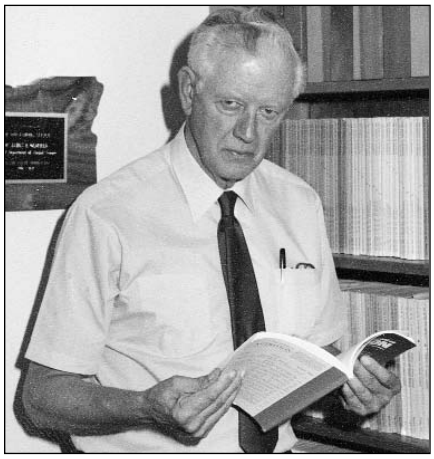
Fur Animal Research

Published by Mink Farmers' Research Foundation, a Committee of Fur Commission U.S.A

Volume 12, Number 4 December, 2004



As this is being written, about the time of the Thanksgiving holiday, I reflect that, although our nation is involved in a war against terrorism, and we face societal problems including dread diseases including cancer, heart disease and AIDS, we do, in fact, have much to be thankful for. With all the modern computer technology at our disposal, we can do so many things quicker and better than we could not many years ago. There are examples right in our mink industry and I know that many of you involve computer programs in developing animal breeding plans, and in feeding them, economically and effectively. We have our own animal disease problems to contend with and the Mink Farmers' Research Foundation (MFRF) annually provides funds for research to overcome or eliminate them. We can be thankful for the dedication and skill of those who perform this work, and I would include among them the late Dr. G.R. Hartsough, Dr. John Gorham, Dr. Marshall Bloom, and, on the MFRF Board, Drs. Gary Durrant and Robert Westlake. So, when you sat down to enjoy turkey and all the trimmings, I hope you were able, as I was, to see light among the gloom of the problems that beset us and give thanks for those who contribute to it.

Looking ahead, we need to identify and support people to take over this workload in the future. As an example, it is encouraging to note the progress made by Marlene Bakko, a veterinary student who has received funding from the Foundation. Marlene has kindly commented on time she recently spent in Denmark as a part of her study program. She writes, "I spent three weeks at the Danish Ministry of Food, Agriculture and Fisheries, working under the supervision of Dr. Hans Henrik Dietz. I set out for Denmark with the goal of supplementing my conventional veterinary education with knowledge of mink diseases, including disease manifestation, diagnostics, treatment and control programs. By the end of my stay in Denmark, my goal had been far exceeded.

"The majority of my time was spent observing and assisting the pathologist on duty with daily post-mortems (necropsies). In addition, I spent time on sample collection and laboratory work in support of ongoing mink disease research, as well as visiting other veterinary-related sites like the DFVF Department of Virology lab on Lindholm Island.

"During my time in Denmark I had the opportunity to visit several mink ranches. These visits allowed me to see first-hand the Danish advances in the areas of waste management, computerized records, feed distribution and animal welfare in relation to pen size and design. I was also able to learn about vaccination techniques, waste management and nutrition/feed production through discussions with both mink farmers and veterinarians. Other visit sites included the Danish Fur Breeders' Plasmacytosis (Aleutian Disease0 laboratory at Glostrup, the Copenhagen Fur Center, and the Limfjorden Feed Production Center at Stovring.

"Towards the end of my stay in Denmark, I had the opportunity to visit the Danish Institute of Agricultural Sciences Research Center in Foulum. It was at this Foulum research farm that I was able to see, first-hand, the integration of computers into Danish fur farming and I was shown their Palm OS-based program, with bar codes to control feed distribution."

It sounds as though Marlene took full advantage during her brief stay, and accomplished a great deal. This exposure to the workings of support services to the mink industry in Denmark will surely serve our American mink industry well in the future. We congratulated Marlene on what she has accomplished, and wish her well in the future. I send best wishes to you for a productive pelting season and happy, year-end holidays.

