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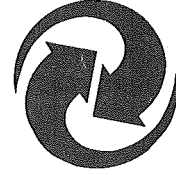
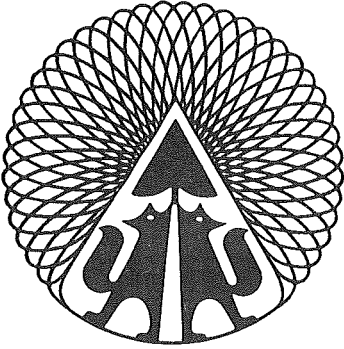


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NOTES

SCIENTIFUR

Vol.2, no.3, August 1978.

Dear readers.

When you are getting this issue of SCIENTIFUR I think that you have had your holiday and are looking with rested and dynamic eyes on your position to research work in the fur animal production to benefit for yourself, the fur animals and for SCIENTIFUR.

We have been very happy during the holiday period to receive relatively many contributions to use in SCIENTIFUR, and also a interest for SCIENTIFUR we can notice during the letters we have received in this period.

In this issue we can advertise a new review of Research References on Fox and Mink compiled by the National Board of Fur Farmers Organizations in USA.

A new journal CARNIVORE which also is mentioned under COMMUNICATION, perhaps, could be of interest to some of you.

As you also see under COMMUNICATION both an American and the Russian institute of scientific information are interested in receiving SCIENTIFUR. We are hoping that the information flow can be more intensive during such arrangements.

If you want help to find scientific reports in your area - you will see that Commonwealth Bureau of Animal Health are willing to be of service to you.

Many of us know that there has been held a succesful mink conference in York, England, in the beginning of April this year. Without permission we have taken copies of the first pages of the report from this conference. We hope that you will appriciate this information, and we will urge The Fur Breeders Association of the United Kingdom & Ireland to send this report direct to SCIENTIFUR as soon as it is published in the future, so we can render our readers a better service. The same time we will be glad to give the service of advertising of the York Conference in SCIENTIFUR - free of charge of course. We also know that there are many valuable reports in The Fur Farmers Gazette and we will use this opportunity to ask the authors of these reports to send abstracts for use in SCIENTIFUR.

The fur production business is so small, and the sources so reduced that we all may work for that no information is unused.

You also under COMMUNICATION will see the final program for the Scandinavian scientific meeting in october. We hope that we will be able to bring abstracts of the reports given there.

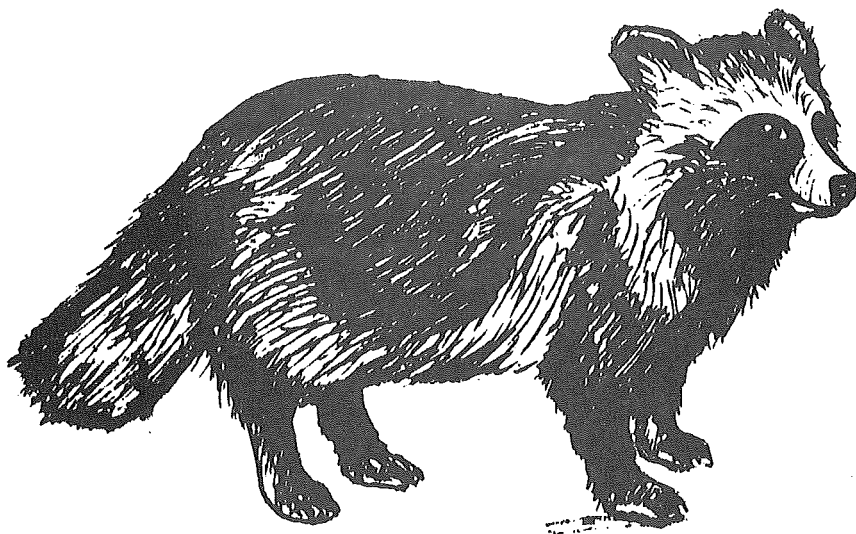
The best wishes for the rest of the summer.

Your editor.


Gunnar Jørgensen



ORIGINAL PAPER.



* THE RACCOON DOG (NYCTEREUTES PROCYONOIDES).

Margit Lykkeberg, Danish Fur Breeders Association,
Langagervej 60, DK 2600 Glostrup, Denmark.

1. Geographical area of distribution .

The raccoon dog belongs to the genus Nyctereutes. He is native to the Far East, where he is still living in the Amurvalley, from where he has imigrated into Komsomolsk, Ussurivalley, the Kankaiplain and Japan. In the beginning of the ninteenfourties some people in Russia started to transplant some game animals, among others the raccoon dog, from the Far East to parts of Russia, where there were few game animals. Especially in the european part of Russia the raccoon dog settled down and from here he has spread mainly towards the west and we find him to-day i Poland, Finland and parts of Sweden.

On the figure is shown in which parts of the world the raccoon dog is native and in which parts he is introduced.

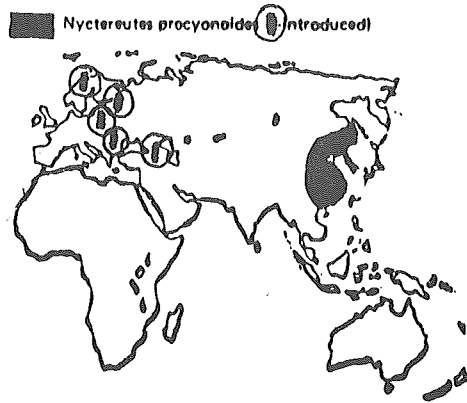


Fig 1 : The geographical area of distribution of the raccoon dog.

2. Characteristics of the exterior.

The raccoon dog has according to Bueler(1973) and Fox(1975) the following characteristics:

- Short, rounded ears.
- Short, pointed snout.
- Circular pupils.
- Rather long body.
- Rather short tail.

The coat of the raccoon dog is characterized by a thick and soft under-fur and long guard hairs. The guard hairs are especially long on the cheeks. On the hind quarters the long guard hairs cover the upper part of the short tail, so that the hind quarters look rounded. On the belly the guard hairs are also long, which makes the legs of the animal seem shorter than they really are..

It is characteristic for the raccoon dog in contradistinction to the foxes that he is able to bristle from the neck and shoulders down all along the back.

The colour of the coat can be described as brownish-gray on most of the body, the back is often darker than the rest and you will often find a bit of cross marking. On the belly the colour is almost yellowish-brown. The snout is black and there dark circles around the eyes, which look like a raccoon mask.

A special character of the raccoon dog is that he hibernates, if he can succeed in increasing his bodyweight enough to survive the max. 4 months hibernation. To be successful in this, he has to increase his bodyweight during the autumn about 50%, if not he will have to go out and seek food during the winter.

The raccoon dog's favorite place to live you will find, where the earth is almost covered by vegetation, because he has got to be able to hide in a hurry for all his enemies, for he cannot run very fast.

3. Historical development.

Already in ancient times the raccoon dog was kept in captivity in both China and Japan. In newer times there is, according to the increasing demand for raccoon dog furs, especially in Japan established big raccoon dog farms including several thousand breeding animals each.

Pedersen(1962) is of the opinion that the breeding of raccoon dogs will be absolutely profitable. This is not only due to the value of the fur, but also the fact that the raccoon dog kept in captivity less than other fur animals is troubled by diseases, at the same time as it has a great fertility.

In Finland, to where the raccoon dog has immigrated from Russia, they caught some wild raccoon dogs in 1972 with which they started breeding. In 1976 there were five thousand raccoon dogs on fur farms in Finland.

Also in Denmark the raccoon dog has been introduced as farmfuranimal, but still only on very few farms.

4. Reproduction.

The breeding of the raccoon dog is still a rather unexplored area, but anyway we know a little about it from the Finnish experiments concerning raccoon dog breeding, Mäkelä(1973).

The outside signs of the start of the mating season is the same for the raccoon dog as for the foxes. The length of the oestrus is nearly the same as for the dog. On the Finnish experimental furfarm the oestrus lasted about 3 weeks of which

the females were in heat and was mated 2-3 times if the female and the male was together in the whole mating period, just as it is in nature where the raccoon dog is monogamous. In captivity it has been tried to mate 3-4 females to 1 male, but it is still not in use very much. In the finnish breeding experiments they found that when the female was mated 3 times during the heat the sterility% was nearly zero.

The mating season is from the beginning of february to the end of april depending on the climate. The length of the gestation is mostly about 59 days.

The litter size in nature and in captivity appears to be nearly the same about 6-10 kits at birth. In the nature about 50% of these die in the first 6 weeks, in captivity the mortality is considerably lower.

5. Furquality demands.

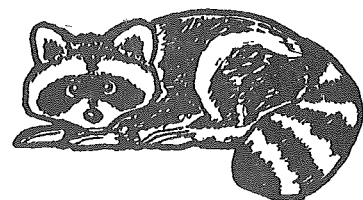
The fur^{of} the raccoon dog is a sort of coarse type of fur, more coarse than that of the foxes. It is demanded that the guard hairs cover the underfur completely and the underfur is sufficiently thick to carry the coarse guard hairs.

As for the colour the fur of the raccoon dog may vary from brownish and reddish to black with or without silvery hairs.

The highest prices in 1976 of raccoon dog furs was obtained for those which were dark and without silvery hairs.

Litterature cited:

- Bueler, L.E. 1973. Wild dogs of the world. Publ. London, 274pp.
 Fox, M.W. 1975. The wild canids. Publ. New York, 508 pp.
 Mäkelä, J. 1973. Mårdhunden i naturen och som farmdjur. Finsk Pälstidskrift 6:189-197.
 Pedersen, A. 1962. Mårdhunden---et nyt europæisk pelsdyr. Dansk Pelsdyravl 25:3-4.



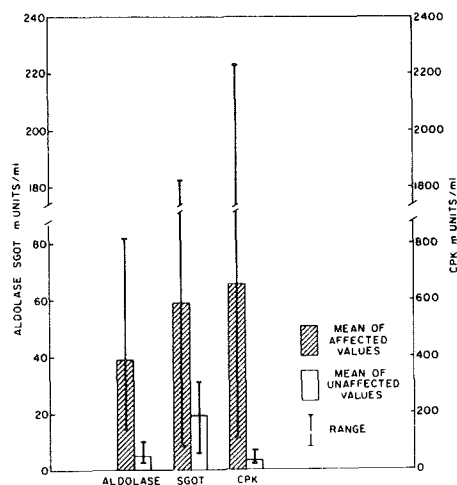
* MUSCULAR DYSTROPHY OF MINK: A NEW ANIMAL MODEL.

