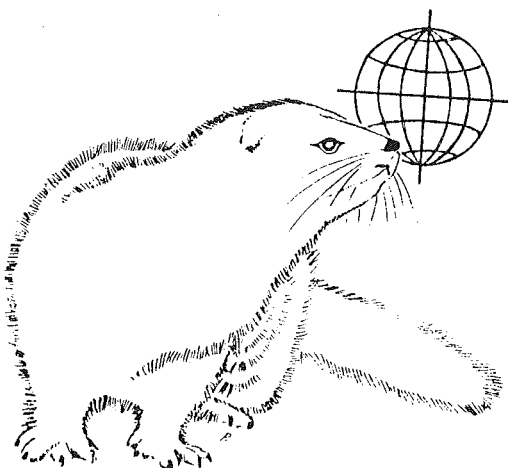


SCIENTIFUR
NO. 2, MAY 1981.

CONTENTS

1.	CONTENTS	1-3
2.	NOTES	4-5
3.	<u>MULTIDISCIPLINARY</u>	
	PELT PRODUCTION ITS ORGANIZATION AND FEEDING OF FUR BEARING ANIMALS IN THE SCANDINAVIAN COUN- TRIES. GUNNAR JØRGENSEN	6
	FOXES, RACCOON DOGS AND POLECATS, H. KONNERUP MADSEN	24
	INDUCTION OF AUTUMN MOULT IN MINK (MUSTELA VISON PEALE AND BEAUVOIS) WITH MELATONIN, D. ALLAIN, J. ROUGEOT	24
	MANUAL RESTRAINT OF THE FERRET, D.L. FELLER, G.J. BENSON	25
	ANAL GLAND SECRETION OF THE FERRET (MUSTELA PUTORIUS FORMA FURO). DOUGLAS R. CRUMP	26
	CONSUMPTION OF FOOD, BODY WEIGHT, PERINEAL COLOUR AND LEVELS OF PROGESTERONE IN THE SERUM OF CYCLIC FEMALE CHINCHILLAS. KAREN M. BROOKHYSER, R.J. AULERICH	26
4.	<u>GENETIC</u>	
	VARIATION IN CHROMOSOME NUMBER IN DANISH BLUE FOXES, K. CHRISTENSEN, HANS PEDERSEN	28
	GENETIC ASPECTS OF ALEUTIAN DISEASE OF MINK, DAVID D. PORTER	28



SCIENTIFUR
ISSN 0105-2403
VOL. 5, NO. 2
MAY 1981

5. REPRODUCTION

- HORMONAL HEAT INDUCTION IN ANOESTRAL BLUE FOX VIXENS
AFTER RECORDING OVARIAL AND HORMONAL CONDITIONS,
KJELL NYBERG 30
- MALE INFERTILITY, LOSS OF KITS IN FINELY-BRED DARKS,
LE GRANDE C. ELLIS, KENNETH TUNG, ROLAND E. HOWELL 30 A
- NUMBER OF NEW BORN AND WEANING WHELPS AND THE CONTENT
OF SOME BLOOD PARAMETERS IN FEMALE POLAR FOXES,
BARBARA STANISLAWSKA, EWA DRYZALOWSKA, OSKAR LOREK 31
- INVESTIGATIONS ON THE DURATION OF SUCKLING IN
NUTRIA. J. SZUMAN, A. SKZYDLEWSKI 32

6. NUTRITION AND FOOD TECHNOLOGY

- A SURVEY OF THE VITAMIN STATUS IN MINK OF VARIOUS
AGE, SEX, AND PELT QUALITITES IN FRANCE (F) AND
YUGOSLAVIA (YU). IVAN BELCIĆ 33
- DIGESTIBILITY OF PELLETS ON MINK AND FITCH,
TUOMO KIISKINEN, JAAKKO MAKELA 36
- REFERENCE TO SOME SIGNIFICANT QUESTIONS OF NUTRITION
IN THE MINK. I. RAJIĆ, S. PAUNOVIĆ 42
- EVALUATION OF FISH VISCERA SILAGE AS A FEED RESOURCE,
FREDDY JOHNSEN, ANDERS SKREDE 43
- NUTRITION, FARM MANAGEMENT USING A PELLET PROGRAM,
WILLIAM L. LEOSCHKE 44
- PATHOGENIC, ENTEROTOXIN-PRODUCING STAPHYLOCOCCI IN
MINK FEED AND MINK FEED RAW MATERIALS,
TAPIO JUOKSLAHTI, SEPPO LINDROTH, AIMO NISKANEN 45
- FEEDING TRIALS WITH BLUE FOXES. H. KONNERUP MADSEN 46

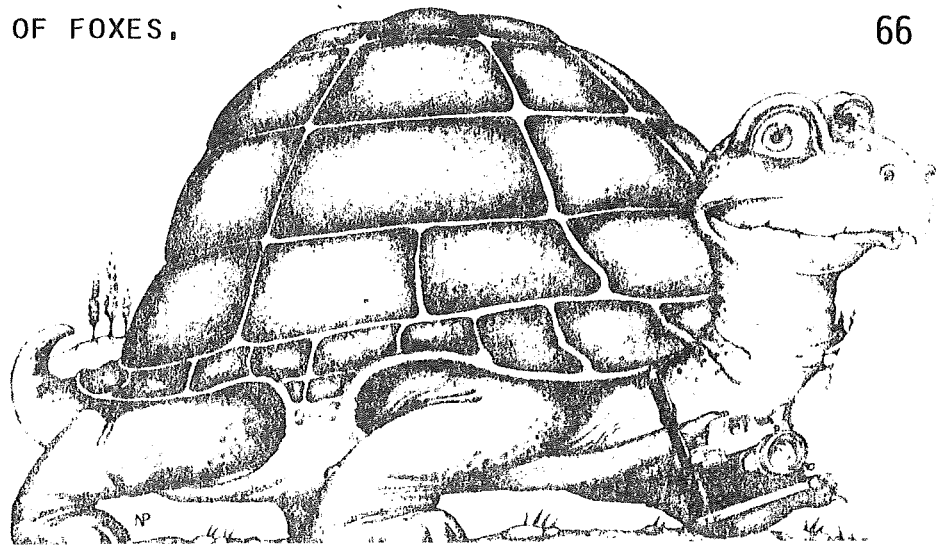
7. VETERINARY SCIENCE

- MORPHOLOGY AND BIOCHEMISTRY OF BLOOD OF SOME MUSTE-
LIDS. THIRD COMMUNICATION: ENZYMOGRAPHIC STUDIES IN-
TO ARTERIAL PLASMA OF MINK (MUSTELA VISON SCHREBER,
1977). R. ZEISSLER, U.D. WENZEL, W. STRAUCH 47
- MORPHOLOGY AND BIOCHEMISTRY OF BLOOD OF SOME MUSTE-
LIDS. FOURTH COMMUNICATION: DETERMINATION OF SOME
METABOLITES IN ARTERIAL PLASMA OF MINK - FOUNDATIONS
FOR PREPARATION OF STANDARD VALUES FOR LABORATORY
DIAGNOSIS OF ARTERIAL PLASMA OF MINK (MUSTELA VISON
SCHREBER, 1977). R. ZEISSLER, U.D. WENZEL,
W. STRAUCH 48
- HISTOCHEMICAL ACTIVITY OS SOME HYDROLYTIC ENZYMES IN
THE FOX (VULPES VULPES L.) LIVER,
A. HRASTE, J. KLAPAC, I. STEVIĆ, M. MAJDAK 49

PSEUDOMONAS PNEUMONIA OF MINK: PATHOGENESIS, VACCINATION, AND SEROLOGIC STUDIES. GERALD G. LONG, ANTHONY M. GALLINA, JOHN R. GORHAM	50
INTESTINAL ADENOMATOSIS IN A BLUE FOX (ALOPEX LAGOPUS), T. LANDSVERK	51
CHANDLERONEMA LONGIGUTTURATA (CHANDLER 1942) GEN. ET COMB. N. (NEMATODA: ACUARIIDAE) FROM RACCOONS, PROCYON LOTOR, IN LOUISIANA. M.D. LITTLE, MIR M. ALI	52
TRICHOPHYTON MENTAGROPHYTES DERMATOPHYTOSIS IN WILD FOX. WILLIAM U. KNUDTSON, CONNIE E. GATES, GEORGE R. RUTH, LEANOR D. HALEY	53
DIROFILARIA IMMITIS: EXPERIMENTAL INFECTIONS IN THE FERRET (MUSTELA PUTORIUS FURE). WILLIAM C. CAMPBELL, LYNDIA SLAYTON BLAIR	54
TRIAL OF AVERMECTION B ₁ A, MEBENDAZOLE AND MELARSOPROL AGAINST PRE-CARDIAC DIROFILARIS IMMITIS IN THE FERRET (MUSTELA PUTORIUS FURO). L.S. BLAIR, W.C. CAMPBELL	55
BRUGIA PAHANGI AND DIROFILARIA IMMITIS: EXPERIMENTAL INFECTIONS IN THE FERRET, MUSTELA PUTORIUS FURO. W.C. CAMPBELL, L.S. BLAIR, J.W. MC CALL	55
TREATMENT OF SARCOPTES INFESTATION IN RABBITS AND FUR ANIMALS. P.S. STRINADKIN	56
TRIAL OF KHIMOKOKTSID (OR CHEMOCOCCID, A ROBENIDINE ANALOGUE) FOR COCCIDIOSIS IN NUTRIA. NUKERBAEVA, K.K., SVANBAEV, S.K.	57
AEROSOL-CIODRIN AGAINST PSOROPTES AND OTODECTES. SIMETSKII, M.A.	57

8. COMMUNICATION

SCANDINAVIAN ASSOCIATION OF AGRICULTURAL SCIENTISTS, FUR ANIMAL DIVISION, ANNUAL SCIENTIFIC MEETING 7-9 OCTOBER 1981.	59
BOOK REVIEW: ULF D. WENZEL: SUMPFBIBER.	62
A BIBLIOGRAPHY OF MUSTELIDS, PART VIII, MARTEN AND FISHER.	64
BIBLIOGRAPHY OF FOXES.	66





N O T E S
SCIENTIFUR, VOL. 5, NO. 2, 1981.

Dear readers

We hope you will forgive the delay of SCIENTIFUR, but the most important link in preparing of SCIENTIFUR - namely Ellen - has just returned from hospital and rest cure.

Another thing, which is not really perfect, is that sometimes we have difficulties in finding the author's addresses in connection to the abstracts we bring in SCIENTIFUR. Especially, it concerns reports of Russian origin often because of lack of addresses or they are written in Russian - a language we are incapable in reading and understanding. But we feel that important information without addresses are better than no information.

You have to remember that the meaning of SCIENTIFUR is not to be perfect, but to be very important for you at a price as low as possible.

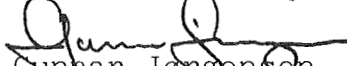
It is one of the reasons why we have not advertised for you that we only bring abstracts of reports of which we have the whole report in hand. Therefore, we are able to provide you with copy of the report, but it takes time and time is money. Therefore - if you want copy service from SCIENTIFUR you have to prepay \$ 6.- per report of 20 pages or less and for every additional 10 pages or fraction add \$ 2.- per report. The prices include air mail delivery.

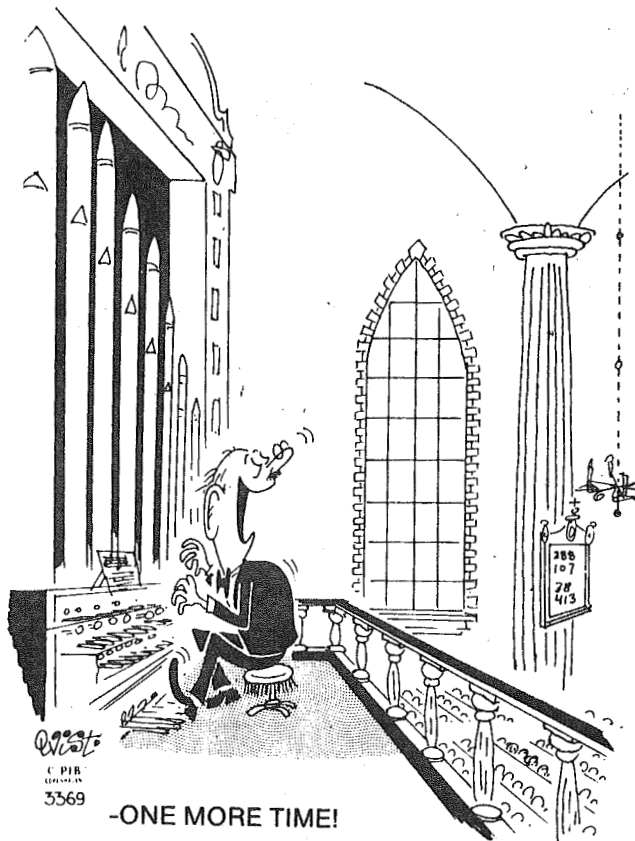
Thanks to the computers and the Danish Dokumentation Center we are able to bring many abstracts also in this issue of SCIENTIFUR. Less than 30 percent of the material we have got directly from the authors. - PLEASE, REMIND SCIENTIFUR AND SEND ABSTRACTS + a copy of the report as soon as possible.