J. E. Oldfield

"SCREW NECK"

Brown-eyed pastels often exhibit a peculiar behavior pattern termed "screw neck." Affected individuals show the symptoms of this condition by carrying the head tilted habitually either to the right, or to the left, or sometimes by tilting it first one way and then the other. When turning around in a cage, especially in the corners, the head is thrown directly over the shoulder or back. If a mink showing pronounced affectation is being observed while in standing position, it will often look directly at the observer with the characteristic tilt, and, if not disturbed, will rotate its head until the ventral side points upward.

When disturbed or frightened these symptoms are accentuated and some pastels that appear normal when not molested will show unmistakable screw neck signs under such conditions. Screw necks are usually reluctant to leave the nest box when disturbed, and if forced out into the cage the tilting of the head is especially evident as they leave the box. If disturbance is continued, inability to cling to the inside of the cage or nest box in a normal manner is shown and the mink races about wildly exhibiting a general lack of coordination in its movements. A few individuals that are affected only slightly when undisturbed turn a series of perfect forward somersaults after being chased from the nest box and allowed to quiet themselves.

Figure 1. Screw neck, in a pastel mink. Affected mink can twist their heads in almost any direction.

The behavior of screw neck pastels in normal surroundings ranges from actions which differ only slightly from normal to the inability to stand erect. The same individual may show a great amount of variation, being decidedly affected some days and on other days varying little from normal behavior. Screw neck symptoms usually tend to become less pronounced with age. If pastels were tested at an early age, perhaps all would show some lack of coordination. The majority of adult pastel mink do not show screw neck symptoms to any marked degree, and since there is no indication that the condition in any way interferes with fecundity or pelt production, it is probably of little or no economic importance. (Shackleford, 1950).

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SALT, IN THE MINK DIET

With the breeding season not too far away, I get questions about the best level of salt to feed. There are a lot of opinions about this without too much hard, experimental data, so it is encouraging to learn that some studies of the salt situation are being run in Sweden. The usual recommendation is for 0.50% (one-half percent) of salt in the diet - much of which can come from the normal diet ingredients. Meat, fish, eggs and animal products all contain some salt. Plant products, including the cereal components, have very little, and this is the reason that herbivorous animals, like cattle and sheep, need to be provided with salt, in blocks or added to their feed. The Swedish studies will look at the best methods for analyzing for the diet's salt content and they will try to determine how important sodium is for mink. They point out, and it is generally accepted, that the lactation period is a critical one for salt since salt is lost from the females' bodies in the milk they produce. Dr. Hartsough used to recommend adding salt to mink lactation diets to encourage females to drink more water. Otherwise, the mothers quickly become dehydrated. (from NJF Seminar No. 354, 7 pp).

DEAFNESS IN MINK

Ranchers found the simplest way to produce a clear white mink was by the use of a mutant gene discovered in Minnesota. Mink homozygous for this gene were named the Hedlund white by Shackleford. Ranchers observed that these mink were difficult to breed and appeared to be deaf. Work done at Michigan State University in 1992 showed that the auditory (hearing) system of standard dark mink was well developed by 26 days of age, but there was a progressive loss of hearing in the Hedlund whites by 55 days of age. This genetic deafness is caused by pathologic changes in the inner ear that are responsible for hearing.

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PEAS AS A MINK FEED INGREDITNT

Anders Skrede, who has spent some time with us in Oregon, has investigated the use of extruded peas in mink diets. He included the extruded peas at two levels: 7.5% or 15% of the diet, and compared these with a control diet containing no peas. The pea product contained 91.6% dry matter, 3.1% ash, 22.8% crude protein, 0.7% fat and 65% carbohydrates. The diets were each fed to 48 mink kits, from July until pelting in November. Dr. Skrede noticed that the peas had a higher moisture-binding capacity than the usual dry cereal ingredients. Both body growth and feed intake figures were similar for all three groups of mink, and he reported that extruded peas could be used in the furring diets of mink as the only carbohydrate source at levels up to 15% without any problems of production and health. (from NJF Seminar No. 354, 8 pp., 2004).

