FUR ANIMAL RESEARCH

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I am sure you will have noticed that the publication schedule for this newsletter has been delayed. The December issue came out in February, and this (the March) issue is delayed to April. The reason for this is the departure of the former editor, **Elaine Scheff,** who left American Legend.

Tracey Mohr has now assumed the editorial duties in the meantime, and we look forward to working with her. We hope by the next issue to get back on schedule.

As I write this, your Board is preparing for our annual meeting, which will likely be in June. This is our opportunity to review the funded research with the various investigators and we will use future newsletters to bring you up to date on what has been accomplished. The Mink Farmers'

Research Foundation Board of Directors would want me to encourage input from ranchers. Specifically, we would like to hear your thoughts about researchpriorities; What problems are bothering you that might respond to a research approach? This kind of input is really important in shaping an

Gunnar Jorgensen

effective research program.

We include in this issue a statement from United Vaccines which we hope you will find useful. This relates to some vaccination problems that occurred a couple of years ago. Also, in this issue is an article about raccoons by Dr. John Gorham. Raccoons have been recognized as a problem animal in carrying virus infections to mink.

In the last issue, we paid tribute to Dr. Gorham for his lifetime of service to the fur industry; now, I'd like to pay similar recognition to Dr. Ounnar Jorgensen, a Danish scientist who has played a significant role in developing the outstanding fur animal research program in Denmark, which is a model for the rest of the world.

Gunnar became chief scientist at the Department for Research in Fur Animals in 1965 and oversaw the origin and expansion of that program, While carrying a heavy administrative load, he always kept close to his first love, which was fur animal research and he published a total of 142 technical papers as well as 112 popular-style papers over the years –an impressive record. A thing I remember clearly about Gunnar was his unfailing willingness – I could even say "enthusiasm" – to share research information.

A true scientist, Gunnar paid no heed to national boundaries, but made information he had available wherever it was needed. Our Mink Farmers' Research Foundation benefited a great deal from this over the years.

Gunnar felt research was never complete until it reached the point of application, and in addition to his scientific publications, he edited the Journal, SCIENTIFUR, which is recognized as the premier fur animal research reference in the world. Gunnar worked hard to bring together fur researchers from various countries, serving on the organizing committee for the International Congresses of Fur Animal Production held in Helsinki in 1976 and Vedbaek in 1980.

He also was a founder and long-time Board member of the International Fur

Animal Scientific Association (IFASA).

The text, **Mink Production,** which I consider to be practically the Bible for the fur industry, was assembled under his leadership. Put all these things together, and there are many more, and you identify a person who has dedicated his career to the fur industry and pursued his objectives with a charming informality and mischievous sense of humor, It is a pleasure and privilege to recognize Gunnar Jørgenson in our American newsletter.

TYROSINEMIA

J. E. Oldfield

Tyrosinemia is a condition which has the potential for causing significant losses in the fur industry, but fortunately that potential has not been reached.

Affected mink have a deficiency of the liver enzymes, tyrosine **amino** transferase, which acts in the normal metabolism of the amino acid, tyrosine. As a result, levels of tyrosine build up in the blood to 20-100 times what is normal in mink. Only dark-color type mink are affected.

Early signs of the problems are watery eyes and sometimes eyelids that become stuck together with exudates. You will recognize these symptoms as also occurring in distemper, and some authorities call tyrosinemia "pseudo-distemper."

Affected mink will lose all appetite, waste away and often die within 2-3 days after the first clinical signs have been noted. In the spring type **of** tyrosinemia, clinical signs will appear in the animals around 3 months of age, while in the fall type, which is usually considered less severe, they will show up just before pelting at about 6 months of age.

Dr. Gorham's laboratory, at Washington State University, has involved itself in research on tyrosinemia, and methods of testing have been devised that can lead to fast and simple **detection** of the disease (see **Proteins** byTapio Juokslahti. In:

Haematology and clinical chemistry of fur animals. SCIENTIFUR 1989, pp. 66-79).