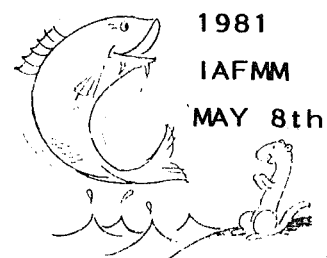
In this issue we advertise the Annual Scandinavian Scientific Meeting About Fur Animal Production. We hope that many of the reports later will be published in English for those of our readers who are not familiar with the Scandinavian languages.

The best wishes for your research and holiday.

Yours sincerely


Gunnar Jørgensen
Editor





Peltproduction its organization and feeding of fur bearing animals in the Scandinavian Countries.

by Gunnar Jørgensen, Natl. Inst. of Anim. Science, Fur Bearing Animals, Trollesminde, 48 H, Roskildevej, DK 3400 Hilleroed.

1. Peltproduction and organization.

The fur animal production has in the period after the Second World War been raised to an efficient economical level both in respect of value of the production and of maximal utilization of byproducts from fishery and slaughterhouses, but also from an employment point of view.

An important background for the skinproduction in the Scandinavian Countries is the great traditions in animal production and fishery and the fact that the fur animals (mink and foxes) are fed with waste products from these industries.

Thus, the fur industry has not only eliminated the problem of disposal of waste products from the slaughterhouses and the fish-industries, but also, by giving a good price for these products, has economically supported these industries.

On a national economic level it has been important that these waste products could be converted into a valuable export, through fur bearing animals.

Whereas the fox production has been fluctuating strict after the market, the mink production expanded explosively in the period 1955-1965, as it will be seen from table no. 1. To a very small degree raccoon dog, chinchilla and polcat is also farm produced in the Scandinavian countries. But in total value it is less than 1 percent.

In total the Scandinavian countries are producing more than 50 percent of that part of the world production of mink and foxes which is exported, which can be seen in Table 2.



Table 1. Fur production in Norway, Sweden, Finland and Denmark in the period 1945 - 80.

Year	Number of pelts produced	
	Silver fox + blue fox	Mink
1945	380,000	0,2 mill.
1950	240,000	0,5 mill.
1955	ca. 150,000 xx)	1,7 mill.
1960	ca. 50,000 xx)	3,7 mill.
1965	ca. 100,000 xx)	8,3 mill.
1970	200,000	10,9 mill.
1975	600,000	8,6 mill.
1977	900,000	8,6 mill.
1980	1.845,000	10,0 mill.

xx) Estimated production.

The background for this production is sufficient supply of feed-stuffs, good tradition in animal husbandry and effective organizations form.

Structure of production.

The production structure is not similar in the Scandinavian countries because of special circumstances e.g. geographical position - access to feed and labour resources, and technical development. Number of farms and extend of skinproduction in each country in comparision to the total world production are given in Table 2. In Table 3 the development of farm number and minkproduction in each country during the period from 1950 to 1980 are shown. Especially remarkable is the great difference in farm size and the fox production in the different countries.

In all the Scandinavian countries the skinsales are handled by the organizations during centralized cooperative based fur auctions.

In each country there is a central fur breeders association and the board of these are taking care of the auctions and all other

Table 2. Skinproduction in the Scandinavian Countries
1980, million pelts.

	No. of farms	Mink 1980	Foxes
Denmark	2.300	4.00	0.095
Finland	2.800	3.85	1.400
Norway	2.200	0.76	0.315
Sweden	500	1.40	0.035
Total Scandinavia		10.01	1.845
Total World production		20.65	2.330
Scandinavia, percent of			
World production		48	79



Table 3. Number of mink skins produced and number of farms in
the Nordic lands from 1950-1980.

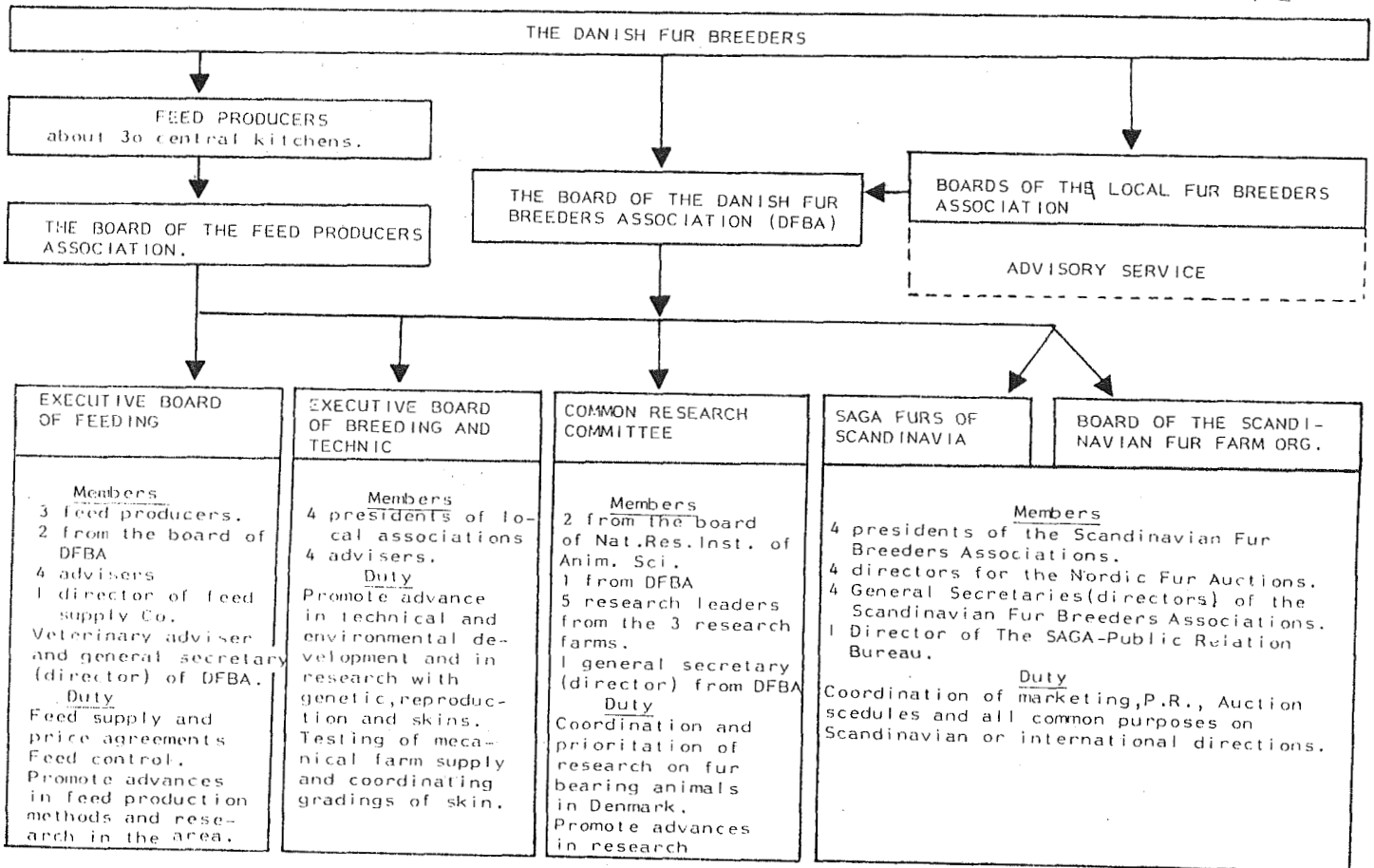
Year	1950	1960	1965	1970	1975	1980
<u>Sweden</u>						
No. of farms	1400	1600	1250	1040	680	500
No. of skins prod.						
total (mill)	0.24	1.14	1.69	1.75	1.20	1.40
per. farm	170	710	1350	1680	1760	2800
Foxes, No. of						
skins produced						35.000
<u>Norway*</u>						
No. of farms	4700	3500	5300	5000	2790	2200
No. of skins prod.						
total (mill)	0.07	0.90	2.16	2.18	1.47	0.78
per farm	15	260	410	440	530	355
Foxes, No. of						
skins produced						315.000
<u>Finland</u>						
No. of farms	600	775	2526	2865	2567	2800
No. of skins prod.						
total (mill)	0.06	0.54	1.55	3.10	2.94	3.85
per farm	100	700	610	1080	1150	1375
Foxes, No. of						
skins produced						1.4 mill
<u>Denmark</u>						
No. of farms	1486	2924	5091	5389	2764	2800
No. of skins prod.						
total (mill)	0.14	1.13	2.91	3.82	2.96	4.00
per farm	90	390	570	710	1070	1430
Foxes, No. of						
skins produced						95.000

joint enterprises in the industry as relations to the government, advisory service, international relationships and to some degree feed supply and research.

In all of the countries the relations to the members and in same degree the advisory service are based on local associations with direct representation in the board of the main association.

The main part of exhibitions, professional meetings and practical course are carried out by these local fur breeders associations. As an example the organization plain for the Danish Fur Breeders Association are given in fig.1.

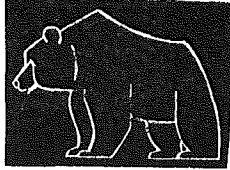
Figur 1. THE ORGANIZATION OF FUR BREEDING IN DENMARK.



Skin sales.

The centralized and well coordinated skin sales have given great advances in marketing of the skin. The fact that the fur breeders themselves on cooperative basis are owner of the auctions save a

lot of money which can be used for common activities as advertisement, research e.t.c.



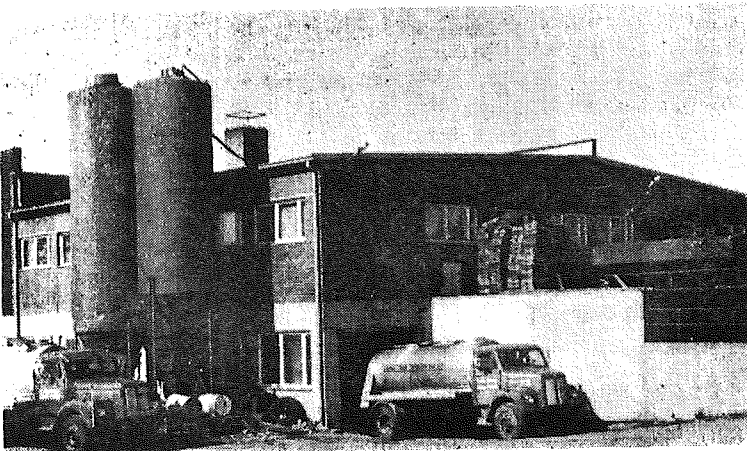
It also give rise for a standardized grading of the whole skinproduction which again are given opportunities for doing statistical treatment on the production. Because every skin are marked there can be done statistical comparison of the production within the skin-types for the single farms and between the single central kitchens.

Feed supply.

One of the big advantages in Scandinavian fur animal production is establishment of private or cooperative owned central kitchens which are producing and delivering ready feed to the farmers (fig.2.) There is about 30 central kitchens in each of Norway, Finland and Denmark, but only few in Sweden where the structure is different from the other countries.

Figur 2.

FEED PRODUCTION AND DISTRIBUTION.

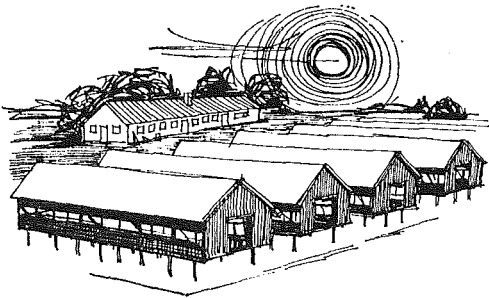


30 centralkitzen in each country.