G.A. Hegreberg, M.J. Hamilton, G.A. Padgett, Dept. of Vet. Path.,
College of Vet. Med., Washington State University, Pullman,
Washington 99163, USA.

Muscular dystrophies comprise an important group of inherited disorders of man. Although the disease has been studied extensively, little is known about the underlying primary pathomechanisms. Consequently, treatment of patients is difficult and prognosis is poor. An animal model of muscular dystrophy is a useful research tool for approaching the basic problems of pathogenesis in muscle diseases. An inherited progressive muscular dystrophy of mink which resembles the amyotonic forms of human muscular dystrophy is currently under study. Clinically, the earliest sign is progressive muscular weakness and atrophy. Muscle enzyme activities in serum are usually elevated to pathologic levels. Urinary creatine/creatinine ratio is elevated. Pathologic changes are limited to skeletal muscle and are typical of those seen in amyotonic forms of human muscular dystrophy. These changes include variation in diameter size of muscle fibers, centralized nuclei, floccular and hyaline degeneration of scattered muscle fibers, increase in connective tissue in endomysial and perimysial areas, and regenerative attempts. Both type I and type II muscle fibers are involved in the disease process. Genetic studies indicate an autosomal recessive mode of inheritance. Although the primary defect in muscular dystrophy is traditionally thought to reside in skeletal muscle, recent studies have produced theories of primary involvement of other tissues and organ systems. These theories are presented and their relationships to the traditional theory are discussed.

Figure 1. Levels of muscle enzyme activity in serum (mean and range) from 8 affected and 24 nonaffected mink. Abbreviations defined in text.

Hegreberg et al.
Federal Proc. 35, 1219.



Federation Proceedings 35 (5) 1218-1224, 1976.

1 table, 5 figs. 9 references.

Authors abstract.

* HISTOPATHOLOGIC DESCRIPTION OF MUSCULAR DYSTROPHY OF MINK.

Gerald A. Hegreberg, Zenaido Camacho, John R. Gorham, Dept. of
Vet. Pathol., College of Vet. Med., Washington State University,
Pullman, WA 99163, USA.

Histologic examinations were performed on mink afflicted with a progressive form of muscular dystrophy. Characteristic alterations were confined primarily to skeletal muscles and included variation in fiber diameter size, centralization of nuclei, degeneration including hyaline change and necrosis, increase in endomysial and perimysial connective tissue, and regenerative attempts. The clinical manifestations, including muscle hypotonicity, weakness, and atrophy; the random distribution of skeletal muscle lesions; the lack of histologic involvement of the peripheral and central nervous systems; and transmission with a definite familial pattern are consistent with previously described amyotonic forms of muscular dystrophy of man, including childhood, facioscapulohumeral, and limb-girdle muscular dystrophies.

Hegreberg et al.
Arch. Pathol. 97, 227.

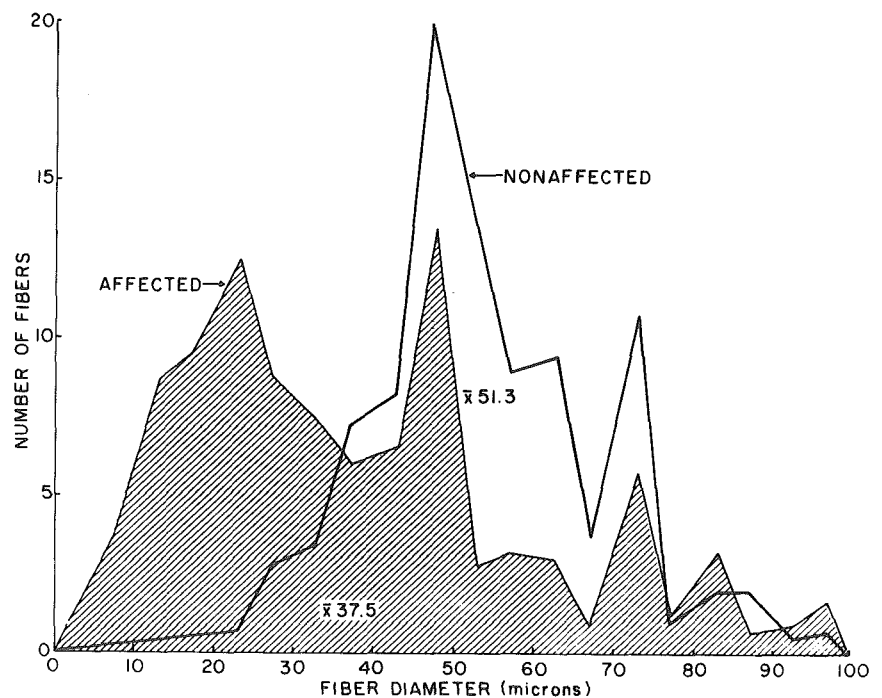


Fig 4.—Distribution of diameter size of affected and nonaffected muscle fibers.



Arch. Pathol. 97, April 1974, 225-229.
7 figs., 17 references.

Authors abstract.

* GROWTH AND DEVELOPMENT OF THE EUROPEAN FERRET
(*MUSTELA PUTORIUS*).

Ann U. Shump, Karl A. Shump, Jr., Dept. of Biol. Science,
State University of New York, Brockport, NY 14420, USA.

Body weight, body length, and other developmental parameters were studied in the European ferret, *Mustela putorius*, from birth to 26 weeks of age. Males and females did not differ in weight until the seventh week of life, and they did not differ in length until the ninth week of life, when the males began to grow faster. Adult males (1400-1500 g) were heavier than adult females (800-900 g), but females reached adult size faster than males.

Laboratory Animal Science. 28 (1) 89-91.
2 figs. 3 references.

Authors abstract.

* A NEW SPECIES OF WEASEL (*MUSTELA*) FROM THE HIGHLANDS OF
COLOMBIA, WITH COMMENTS ON THE EVOLUTION AND DISTRIBUTION
OF SOUTH AMERICAN WEASELS.

Robert J. Izor, Luis de la Torre, Div. of Mammals, Field Museum
of Natural History, Chicago, Illinois 60605, USA.

The weasels of the genus *Mustela* (subgenera *Mustela* and *Grammogale*) are among the lesser known components of the South American fauna. Relatively few specimens have been taken and almost no behavioral or ecological data are available. Little has been added to our knowledge of these interesting carnivores since Hall's (1951) publication.

Mustela is widely distributed, primarily in the northern hemisphere of the Old and New Worlds. Of its approximately 15 species (Stains, 1967), five have been previously recognized in North America, one of these in Central and South America also, and a sixth in South America only. Curatorial work in the carnivore collections of the Field Museum revealed the existence of a third South American form, here named and described.

A new species of *Mustela*, subgenus *Grammogale*, is described. It is characterized by dark, uniform dorsal coloration, reduced anterior premolars, and a wide mesopterygoid fossa. A range extension is recorded for *Mustela africana*, and an overall evolutionary scheme for the three Neotropical species of *Mustela* is proposed.

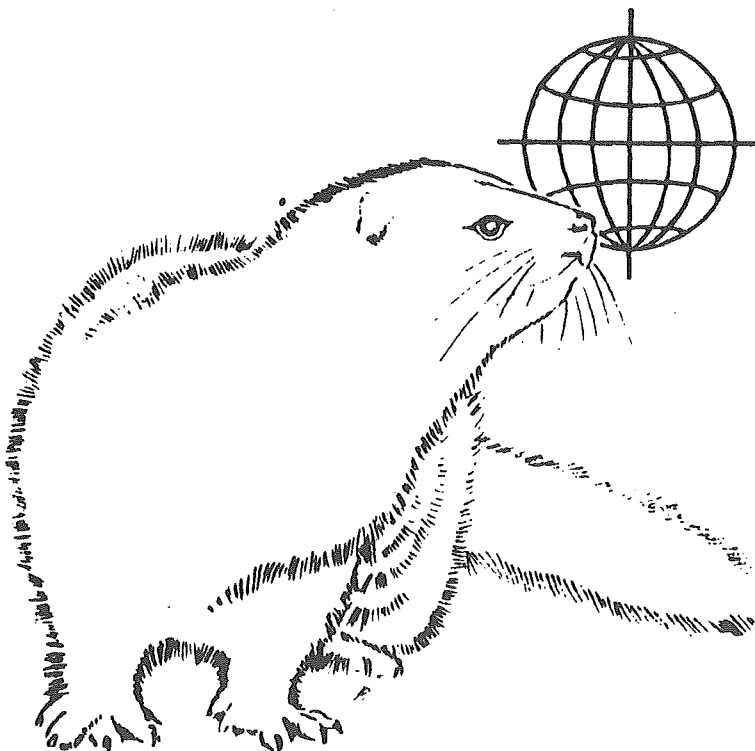
Journ. of Mammalogy, 59 (1), February 1978, 92-102.

2 tables, 5 figs., 15 references.

Authors introduction and abstract.

SCIENTIFUR

SCIENTIFIC NEWSLETTERS IN FUR ANIMAL PRODUCTION



The name in scientific
fur animal communication.

* G-BAND KARYOTYPE AND ANEUPLOID CELL LINES OF THE
EUROPEAN RACCOON DOG, NYCTEREUTES PROCYONOIDES.

Auli Mäkinen, College of Vet. Med., Dept. of Anim. Hygiene,
Hämeentie 57, Helsinki 55, Finland.

The chromosome number of the raccoon dog, *Nyctereutes procyonoides*, was first determined by MINOUCHI (1929) as $2n = 42$ in direct preparations of male germ cells. He described the 21 bivalents in male meiosis, including one heteromorphic pair which he selected as the sex chromosomes.

The first raccoon dog karyotype analyses with the use of tissue culture were described by TODD and PRESSMANN (1969) and WURSTER (1969). They also found a chromosome number of $2n = 42$, the NF value of the autosomes 66. The X chromosome is a large acrocentric unlike the metacentric X chromosome of all other Canidae. The Y chromosome is a small satellited acrocentric. The majority of chromosomes were metacentric.

In Finland, the diploid chromosome number of the raccoon dog was observed to be $2n = 56$ (MÄKINEN, 1974). The NF value being 68 and the NF value of the autosomes 64. The X chromosome was a medium-sized submetacentric and the Y a small satellited acrocentric. The majority of chromosomes were acrocentric.

The raccoon dog karyotype consists of 5 pairs of metacentric or submetacentric autosomes and 22 pairs of acrocentric autosomes. The X chromosome is medium-sized with a submedially situated centromere. The Y chromosome is the smallest acrocentric chromosome with satellites, these features are difficult to demonstrate and are apparent in relatively few spreads.

The chromosome complement $2n = 56$ of the Finnish raccoon dogs originating in Russia have large number of one-armed chromosomes, while in the American and Japanese raccoon dogs with $2n = 42$, a

low number of mostly two-armed chromosomes has been found.