MEAT AND BONE MEAL

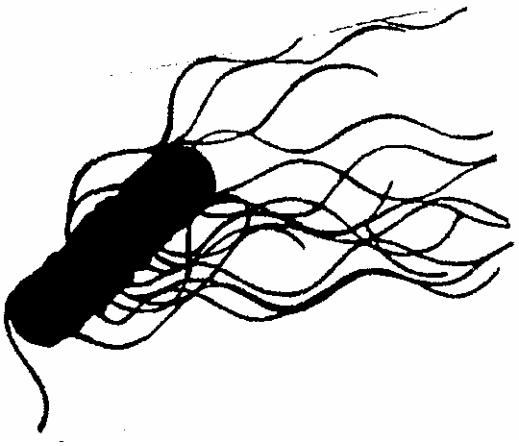
In evaluating various protein sources, in addition to checking the quality (amino acid balance) of the **protein,** one should also assess the possibility of bacterial contamination.

A case in point is Meat and Bone Meal (MBM) which has been identified from time to time as a source of salmonella. Careful plant management by the MBM producers, however, can substantially reduce the possibility of such contamination.

In New Zealand. for example, MBM handlers claim a very low level of salmonella contamination – so low that the product sells at a premium on the Japanese market. A survey of three New Zealand rendering plants, which together supplied over 55% of the country's MBM, showed that they had not recorded a single positive test for salmonella in over three years.

This record was achieved by regular cleaning of the mill rooms, followed by sprinkling a dry sanitizer powder through the product contact areas.

The plants also insist on a meal-drying sterilization at I 15°C for 60 minutes. In any purchase of MBM, it might be well to look into plant production techniques, as well as the usual protein quality considerations (from Render 31:10-12, February, 2002).



COMMENT ON AD VACCINES

The following information about 2001 CEP testing at United Vaccines, Inc. has been provided to the Mink Farmers' Research Foundation for publication and rancher interest.

Our AD antigen is used in the U.S., Canada, and other major fur producing countries overseas. The two largest testing labs (Denmark, Holland) purchase our positive reference serum as their control. We use both positive and negative controls on every plate of 48 samples. Our experience this past winter shows that the research results with Danish antigen virtually mirror our antigen when run in our system against duplicate samples. United Vaccines, Inc.'s CEP testing laboratory has also participated in "ring testing" with major foreign testing laboratories. This is the testing of shared CEP samples. Our laboratory results using United Vaccines' AD antigen compared favorably with the other participating laboratories.

We remain confident that when our AD antigen is used properly that it allows mink ranchers to screen for Aleutian disease and to make their management decisions accordingly. Options are discussed with ranchers having a high percentage of positives and they are encouraged to confirm AD as the problem via necropsy or other methods.

2001 MINK CEP TESTING Done BY UNITED VACCINES, INC.

73 Mink Fams Tested	
Average percent positive on all 73 farms	10.13%
Average percent positive on 69 farms	0.07%
Average percent positive on remaining four farms'	38.30%
Percent no test2 on all farms	1.76%
Percent no test2 on 69 farms	0.09%
Percent no test2 on remaing four farms'	4.47%
43/78 farms 100% negative	58.90%
18/73 farms averaging less than 1% positive	24.70%
6 1/73 farms 100% negative or less than one percent positive	83.60%
Percent farms testing 2,000 or more samples per year	28.10%
Percent farms testing 1,000 -2,000 samples per year	9.90%
Percent farms testing in excess of 1,000 samples per year	38.00%

! Three of these four farms pelted Out the winter of 2001/2002.

2 No test = sample shows some interference, however it is not similar to the positive control samples.

If you need a conclusive result, we recommend that you submit a new sample. For questions call 1-800-283-6465.

RACCOONS CARRY VIRUSES TO MINK

Mink farmers should be aware that raccoons can be infected with distemper, Aleutian disease, and mink virus enteritis. Since raccoons are a prime source of rabies, fur farmers should protect themselves from raccoon bites or scratches.

The home range of a raccoon varies from about a square mile up to about 20 square miles. They travel considerable distances; there are records where they have wandered 50 or more miles. And there arc a lot of raccoons; Michigan officials say they have a state population of several million. There is no doubt that many other states also have high raccoon populations.

Raccoons are most active from sunset to sunrise. Their average life span is usually three to four years. They are meat eaters with mink food topping their preferred food list. They are social animals, which allows easy spread of the distemper virus between raccoons. Distemper in raccoons is like sex, it will never be eradicated.

Raccoons are intelligent animals. Any farm without a good guard fence equipped with an electric "hot" top wire is an open invitation for nighttime raccoon visits.

Distemper

A raccoon infected with

Figure **1:** *Raccoon* ***Distemper. The eyelids are swollen arid ijck*** *together with a purulent* ***exudate.***

distemper is a real danger for ranch-raised mink. While dogs with distemper were thought to be the primary source of distemper for fanned mink, all veterinarians now feel
that the raccoon is the number one source.