Distribution to the farmers by tankcar.

Fig. 2 continued.

Farm silos for ready mix.



The main part of the Scandinavian fur bearing animals are fed by motorized feed trucks with semi automatic portioning systems.

This centralization of the feed production has in addition to the easy way for the single fur breeder to get feed, given good possibilities for centralizing the feed supply on country basis and given basis for establishment of a very effective feed control both with chemical composition and chemical and microbiological quality of raw material and ready mix.

The centralization and the skin statistic where the production results of each central kitchen is compared has given rise to a very uniform and sufficient feeding of the animals.

Research.

Research work is to some degree run by the government, but the fur breeders association have a great influence on research during special elected research boards in each country and during economical supports to important projects. Besides that there in Finland and Danmark are research farms owned and runned by the fur breeders organizations.

The research is to a high degree coordinated within each country. Based on continuous contact between researchers in the four countries you natural will have a great degree of coordination of research work in the Scandinavian countries.

This contact is executed both during the close contact between the fur breeders organizations and during The Scandinavian Association of Agricultural Scientists Which have a division on fur bearing animals, there among others are arranging scientific scandinavian meetings at least once a year, international congresses dealing with fur animal production and editing an international scientific journal in fur animal production.

Education and advisory service.

At the higher level the agricultural universities are giving courses in health, nutrition and genetic of fur bearing animals. And we can see an increasing interest from the students to these disciplines. An increasing part of the research work is done by students and post graduates as main tasks.

The fur breeders are educated mainly during short courses but also in a limited degree on agricultural schools.

There is an effective advisory service in all countries. The degree of centralization of this service is not equal. Besides the advisory service the advisers also are giving lessons on the mentioned short courses.

Scandinavian and international relations.

Both regarding production, sales, research and international relationships the Scandinavian countries are working as one big organization representing about 50 percent of the world market of farm produced fur bearing animals.

This strong coordination is based on the fact that the fur breeders themselves on cooperative basis own the fur auctions. From that operation they know the value of co-work and they have the economical background for advertising on the sales side, and for all kinds of service to the breeders and for developing the international relations.

2. Feeding

Feed resources.

In the beginning the feeding was based only on fresh byproducts from slaughterhouses and fish industry, but the increase in pelt-production and increasing competition from the pet food industry has given rise to great changes in the traditional feeding systems.

The total need for feed supply to the Scandinavian fur animal production are shown in table 4.

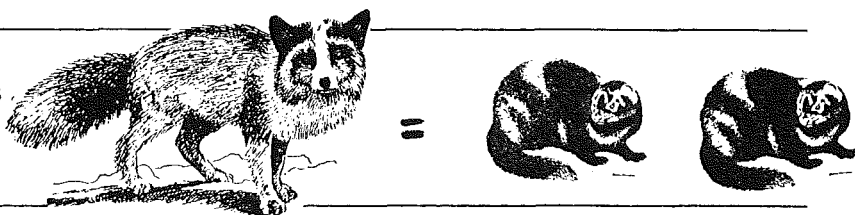
The fact that 80 percent of the feed is used in the period July to pelting has given demand for storing of big quantities of fresh animal byproducts. This storing has without problems mainly been done in big freezing rooms with a temperature of minus 18-20 Celsius degrees as long it concerned offal of lean fish and slaughterhouse offal. But the mentioned limit of these feedstuffs have given rise to use of increasing amounts of the so called industry fish which often is containing a high percent of unsaturated fat.

Storing of these fish have given rise to complications because of fat oxidations go on with the low temperatures. It has therefore been necessary to develop other preserving methods for these fish, and it is now very common to preserve these with acids and anti-

Table 4. Total amount of feed used for pelt production in the Scandinavian Countries 1980.
(Basis 58 kg of ready feed (containing approximately 31% dry matter) per Mink unit produced).

Country	No of mink units *)	tons of feed 1980
Denmark	4.19 mill	243.000
Finland	6.65 "	386.000
Norway	1.39 "	81.000
Sweden	1.47 "	85.000
<hr/>		
Total Scandinavia	13.70 mill	795.000

*) 1 fox = 2 mink units.



oxidants which seems to give a very good silage. Because of the structure concerning centralkitchens it also have been more and more common to cool the best batches of industryfish immediately after landing and distribute this very fresh fish to the central kitchens daily.

Also dried animal feedstuffs as fishmeal, meat meal and blood meal, are now common used besides the traditional dried products from milk and brewery yeast.

Many Experiments have been done with replacement of animal protein sources with proteins of vegetable origin. Products as soybean meal and corn gluten meal are today used in some amount in feed for fur bearing animals.

To give an expression of the actual use of different feedstuffs table no. 5 show the average composition of Danish and Finnish feed for mink and foxes.

As it can be seen from table 5 there is great difference between the use of fresh animal feedstuffs in Finland and Denmark. This is due to the possibilities for getting the single feedstuffs.

Table 5. Estimated average composition of Danish and Finnish feed for fur bearing animals 1980.

	<u>Denmark, %</u>	<u>Finland, %</u>
Fish offal	40	22
Whole fish, fresh-frozen	10	22
Whole fish, ensiled	10	5
Fish meal	2	4

Slaughterhouse offal		
incl. blood	7	17
Dried animal protein feedstuffs	3	3
Vegetable protein feedstuffs	3	1
Cereals	10	9
Vitamins etc.	2	2
Fats - oils	1.5	1
Water	11.5	14

Source: Finnish Fur Breeders Association and Danish feed budget 1980.

In Finland, for example, the veterinary restrictions and the competitors to slaughterhouse offal are not reducing the possibilities for getting this very important feedstuff for fur animal feed whereas all the slaughterhouse byproducts have to be industrial sterilized in Denmark before use at the same time as the competition from the pet food industry is very strong here. The veterinary restrictions in Denmark are due to the fact, that this country is producing important quantities of meat products for export.

When Denmark has a big fishery, and good possibilities for import of fish offal, the fishery in Finland is very small and contains mainly Baltic herrings which are used as whole fish, freeze stored, or ensiled.

Based on the total feed consumption shown in table 4 and the average composition shown in table 5 it is possible to calculate the need for the single feedstuffs. The results of this calculation are shown in table 6 of which it can be seen, that the fishery are delivering 449.000 tons of the total feed consumption which are equal to 56 percent.



Table 6. Consumption of fish products in the Scandinavian
peltproduction 1980.

(thousand metric tons).

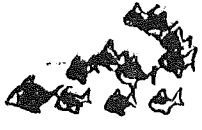
	Denmark		Finland		Norway ^{*)}		Sweden ^{*)}		Total
	(%)	t	(%)	t	(%)	t	(%)	t	t
Total feed consumption		243		386		81		85	795
Fish offal	(40)	97	(22)	85	(31)	25	(31)	26	233
Whole fish fresh/frozen	(10)	24	(22)	85	(16)	13	(16)	14	136
Whole fish, ensiled	(10)	24	(5)	19	(7.5)	6	(7.5)	6	55
Fish meal	(2)	5	(4)	15	(3)	2	(3)	3	25

^{*)} feed composition estimated as average of Denmark and Finland.

The comprehensive use of fish silage and cooled industryfish in Denmark is a relative new phenomenon and is based on intensive development work in background of the need for high quality protein for replacement of the slaughterhouse byproducts to reasonable price. Because of the big fishmeal production it is possible to get very fresh raw material to this feedstuff production, and this raw material is at the same time the cheapest one can buy.

The price relations based on the nourishment contents are presented in table 7 and 8. The nourishment content are based on average analysis and digestibility trials, and the economical value are based on the actual fishmeal and fat price, april 1981.

Table 7. Nourishment content of fish products and soybean meal as used for fur animal feed.



	% dry matter	% dig. crude prot.	% dig. crude fat	Metabol. energy Kcal/100g	Nourishment value *) Dkr/kg	Nourishment relative **)
Cod offal	22	13.5	1.0	70	.99	100
Plaice offal	23	12.7	3.1	87	1.01	102
Whole fish, fresh ***)	31	13.6	11.0	166	1.39	140
Whole fish, ensiled	31	13.6	11.0	166	1.39	140
Cod viscera, Norway	18	13.0	3.0	87	1.03	104
Fish meal, mink quality	94	60.0	7.5	341	450	454
Soybean meal	89	40.8	0.7	223	288	291

*) Basis price is fishmeal Dkr 4.50/kg and fat Dkr 3.50/kg
i.e. price of dig. per kg: fat Dkr 4.02, protein Dkr 7.00

**) Cod offal = 100.

***) Average nourishment content, the fat content which plays a big role for the nourishment value vary during the year and between the fish species.

From table 8 it can be seen that fishmeal of reasonable quality is too expensive for use as fur animal feed today. This fact can on a short term sight intricate the fishmeal industries interest in developing new and better production methods especially with regards to the nourishment utilization and quality. But the history tell us, that the future may be in developing quality products.

The practical feeding, possibilities and norms.

Above the possibilities for receiving the single feedstuffs and some prices are mentioned but the utility of these is also setting a limit.

There is no maximum limit for the utility of fish offal of good quality, except for offal from some species containing the anaemia or the antithiamine factor. Experiments have shown that fishmeal

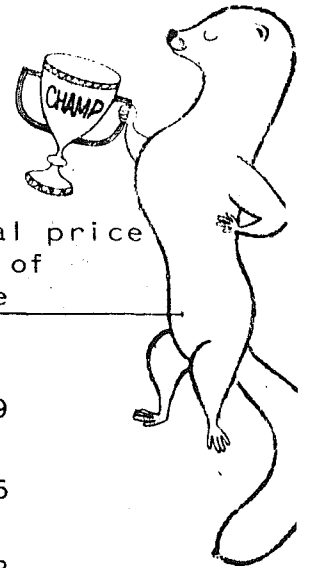


Table 8. Nourishment value compared to market price
April 1981.

	Nourishment value *) Dkr/kg	Actual market price **) Dkr/kg	Actual price in % of Value
Cod offal	.99	.90	91
Plaice offal	1.01	.90	89
Whole fish, fresh/frozen	1.39	1.05	76
Whole fish, ensiled	1.39	.95	68
Cod viscera, Norway	1.03	?	?
Fish meal, mink quality	4.50	4.50	100
Soybean meal, spec. quality	2.91	2.30	79

*) Nourishment value calculated in Table 6.

**) Actual market price is included .10 Dkr per kg for transportation costs, and Cod and plaice offal further .15 Dkr for handling and freezing because of the season variations.

of good quality (e.g. produced of absolutely fresh raw material and stabilized with antioxidant) can replace up to 40% of the protein without problems.

Use of fish silage, which is the absolutely cheapest product on the market, is limited because of the preservation method where in general is used 2,6 w/% Sulphuric acid, 1.1 w/% Acetic acid and 200 ppm Etoxyquin.

Such a silage do have a pH on about 2,8 and it will lower the feed pH in relation to the used amount. Experiments have shown that pH below 5.3 in the ready feed mix result in metabolic acidosis in the animals. The experiments have also shown that neutralization only to some degree can be done without negative effect on the animals. Generally there can be used 10% silage during the year with increasing amounts during July and August to about 30%.


The experiences with cooled or frozen industryfish tell us, that as long time these fish species will be fished, the fur animal production will not be depending on fantasy prices of fishoffal.

Soybean meal is a relatively cheap feedstuff for fur bearing animals but problems with both growth and pelt quality have until now been a great limit for the use of this stable product both from a price and a quality point of view. It seems so that the fur animals make demand for more effective heat treatment than other domestic animals. This may be due to the content of trypsininhibitors but can also to some degree be due to special carbohydrates in the meal. Use of soybean isolates and concentrates seems not to affect growth and pelt quality, and during the last years some special treated soybean products have shown satisfactory qualifications as main replacement for fishproducts.

The feeding norms are fluctuating a little in the Scandinavian Countries, this is mainly due to the differences in the feed composition and especially in the suitability of the carbohydrate feedstuffs for the mink.

In Denmark we in background of experiments and statistical treatment of data from practice are recommending the following relations between the main nourishments in feed for fur bearing animals (Table 9).

Table 9. Practical guidance for norms for fur bearing animals.