These two raccoon dog groups are characterized by different chromosome numbers, the cause of which still is relatively unclear. Probably, autosomal changes of centric fusion type have taken part in karyotype evolution, and pericentric inversion has played some part in the X chromosome evolution, because the NF value is 68 in both groups.

The study of several specimens from different populations of any species will eventually be instructive for studying the process of speciation and hybridization. There seems to be two separate raccoon dog species, one occurring in America and Japan, and the other in Europe. It is also possible that we here witness how isolated populations of one species are engaged in a slow process of becoming two separate species.

Deutsche Vet.med. Gesellschaft e. V., Fachgruppe "Tierzucht, Erbpathologie, Haustiergenetik".

2. Europäisches Kolloquium über Zytogenetik (Chromosomenpathologie) in Veterinärmedizin, Tierzucht und Säugetierkunde, Giessen, 29. und 30. September 1975.

3 Figs. 6 references.

Abstract: G. Jørgensen.



ORIGINAL PAPER.

* PHOTOPERIODIC CONTROL OF PLASMA TESTOSTERONE CONCENTRATION IN THE MINK
(Mustela Vison)

Lise Martinet, D. Allain*, Monique Meunier. Station centrale de Physiologie animale,
* Laboratoire des Pelages, Toisons et Fourrures, Institut National de la Recherche
Agronomique 78350 Jouy-en-Josas, France.

Introduction

Under natural conditions ranch mink show a single annual period of breeding with active spermatogenesis from December to March and sexual activity only in February and March (HANSSON, 1947 ; HEMMINGSEN, 1967). Experiments conducted to determine whether reproductive cycles in the male could be shortened by regulation of the photoperiod suggest that two testicular cycles could be induced, but that a refractory period in the fur growth cycle could delay the initiation of spermatogenesis (DUBY and TRAVIS, 1972).

The present study was undertaken to induce a testicular cycle in a 6-month period and to follow the plasma testosterone concentration in relation to increasing and decreasing photoperiod.

Material and Methods

Three adult males of the pearl color phase were housed from June 1976 to December 1977 in a closed room without windows where the light was changed at 3-day intervals, doubling the rates of increase and decrease in the photoperiodic cyclic. Temperature ranged from 15°C to 25°C throughout the experimental period. Two control males housed under natural conditions of light and temperature were followed during the same period. Animals were weighed every 2 weeks.

Blood samples were taken once a month : the animals were lightly anesthetized with ketamine hydrochloride and the blood was withdrawn by cardiac puncture with a heparinized syringe.

Plasma testosterone was determined by radioimmunoassay after 50/50 cyclohexane-ethyl acetate (v/v) extraction. The antiserum provided by Roussel (France) was highly specific, the cross-reaction obtained being 14 % with DHT and 5 % with Δ_4 . The sensitivity of the assay was 10 pg/ml.

Results and Discussion

In the 2 control males the testosterone levels remained basal from April to December (100 to 800 pg/ml). A very sharp rise occurred in January for 1 male, and in February for the other with peak values of 7 900 and 6 600 pg/ml, followed by a rapid decrease to basal value as early as March or April (text, fig. 1). Body weights increased from 1 600 to 2 000 g between October and March, then decreased abruptly to 1 400 g in March-April (text, fig. 1).

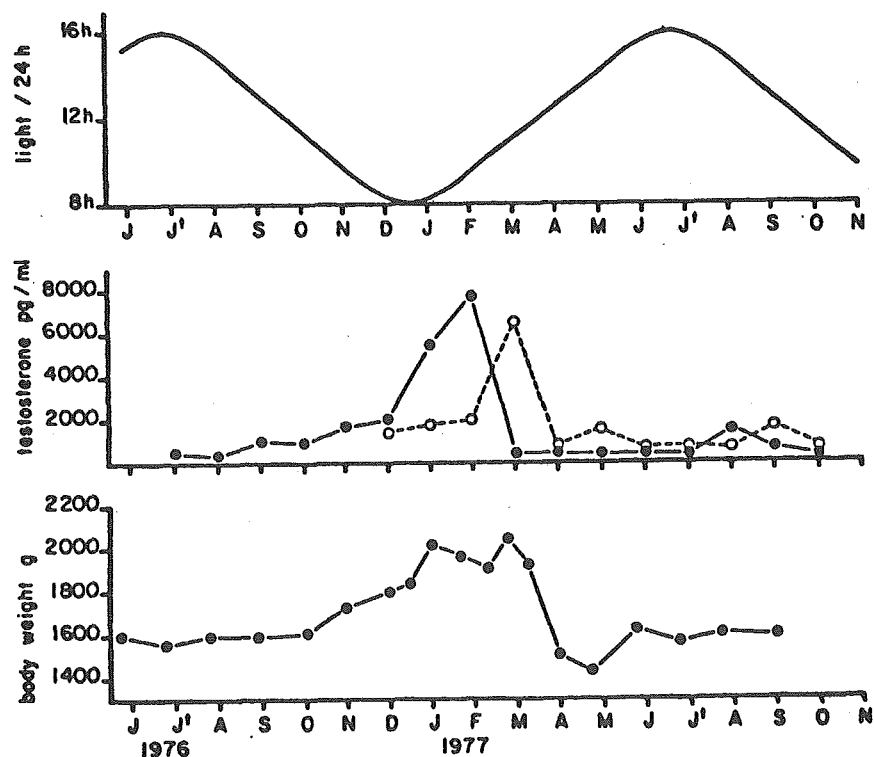


Fig. 1 Plasma testosterone and body weight variation in 2 minks housed under natural conditions of light and temperature.

In the experimental group, 1 male sampled during the whole 18-month period exhibited three plasma testosterone peaks of 6 000, 4 600 and 8 400 pg/ml corresponding to the 3 periods of increasing daylight. The other two males, which died from cardiac puncture during the sampling period, also exhibited plasma testosterone peaks during increasing days (text, fig. 2). Body weight variations closely followed increases and decreases of plasma testosterone concentration.

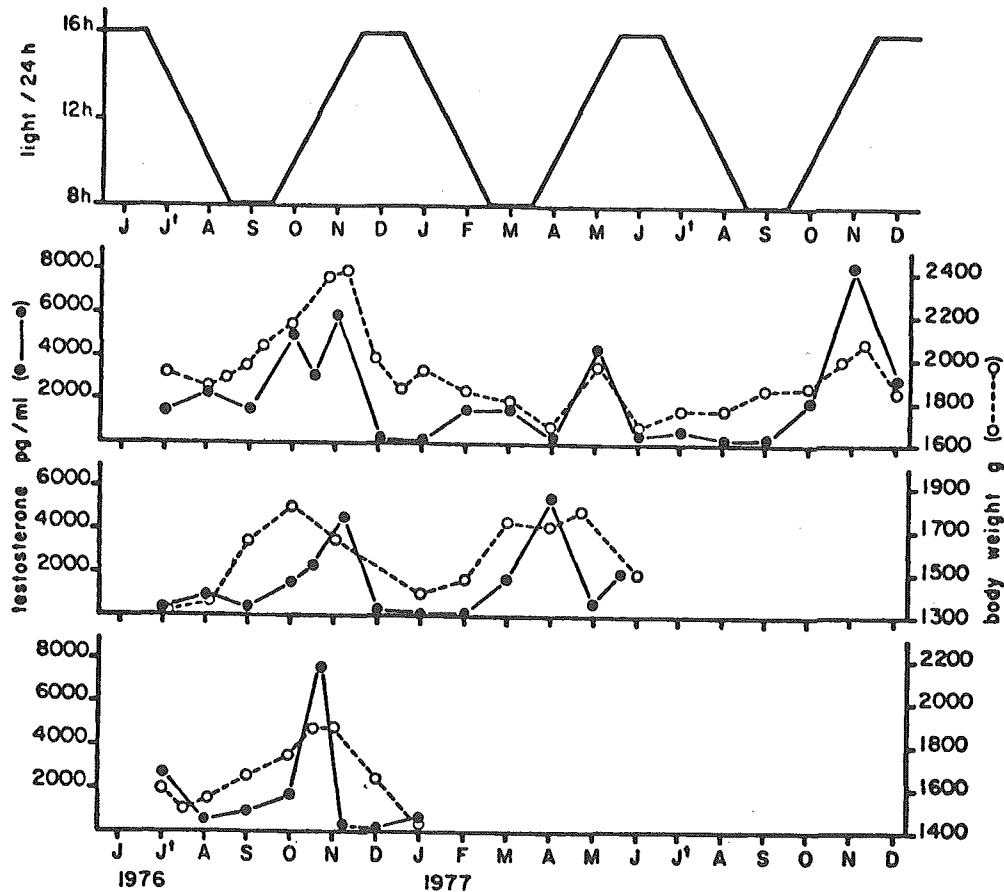


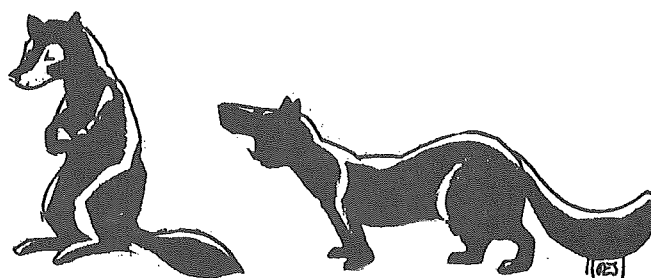
Fig. 2 Plasma testosterone and body weight variation in 3 minks housed under a semestrial light cycle (1 year in 6 months).

In the mink it appears that the annual plasma testosterone cycle is characterized by a very sharp peak in testosterone secretion. An acceleration of the photoperiodic increasing or decreasing rate corresponds to an acceleration of the testosterone secretion cycle. So it seems possible to induce two annual testicular cycles of growth and regression. However, a study of spermatogenesis and sexual behavior in such conditions still remains to be done.

The refractory period observed by DUBY and TRAVIS (1972) does not prevent the initiation of two annual testicular cycles. However, one of us has noticed an alteration of the fur growth cycle ; it seems that, instead of summer and winter coat succession corresponding to increasing and decreasing photoperiodic rate, respectively, only winter molt occurs when daylight ratio decreases. These results will be published in another report.

References

- DUBY R.T., TRAVIS H.F., 1972. Photoperiodic control of fur growth and reproduction in the mink (Mustela Vison). J. Exp. Zool., 182, 217-226.
- HANSSON A., 1947. The physiology of reproduction in mink with special reference to delayed implantation. Acta Zool., 28, 1-136.
- HEMMINGSSEN B., 1967. Postnatal development and cyclic changes in the testes of mink (in Norwegian). Nord. Vet. Med., 19, 71-80.