The farmer may find a distemper-infected raccoon wandering around the mink yard in a dazed state. In the later stages, the raccoon's eyes may have a pussy exudate that sticks the lids together and is similar to the exudate seeninaminkordog(Figure 1). The footpads may become enlarged and hard (Figure 2). Convulsions are often seen. An infected raccoon probably passes distemper virus in the air within four to five days after infection and continues to do so up until it dies about three weeks later. The raccoon distemper virus seems to be highly virulent and is transmitted with ease to mink and other raccoons.

Aleutian Disease Virus (ADV)

While there are several reports of ADV infection in raccoons, the report by Bloom, Durrant and their co-workers provided background research showing that young raccoons might carry a particularly virulent ADV to mink. Aleutian disease virus was identified in samples from mink and trapped raccoons on commercial ranches during an outbreak of Aleutian disease.

To observe the susceptibility of raccoons to ADV, young raccoons were inoculated with different strains of ADV. None of the raccoons became sick nor did they show any ADV lesions when necropsied. But they did become carriers of the ADV because ADV antibodies were demonstrated in the raccoons'

blood, which signifies infection.

Finally, to nail down the transmission of ADV from raccoons to mink, tissues from infected raccoons were inoculated into mink

Figure 2; *In the stages of racoon distempet; the Jon/pads ,nav become enlarged and* cracked.

and typical AD was induced in both Aleutian and non-Aleutian mink. Bloom. Durrant and their co-workers did not say that free-ranging raccoons caused the Aleutian disease outbreaks in Utah, but it would seem
highly likely that raccoons could carry ADV to mink.

Mink Virus Enteritis (MVE)

Since there was no information concerning the susceptibility of raccoons to MVE, we performed the following trial. Ten young raccoons were fed a tissue suspension containing virulent MVE. Nine of the ten raccoons showed no signs of the disease but one raccoon had slight diarrhea and loss of appetite. No lesions were seen when the raccoons were autopsied. The raccoons carried MVE in their tissues for at least 12 days. There is a good possibility that they might shed MVE in their feces and be a potential danger to mink. We did not answer the crucial question _Will MVE-infected raccoons infect other raccoons and allow MVE to persist in wild raccoon populations?

Rabies

A rabid raccoon is more dangerous to the caretaker, his dogs and cats and other mammals than to mink confined in pens because the rabies virus is transmitted primarily by a bite or scratch. Since a rabid raccoon shows some of the same symptoms as a raccoon infected with distemper, the two diseases might be confused.

Like raccoons infected with

continued next page

RACCOONS CONT.

distemper, rabid raccoons lose their fear of man and are found wandering around in the daytime. They may become paralyzed and show other nervous signs.

Since a rabid raccoon is a real danger, it must be killed and its head submitted to a state health laboratory for an examination for rabies and distemper. Avoid shooting the raccoon in the head as the brain tissue must be used for the laboratory examination. A mink farmer who finds a suspect raccoon on his or her property should call the state department of health for their instructions.

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ZINC IN MINK DIETS

Zinc is one of the essential trace elements, which functions in animals to stimulate the immune system, aid in the metabolism of vitamin A and in the synthesis of keratin, which affects fur quality.

Danish investigators have calculated that a zinc content of 60 mg/kg is sufficient in the diet for normal health in mink. Nevertheless, some have questioned whether adding additional supplemental zinc to mink diets might not be beneficial.

A German team has looked into the effects of added zinc upon mink performance. Their basal diet contained 124 mg zinc/kg and 80mg zinc/kg during the growth and breeding periods, respectively, while the zinc-supplemented diets contained 200 mg/kg and 157 mg/kg of zinc for growth and breeding.

The additional zinc was apparently not needed: it did not affect feed consumption, growth rate or reproductive performance (Pingel, H., M. Anke and E. Salchert. 1992. The influence of zinc supplementation on growth and reproduction of mink. Norwegian J. Agr. Sci. Supplement 9,pp. 321-325).

Moiu ON ANTIBIOTICS

As in human medicine, antibiotics have been and continue to be extremely useful to the mink industry. However, there is controversy about their continued use, relative to the development of resistant strains of bacteria, and I'll try to keep you updated on what's going on.