	<u>% of met. energy from</u>			g dig. protein/ 100 kcal.
	protein	fat	carbo- hydrates	
15th of Nov.- 20th of April	58	30	12	12.9
20th of April - 5th of June	54	32	14	12.0
15th of June - 1st of August	47	36	17	10.4
1st of August - pelting	46	36	18	10.2

The changes have to be done during sliding transition periods.

For the vitamins we are following the Scandinavian recommendations which are given in table 10.

Table 10. Recommended allowances of vitamins for mink given per kg dry matter in the diet.

	USA NAS-NRC	Nordic Countries Åhman
Vitamin A, I.U.	3500	5000-20000
Vitamin D ₃ , I.U.		500-2000
Vitamin E, mg	25	15-40 (40-60)
Thiamine (B ₁), mg	1.2	2-6
Riboflavin (B ₂), mg	1.5	4-8
Panththenic acid, mg	6	12
Nicotinic acid, mg	20	40
Pyridoxine (B ₆), mg	1.1	2
Folic acid, mg	0.5	0.8
Biotin, mg		0.2
Choline, mg		
Vitamin B ₁₂ , mg		0.05



*I asked for vitamins
not water.*

The amount of vitamin E is related to the amount of marine fats in the feed, and is therefore higher than the basic norms because the content of marine fats is increased significant in especially the Danish minkfeed. This increase is both due to the use of fatty fish and due to adding fish oils to the feed. Danish experiments have shown that the pelt quality are going to be better if 40-60% of the fat is of marine origin in the growth period.

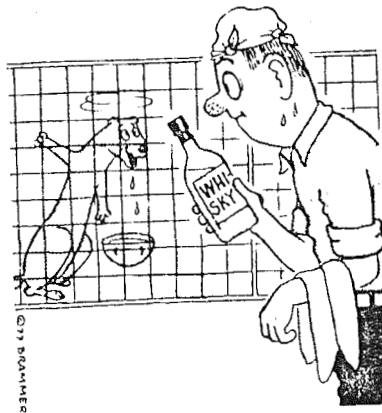
It has of course to be very high quality fat and considerations have as mentioned to be taken to the content of vitamine E and synthetic antioxydants.

The quality of drinking water have in some cases given problems. Therefore, there have been set up standards for quality of drinking water. The standards are given in table II.

Table II. Recommended maximum limits for certain agents in drinking water for mink.

	Finland	Denmark
pH	7.2-9.0	7.2-9.0
Ammonia, mg/l	0.5	0.5
Nitrite, mg/l	0.02	0.05
Nitrate, mg/l	50	25
Iron, mg/l	0.3	0.1
Chlor, mg/l	0.5	0.5
Chloride, mg/l	70	70

*It's the best
water I've
got until now.*



The main problem in modern feeding of fur bearing animals is, because of the central feed production, the hygienic quality of the feed.

In all the Scandinavian Countries therefore are established control of the hygienic quality of both feedstuffs and ready feed mixes. This control is basis for recommendations for quality standards and handling descriptions of feedstuffs and feed.

Of microbiological tests in routine made the total count, streptococcus faecalis, Coli, anaerobic bacteria, Lactobacillus, yeast and fungus.

Of chemical quality analysis are used the content of FFA (Free fatty acids), Peroxide number, Anisidine number, TVN (Totale volatile nitrogen) and in some cases ammonia, TMAO + TMA.

Quality guidance for fish products are shown in table 12.

Table 12. Quality guidance for fish products used in feed for fur bearing animals.

	fish offal	whole fish		fish meal
		fresh/frozen	ensiled	
<u>Chemical quality:</u>				
Water, max. %	-	-	-	8
Crude protein, min. %	-	-	-	72
TVN, max, % of total N	1.3	1.5	2.5	1
FFA, max. % of total fat	5	5	10	12
Peroxide number, max meq:O ₂ /kg fat	15	1	1	5
<u>Microbiological quality (Max. number of organisms per gram):</u>				
Total count	1 mill	.5 mill	10,000	100,000
Streptoc.faecalis	500	2500	-	200
Coli	1000	1000	-	1000
Anaerobic bact.	100	-	200	-
Lactobacilus	-	-	1000	-
Yeast	-	-	1000	-
Mould fungus	-	-	100	-

The chemical composition of the ready feed mixes is controlled once a week and total analysis for both chemical composition, microbiological and chemical quality are done about 5 times a year on samples taken by the leading adviser of the feed control system.

Another control with the central kitchens is the mentioned statistical comparison of both reproduction data and skinproduction.

The interest for health control and economical optimization based on statistical treatment of data from feeding, health control, reproduction, skinproduction, management and environment have increased during the last years. The fact that the structure of the fur animal production in the Scandinavian Countries gives the best basis for such arrangement both in comparison with other fur animal producing countries and in comparison with other kinds of farm animal production, will give a solid basis for further improvement of the fur production in the Scandinavian countries.

Summary .

Fur breeding in Scandinavian countries is well organized both regarding marketing of the products and regarding service to the fur breeders, research, and Scandinavian and international relations. The effectiveness of the organizations are thanks to the basis in the cooperative idea both in respect to the skin sales and to the organization principle at all.

Authors adress:

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FOXES, RACCOON DOGS AND POLECATS.**(Ræve, mårhunde og ildere).**

H. Konnerup Madsen, Agerledet, DK 9300 Sæby, Denmark.

The reproductive performance and pelt characters of silver foxes, polecats and raccoon dogs are discussed. Notes are given on feeding and management.

Dansk Pelsdyravl, 43 (9), 380-383, 1980.

4 photos, 1 fig., 1 table.

In Danish.

CAB-abstract.

**INDUCTION OF AUTUMN MOULT IN MINK (MUSTELA VISON PEALE
AND BEAUVOIS) WITH MELATONIN.**

D. Allain, J. Rougeot, Laboratoire des Pelages, Toisons et Fourrures, I.N.R.A., 78350 Jouy-en-Josas, France.

Adult female mink, living in natural conditions of temperature and photoperiod, were treated by melatonin implants in mid-July, when the summer coat was in its resting stage. As a result, a moult was induced 5 to 6 weeks before the normal time; it showed the characteristics of an autumn moult as observed by the gradient of hair changes over the body and the high number of hair follicles per bundle (47 p. 100 more than in the summer coat). The winter coats produced in this way were mature in the early days of October, i.e. 6 to 7 weeks before those of the control group.

Reprod. Nutr. Dévelop. 1980, 20, (1A) 197-201.

1 fig., 1 table, 18 references.

Authors summary.

MANUAL RESTRAINT OF THE FERRET.

D.L. Feller, G.J. Benson, Dept. of Anesthesiology, Coll. of Vet. Med., University of Illinois, Urbana, Illinois 61801, USA.

Various correct and incorrect methods of handling are illustrated with photographs. Ferrets should not be held simultaneously by the hindlegs and nape of the neck. Leather gloves should be worn for protection.

Ferrets resemble cats in that they will not retaliate after they have been freed after experiencing an unpleasant procedure.

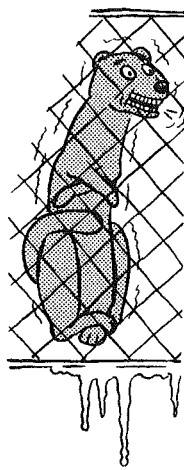
For intramuscular or subcutaneous injections, ferrets should be restrained as described. Althout intramuscular injections may be given in the hindlegs, injection into the lumbar muscles is probably easier. Due regard must be given the subcutaneous layer of fat, however, especially because it thickens in the fall.

These simple methods of restraint allow safe examination or injection of the ferret. They minimize problems associated with the apprehensive animal, yet allow the handler to maintain adequate control.

Vet. Med. and Small Animal Clinician, 75 (4), 690-693, 1980.

9 photos, 4 references.

Abstract: Gunnar Jørgensen.



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ANAL GLAND SECRETION OF THE FERRET
(MUSTELA PUTORIUS FORMA FURO).

Douglas R. Crump, Chemistry Division, Dept. of Scientific and Industrial Research, Private Bag, Petone, New Zealand.

2,2-Dimethylthietane (1), trans-2,3-dimethylthietane (2), cis-2,3-dimethylthietane (3), 2-propylthietane (4), 3,3-dimethyl-1,2-dithiolane (5), trans 3,4-dimethyl-1,2-dithiolane (6), cis-3,4-dimethyl-1,2-dithiolane (7), 2-pentylthietane (8), 3-propyl-1,2-dithiolane (9), quinoline (10), and idole (11) have been identified as components of the anal gland secretion of the ferret, *Mustela putorius forma furo*. Male and female ferret secretions were indistinguishable except during the breeding season.

Journal of Chemical Ecology, Vol. 6, No.4, 1980, 837-844.

2 figs., 15 references.

Authors abstract.

CONSUMPTION OF FOOD, BODY WEIGHT, PERINEAL COLOUR AND
LEVELS OF PROGESTERONE IN THE SERUM OF CYCLIC FEMALE
CHINCHILLAS.

Karen M. Brookhyser, R.J. Aulerich*, Dept. of Poultry Science*,
Fur Animal Project, Michigan State University, East Lansing,
Michigan 48824, USA.

Venous blood of eight cyclic female chinchillas (*Chinchilla laniger*) was collected twice weekly during all stages of the oestrous cycle and levels of progesterone were determined by radioimmunoassay. Consumption of food, body weight and perineal colour were also monitored in 25 cyclic female chinchillas. Cyclic trends were significant for feed consumption ($P < 0.01$), colour of the perineum ($P < 0.001$) and body weight ($P < 0.001$). Analysis of data used a standardized cycle of 36 days which was arranged according to vaginal perforation. This was subdivided into six periods with 6 days in each. Values of progesterone in the serum ranged from 0.07 to 6.27 ng/ml ($n = 64$ samples, each in duplicate), and the period of 6 days with the lowest mean progesterone

value was that which included the first day of vaginal perforation. The pattern of fluctuations of progesterone resembled that of another hystricomorph rodent, the guinea-pig.

J. Endocr. 1980, 87, 213-219.

2 figs., 22 references.

Authors summary.

KAREN M. BROOKHYSER AND R. J. AULERICH

Physiological parameters in chinchillas

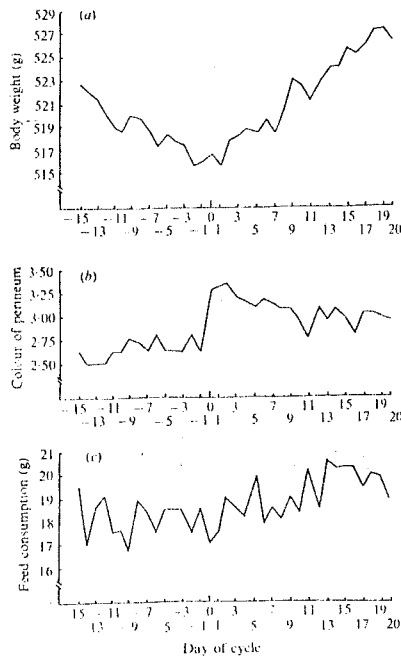


Fig. 1. Mean (a) body weight, (b) perineal colour and (c) feed consumption of cyclic female chinchillas. Day 0 denotes the first day of vaginal opening. Perineal colour was estimated on a qualitative scale of 1-6; 1 denoting a dull flesh colour and 6 a vibrant, deep red colour.

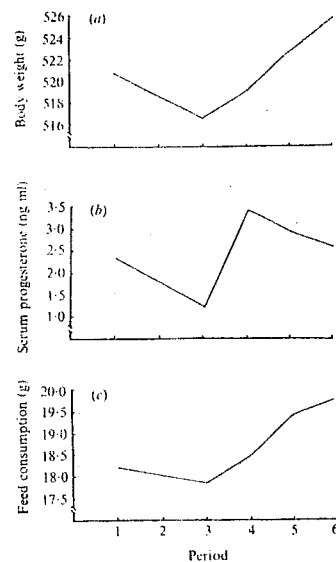


Fig. 2. Mean (a) body weight, (b) serum levels of progesterone and (c) feed consumption of cyclic chinchillas during the oestrous cycle. The length of the periods (6 days = one period) represents estimates of the follicular (days 1-12, periods 1 and 2), ovulatory (days 13-18, period 3) and luteal (days 19-36, periods 4, 5 and 6) stages.