You've got a full-length mink coat.
What else do you want ?

* RELATIONSHIP OF VULVAR SWELLING TO ESTRUS IN MINK.

Hugh F. Travis, Thomas E. Pilbeam, William J. Gardner, Sr.,
Russell S. Cole, U.S. Dept. of Agric. and Cornell University,
U.S. Sheep and Fur Animal Expt. Stn., ARS, Cornell Univ.,
Ithaca, NY 14853, USA.

A study was conducted using 103 multiparous (adult) and 93 nulliparous (kit) female mink to correlate vulvar swelling with mating performance, vaginal smears, and plasma estradiol levels during the breeding season. Vulvar swellings were classified into four stages. The 0 stage was anestrus, and little or no vulvar swelling was present. Stages 1 to 3 represented increasing levels of swelling. Most females would mate at stage 2 or 3 but not at stage 0 or 1. Not all females attained stage 3. On the average, stage 2 was attained by the adult females 16 days before kit females.

Stages 0 and 3 could be readily distinguished by vaginal smears, but stages 1 and 2 were difficult to differentiate. Although vaginal smears could be used to determine when mink would not mate, they could not be used to predict when mink would mate. The estradiol levels of females in stage 0 were significantly greater than those of females in stages 1, 2, or 3 ($P < .01$), and the estradiol levels of females in stage 3 were significantly lower than in stages 0, 1 and 2 ($P < .01$).

Journ. of Anim.Science 46 (1) 219-224.

(Referred in Fur Rancher, March 1978, 13-14.)

1 figs., 3 tables, 15 references.

Authors summary.

* EINIGE MORPHOLOGISCHE UNTERSUCHUNGEN AN NICHTTRANZEN-
DEN NERZRUDEN.

(Morphological studies of non mating mink males).

Karel Kostroň, František Kukla, Inst. für Pelztierzucht der land-
wirtschaftlichen Fakultät der Hochschule für Bodenkultur
Brno, Zemědělska 1, 662 65, Brno, CSSR.

A morphological and histological examination of testicles of non mating mink males and comparison to normal mating males are done. The investigation showed:

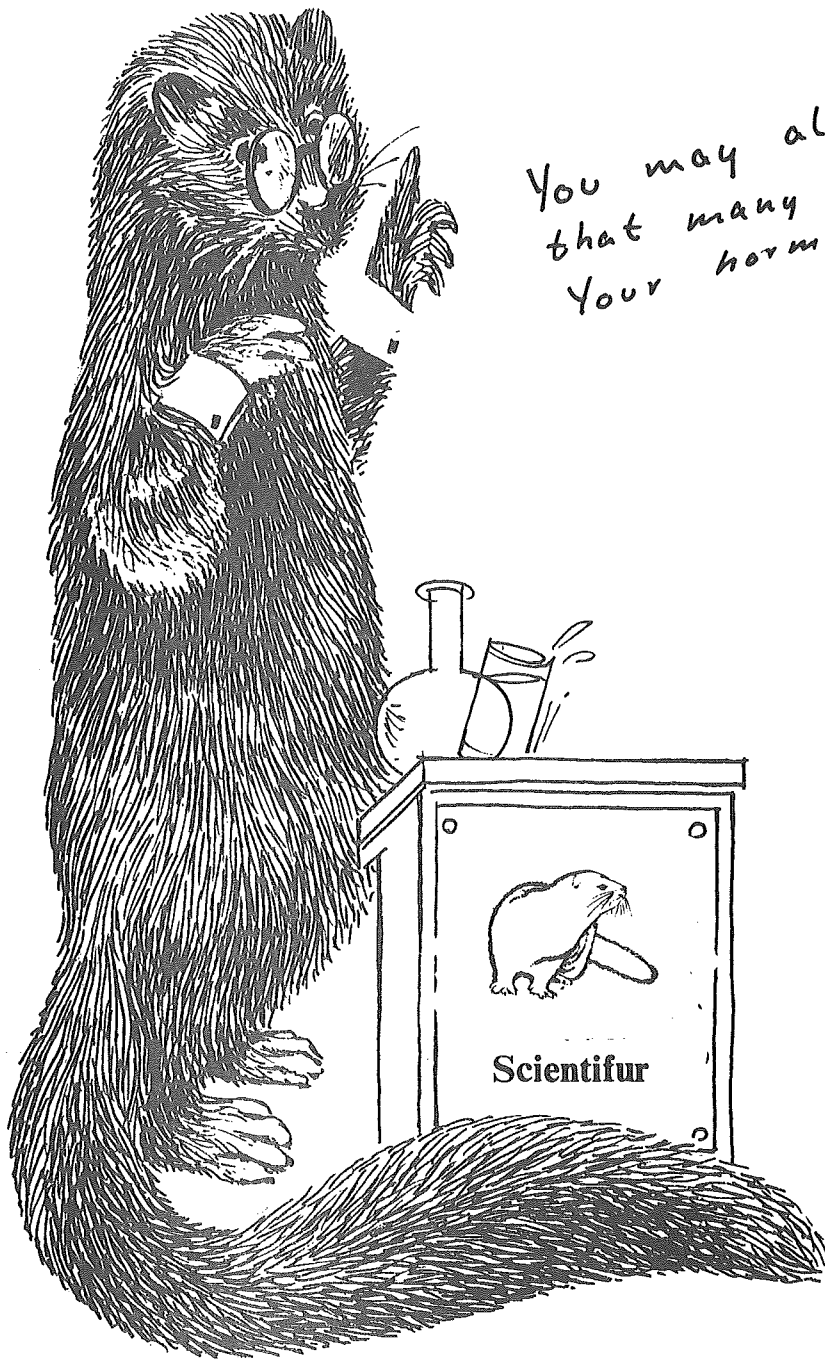
1. The average weight of testicles in March was $2.86g \pm 0.438$.
The body weight of the same animals was $1.52 kg \pm 0.244$.
2. The length of the testicles was $2,35 cm \pm 0.186$.
3. The breadth of the testicles was $1.38 cm \pm 0.102$.
4. The volumen of the testicles was $2.54 ml \pm 0.548$.
5. There was not statistical significant differences between any of the measurings on left and right testicle.
6. The histological picture of the spermatogenesis and the collection of the semens in the epididymic channels showed the reason of the sterility.

Acta Universitatis Agriculturae, XVIII, 4, 1970, 725-732.

6 tables, 6 figs., 12 references.

(In German).

Authors abstract.



* ROLE OF VITAMIN E IN MINK NUTRITION HAS MORE THAN ONE FACET.

Hugh F. Travis, U.S. Dept. of Agric., ARS, 321 Morrison Hall,
Cornell University, Ithaca, NY 14853, USA.

While enough is known about the nutrition of vitamin E so that some feeding recommendations can be made, there are areas where more knowledge of its action could be beneficial to mink farmers. These include the areas of antibody production, effects on reproductive performance, and the effects of vitamin E on different kinds and different kinds at different lengths of storage of mink feeds and ingredients.

Investigations into the effects of storage on vitamin E levels in feed currently are being conducted at Cornell and investigations into its effects on reproductive performance are continuing. Results will be reported as further information is obtained.

Fur Rancher, April 1977, 4-6.
1 table, 7 references.

Authors summary.

* EFFECTS OF STORAGE ON THE VITAMIN E AND OXIDATIVE
RANCIDITY LEVELS OF FEEDS.

Hugh F. Travis, Thomas E. Pilbeam, Dept. of Agric., ARS, 321 Morrison
Hall, Cornell University, Ithaca, NY 14853, USA.

Vitamin E functions both as a vitamin and an antioxidant.

The purpose of this study was to determine the influence of storage on vitamin E and peroxide levels of typical mink diets with and without antioxidants and simulating ranch conditions.

A total of six diets was mixed:

Diet 1: East coast fish without Santoquin.

Diet 1 A: East coast fish with Santoquin.

Diet 2: West coast whole sole without Santoquin.

Diet 2 A: West coast whole sole with Santoquin.

Diet 3: West coast scrap fish without Santoquin.

Diet 3 A: West coast scrap fish with Santoquin.

TABLE I. VITAMIN E AND PEROXIDE LEVELS OF STORED FISH WITH & WITHOUT ANTIOXIDANT

Diet	----- Vitamin E ppm -----			Peroxide [Milliequivalents H ₂ O ₂ /1,000 g]		
	Feb. 11	June 30	Difference	(Feb. 11)	(June 30)	(Difference)
1 East Coast	34.7	28.3 ¹	- 6.4	1.59	8.95 ¹	+7.36
1A East Coast + Santoquin	35.4	29.5 ¹	- 5.9	1.50	7.13 ¹	+5.63
2 West Coast Sole	28.7	19.6 ¹	- 9.1	2.26	6.20 ¹	+3.94
2A West Coast Sole + Santoquin	34.5	33.9 ¹	- 0.6	4.49	8.57 ¹	+4.08
3 West Coast Scrap	34.4	20.0 ¹	-14.4	3.59	8.60 ¹	+5.01
3A West Coast Scrap + Santoquin	30.0	27.7	- 2.3	3.90	6.42	+2.52

It possible that if the foods had been placed under more-stressful conditions (warmer temperatures or longer storage), the losses of vitamin E and increases in rancidity would have been greater. This must be considered in generalizing from the specific conditions of this study.

TABLE II. INFLUENCE ON VITAMIN E & PEROXIDE LEVELS OF EXPOSURE OF MIXED MINK FEED TO AIR OVERNIGHT ON WIRE

Diet	----- Vitamin E ppm -----		
	Before	After	Difference
1 East Coast	28.5	23.7	- 4.8
1A East Coast + Santoquin	29.5	27.4	- 2.1
2 West Coast Sole	29.4	19.7	- 9.7
2A West Coast Sole + Santoquin	31.4	26.2	- 5.2
3 West Coast Scrap	29.2	17.2	-11.5
3A West Coast Scrap + Santoquin	29.9	21.3	- 8.6

Diet	Milliequivalents H ₂ O ₂ /1,000 g		
	Before	After	Difference
1 East Coast	7.69	9.95	+2.26
1A East Coast + Santoquin	6.78	7.25	+0.47
2 West Coast Sole	7.55	9.78	+2.23
2A West Coast Sole + Santoquin	7.62	9.01	+1.39
3 West Coast Scrap	6.97	8.72	+1.75
3A West Coast Scrap + Santoquin	6.93	8.47	+1.54

Fur Rancher, Febr. 1978, 10-11.

2 tables, 7 references.