ASTROVIRUS IN MINK

Pre-weaning diarrhea is an important cause of deaths of kit mink, and European studies indicate that the cause may be astrovirus infection. Fecal samples were obtained from six Danish and five Swedish mink farms that had previously been shown to contain large numbers of virus particles, and the viruses were shown to be strains of astrovirus. The investigators were able to clearly identify the viruses as either Danish or Swedish. This is an area of infection that should be borne in mind in any investigation of viral pathogens in North America. (from: Pavirande och Sekvenaunalys au Mink Astrovirus stammar fran Danmark ch Sverige. 2003. Annual Report, Danish Fur Breeders Research Center, Holstebro. pp. 141-143.)

FEEDING FUR ANIMALS BY USE OF A COMPUTERIZED FEEDING MACHINE

The limiting factor in the number of mink per farm worker is the amount of work during the nursing period in May and June. A Danish system, identifying the amount of feed needed (from hand-feeding records) is fed into a computer-controlled feeding pump. This system has been tested and found satisfactory on three Danish fur farms. The farmers use the Copenhagen Fur Center's hand-held scanner called **Farmpilot**, equipped with newly-developed software. A barcode for the scanner registers the number of the animal or of its cage, as the amount of feed is increased or decreased (from: M. Sønderup. 2004. Individual feeding of fur animals by use of a computerized feeding machine. Proceedings, NVF Seminar No. 359. 6 pp.)

MINK MANAGEMENT PROBLEMS AND THEIR SOLUTION

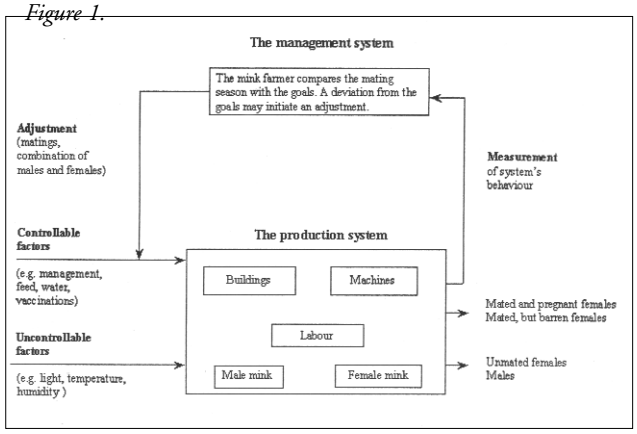
Drs. Moller and Sorenson, of the Danish Institute of Animal Sciences, remind us that the production of some farm animals varies from season to season, while that of others does not. Mink, along with horses, sheep, goats, deer, foxes, ferrets and trout, are seasonal in their reproduction, while cattle, pigs and poultry are not. They point out advantages of continuous animal production systems, as including:

1. Better utilization of resources, e.g. buildings, labor.
2. Ability to supply fresh products, like milk, meat, and eggs continuously.
3. Increased reproduction, by shortening intervals between breedings.

They present, in graphic form, below, the way that management practices interact with the animal production system:

The following chart (Figure 2) shows how mink production can be divided into a series of season production periods.

Figure 1.



Mink production as a cybernetic system (modified from Sørensen & Kristensen, 1992).

To meet the needs of management planning, the Danes have developed what they call Systematic

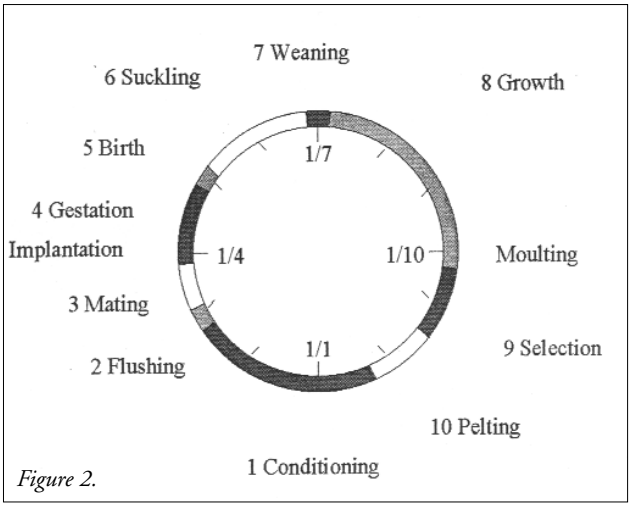


Figure 2.