GENETIC

VARIATION IN CHROMOSOME NUMBER IN DANISH BLUE FOXES.

(Variation i kromosomtallet hos danske blåårve).)

K. Christensen, Hans Pedersen, Den Kgl. Veterinær- og Landbohøjskole, Afd. for husdyrgenetik, Bülowsvej 13, 1879 Copenhagen V.

In view of the fact that the chromosome number of blue foxes in Sweden has been found to vary from 48 to 50, and that foxes with 49 chromosomes are reputed to have impaired fertility, chromosome analysis was carried out on blood cells from 30 blue foxes at 3 farms in Denmark. Of these foxes, 8, 12, and 10 had 48, 49, and 50 chromosomes respectively.

Dansk Pelsdyravl, 43 (10):435 (1980).

1 table, 1 fig.

In Danish.

CAB-abstract.

GENETIC ASPECTS OF ALEUTIAN DISEASE OF MINK.

David D. Porter, Dept. of Pathology, UCLA School of Medicine, Los Angeles, California 90024. USA

Aleutian disease is a chronic or persistent viral infection of mink, and is caused by a parvovirus. Highly virulent virus strains cause serious disease in all types of mink, while less virulent virus strains cause serious disease and death primarily in mink of the Aleutian genotype. Mink with progressive disease develop marked hypergammaglobulinemia and extremely high levels of viral-specific antibody. Deposition of circulating immune complexes causes severe glomerulonephritis and arteritis.

The tissue lesions may be decreased by immunosuppressive drug therapy or infection in utero, or increased by inoculation of a killed virus vaccine prior to challenge by live virus. While

it is apparent that both viral and host genetic factors play major roles in the development and extent of the lesions of Aleutian disease, additional work is needed for a complete understanding of the role the genetic factors play in this disease.

Elsevier North Holland Inc.

Genetic Control of Autoimmune Disease. Proceedings of the workshop on genetic control of autoimmune disease held in Bloomfield Hills, Michigan, USA, on July 10-12, 1978.

Part of a collective document.

In this document it is page 309-318, 1978, ISBN 0-444-00297-9.

59 references.

Authors abstract.





HORMONAL HEAT INDUCTION IN ANOESTRAL BLUE FOX VIXENS AFTER
RECORDING OVARIAL AND HORMONAL CONDITIONS.

(Forsøk med hormonell brunstinduksjon på anøstrale ungtisper
av blårev etter forutgående registrering av ovarial- og
hormonell status.)

Kjell Nyberg, Boks 62, N-9301 Finnsnes, Norge.

An investigation on the ovarial status of blue fox vixens which had not come into oestrus until the 15 of April is described. The ovarial status was determined both by progesterone-analysis and by laparotomy and direct inspection of the ovaries. Afterwards, the vixens were treated with 100 I.U. PMSG (Antex^R, Leo) every second day for five treatments. One day after the last PMSG treatment 200 I.U. HCG (Physex^R, Leo) was administered.

Two days after the last treatment, the vixens were killed and two ovaries were reexamined. The investigation showed that 44% of the vixens had functioning corpora lutea in the ovaries by the time of the first inspection. One vixen had cystic degeneration of the ovaries, two had follicles, while the rest had inactive ovaries. The progesteron levels were in accordance with the findings by laparotomy.

Thirty-one percent of the vixens with inactive ovaries responded to treatment with ovulation, and all of those with follicles ovulated, while no response of the vixens with corpora lutea could be registered.

Nord. Vet.-Med., 1980, 32, 128-131.

2 tables, 1 fig., 5 references.

In English with summaries in Norwegian and English.

Authors summary.

MALE INFERTILITY, LOSS OF KITS IN FINELY-BRED DARKS.

LeGrande C. Ellis, Kenneth Tung and Roland E. Howell, Utah State University, Dept. of Biology, College of Science, UMC 53, Logan, Utah 84322, USA.

A series of investigations were undertaken to characterize and possibly delineate the etiology of the male infertility and neonatal kit losses in finely-bred dark mink. Subsequent observations on blood and tissue samples of over 300 male mink showed that the infertility originated from lesions in either the testis (orchitis) or the epididymis (epididymitis). The condition was subdivided into two categories: 1) primary infertility--where the males were infertile the first year and 2) secondary infertility--where the males were fertile for one or more years followed by a subsequent year of infertility. Primary infertility was associated with poor testicular development, but in secondary infertility there was a high rate of autoimmunity of the testis and epididymis. In the testis the primary finding was aspermatogenesis that was associated with: 1) orchitis--a

condition characterized by infiltration of the interstitial area with white blood cells and/or macrophages, 2) seminiferous tubular orchitis--a condition where there was infiltration of the seminiferous tubular area with macrophages and/or white blood cells, and 3) immune complexes--a condition where there was a thickening of the basement membrane with a heavy deposition of immunoglobulins. The presence of antisperm antibodies in male and female dark, pastel, opal, and violet mink showed a genetic tendency in the ability of various color phases towards the induction of these antibodies.

Investigations using neonatal moribund kits from finely-bred dark mink indicate that the condition resulted from a lack of nursing and the inability of the kits to mobilize their energy reserves through insulin and glucagon responses. MSH was observed to be high in finely-bred dark mink and was postulated as being a possible mediator of the two conditions.

Blue Book of Fur Farming 1981, pp 19-21.
2 tables, 2 figs.

Authors abstract.

**NUMBER OF NEW BORN AND WEANING WHELPS AND THE CONTENT
OF SOME BLOOD PARAMETERS IN FEMALE POLAR FOXES.**

(Liczba urodzonych i odchowanych szczeniqt a zawartość
wybranych wskaźników krwi lisic polarnych).

Barbara Stanislawska, Ewa Dryzalowska, Oskar Lorek,
ul. Lomżyńska 47b/27, 85-863 Bydgoszcz, Poland.

There were compared 26 blood parameters in female polar foxes which born large and small number of whelps in a brood. The number of whelps in brood influenced blood parameters to a higher extent than pregnancy and lactation of individual females. In female polar foxes having 11-17 whelps in brood there was found lower concentration of haemoglobin, lower haematocrit value,

increase of the number of leukocytes in the course of lactation, decrease of gamma globulin level at the end of pregnancy and in the course of lactation, decrease of beta 1 and increase of alpha 1 at the end of pregnancy and increased activity of AIAT and AspAT in the course of lactation, and higher concentration of inorganic phosphate and lower K and Mg level in the period of nursing.

Medycyna Weterynaryjna, 36 (7), 442-445, 1980.

3 tables, 18 references.

In Polish with summaries in Polish, Russian, and English.

Authors summary.

INVESTIGATIONS ON THE DURATION OF SUCKLING IN NUTRIA.

(Untersuchungen über die zweckmässige dauer der saugezeit
in der sumpfbiberzucht.)

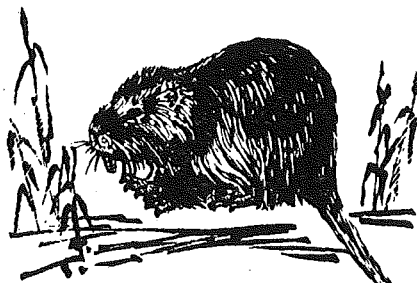
J. Szuman, A. Skzydlewski,

Early weaning (at 21 days of age) of nutria had no deleterious effect on the performance of the young, and had a beneficial effect on the reproductive performance of the dam.

2 figs., 4 references.

In German.

CAB-abstract.



ORIGINAL REPORT.**A SURVEY OF THE VITAMIN STATUS IN MINK OF VARIOUS AGE, SEX, AND PELT QUALITIES IN FRANCE (F) AND YUGOSLAVIA (YU).**

Ivan Belčić, F. Hoffmann-La Roche & Co., CH-4002 Basel, Schweiz.

Several factors should be taken into consideration in assessing the rentability of a mink farm.

In the first place, there is the production of first class pelts. Furthermore, fertility and resistance to illness of the animals are of great importance.

In order to determine the vitamin status of mink from two geographically widely separated farms, relevant surveys were carried out whose aim was to investigate the possible correlation between vitamin content, fertility, and pelt quality. Vitamins A, E, and biotin in liver and plasma, respectively, were studied.

Regarding the farms, there was a private one in France with approximately 1500 in-bred animals of the so-called wild type shade, and then a veterinary station in Yugoslavia with approximately 1000 in-bred animals with furs of standard and pastel shades.

At the end of 1978, mink born in the same year were killed and skinned at the French farm. A smaller number of older in-breds of both sexes was also included. Thirty females and males, respectively, were chosen at random, and, after anaesthesia with Nembutal, blood samples were taken by heart puncture. After separation of the plasma by centrifugation, it was deep-frozen at -28°C in the laboratory. After skinning, the livers were removed and the bile drained. The livers were washed with physiological saline, dried, and deep-frozen under nitrogen protection. A similar procedure was also carried out with the livers at the Yugoslavian farm.

The results of our experiments are summarized in the following Table no. 1.

In the age group 7-8 months in the French mink a great difference was found in vitamin A content per gram of liver in relation to sex. Analyses showed 33,480 IU vit. A in the females and 27,490 IU vit. A in the males. The statistical evaluation using the t-test resulted in a high significance ($p < 0.01$). Also in the 3-4 year old mink from the same farm the vitamin A content per gram of liver in the females was 53,140 IU vitamin A - $p = < 0.001$ - significantly higher than in the males with 22,890 IU vitamin A. As a consequence of the twice as heavy livers in males, in absolute terms, approximately 5000,000 IU vitamin A more would be stored.



Analysed groups	Average vitamin content of liver () number of samples				in plasma
	Weight of liver (g)	Vitamin A (IU /g)	Vitamin E (µg /g)	Biotin (ng /g)	Biotin (ng/100 ml)
Female age:7-8 mts. fur quality: good	F 43.9 (30) Y (30)	33'480** 27'490	28.9** 30.2	1'113 878	131 (14)
Male age:7-8 mts. fur quality: good	F 83.2 (30) Y (24)	23'610** 21'840	19.4** 21.2	964 909	140 (14)
Female age:3-4 yrs. fur quality: good	F 47.9 (30)	53'140***	43.9***	1'011	140 (14)
Male age:3-4 yrs. (1978)	F 81.9 (30)	22'890***	18.6***	1'080	118 (14)
Male (1979)	F 92.88 (58)	59'420	82.4	1'070	141

Statistical evaluation acc. to Student's t-test:

** Significance $p < 0.01$

*** Significance $p < 0.001$

In the corresponding Yugoslav 7-8 month old age group, no difference in vitamin A content between the sexes could be demonstrated. In statistical terms, therefore, the null hypothesis was confirmed. The corresponding vitamin A results published by ÄHMAN (1966) were considerably exceeded in this study.

A similar situation to vitamin A was observed for vitamin E. In the French mink, there was again a sex dependence. In the age group of 7-8 months, 19.4 µg α-tocopherol per gram of liver was found in the males and 28.9 µg in the females. These differences are statistically significant - $p = < 0.01$. In the 3-4 year age group, there was an even greater difference with a p value of < 0.001 . The analytical results were 18.6 µg α-tocopherol per gram of liver in the males and 43.9 µg in the females. Similar results were published by HELGEBOSTAD in 1975.

If one takes into consideration the above average reproduction capacity of the French farm, then this can be seen to be associated with the good vitamin E supply. This interesting finding needs to be substantiated further.

Regarding the biotin contents in liver and plasma, there were no definite differences to be found between the sexes in either of the different age groups. In the liver, approximately 1 µg/g, independent of age, sex, or origin, was found. The average biotin contents in plasma varied between 120-140 ng/100 ml.

It is interesting to note that also in Collie dogs approximately 140 ng biotin per 100 ml of plasma were found (TRIEBEL 1980).

However, comparisons with other species seem to be less relevant, owing to the essential differences in nourishment and behaviour.

References:

ÄHMAN G.: Versuch mit verschiedenen Vitamin A-Futtermitteln für Nerze.
Der Deutsche Pelztierzüchter 45, 5, 81-83 (1971)

HELGEBOSTAD A.: Vitamin E-Mangel bei Nerzwelpen vor dem Absetzen.
Der Deutsche Pelztierzüchter 49, 3, 45 (1975)

TRIEBEL D.: Personal communication (1980).