Abstract: G. Jørgensen

* EFFECTS OF SUPPLEMENTAL VITAMIN E ON REPRODUCTION AND GROWTH OF MINK KITS FROM BIRTH TO SIX WEEKS.

Hugh F. Travis, Thomas E. Pilbeam, Dept. of Agric., ARS, 321 Morrison Hall, Cornell University, Ithaca, NY 14853, USA.

This report presents the results of our 1977 reproduction study, which again shows slightly-beneficial effects from feeding added vitamin E, but not differences that can be validated statistically.

This feeding trial was designed to compare the results of feeding a basal diet (31 PPM vitamin E₁) with a diet to which vitamin was supplemented (138 PPM vitamin E₂).

Mortality for kits was 8,3 per cent for the E₁ diet and 5,0 per cent for the E₂ diet.

Hemoglobin levels were significantly different for the dams of each diet at day 42 when compared to day one (P<0,01). Kit female and male hemoglobin levels were similar.

Plasma alpha-tocopherol levels for mink on diet E₂ were significantly higher than those on E₁ on both May 3 and June 15 (P<0,01).

Fur Rancher, June 1978, 17-18.

4 tables, 4 references.

Abstract: G. Jørgensen.

* UTILIZATION OF PLANT PROTEINS BY GROWING - FURRING AND BREEDING MINK.

R.J. Belzile, Université Laval, Quebec G1K 7P4, Canada.

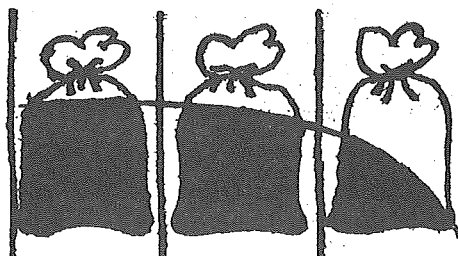
Two trials were conducted in successive years for testing the replacement value of soybean, seeds, solv extd (SBM), for raw meat in mink diets. The total number of Pastel mink used was 336

growing-furring kits and 56 breeding and lactating females. They were fed diets containing 11,5, 18, 23, and 31% soybean, seeds with hulls, solvent extracted (SBM) on a dry basis. When fed, the diets contained 40% dry matter. Tallow and DL methionine supplementation were studied using the 11,5 and 23% SBM diets. In every respect, the 31% SBM diet was a poor one. As for the other diets, body weight gain was highest ($P < .05$) for the group fed the control diet (9% SBM) but there was little difference among groups fed SBM supplemented or unsupplemented with tallow or methionine. Initial palatability of the SBM diets seemed to account for the difference in final body weight between the control and the SBM diets (approximately 200 grams for both males and females). Pelts from both sexes were somewhat longer when the mink had been fed the control diet but the quality was essentially the same for all dietary groups. There was a slight reduction in apparent digestibilities of dry matter and nitrogen when the animals were fed SBM diets but the nitrogen retention was the same among groups. Under the trial conditions, no definite trend could be established as to the economic advantage of substituting SBM for raw meat in a mink diet, even though diets containing 11.5 to 23% SBM appeared adequate. A short term trial with breeding females indicated that 11.5 or 23% SBM diets had no effect on reproduction and lactation.

Proceedings, First Internat. Symposium Feed Composition, Animal Nutrient Requirements, and Computerization of Diets, July 11-16, 1976, Utah State University, Logan, Utah, USA.

7 tables, 7 references.

Authors abstract.





* A PRELIMINARY REPORT OF BLOOD GROUPS IN MINK.

Ruth Saison, D.G. Ingram, Ontario Veterinary College, Guelph,
Ontario, Canada.

Several methods have been employed in order to ascertain the best test to use for the detection of red-cell antigens of this animal: albumin, trypsin, papain (activated and inactivated), the hemolytic test, direct agglutination, and antiglobulin tests. Direct agglutination and antiglobulin tests were the only methods which detected reactions between antisera and red-cell antigens.

The sera of 181 unvaccinated mink have been tested by the direct agglutination method for naturally occurring antibodies; all of the tests were negative.

Twenty-four sera from mink vaccinated with virus enteritis vaccine prepared from mink spleen and liver were tested by the direct agglutination and antiglobulin tests. Two gave specific but weak reactions with the antiglobulin test. The antiglobulin serum used was rabbit antipig as no antimink antiglobulin was available.

The cells of 72 mink were tested with an incomplete pig anti-A serum. The results of these tests showed that some mink have an A-like antigen on their red cells. Fifty-two of the animals were from one ranch and 20 from another. The percentage of A-positive to A-negative in each group was almost identical.

It has been shown that some mink possess an A-like antigen on their cells. In addition, at least three blood factors have been recognized by the use of isoimmune antisera.

Annale of the New York Academy of Science, 97, Article 1, 233-234. 1962.
1 table.

Abstract: G. Jørgensen.

* IMMUNOGENETICS OF THE DOMESTIC MINK: BLOOD GROUP
FACTORS A, B₁ AND B₂.

Jan Rapacz, Zaklad Hodowli Budla, Wyzsza Szkola Rolnicza, Krakow,
Richard M. Shackelford, Dept. of Genetics, University of Wisconsin
Madison 6, Wisconsin.

612 mink used in this investigation were of various colour phases from the herd of the Fur Animal Research Laboratory, University of Wisconsin.

Neither normal agglutinins nor hæmolysins were found in the sera of the initial group of 53 animals tested. An agglutinin was manifest in a single individual among 121 examined six months subsequent to the first test: from the results of comparing this serum with reagents prepared from isoimmune sera, it appears that this one mink has antibodies against a mink blood group tentatively designated B₂. Sera of all mink lacking the antigen B₂ were checked, but in no case were antibodies against this blood type found.

76 mink were immunized against mink red cells to get iso- and hetero-immune sera.

Of the 76 mink injected, 30 were young (six months); only one of the young group responded (weakly), while among the adults 14 produced antibodies. The red blood cells used for absorption were taken from mink chosen at random. At least seven different reagents were detected from the 14 immune sera, leading to the recognition of several blood factors.

Each hetero-immune serum reacted with the blood cells of all mink tested.

The symbols assigned to the three blood factors are A, B₁ and B₂: their frequencies in this population were, respectively, 64, 55 and 77 per cent. Five phenogroups, A₁, B₁B₂, AB₁B₂, AB₂ and B₂,

were found in the sample of 612 mink tested, and each individual was identified as belonging to one or another of these groups. Pedigree analysis of this population suggests that the three blood factors are members of a single system, and are determined by alleles or closely linked genes.

Nature 196 (4861) 1340-1341, 1962.

1 table, 6 references.

Abstract: G. Jørgensen

* ELECTROPHORETIC AND IMMUNOELECTROPHORETIC CHARACTERIZATION OF NORMAL MINK SERUM PROTEINS.

David D. Porter, Frank J. Dixon, Div. of Expt. Pathology, Scripps Clinic and Research Foundation, La Jolla, Calif. (Publ. no. 108). Dr. Porter's address: Wistar Institute of Anatomy and biology, Philadelphia, PA. USA.

By electrophoretic and immunoelectrophoretic techniques, normal mink serum had the expected complexity - with 4 protein bands identified by paper electrophoresis, 5 by cellulose acetate electrophoresis, 12 by starch gel electrophoresis, and 25 by immunoelectrophoresis. Mink serum had 2 lipoproteins, 1 protein with oxidase activity analogous to ceruloplasmin and an iron binding protein. A homoglobin-binding protein was rare. There was immunologic cross reactivity between mink and human serum proteins. An overall similarity of mink serum proteins to human serum proteins was evident, even though there were differences in electrophoretic mobility.

Amer. Journ. of Vet. Res. 27 (116) 335-338.

1 table, 3 figures, 11 references.

Authors summary.



* A TECHNIQUE FOR SAFE MULTIPLE BLEEDINGS, OR INTRAVENOUS INJECTIONS IN MINK.

Sheilah M. Fletch, G. Wobeser, Western College of Vet. Med.,
Univ. Saskatchewan, Saskatoon, Saskatchewan, Canada.

A technique is described for jugular venipuncture in the mink. The method has proved to be safe and effective for frequently repeated bleeding and for injections.

Can. Vet. Journ. 11 (2) 33. 1970.

1 fig. 4 references.

(English with English and French summary)

Authors summary.

* A TECHNIC FOR MULTIPLE BLEEDINGS OR INTRAVENOUS INOCULATIONS OF MINK AT PRESCRIBED INTERVALS.

Robert K. Bergman, Donald L. Lodmell, William J. Hadlow,
U.S. Dept. of Health, Education, and Velfare, Public Health Service, Natil. Inst. of Health, Nat. Inst. of Allergy and Infectious Diseases, Rocky Mountain Lab., Hamilton, Montana 59840, USA.

To accurately determine the biological half-life of radiolabelled materials in mink, a method was developed to place a polyethylene catheter in the jugular vein. This allowed intravenous inoculations and withdrawal of blood samples at timed intervals. Intervals from 1 min-24 hr have been used, and sample volumes ranging from 0.25-55.0 ml have been withdrawn. This catheterization procedure has been performed on 36 mink.

Laboratory Animal Science, 22 (1) 93-95.

2 figs., 11 references.

Authors summary.



* BLOOD PARAMETERS OF HEALTHY MINK.

S.M. Fletch and L.H. Karstad, Dept. of Path., Ontario Vet. College,
University of Guelph, Guelph, Ontario, Canada.

Packet cell volume (PCV) and hemoglobin (Hb) were not dependent on color type. Both were significantly higher ($P < 0.01$) in the adult male mink as compared to the adult female. The total erythrocyte count was more variable but the parameter appeared unaffected by either sex or color types. Polychromasia, reticulocytes and the occasional normoblast, were present in peripheral mink blood smears. Rouleau, to some degree, was also seen. The most variable parameter was the total leukocyte count. The average lymphoid-neutrophil ratio was 1:1.

Can. J. comp. Med. Vol. 36, July 1972.

8 tables, 16 references.

(English with English and French summary).

Authors summary.

* ONE-SHOT VACCINATION FOR DISTEMPER VIRUS ENTERITIS,
BOTULISM IN MINK.

T.M. Schwartz, Austin E. Larson, Tech.service dept. of American
Scientific Laboratories, P.O. Box 7130, Madison, Wisconsin
53707, USA.

Distox is a new one-shot vaccine for use against distemper, virus enteritis, and botulism in mink.

The new vaccine contains two components:

- 1) A lyophilized (dried) distemper vaccine containing a modified live virus grown in chicken embryo tissue culture combined with stabilizing agents, and
- 2) a specially-processed diluent containing an inactivated mink enteritis virus grown in feline tissue culture combined with

Clostridium botulinum Type C bacterin-toxioid with an aluminum adjuvant. The liquid virus enteritis/botulism toxoid component serves as a diluent for rehydrating the dried distemper vaccine.