Operating Programs for the most labor-intensive periods in the mink farm operation. One such program, for the mating period, is reproduced below as Table 1.

Table 1

Action plan for the mating period (6/3-25/3)
Usual mating plan where young as well as old females are mated from the beginning of March.

Period	Observation	Action
At feeding	=>	Feed females ad libitum.
March 6 - 7	=>	Mating starts. Place the female with the male, and record the time.
Until March 15	Females that have not been exposed to a male, were a little willing yesterday or were tried three days ago.	Try or retry the female. Record the date on the females' card.
Mating attempts	Young males who will not start mating.	Let them try with an old female first.
	The animals fight, mating is not started within 15-20 minutes.	Put the female back in her own cage. Note the date on the card as a mating attempt. The male can be tried again after a break.
	The female is willing. Neck bite is established and mating starts.	Record the time on the card.
	After 10 minutes of mating.	Approve the mating – record the date on the card. Remove the female after the pair has separated. If necessary the mink can be separated after approx. 20 min.
From March 9	=>	Feed also the males ad libitum.

(from: Møller, S.H. and J.T. Sørensen. 2004. Management problems and tools for strictly synchronized animal production systems exemplified by mink production. ***Scientifur*** *27(4):85-91.*

SUSCEPTIBILITY OF PASTEL MINK TO DISTEMPER

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Mink ranchers in North America and Scandinavia who have had distemper outbreaks have reported that the pastel mutation was more likely to shown signs and die when compared to black mink or other mutations. These outbreaks occurred on ranches where pastels, black and other color mutations of mink were raised on the same ranch.

Dr. Mogens Hansen, a Danish veterinarian, collected distemper mortality data on 71 farms that had a total population of 82,036 kits (see accompanying figure). If the kits were not vaccinated, or vaccinated within a few days after an outbreak began, the percent mortality was higher in pastel mink. Again, if kits were vaccinated 1-3 weeks prior to the outbreak, the percent mortality was higher in pastels. On the 51 farms where the kits were vaccinated 4-12 weeks prior to the outbreak, the mortality percentages were lower because of the development of immunity in both pastels and non-pastels

These observations suggest that the genes for the pastel mutation increase the susceptibility to distemper but do not affect the ability of the pastel to respond to the distemper vaccine.

Mortality in 71 farms with distemper in the summer and autumn 1969 (Frederikshavn)

Group	Vaccination of kits	Number of		Percentage mortality		
		Fur farms	Kits	Total	Pastel	Without pastel gene
1	Not done	7	11,852	64	75	55
2	Few days after outbreak	9	10,977	25	64	22
3	1-3 weeks prior to outbreak	4	24,430	45	63	39
4	4-12 weeks prior to outbreak	51	34,777	24	25	23
	Total	71	82,036			

Hansen, M. Nord. Vet. Med. (1971) 21 374-382

PSEUDOMONAS PNEUMONIA OF MINK

Pseudomonas pneumonia or hemorrhagic pneumonia is an acute infectious disease of ranch mink caused by *Pseudomonas aeruginosa* bacteria. The disease occurs throughout the northern hemisphere. Most reports indicate that the disease usually occurs in the autumn. We have seen a few cases in the Northwest and Midwest in the summer and winter.

Clinical signs often are not observed. Most affected mink are found dead. With careful observation, however, most affected mink may be noticed to be lethargic and lose their appetite the day before death. Within hours of death, respiration becomes quite rapid and shallow or labored. The severe terminal phase of the disease is characterized by

PSEUDOMONAS PNEUMONIA OF MINK CONTINUED

labored breathing, convulsions and expulsion of blood-tinged fluid from the nose and mouth.