Tuomo Kiiskinen; Agricultural Research Centre/Institute of Animal Husbandry

Jaakko Mäkelä; Finnish Fur Breeders Association/Helve's Foundation

DIGESTIBILITY OF PELLETS ON MINK AND FITCH

The mink (*Mustela vison*) and the fitch (*Mustela putoris*) belong to the family Mustelidae. When comparing the size and body construction they are very much like each other. The digestion ability of mink has been vastly investigated. The fitch is fairly new as a farm animal and thus its digestion capacity is more unknown. As mink and fitch are very near relatives, it is quite likely that they are similar even in this aspect. On the Veikkola Research Farm of Helve's Foundation both mink and fitch have been fed with pellets. In these experiments the faeces of the fitch have been by visual detection considered more solid than those of mink, which may indicate differences in digestion systems. Therefore a digestibility trial was carried out at the Institute of Animal Husbandry in Jokioinen, in order to compare the digestibility of pellets on mink and on fitch.

MATERIAL AND METHODS

The research animals, 12 male kits of each species, 3-4 months in age, were moved from Helve's research farm to Jokioinen. The fitch kits were approximately 2 weeks younger than the mink due to the later whelping time of the species. The kits had already been on pellets on the research farm. After 5 days adaption time the actual digestibility trial was carried out during 4 days. During this time the feed consumption was measured and the faeces and urine collected and weighed. The weight of the animals was determined both in the beginning and the end of the 4 days collection period. The water consumption of the animals was controlled during 5 days. Both the feed and the faeces were analysed, the protein and fat being determined from fresh samples and the other elements from samples dried in 60°C. The method of fat determination includes hydrolysis (with 3-n HCl) before ether extraction. The nitrogen content of the urine was determined. The feed used in the experiment was a Finnish

commercial type pellets. The chemical composition is presented in table 1. The diameter of the granules was 4.0 mm. The mean feed ratio was 115 g per animal a day, which means 110 g dry matter per day. The mean temperature in the experiment room was 15°C. One mink was discarded because of illness.

Table 1. The analysis and the ingredients²⁾ of the pellets¹⁾

	% In pellets	% Dehydrated basis
Dry matter	94.9	
Crude protein	43.9	45.6
Crude fat	21.1	22.1
Crude fiber	1.3	1.4
N-free extr.	20.7	22.2
Ash	8.3	8.7

1) Täysrehu 3 (complete dry feed), manufacturer Vasa Mills Ltd.

2) Ingredients according to the manufacturer: fishmeal 40 %, soybeanmeal 8 %, meat- and bonemeal 5 %, brewer's yeast 3 %, bloodmeal 1 %, wheat germs 2 %, greenmeal 4 %, feathermeal 3 %, fat 19 %, processed cereal 13 %, minerals 1 and vitamin mixture 1 %.

RESULTS AND DISCUSSION

In the beginning of the trial the fitch kits were almost 280 g lighter than the mink kits. The fitches being c. 2 weeks younger they were still growing very fast and gained almost 100 g more in weight during the 4 days collection period than the mink. The deviation of individual values was higher in mink. The results may also have been affected, partly, by the restlessness of mink compared to the fitch.

Table 2. Mean weights of the animals and weight gain during the trial.

	Mink	Fitch
Starting weight g \pm SD	1398 \pm 125	1121 \pm 62
Finishing weight g \pm SD	1424 \pm 133	1242 \pm 60
Weight gain g \pm SD	26 \pm 40	121 \pm 21

SD = Standard deviation

During the collection period the feed consumption counted as dry matter was c. 50 g higher for fitch than for mink (table 3), the difference being statistically significant ($p < 0.001$). The dry

Table 3. The consumption of feed dry matter and dry matter content of the faeces.

	Mink	Fitch	
Feed dry matter per animal g \pm SD	299.9 \pm 37.2	349.7 \pm 25.4	t=3.93 ^{***} (df 2)
Dry matter in faeces %	25.7 \pm 1.9	27.6 \pm 0.6	t=3,22 ^{**} (df 2)

**) $p < 0.01$ 99 % significance

***) $p < 0.001$ 99.9 % significance

matter content of the faeces was also significantly higher ($p < 0.01$) for the fitch. In parallel control the fitches consumed both more feed (table 4) and more water than the mink. Concerning the mink, the results agree with previous investigations of the water consumption of mink (Mäkelä 1971). The relation of the amount of water to the amount of feed was for mink a little higher which may be a cause for the loose consistence of faeces.

Table 4. Consumption of feed and drinking water.

	Mink	Fitch	
N	5	5	df=4
Feed consumption g/day	83.7 ± 15.3	95.2 ± 11,0	t=1.10
Water consumption ml/day	205.6 ± 26.3	210.8 ± 20.9	t=0.29
Drinking water/feed	2.49 ± 0.24	2.22 ± 0.16	t=1.62
Water in the feed ml/day	4.2	4.8	
Water consumption total ml	210	216	

The digestibility of protein, fat, fiber and ash was almost exactly the same for both species (table 5). The NFE (nitrogen free extracts) on the contrary showed c. 8 % higher digestibility for mink than for fitch. The difference was highly significant ($p < 0.001$). Therefore the crude carbohydrates and the organic matter also showed better digestibility for mink. The higher carbohydrate content in fitch faeces may even be the reason for their more solid consistence.

Table 5. The digestibility ratio (+SD) and nitrogen balance for mink and fitch respectively.

	Mink	Fitch	
N	11	12	df=21
Organic matter	77.4 ± 1.2	75.3 ± 1.2	t=4.37 ^{***}
Crude protein	79.9 ± 1.4	79.7 ± 1.1	t=0.43
Crude fat	85.8 ± 2.9	85.7 ± 1.7	t=0.09
Crude fiber	7.2 ± 9.3	7.1 ± 7.4	t=0.02
N-free extr.	68.3 ± 2.6	60.2 ± 2.4	t=7.98 ^{***}
Crude carbohydrates	64.8 ± 2.6	57.1 ± 2.2	t=7.66 ^{***}
Ash	38.5 ± 2.6	39.4 ± 2.4	t=0.88
Nitrogen balance g	+8.6 ± 2.6	+7.7 ± 2.6	t=0.85

***) $p < 0.001$ 99.9 % significance

The mink had also slightly a higher nitrogen balance, but the difference was not significant compared to the fitch. What can be the reason for lower carbohydrate digestibility? The 2 weeks difference in age can hardly result in such a clear difference, especially as the variation in both groups was very limited. A possible explanation is that mink has been farmed a lot longer than fitch, it has been adapted to digest even carbohydrates, because the mink feed conventionally includes 10 % of cereal which means approximately one third of the dry matter.

In table 6 the amount of metabolizable energy in the pellets both for mink and fitch has been counted. According to this the mink is able to get 80 kcal more out of a kilogram of feed dry matter. The calculated value of the pellets, 4 Mcal metabolizable energy/kg dry matter and 36.4 % digestible protein on a dehydrated basis agree well with the values presented by the manufacturer.

Table 6. The amount of digestible protein and the calculated energy value in pellets:

	Mink		Fitch	
Dry matter %	95	100	95	100
Digestible protein %	34.8	36.4	34.7	36.3
Metabolizable energy Mcal				
from protein	1.56	1.64	1.56	1.64
from fat	1.68	1.76	1.68	1.76
from carbohydrates	0.58	0.63	0.52	0.55
Mcal/kg	3.82	4.03	3.76	3.95
MJ/kg	16.00	16.89	15.75	16.55

The energy coefficients: protein 4.5, fat 9.3 and carbohydrates 4.1 kcal/g

SUMMARY

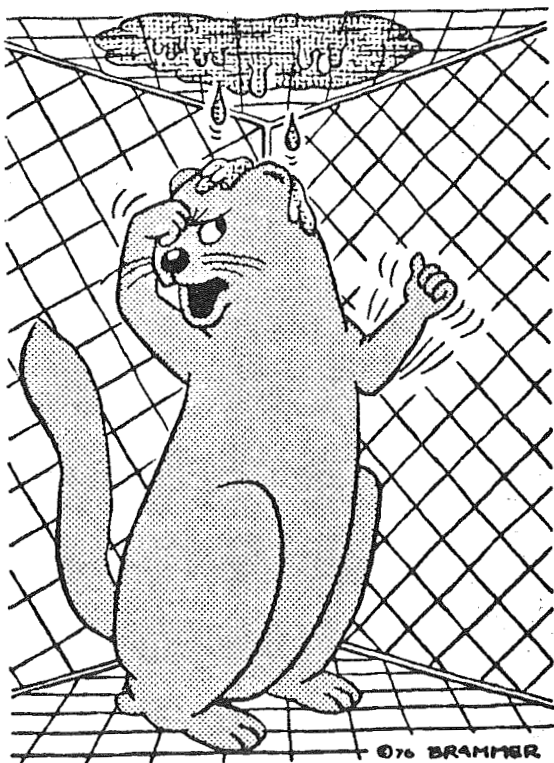
A comparative digestibility and balance trial on mink and fitch was carried out using a pelleted dry feed planned for mink. In the same experiment the water consumption of the animals was controlled. The groups consisted of 11 mink and 12 fitches.

The average digestibility of crude protein was c. 80 % and of crude fat c. 86 % for both species. The digestibility of NFE (nitrogen free extracts) was for mink 68 and for fitch 60 %, of crude carbohydrates 65 and 57 % and the digestibility of organic matter 77 and 75 % respectively. The animal species showed statistically significant difference ($p < 0.001$). The concentration of metabolizable energy was for mink 4.03 and for fitch 3.95 Mcal per kilogram dry matter. The pellets included 36.4 % digestible protein in dry matter. The fitches consumed more feed ($p < 0.001$) and had more solid faeces ($p < 0.01$) than the mink. The total consumption of water was for mink 206 ml and for fitches 211 ml per day and the water-feed relation 2,5 and 2,2 respectively.

Literature:

Mäkelä, J. 1971: Minkin juomaveden tarpeesta, Turkistalous 43: 415-416
(About the need of drinking water for mink).

The original work has been printed in Finsk Pälstidskrift, 15, 1981, pp 193-195 and Dansk Pelsdyravl, 44, 1981, pp 211-213.



Something might be better
with pellets!

REFERENCE TO SOME SIGNIFICANT QUESTIONS OF NUTRITION
IN THE MINK.

(Osvrt na neka značajnija pitanja ishrane kanadskih
lasica).

I. Rajić, S. Paunović, Katedra za Bolesti Kopitara, Mesojeda,
Zivine I Divljaci, Veterinarski Fakultet, Belgrade,
Yugoslavia.

The paper submits the survey of needs of the mink concerning nutritive matters (energy, proteins and aminoacids, fats, mineral matters and vitamins) regarding the category. In connection with the needs, some diseases due to the lack of nutritive matters have been pointed out (avitaminosis, rachitis, poor fur, steatitis etc.). Of a larger number of nutritive matters which can be used in the diet the most significant of animal and plant origin have been pointed out. Of a larger number of tested prescriptions for the nutrition of the mink the sample of the constitution of starchy feed for minks. The paper submits the significant moments related to the feeding and drinking of minks.

Veterinarski Glasnik 34, (4), 403-410, 1980.

2 tables, 12 references.

In Yugoslav with summaries in English and Russian.

Authors abstract.



EVALUATION OF FISH VISCERA SILAGE AS A FEED RESOURCE.

Freddy Johnsen, Anders Skrede, Dept. of Animal Nutr., Agricultural University of Norway, N-1432 Ås-NLH, Norway.

The chemical composition of five different fish viscera silages was determined. The silages were produced at industrial-scale processing plants in the north of Norway. The method included preservation with approximately 0.75% formic acid and 0.75% propionic acid, autolysis, heating to 95°C and removal of fat by centrifugation. Two of the silages were concentrated by vacuum drying.

The method resulted in microbiologically acceptable and stable products. Propionic acid was to a certain extent lost during vacuum drying, but concentrated silages revealed good storage stability.

Proximate analysis revealed considerable variation between silages, especially with regard to fat contents which varied between 3.1 and 15.2% of the dry matter. The residual fat fraction was of poor quality as judged by free fatty acids and peroxide values.

Tryptophan was partly lost during processing and storage of the silage. Comparison with fresh viscera indicated a 50% loss of tryptophan in fish viscera silage. Other amino acids appeared not to suffer notable damage during processing.