After basic safety and efficacy standards of the new vaccine had been proven at the laboratory level, field trials were conducted with the approval of the Department of Agriculture. Approximately 5,000 six to eight-week-old mink kits on six Utah ranches and 600 10-week-old mink kits on three Wisconsin ranches were vaccinated. All of these kits were from females which had been vaccinated against the three diseases the year before.

The kits were observed for adverse reactions for three weeks after vaccination. No abnormal responses or indications were noted. Following these safety observations, selected vaccinated test kits and unvaccinated control kits from one ranch in Utah and one ranch in Wisconsin were taken to isolated locations and challenged sequentially with virulent distemper virus, mink enteritis virus, and *Clostridium botulinum* Type C toxin.

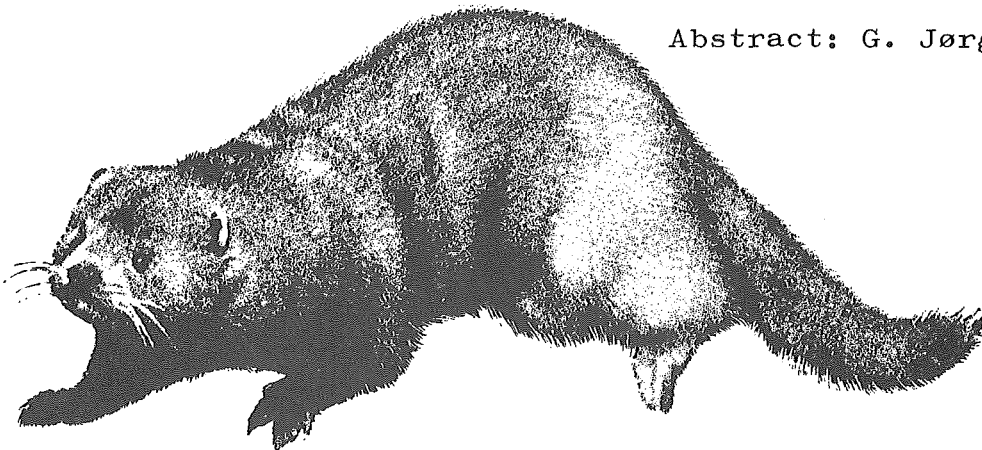
The vaccinated kits exhibited excellent protection throughout the challenge tests.

These results are comparable to mink vaccinated separately with single entity vaccines for these diseases.

Fur Rancher, Vol. 58, June 1978.

2 Tables.

Abstract: G. Jørgensen.



* EXPRESSION OF ALEUTIAN MINK DISEASE ANTIGEN IN CELL CULTURE.

Edwin C. Hahn, Luciano Ramos, Alan J. Kenyon, Sloan-Kettering Institute, Walker Laboratory, 145 Boston Post Road, Rye, NY 10580.

Infection of CRFK feline kidney cells with Aleutian disease virus leads to production of virus-induced antigen(s) in the nucleus which could be demonstrated by the fluorescent-antibody technique. The number of fluorescent nuclei was linearly dependent on the dilution of the inoculum, but rarely exceeded 20% of the cells. Aleutian disease nuclear antigen was only transiently detectable. The virus-induced antigen was detected after infection of cells of several divergent species, however, the CRFK line of feline kidney cells was the most susceptible. Inhibitor studies indicated that deoxyribonucleic acid synthesis, ribonucleic acid synthesis, and protein synthesis were required for viral antigen production. Cell growth was also a requirement for synthesis of viral antigen. An in situ radioimmune assay was used to measure binding of ¹²⁵I-labeled mink anti-Aleutian disease virus to infected cells and competition with unlabeled sera. The system is suitable for quantitation of infectivity.

Infection and Immunity, 15 (1), 204-211.

5 tables, 4 figs., 22 references.

Authors abstract.

* PROPERTIES OF ALEUTIAN DISEASE VIRUS ASSAYED WITH FELINE KIDNEY CELLS.

E.C. Hahn, L. Ramos, A.J. Kenyon, Sloan-Kettering Institute, Walker Laboratory, 145 Boston Post Road, Rye, NY 10580, USA.

Properties of Aleutian disease virus (ADV) were studied using feline kidney cells, line CRFK, to assay virus by the induction of

nuclear antigen. ADV nuclear antigen was detected by immunofluorescent staining. Titers of virus obtained from mink spleens at 10-8 days after infection were usually between 10^3 and 10^5 infectious units per gram of spleen. ADV was purified by fluorocarbon extraction, differential centrifugation, biogel A-15 chromatography and CsCl equilibrium centrifugation. The molecular weight of the virus was estimated to be $3-5 \times 10^6$ daltons. The density of antigen-inducing virus in equilibrium CsCl gradients was $1.32-1.34 \text{ g/cm}^3$. On velocity sucrose gradients, antigen-inducing virus had a sedimentation coefficient of approximately 110S. The virus was not neutralized by sera from chronically infected mink and ferrets and by sera from experimentally infected mink. ADV was resistant to ionic and nonionic detergents and lipid solvents. The titer of partially purified virus was reduced as much as 700-fold by proteolytic enzymes but not by NDase or RNase. The virus was inactivated slowly at 56° C , the initial half-life was 90 minutes. It is concluded that the properties of ADV can be determined by assay in CRFK cells, thus facilitating virological study of the disease.

Archives of Virology, 55, 315-326, 1977.

5 tables, 4 figs., 24 references.

Authors abstract.

* PROTIDES OF THE MUSTELIDAE: IMMUNORESPONSE OF MUSTELIDS TO ALEUTIAN MINK DISEASE VIRUS.

Alan J. Kenyon, Bonnie J. Kenyon, Edwin C. Hahn, Sloan-Kettering Cancer Center, New York, NY 10021, USA.

Although Aleutian disease in mink was described in 1958 by Helmboldt and Jungherr at the University of Connecticut, the host range of this virus has not been systematically studied in other members of Mustelidae. Efforts to transmit AD from ranch mink (Mustela vison) to domestic ferrets (Mustela putorius) resulted in persistent infection of the latter, but did not cause typical AD lymphoproliferative lesions and gammopathy which characterizes the disease in mink. However, a ranch survey of ferrets grown commercially revealed a high proportion of animals with gammopathies and typical AD lesions. These observations have been extended as follows.

Fourteen species of North American Mustelidae were tested for their response to inoculation with 10^6 infective doses Aleutian disease virus. In the subfamily Mustelinae, 3 species in the genus Mustela (M. vison, mink; M. erminea, weasel; and M. putorius, domestic ferret) and 2 species in the genus Martes (Ma. pennanti, fisher; Ma. americana, marten) responded immunologically with some features resembling Aleutian disease in mink. In the subfamily Mephitinae, only Mephitis mephitis responded, and others of the subfamily did not, nor did members of subfamilies Melinae and Lutrinae. The observed responses ranged from the development of detectable antibody levels determined by counterimmunoelectrophoresis to histopathologic changes typical of Aleutian disease. Mink, ferrets and to a lesser extent striped skunks developed typical lymphoproliferative lesions while, in addition, martens and spotted skunks developed only gammopathies. Animals which had detectable antibody levels by counter-current immunoelectrophoresis were mink, ferret, weasel, marten, and striped skunk.

Am. J. Vet. Res. 39 (6), 1011-1015, 1978.

2 tables, 5 figs., 17 references.

Authors Extended abstract.

* TREATMENT OF ALEUTIAN MINK DISEASE WITH LEVAMISOLE.

Alan J. Kenyon, Sloan-Kettering Cancer Center, New York, New York 10021, USA.

The immunomodulator levamisole (L-2,3,5,6-tetrahydro-6-phenylimidazo-(2,1-6)-thiazole) was tested for therapeutic activity in Aleutian disease (AD) of mink under commercial mink husbandry conditions.

At the termination of the study, blood samples and body weights were obtained prior to pelting. On necropsy, organ weights were obtained and histological preparations were made from kidney, liver, and spleen.

The effect of levamisole appeared to be most evident with mink possessing lower levels of gammopathy.

The most notable difference in lesions (plasma cell infiltrates) was seen in liver sections of the two groups. The treated animals

had a lower incidence of bile duct proliferation and periportal infiltrates. The splenic weight expressed as an organ weight index paralleled the trend in reduction of gammopathy.

The data presented here indicate that oral administration of 1 mg/kg had improved the health status of ADV-infected mink as indicated by a reduction in gammopathy and increased body weight.

Current Chemotherapy, 1978, 357-358.

1 table, 10 references.

Abstract: G. Jørgensen.

* OBSERVATION ON THE REMARKABLE STABILITY OF TRANSMISSIBLE
MINK ENCEPHALOPATHY VIRUS.

D. Burger, J.R. Gorham, Dept. of Vet. Microbiol. and Path., Washington State University, The Pioneering Research Laboratory, U.S. Dept. of Agric., Agric. Res. Serv., Pullman, Washington 99163, USA.

Transmissible mink encephalopathy (TME) virus is in all probability the same as or a variant of scrapie virus. The scrapie virus in crude suspensions historically has been notorious for its partial resistance to inactivation by virucidal concentrations of formalin (Pattison 1965). Most recently, it was reported that the virus causing Creutzfeldt-Jacob disease, another subacute spongiform encephalopathy, survived room temperature in 10 per cent formalin for seven months in the form of a brain suspension (Gajdusek et al. 1976). The following observations attest to a similar unusual degree of formalin resistance of the TME virus.

Transmissible mink encephalopathy (TME) virus retained biological activity after prolonged storage in formalin (about three and a half years) and in paraffin tissue blocks used for histologic preparations (about six and a half years). Thus, TME tissues in

formalin and in paraffin blocks should be handled as contaminated materials.

Research in Veterinary Science 1977, 22, 131-132.

1 table, 3 references.

Authors introduction and summary.

* CONTACT TRANSMISSION OF DISTEMPER VIRUS IN FERRETS.

D.T. Shen, J.R. Gorham, Agric. Res. Serv., US Dept. of Agric. and College of Vet. Med., Washington State University, Pullman, Washington, 99164, USA.

Distemper virus was transmitted when infected donor ferrets were placed with susceptible ferrets for various contact periods. Distemper was more likely to be transmitted during the later stages of the disease. A positive correlation was found between the length of contact time and the acquisition of infection.

Research in Veterinary Science, 1978, 24, 118-119.

1 table, 5 references.

Authors abstract.

* COMPARISON OF THE LESIONS OF ALEUTIAN DISEASE IN MINK AND HYPERGAMMAGLOBULINEMIA IN FERRETS.