The terrorist-inspired anthrax attacks have triggered fears that the United States may be running out of effective antibiotics and the government takes such concerns very seriously

Some of the companies that produce antibiotics place them at a low priority since they do not bring thc huge profits of some other preparations, like Allegra and Lipitor. for example.

Another reason that firms tend to shy away from antibiotics is that in response to the concem about development of resistant strains of bacteria, people use antibiotics for only short periods, as contrasted with many other drugs which are taken continuously, for years.

During the past year, some companies have reduced spending on research into new antibiotics that kill bacteria outright, in favor of searching for compounds that will block the disease-causing effect of bacteria, thus reducing or stopping the production of bacterial toxins.

Reducing funding for research on new antibiotics is a risky business, however, since bacteria can develop resistance so quickly. It is good that the govemment has increased its support to agencies that can sponsor antibiotic research, like the National Institute of Health (NIH). Also, the government is looking at other ways to induce companies to continue antibiotic production, such as possibly extending the period of patent protection for some of the more powerful antibiotics (from **Feed** Management 52:4. December, 2001).

FLEA INFESTATION

It is generally felt that flea infestation is detrimental to mink: contributing to poor mothering of kits by the females, types of pelt damage, anemia and in some cases, even death.

A study of methods of flea control has been done at the Danish Pest Infestation Laboratory at Lyngby. Several different species of flea were found on the mink and treatment methods were aimed at breaking the life cycle of the fleas in the nestbox. All bedding material in the nestboxes was removed and burned. Preventive insecticide treatments were applied to the nestboxes in spring, mid-summer and fall.

Although these procedures were thought to be helpful, they did not result in complete elimination of fleas, and more than 40% of Danish fur farms continued to have flea infestations, year after year (Larsen, KS. 1992. Fleas and farmed mink. Norwegian! Agt Sci. Supplement 9, pp. 420-425).

FEEDING METHODS

The most common way to feed mink is to place the feed on the cage wire, and while quick and economical, this has the disadvantage of being wasteful, par icularly if the feed is either too dry or too wet.

Over the years, some other methods have been developed and these have been compared at the experimental fur farm at the Nova Scotia Agricultural College. Methods tested included normal, on wire, dry pellet feeder. cup feeder and spill/slant trays, to collect wastage.

The amount of feed wasted in the control (cage wire) group was significantly higher (17-21%) than in the groups using cups or pellet feeders *(5*-12°/a).

Moisture content of the feed mix was related to wastage, and it was found that a 1 percent decrease in dry matter of the diet increased feed wastage by 3.8% (This was measured over a range of dietary dry matter contents from 33-25.) (from: Rouvinen, K., D.M. Anderson and S. Alward. 1992. Feeding devices reduce waste in mink feeding. Norwegian J. Agric. Sei. Supplement 9:332-335).

MINK BREEDING PROGRAMS

As we enter the 2002 breeding **season,** it is timely to consider what has been accomplished in Denmark at the Foulum Fur Animal Research Station. This is probably the largest fur animal breedingprogram in the world. Peer Berg, the director of the program, notes the significant progress that has been made since computers have become available for assessing and storing data. About 40% of the Danish mink farms, which account for 60% of the country's breeding mink, use the programs on personal computers. He recommends that selection should be practiced primarily to pursue long-term goals rather than to solve short-term problems. Long-term goals might include, for example, increase in litter size, increased size (body weight, length) and improvement of fur color and quality characteristics. It is important to know how heritable some of these traits are, and the Danes have provided such information.

All of these traits are considered reasonably highly heritable. A low heritibility suggests that a trait is more highly influenced by environmental factors and can be improved by attention to nutrition and/or management factors (from: Berg, P. 1998. Breeding and Genetics of Mink. In: Research in Fur Animals at the National Institute of Animal Science. Publication 720, Quti Loki and Christian Friis Borsting, Eds. pp. 21-29).

TABLE 1. HERITABILITY ESTIMATES FOR CERTAIN TRAITS IN MINK

Trait	Range of Heritibility	4 Mea	n ± SD
Litter size	0.07 .0.30	0.16	± 0.07
Bodyweight	0-0.98	0.33	± 0.21
Bodysize	0-0.42	0.15	± 0.11
Bodylength	0.10-0.74	0.52	± 0.17
Pelt color	0.07 .0.93	0.44	± .021
Furdensity	0.10-0.34	0.19	± 0.08
Guard hair length	0 .0.80	0.43	± *0.25*
Underfur length	0.23 .0.69	0.44	± 0.17

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