The autolysis causes a degradation of the protein by the inherent enzymes of the viscera. The silages could be separated by centrifugation into a soluble phase and an insoluble sludge. The latter represented, on average, 12.7% of total dry matter, but contained about half of the total fat and most of the true protein. The soluble phase contained almost all the ammonia and more ash, as compared with the insoluble sludge. Free amino acids represented most of the amino acid nitrogen in the soluble phase.

Amino acid analysis revealed a higher concentration of the aromatic amino acids, phenylalanine, tryptophan and in particular tyrosine, in the insoluble sludge than in the soluble phase.

Acta Agric. Scandinavica, 31, 1981, 21-28.
9 tables, 16 references.

Authors summary.

NUTRITION, FARM MANAGEMENT USING A PELLET PROGRAM.

William L. Leoschke, MINK NUTRITION RESEARCH, National Mink Feeds
New Holstein, Wisc. 53061, USA.

The National Pellet Program for Mink provides six special formulations - one for each nutritional phase of the ranch year as follows:

Jan-Feb: Furring Pellet (higher energy) or Reproduction Pellet
(lower energy).
March-April 15-20th: Reproduction Pellet (lower energy)
April 15 (Darks)-20 (Mutations): Pre-Whelping Pellet.
Whelping-May: Lactation Meal.
June: Early Growth Pellet.
July-August: Late Growth Pellet.
Sept-December: Fur Production Pellet.

Farm Management recommendations include:

Ample fresh water throughout the ranch year.

Free Feed or Restricted feeding of the mink from pelting to April 15th - choice of feeding program related to factors of mink genetics, temperature of the environment and weight condition of the animals.

Wet mash program from whelping until the kits are 6-7 weeks of age with pellets in hoppers available for lactating mothers and/or kits.

Removal of light weight nursing females (less than 900 grams) at six weeks of age with a male kit to keep nursing anemia to a minimum.

Higher energy pellets for mink kits if cannibalism is a problem at 5-6 weeks of age (Early Growth Pellet).

"Don't Pelt Too Early" - pellets provide a stable fat resource and thus mink maintain excellent color stability into late December.

Breeder selection on the basis of (1) FUR QUALITY and (2) LACTATION PERFORMANCE.

Hybrid vigor via new genetics into the herd each year.

Blue Book of Fur Farming, 1981, pp 40-43.

Authors abstract.

PATHOGENIC, ENTEROTOXIN-PRODUCING STAPHYLOCOCCI IN MINK FEED AND MINK FEED RAW MATERIALS.

Tapio Juokslahti, Seppo Lindroth, Aimo Niskanen,
Dept. of Biochemistry, College of Vet. Medicine, P.O. Box
6, 00551 Helsinki 55, Finland.

Samples of 51 mink feeds and 101 raw material batches were analysed for pathogenic staphylococci. Of the feed samples 37% were contaminated with pathogenic staphylococci, the mean count being 3.02 log CFU (colony forming units)/g and the highest count being 4.48 log CFU/g of feed. Of the raw materials investigated, slaughter-house offals were most frequently contaminated and contained highest counts of *S. aureus*, 60% of the samples being positive with a mean log count of 3.86/g and a maximum of 5.70/g. Forty-eight staphylococcal isolates were tested for enterotoxin production. Toxin A, B or C were produced by eight isolates, A being the most common. None of the isolates produced B or E toxins.

Acta vet. scand. 1980, 21, 516-522.

7 tables, 19 references.

Authors summary.

In English with summaries in English and Swedish.

FEEDING TRIALS WITH BLUE FOXES.

(Fodringsforsøg med blåårve).

H. Konnerup Madsen, Agerledet, DK 9300 Sæby, Denmark.

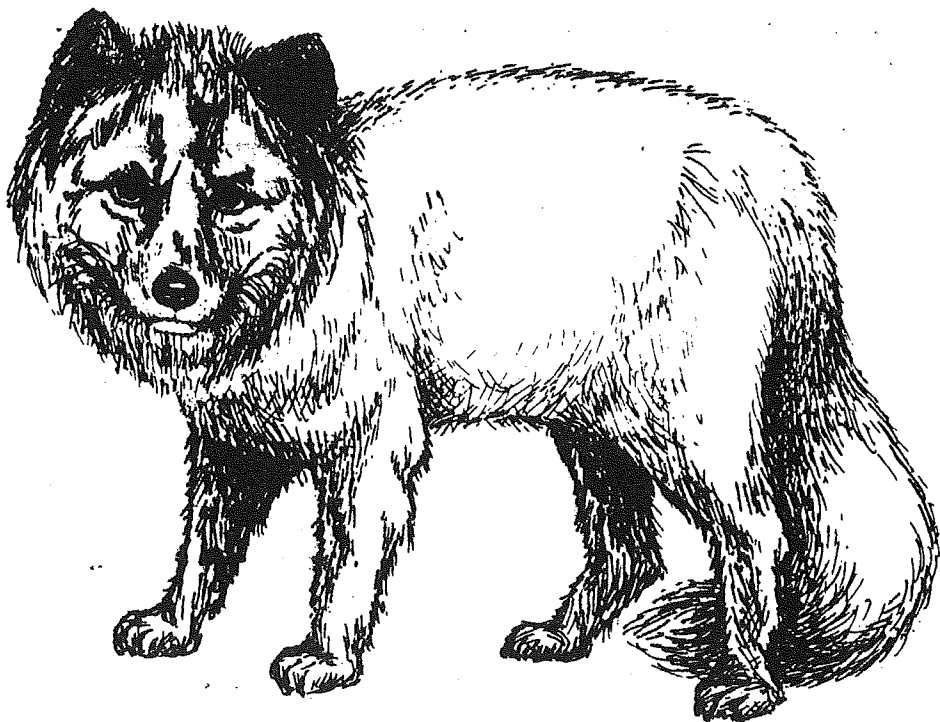
From July, 3 homogeneous groups of 120 young foxes were given to appetite conventional mink feed of good quality, alone or with 20 percent of a supplement. The supplement changed the proportion of protein in energy from 46 to 41 or 50 percent and of fat from 37 to 33 or 32 percent and of carbohydrate, in group 2, from 18 to 26 percent. From September until pelting half of each group continued on the same feed as before and the others had protein reduced to 41, 37 or 46 percent of energy; carbohydrate was increased to 24, 29 or 23 percent. Weight gain and pelt quality were not improved, and for group 2 were decreased, by changing the composition of conventional mink feed.

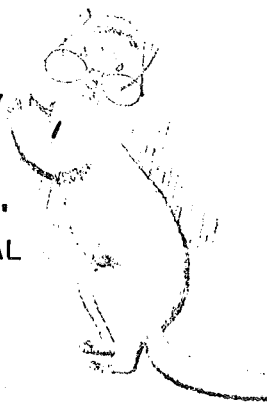
Dansk Pelsdyravl, 42 (5), 183-184, 1979.

3 tables, 1 fig.

In Danish.

CAB-abstract.





MORPHOLOGY AND BIOCHEMISTRY OF BLOOD OF SOME MUSTELIDS.
THIRD COMMUNICATION: ENZYMOGRAPHIC STUDIES INTO ARTERIAL
PLASMA OF MINK (*MUSTELA VISON* SCHREBER, 1777).

(Beiträge zur Morphologie und Biochemie des Blutes einiger Musteliden. 3. Mitteilung: Untersuchungen zum Enzymogramm im arteriellen Plasma des Farnnerzes (*Mustela vison* Schreber, 1777)).

R. Zeissler, U.D. Wenzel, W. Strauch, DDR-9706 Rodewisch Innere
Karl-Liebknecht-Str. 1.

Twelve different enzyme activities, which are listed and explained in greater detail in Table 2, were determined, statistically secured, and discussed, following a three-year study into arterial plasma of 118 female and 124 male minks, aged between six and seven months and kept under anaesthesia.

Simply normally distributed or logarithmically distributed plasma enzyme activities were found to differ primarily by sex, with other experimental conditions being identical and regular.

The enzyme activities of ICDH, active CPK, and total LDH (the latter only with females) were normally distributed, whereas all the other enzyme activities tested, except for gamma-GT and SDH, were of Gaussian distribution only after logarithmic transformation of the individual values.

The plasma enzyme activities of GPT, LAP, ChE, LDH₁, MDH, and AP differed from those of GOT, gamma-GT, SDH, total LDH and active CPK, in that they usually exhibited highly significant sex-related differences.

All minks were tranquilised and kept under general anaesthesia, using neuroleptanalgesia, but all their enzyme activities were found to vary just as widely as those reported elsewhere in literature, in the context of minks without anaesthesia.

The latter result was experimentally confirmed by means of a

model experiment in which enzyme activities were recorded from nine male ferrets, prior to, during, and after neuroleptanalgesia.

Arch. exper. Vet. med., Leipzig 34, 1980,
November , 6, 861-876.

5 tables, 2 figs., 46 references.

In German with summaries in German, Russian and English.

Authors summary.

**MORPHOLOGY AND BIOCHEMISTRY OF BLOOD OF SOME MUSTELIDS,
FOURTH COMMUNICATION: DETERMINATION OF SOME METABOLITES
IN ARTERIAL PLASMA OF MINK - FOUNDATIONS FOR PREPARATION
OF STANDARD VALUES FOR LABORATORY DIAGNOSIS OF ARTERIAL
PLASMA OF MINK (MUSTELA VISON SCHREBER, 1977).**

(Beiträge zur Morphologie und Biochemie des Blutes einiger Musteliden. 4. Mitteilung: Zur bestimmung einiger Stoffwechselprodukte im arteriellen Nerzplasma - Grundlagen zur Erstellung labordiagnostischer Arbeitswerte für den Farmnerz (Mustela vison Schreber, 1777)).

R. Zeissler, U.D. Wenzel, W. Strauch, DDR-9706 Rodewisch,
Innere Karl-Liebknecht-Str. 1.

An account is first given of latest knowledge on how to determine clinico-diagnostic applicability of certain metabolites in mink plasma and serum. Then, statistically treated results obtained from analysis of levels of total protein, albumin, creatinine, urea, total cholesterol, triglyceride, and total bilirubin are tabulated and discussed, with due consideration being given to sexual dimorphism, following determination of those values from arterial plasma of 118 male and 124 female minks, aged between six and seven months and kept under anaesthesia.

The following preliminary findings are somewhat worth mentioning:

(a) Total cholesterol concentrations in plasma of females were found to be higher than those recorded from the males tested. However, no sex-related differences were established for any of the other parameters.

(b) Creatinine, urea, and total cholesterol followed simple normal distribution. However, plasma protein concentrations exhibited no Gaussian distribution until all individual data had been logarithmically transformed.

(c) In a complementary model experiment, in which the above plasma data were determined from nine male ferrets, aged between six and seven months, evidence was produced to differentiated effects of neuroleptanalgesia on metabolite concentrations.

Arch. exper. Vet. med., Leipzig 34, 1980, November 6, 877-890.
5 tables, 78 references.

In German with summaries in German, Russian and English.

Authors summary.

HISTOCHEMICAL ACTIVITY OF SOME HYDROLYTIC ENZYMES IN THE FOX (*VULPES VULPES* L.) LIVER.

(Histokemijska aktivnost nekih hidrolitskih enzima u
jetri lisice (*vulpes vulpes* L.).

A. Hraste, J. Klapac, I. Stević, M. Majdak, Vet. Fac. Univ.
41001 Zagreb, Yugoslavia.

The liver of 10 foxes bred on the fur farm of the Veterinary Centre in Cakovec was investigated. The pieces of the liver were fixed in neutral formolcalcium and cut in the cryostat into 8 micron-thick sections. The activity of alkaline and acid phosphatases and esterases was investigated after Burstone (1962) and Pearse (1968). A strong activity of alkaline phosphatase was noted in sinusoids' endothelium, in the peripheral parts of the lobules but it was weaker in the central parts. Liver cells showed a very weak activity of alkaline phosphatase.

Acid phosphatase was found in the liver and in Kupffer cells and in interlobular connective tissue. Kupffer cells showed a strong activity of acid phosphatase, while the activity of enzymes within interlobular connective tissue and in liver cells was rather weak. In all the animals investigated liver cells showed either a weak or moderate activity of esterases. It was observed that sinusoids' endothelium and Kupffer cells showed a more manifest presence of esterases.

Veterinarski Arhiv 49 (6) 269-276, 1979.

3 figs., 30 references.

In Yugoslav with English summary.

Authors summary.