K. Ohshima, D.T. Shen, J.B. Henson, J.R. Gorham, Pioneering Res. Lab., Agric. Res. Service, US Dept. of Agric., Pullman, Washington 99164, USA.

Gross and microscopic lesions of Aleutian disease (AD) in mink and hypergammaglobulinemia in ferrets were compared. Both conditions were characterized by widespread proliferation of plasma cells, but proliferation was more prominent in mink infected with AD.

Arteritis did not occur in hypergammaglobulinemic ferrets. Minimal or no glomerular alterations occurred in infected ferrets, but were severe in mink infected with AD. Bile duct proliferation was more prominent in diseased mink. Tissue alterations suggested that AD in Aleutian genotype mink is more rapidly progressive than is AD in ferrets, causing overt clinical disease and death. In contrast, hypergammaglobulinemia in ferrets appeared to progress more slowly, with little clinical evidence of disease. This is probably the result of a paucity of glomerular lesions in ferrets. Possible mechanisms to explain the differences in the development of lesions are discussed.

The Amer. Journ. of Vet. Res., 39 (4), 653-657.

1 tables, 6 figs., 17 references.

Authors abstract.

* SPINAL ARTHRITIS (SPONDYLOSIS DEFORMANS) IN THE
RED FOX, VULPES VULPES, WITH SOME METHODOLOGY OF
RELEVANCE TO ZOOARCHAEOLOGY.

Stephen Harris, University of Bristol, Dept. of Zoology, Woodland
Road, Bristol BS8 1UG, Great Britain.

The skeletons of 252 adult foxes killed in suburban London were used to study the development of spondylosis derformans, a condition of the spinal column previously unrecorded in the Red fox. Although the average age of the specimens was only one year nine months, 34.5% of the population were found to be affected with spondylosis. The distribution of osteophytes on the vertebral column is shown, and factors such as age and trauma, which affect the development of the condition, are examined. The significance of such well-developed pathological conditions in a wild mammalian population is discussed.

Journ. of Archaeological Science, 1977, 4, 183-195.

6 tables, 6 figs., 29 references.

Authors abstract.

* SAN MIGUEL SEA LION VIRUS FED TO MINK AND PIGS.

F.W. Wilder, A.H. Dardiri, Plum Island Animal Disease Center,
Agricultural Research Service, U.S. Dept. of Agric.,
Greenport, New York 11944, USA.

Mink became infected with San Miguel sea lion virus when fed ground meat from seal carcasses showing vesicular-like lesions in the skin. The mink also contracted the infection when they were fed San Miguel sea lion virus infected pig meat or cell culture propagated virus. San Miguel sea lion virus infection in mink was inapparent but the virus was isolated from blood and rectal swabs. Pigs treated similarly with the same virus preparations given to mink developed a severe vesicular disease syndrome similar to that produced by vesicular axanthema of swine. In a separate trial, pigs fed a large sample of commercial ground seal meat did not develop disease signs or antibodies. Further work is needed to assess the hazard of introducing San Miguel sea lion virus into swine on the same premises when potentially San Miguel sea lion virus infective seal meat is fed to mink.

Can. Journ. of Comp. Medicine, 42 (2) April 1978, 200-204.

3 tables, 4 references.

(English with English and French abstracts).

Authors Abstract.

* VIRAL INCLUSIONS IN RACCOON LIVER CELLS.

V.L. Sanger, E.J. Bicknell, A.L. Trapp, E. Roege, W. Roberts,
R.F. Langham, Dept. of Pathology, Michigan State University,
East Lansing, Michigan 48824, USA.

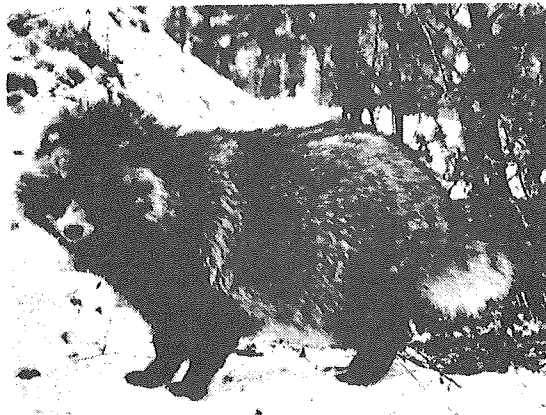
Raccoons (*Procyon lotor*) are naturally or experimentally susceptible to a number of different viral diseases. These include: canine distemper (paramyxovirus) infectious canine hepatitis (adenovirus), Eastern, Venezuelan and Western equine encephalomyelitis (togaviruses), pox virus and pseudorabies (herpesvirus), rabies and vesicular

stomatitis (rhabdovirus), feline enteritis (parvovirus) and encephalomyocardial disease (picornavirus). This report describes a possible new viral disease in raccoons.

Three young raccoons (*Procyon lotor*), two from Michigan and one from Arizona, died suddenly from acute infections. Intranuclear inclusion bodies and viral particles typical of herpesvirus were seen in liver cells from all three. Inclusions also were seen in the nuclei of endothelial cells in the lung, liver, glomeruli and reticuloendothelial cells of the spleen. The source of the infection was not determined, but possible transmission from other species could not be ruled out.

Journ. of Wildlife Diseases, Vol. 14, April 1978, 240-243.
2 figs., 21 references.

Authors introduction and abstract.



Mårdhunden i finländskt skogslandskap.

COMMUNICATION.



NORDISKE JORDBRUGSFORSKERES FORENING

SCANDINAVIAN ASSOCIATION OF AGRICULTURAL SCIENTISTS - FUR ANIMAL
DIVISION.

Final program for scientific meeting about fur animal production.
Hotel Marienlyst, Elsinore, Denmark, 9th to 11th of October 1978.

Monday 9th of October (12 A.M.)

Åke Qvist: Welcome by the chairman.

Norodd Nes, Norway, Outi Lohi, Finland: Our present knowledge to
mutations in blue- and silverfox.

Auli Mäkinen, Finland: Chromosome studies of different foxspecies
and their crossbreeds.

Ingemar Gustavsson, Sweden: Chromosome alterations in bluefox.

Ordin Møller, Norway: The reproduction physiology of blue fox.

Tapio Juokslahti, Finland: Causes of kit loss at foxes.

Hans Rimeslåtten, Norway: Composition of feed for silverfox.

Tuesday 10th of October (9 A.M.)

H. Konnerup Madsen, Denmark: Feeding experiments with blue fox in Denmark.

Jouni Kangas, Finland: Ecto parasites in foxes.

Auli Mäkinen, Finland, Vibeke Simonsen, Denmark: Chromosome- and electroforetic studies in raccoon dog.

Jaakko Mäkelä, Finland: Farming and feeding of raccoon dog.

Birger Sjögård, Finland: The behavior of ferret and experiences from farming of this fur bearing animals.

Niels Glem-Hansen, Denmark: The minks requirement for energy for maintenance.

Hygienic and chemical quality demands of feedstuffs and ready-feeds for mink.

Hans Poulsen, Denmark: Experiences from the voluntary feed control managed of Danish Fur Breeders Association.

Gudmund Loftsgaard, Norway: Experiences from the feed control in Norway.

Tapio Juokslahti, Finland: Experiences from the feed control in Finland.

Torbjörn Mejerland, Sweden: Experiences from the feed control in Sweden.

Gudmund Loftsgaard, Norway: Conclusion and consequences for practical feed production of the experiences from the feed control.

Common discussion about the quality demand for minkfeed.Election of board and committee members for the fur animal division.Wednesday 11th of October (9 A.M.).

Einar Einarsson, Norway: The possibility during selection to increase the litter size in mink.

Anders Skrede, Norway: Artificial light and pelt development in mink. Conditions, results, and economy.

Ordin Møller, Norway, Halvor Andersen, Denmark: Effect of light and hormone treatment as regulator of the reproduction in mink.

Discussions of reports sent to but not given at the meeting.Conclusion of the meeting.

NATIONAL BOARD OF FUR FARM ORGANIZATIONS

3055 North Brookfield Road
Brookfield, Wisconsin 53005
(414) 786-4242

July 22, 1978

Mr. Gunnar Joergensen
Editor, Scientifur
48 H Roskildevej
DK-3400 Hilleroed
Denmark

Dear Gunnar:

Surely enjoyed our day together last spring, although that now seems like ages ago. I understand from others whom you visited that you had a busy schedule, and hope it proved satisfying to you.

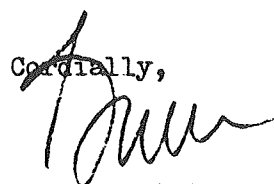
I have not seen the May issue of Scientifur as yet. We began sending you every issue of Fur Rancher on an exchange basis effective in April, and hope you have been receiving them.

We are quite proud of the Research References booklet which is enclosed and believe it to be the first of its kind. You will note that most of the articles cited were published in English. We would appreciate your comments on the booklet.

You may mention it in Scientifur if you wish. Copies are available at \$2 each, plus proper postage, to your readers. The postage should be calculated on a three-ounce basis. The Research References booklet may not be reprinted without our written permission, however.

Please check up on your May issue for me and write when you have time.

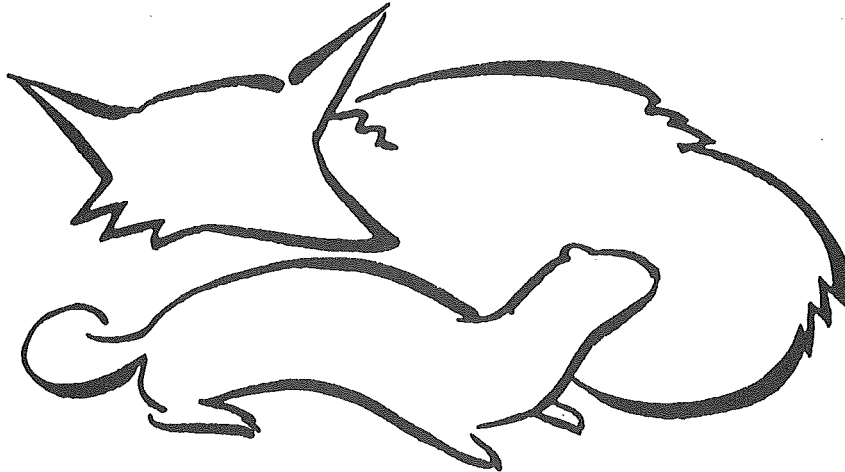
Cordially,



Bruce W. Smith
Administrative Officer

BWS:sb

RESEARCH REFERENCES ON MINK & FOXES



Compiled 1978 by the
National Board of Fur Farm Organizations
Two Dollars

Published by the
NATIONAL BOARD OF FUR FARM ORGANIZATIONS, INC.
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Brookfield, Wisconsin 53005

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9 July 1978

CARNIVORE

Gunnar Joergensen
NJV's Fur Animal Division
SCIENTIFUR
48 H Roskildevej
DK-3400 Hilleroed
Denmark

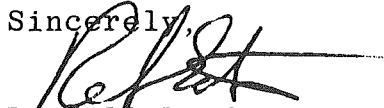
Dear Gunnar:

Thank you for your note and the copy of SCIENTIFUR. Yes, we would like to exchange journals with you, and we especially ask that announce our journal to your readers--we would reciprocate for you in our journal.

