2 to 7 weeks

Mink bites and holds on to the pen bottom. The tail is curled over the back similar to a squirrel.

TME progresses slowly over a period of weeks. Most of the time it is in a stage of deep sleep. The disease is always fatal.

Once a TME mink bites an object such as a handling mitt it will refuse to release it.

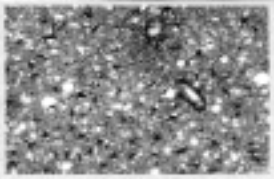
NEUROPATHOLOGIC CHANGES

Spongiform change in gray matter of brain
Degeneration of nerve cells
Pronounced astrocytosis
Changes most severe in forebrain

Lateral view of mink brain showing distribution of the lesions. The cerebral cortex shows the most severe spongiform changes, neuronal degeneration and diffuse astrocytosis. (Drawing courtesy R.J. Eckroade)

Spongiform change with neuronal degeneration in the hippocampus (Hematoxylin and Eosin)

Vacuolated neuron in the brain stem of a TME mink (Hematoxylin and Eosin)



Severe spongiform change with neuronal degeneration and astrocytosis in the caudate nucleus (Cajal's)

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