Mink that have died with *Pseudomonas* pneumonia usually have bloody exudates around the nose and mouth. A small pool of blood often is found beneath the cage. Gross changes in the lungs can be classified as acute pneumonia. In the acute form of the disease, one or more lobes of the lungs are red to tan and consolidated. The acute form is characterized by severe hyperemia throughout the lungs, with foci of hemorrhage. Hemorrhagic pleural exudates may be found. Splenomegaly and other changes suggestive of sepsis often are found. Diagnosis is made by isolation of P. *aeruginosa* bacteria in large numbers from affected lungs.

We have seen an outbreak of *Pseudomonas* pneumonia in mink in which young male kits, approximately six months old, were preferentially affected. These animals otherwise were vigorous, in excellent flesh and had no apparent evidence of any disease process other than the *Pseudomonas* infection.

Chediak-Higashi syndrome, a hereditary disease of mink and some other species, is characterized by abnormal fusion of cell lyososmes. This defect results in dilution of the coat color and abnormal functioning of phagocytic cells. Mink with this disease syndrome, often termed blue mink, are more susceptible to some bacterial infections. Pseudomonas pneumonia occurs in mink that have the disease syndrome but does not appear to do so preferentially.

The common occurrence of *Pseudomonas* pneumonia in the autumn probably is associated with a number of factors. Maternal antibodies would be gone from the kits by this time, the ranch is at its highest population of mature or nearly mature animals, the weather is variable and the mink are undergoing the stress of autumn pelt development. Herd mortality is quite variable with death rates ranging from 0.1% to 50% have been reported. In our experience, mortality is unpredictable. Some outbreaks are quite explosive with high mortality over a short period. Other outbreaks have a lower level of mortality that continues for a long period. Sporadic deaths of single animals due to *Pseudomonas* pneumonia are probably common but seldom recognized. We have seen individual mink with *Pseudomonas* pneumonia included with mink submitted for necropsy for other disease processes.

In the past the standard treatment for *Pseudomonas* pneumonia was the addition of sodium sulfathiazole to the feed. Today sodium sulfathiazole is no longer available. In our experience, the efficacy of this treatment was highly variable. In some cases that we diagnosed as *Pseudomonas* pneumonia, the death rate dropped sharply after addition of the drug to the feed. In many cases, the death rate fell over a number of days but flared up later when the treatment was discontinued.

In our studies almost all outbreaks of *Pseudomonas* pneumonia in mink could be associated with four serotypes of P. *aeruginosa*. More than one serotype was isolated from the same ranch in some instances. A bacterin comprised of the four commonly occurring serotypes is currently approved by the U.S. Department of Agriculture.

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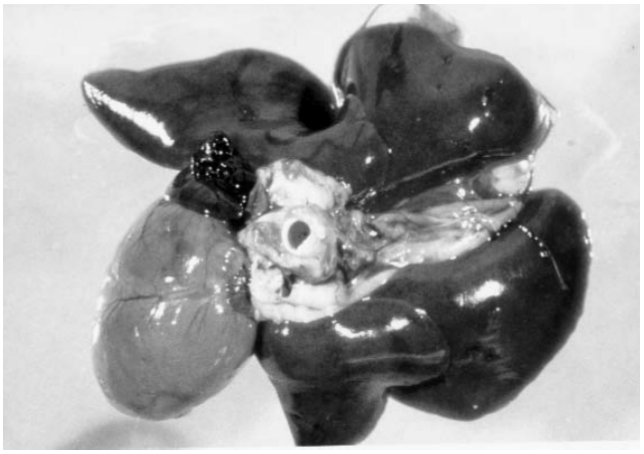

Lungs from a mink dead from Pseudomonas pneumonia. The lungs are dark red, and filled with blood.

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