CARNIVORE is being sent to you separately but by air mail.

Thanks again and good luck with your journal.

Sincerely,



Randall L. Eaton, Editor

Carnivore Research Institute
Burke Museum DB-10, University of Washington Seattle, Washington 98195

Commonwealth Bureau of Animal Health
at the

Central Veterinary Laboratory

New Haw, Weybridge, Surrey, K15 3NB
England

Telephone: BYFLEET 42826

Publications:
THE VETERINARY BULLETIN
INDEX VETERINARIUS

10th July, 1978.

G. Joergensen,
Editor Scientifur,
NJF's Fur Animal Division,
48H Roskildevej,
DK-3400 Hilleroed,
DENMARK.

Dear Sir,

Further to your request in Scientifur Volume 2 number 1 (February 1978) for information from institutions engaged in fur bearer research, I wondered if you would be interested in the results of a small (preliminary?) online search which I carried out on the CAB Abstracts data base for the period 1972-1978.

<u>Key Terms Selected</u>	<u>Number of References Retrieved</u>
CHINCHILLA	229
FOX	923
ALOPEX	63
MINK	1065
NUTRIA	76
COYPU	19
MYOCASTOR	33
FUR BEARING ANIMALS	3
FUR BEARERS	33

[Terms not included in this search: SABLE, BEAVER, FUR SEALS, SEA OTTER, RABBIT - any more?]

These results seem at first glance to indicate a substantial body of literature for the past six years. The total number of relevant references is probably somewhat less than this due to:

1. Duplication between Subfiles within the data base. Each Subfile is equivalent to one of the CAB Abstract Journals.
2. Free-text searching in the DIALOG system used for searching the data base. Thus, a passing reference to one of these species in an abstract would be retrieved but may be of little or no relevance to someone in fur bearer research.

In order to obtain an indication of the relevance of references selected I then searched selectively for use of the key terms in the titles of papers and for their use as main index entries. The results were as follows:-

G. Joergensen

- 2 -

10th July, 1978

No. of references where it was
retrieved from:

<u>Key Term</u>	<u>Title</u>	<u>Index Terms</u>
CHINCHILLA	66	118
FOX	228	482
ALOPEX	28	22
MINK	719	774
*NUTRIA	49	52
*COYPU	11	3

*Unfortunately Myocastor was omitted from this stage.

A number of references to the fox are probably papers on the wild animal (mainly with reference to rabies) and so would not be as relevant as those on foxes reared for their fur. As I said earlier this was only a small search. More time would need to be spent to find the true extent of the literature on fur bearers in the CAB data base. A combination of key terms FOX and FUR would probably reduce the number of references on the fox, for example.

Further details about CAB abstract journals and other services (literature searches, annotated bibliographies) and of CAB Abstracts Online, which can be used to provide an SDI service for you, can be obtained from:-

Commonwealth Agricultural Bureaux,
Farnham House,
Farnham Royal,
SLOUGH,
Bucks,
UK. SL2 3BN

I enclose some references which were printed out during the search.

Yours faithfully,

M. R. Hails

M.R. Hails
For Director

Enc.

846080 I0046-01803; V0048-02990 2
Agents of dermatomycoses in furbearing animals and rabbits.
Vozbuditeli dermatomikozov pushnykh zveri i krolikov.
Nikiforov, L. I.
VIEU, 109 472 Moscow, USSR.
Byulleten Vsesoyuznogo Instituta Eksperimental'noi Veterinariii,
1976, No.25, 74-75
Languages: Ru
Descriptors: Trichophyton; furbearing animals; fox; ringworm; rabbit
diseases
Identifiers: Microsporum; Skin diseases; Mycoses;
Subject Codes: I00000001; VD72



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NJF's Scandinavian Association of Agricultural
Scientists
Fur Animal Division
Roskildevej 48H
3400 Hillerod, Denmark

June 27, 1978
Ref. No. 78-6/840

Dear Sir/Madam:

Enclosed you will find request form(s) for your publication(s).

We would appreciate receiving a complimentary review copy of the requested title(s) for abstracting and indexing in *CHEMICAL ABSTRACTS (CA)*.

We feel that it is most important that the availability of these publication(s) be brought to the attention of the world's scientists and engineers through announcement in *CA*. We believe that you will agree that it is desirable for this to be done as promptly as possible. The wide scope of our coverage of the world's chemical literature, including its many interdisciplinary links, is made possible by the willingness of organizations, such as yours to supply us with their publications. The results of this cooperation, we think, are mutually advantageous.

In any reply, please feel free to use the back side of the green request form enclosed; otherwise, please refer to our reference number (Ref. No.).

Thank you in advance for your kind cooperation. We look forward to receiving shipment of the review material(s) and/or your reply.

Sincerely yours,

Library Acquisitions Group
Chemical Abstracts Service

Enclosed request form(s)
Mailing return label

№ 64-645/ 369-A Moscow 19/VII 1978

Dear Sirs,

The Institute of Scientific Information of the USSR Academy of Sciences publishes... series of the Abstracts Journal dealing with the major fields of science and technology. We receive more than 25 000 journals published in 130 countries of the world. We are trying to supply our readers with maximum information about the latest achievements in science and technology. Therefore we kindly ask you to send us free of charge a specimen copy of your publication

Scientifur

direct to: The Institute of Scientific Information, Baltiyskaya ul., 14, Moscow, A-219, USSR.

Your journal will be studied carefully with the view of reviewing it in our Abstracts Journal. This will give your publication widespread publicity.

Thank you in advance.

The Institute of Scientific
Information
The USSR Academy of Sciences

В печать 21/X-1975 г. Зак. 8353 ПИК ВИНТИ

Dear friends in The Institute of Scientific Information, Moscow.

Thank you very much for your request for a free of charge copy of SCIENTIFUR.

The reason for SCIENTIFUR is a world wide exchanging of scientific reports on fur bearing animals and a world wide communication in the field.

We therefore are very glad for this sign of interest in the USSR, and we will start to send you SCIENTIFUR free of charge.

But we think you know that in exchanging news there have to be

a stream in both directions. Therefore I am asking you to help SCIENTIFUR in getting both subscribers and contributors from USSR.

We know that you are doing a big and serious scientific work on fur bearing animals in USSR and we hope to get in contact with people working on that and that you can help us to receive reprint of reports from the USSR. Of course we like them in English but we can have them translated. So the language barriers will not be a great problem.

In advance thank you for your cooperation.

Yours sincerely


Gunnar Jørgensen
editor

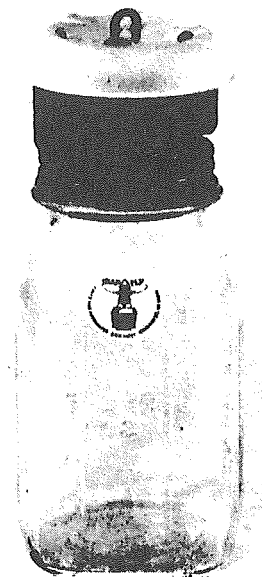
Efficient, low-cost fur farm fly trap

Trap-A-Fly from Fritz & Associates appears to have great promise as a fly control device for mink and fox farms. The unit is based on an organic control method developed more than two decades ago, according to President Kenneth Fritz.

A piece of raw meat, chicken, or fish is used as the bait, atop an ordinary quart-size glass jar. Action Fluid, supplied with the trap, and water are

added to produce a scent which attracts flies from many feet around.

The Trap-A-Fly will not affect bees or other useful insects, according to Fritz. For details and prices, address Fritz & Associates, PO Box 14221, Milwaukee, Wis. 53214.



F.B.A. INTERNATIONAL MINK BREEDERS'
CONFERENCE REPORT

THE FUR BREEDERS' ASSOCIATION of the
UNITED KINGDOM & IRELAND

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C O N F E R E N C E

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OUR SPEAKERS

Dr. C.E. Adams, B.Sc., Ph.D.	Agricultural Research Council Institute of Animal Physiology Animal Research Station 307 Huntingdon Road Cambridge, CB3 OJQ, UK
Mr. Harold B. Craggs	Blue Granite Fur Farm Granite Falls Washington USA
Mr. H.M. Dwan	Managing Director Hudson's Bay & Annings Ltd. Beaver House Great Trinity Lane London EC4V 2AX, UK
Mr. Orville Griffin (of Canada)	Chairman Mink International Wergelandsveien 5 Oslo 1 Norway
Mr. L.J. McMillan	McMillan & Moore Ltd. 16 Queenhithe London, EC4, UK
Mr. A.A. Rietveld	Northwood Fur Farms Inc. PO Box 40 Carey Illinois 60013 USA
Mr. Bruce W. Smith	Editor 'Fur Rancher' 3055 N. Brookfield Road Brookfield Wisconsin 53005 USA

*

EDITOR:

The chairmanship of the Conference was shared by the members of the Committee of the FBA who introduced the individual speakers.

THE FUR BREEDERS' ASSOCIATION OF THE
UNITED KINGDOM & IRELAND

Hon. President: Arthur Frayling, O.B.E.
Chairman: D.G. Stern, Bednall Mink Farm
Vice-Chairman: P.A. Hawkyard, Hawkyard Mink Farm Ltd.
 T.R.N. Burberry, The Argyll Mink Farm Ltd.
 W.L. Macdougald, Vasa Mink (Ireland) Ltd.
Secretary: Mrs. D.E. Hammett

**Riverbank House (1st floor)*
67 Upper Thames Street
London EC4V 3AB

YORK 1978

Our Thirteenth Annual Conference can be said to have been truly international. There were speakers not only from the USA and Canada but there were also delegates from Belgium, Holland, Iceland, and a very welcome contingent of nine mink ranchers from the United States.

I believe the effectiveness of the Conference is a tribute not only to the speakers, but also to the contribution made by the delegates themselves.

I commend this Conference Report equally to those who attended the Conference to confirm the points made, as well as to those who could not attend this year but who I hope will be with us at York in 1979.

DAVID STERN
Chairman