PSEUDOMONAS PNEUMONIA OF MINK: PATHOGENESIS, VACCINATION, AND SEROLOGIC STUDIES.

Gerald G. Long, Anthony M. Gallina, John R. Gorham,
Animal Disease Diagnostic Laboratory, School of Veterinary
Medicine, Purdue University, West Lafayette, IN 47907, USA.

Fulminating pneumonia was produced in mink by the intratracheal administration of *Pseudomonas aeruginosa*. The sequence of pulmonary lesions was focal inflammation, focal necrosis, and widespread inflammation and necrosis. Secondary lesions of peracute hemorrhage and necrosis were the result of bacterial spread via the airways. Invasion of vessel walls by *P. aeruginosa* was a terminal event and was secondary to bacillary invasion and necrosis of adjacent tissues. Regional (lymphatic) and systemic spread of bacteria followed the development of pulmonary lesions, but there was little morphologic evidence of tissue damage in other organs. Immunofluorescence studies showed that *P. aeruginosa* antigen was dispersed within pulmonary cells and was free in the lung parenchyma. Mink surviving beyond postinfection hour 60 had a macrophage infiltration into limited pulmonary lesions.

A vaccine trial was conducted with *P. aeruginosa* lipopolysaccharides (LPS) used as antigen, and an enzymelinked immunosorbent

assay was used to detect antibody. Antibody was detected in mink after vaccination with LPS or natural exposure. Mink with antibody to LPS, from vaccination or naturally acquired, were resistant to experimental infection.

American Journal of Veterinary Research, Vol. 41, No.10, 1720-1725.

3 tables, 4 figs., 28 references.

Authors summary.

INTESTINAL ADENOMATOSIS IN A BLUE FOX (*ALOPEX LAGOPUS*),

T. Landsverk, Dept. of Pathology, Vet. College of Norway,
P.O. Box 8146, Dep., Oslo 1, Norway.

An outbreak of diarrhea affected about 30 of 400 blue fox pups on one farm. The diseased foxes, from four litters that had just been weaned, were about 2 ½ months old. Older pups were not affected. One third of the diseased pups died during the acute phase of diarrhea, one third recovered and another third developed chronic diarrhea and debility. Treatment with tetracycline for three days had no effect of the course of the disease.

Necropsy showed anemia and emaciation. The walls of the cecum and the proximal portion of colon were up to 6 or 7 mm thick, and the lumen was narrow. The mucosa in the affected intestine was thick, wrinkled and ulcerated.

No pathogenic bacteria were isolated from the intestinal contents by routine techniques. No bacteriological examination was made of the intestinal wall. Parasitological examination on the intestine showed some immature specimens of *Taxascaris leonina*.

The lesion resembled the adenomatous hyperplasia described in pigs, lambs, and hamsters. The intracellular organisms also resembled those described in pigs, and hamsters, the organisms

in pigs being identified as *Campylobacter sputorum* subsp. *mucosalis*. The localization of the intestinal lesion in the cecum and colon, however, distinguishes this condition from that described in the other species, which usually involved the ileum as well. Otherwise, this disease is analogous to that in the other species, and may involve a symbiosis of bacteria and epithelial cells resulting in epithelial transformation. This is the first report of intestinal adenomatosis in the blue fox.

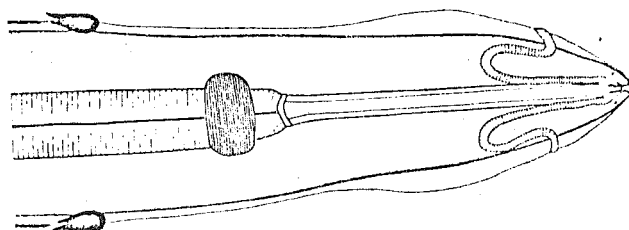
5 figs., 6 references.

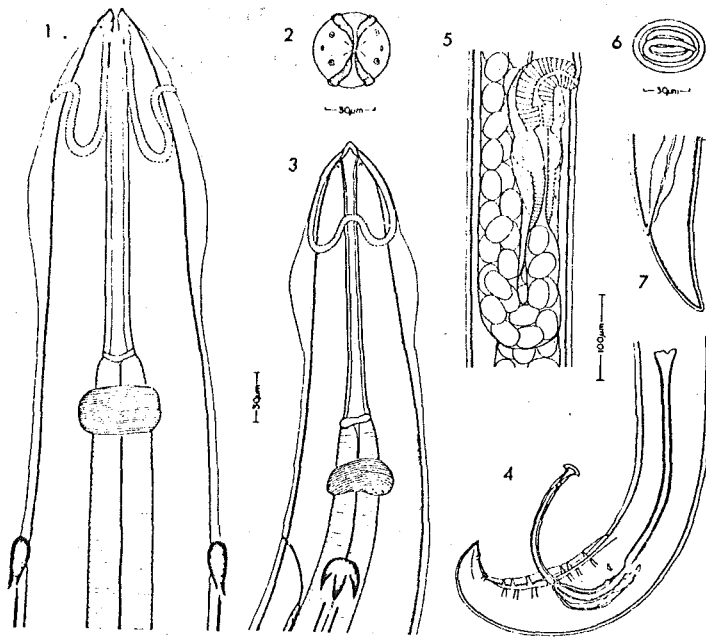
Abstract: G. Jørgensen

**CHANDLERONEMA LONGIGUTTURATA (CHANDLER 1942) GEN. ET
COMB. N. (NEMATODA: ACUARIIDAE) FROM RACCOONS,
PROCYON LOTOR, IN LOUISIANA.**

M.D. Little, Mir M. Ali, Dept. of Trocipac Med., Tulane Univ.
School of Public Health and Tropical Med., 1430 Tulane Ave.,
New Orleans, Louisiana 70112, USA.

Worms conforming to the description of *Synhimantus longigutturata* Chandler 1942 were recovered from the stomachs of raccoons, *Procyon lotor*, in Louisiana. The male is described for the first time. The worm has short, delicate, recurrent and anastomosing cephalic cordons; a long pharynx; and a pair of double, lateral alae, each arising behind a tricuspid cervical papilla. These features differ significantly from those of other species within the genus *Synhimantus* and, consequently, from worm is transferred to a new genus, *Chandleronema*.





FIGURES 1-7. *Chandlerionema longigutturata* (Chandler 1942) gen. et comb. n. 1. Anterior end of female, ventral view. 2. Female, en face view. 3. Anterior end of male, lateral view. Double lateral alae are shown beginning posterior to tricuspid cervical papilla. 4. Tail of male, showing spicules and genital papillae. 5. Female, lateral view in region of vulva and ojector. 6. Egg. 7. Female tail.

J. Parasitol., Vol. 66, No.3, June 1980.

1 fig., 1 table, 9 references.

Authors abstract.

TRICHOPHYTON MENTAGROPHYTES DERMATOPHYTOSIS IN WILD FOX.

William U. Knudtson, Connie E. Gates, George R. Ruth, Leonor D. Haley, Animal Disease Research and Diagnostic Laboratory, South Dakota State University, Brookings, South Dakota 57007 USA.

Dermatophytosis caused by a zoophilic variant of *Trichophyton mentagrophytes* was diagnosed in a litter of eight captures wild red fox, *Vulpes fulva*. The animals had widespread partial alopecia and scattered crusty foci 2 to 3 cm in diameter on the skin.

Treatment with 7 mg kg body weight day of griseofulvin in the feed effectively controlled the infection.

Journal of Wildlife Diseases, Vol. 16, No.4, Oct. 1980,

485-468. 1 fig., 10 references.

Authors abstract.

DIROFILARIA IMMITIS: EXPERIMENTAL INFECTIONS IN THE
FERRET (*MUSTELA PUTORIUS FURO*).

William C. Campbell, Lyndia Slayton Blair, Merck Inst. for
Therapeutic Research, Rahway, New Jersey 07065, USA.

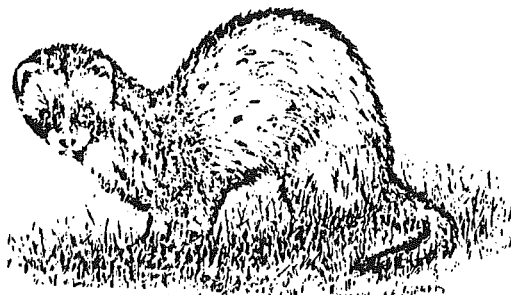
The ferret, *Mustela putorius furo*, was found to be susceptible to *Dirofilaria immitis* infection when exposed to low (14) or high (280-420) numbers of infective larvae harvested from *Aedes aegypti*.

Eight ferrets (half of them cortisonized) were inoculated subcutaneously with 14 larvae each. All of them were subsequently found to harbor *D. immitis* in the heart, and all but one of them had worms of both sexes. Six of these ferrets were examined for microfilaremia at 31 to 35 weeks after inoculation; 3 were positive (one observed only at postmortem examination) and there was evidence that fertilization of female worms had occurred in one other. Females up to 25.5 cm and males up to 16.0 cm were recovered. There was no evidence that the cortisonization of some ferrets had affected the infections. Both male and female ferrets became infected.

Four cortisonized ferrets were inoculated with 280 or 420 larvae of *D. immitis* (divided equally between subcutaneous and intraperitoneal routes). All of them died 16 to 18 weeks after inoculation, yielding 102 to 125 immature *D. immitis*. In these lethal infections, worms were recovered from the heart and adjoining vessels, and also from vascular and extravascular sites throughout the body.

Journ. of Parasitology, Vol. 64, No. 1, Febr. 1978, 119-122.
1 table, 1 reference.

Authors abstract.



TRIAL OF AVERMECTION B₁A, MEBENDAZOLE AND MELARSOPROL
AGAINST PRE-CARDIAC DIROFILARIS IMMITIS IN THE FERRET
(MUSTELA PUTORIUS FURO),

L.S. Blair, W.C. Campbell, Merck Inst. for Therapeutic Research,
Rahway, New Jersey 07065, USA.

Avermectin B₁a was found active against the pre-cardiac stage of *Dirofilaria immitis* in ferrets. The drug was given orally, at 0,2 mg/kg, on days 38-42 of infection. At necropsy, 5½ months after inoculation, worms were almost totally absent from the hearts of these ferrets. The efficacy of melarsoprol against developing *Dirofilaria*, which has been demonstrated in dogs by other workers, was demonstrated in ferrets given oral doses, at 100 mg/kg, on days 38-42 of infection. The reported efficacy of mebendazole was not evident in the ferret host in this study, probably because the treatment (100 mg/kg, orally, on days 38-42) was shorter and later than that reported for dogs.

J. Parasitol., 64 (6), 1978, 1032-1034.

1 table, 5 references.

Authors abstract.

BRUGIA PAHANGI AND DIROFILARIA IMMITIS: EXPERIMENTAL
INFECTIONS IN THE FERRET, MUSTELA PUTORIUS FURO,

W.C. Campbell, L.S. Blair, J.W. McCall, Merck Inst. for Therapeutic Research, Rahway, New Jersey 07065, USA.

Ferrets were inoculated with 160 third-stage larvae of the filarial nematode *Brugia pahangi*, followed 23 days later by 15 larvae of another filarial nematode, *Dirofilaria immitis*. Other ferrets received only one of these species. Microfilaremia developed in some ferrets with single infections of each species and in some ferrets with dual infections. The nature of the experiment did not permit a through study of microfilaremia, but *B. pahangi* microfilariae were found in numbers as high as 15,650/ml. At necropsy, approximately 8 months after inoculation, adult *B. pahangi* were recovered from the lymphatic vessels of all 8 ferrets inoculated only with that species, the recovery rate (based

on 6 animals only, varying from 2 to 50% of the inoculum (mean 25%). Adult *D. immitis* were recovered from the heart of all three ferrets inoculated only with that species, the recovery rate being 7, 47, and 60% (mean 38%) of the inoculum. All 5 ferrets inoculated with both species yielded both adult *B. pahangi* (6 to 23%, mean 16% of inoculum) and adult *D. immitis* (13 to 67%, mean 37% of inoculum). It is concluded that the ferret is highly susceptible to both species and that concurrent infections with both species may readily be established.

Expt. Parasitology, 47, 327-332, 1979.

2 tables, 9 references.

Authors abstract.

TREATMENT OF SARCOPTES INFESTATION IN RABBITS AND FUR ANIMALS.

Обработка кроликов и пушных

зверей при саркоптоидозах

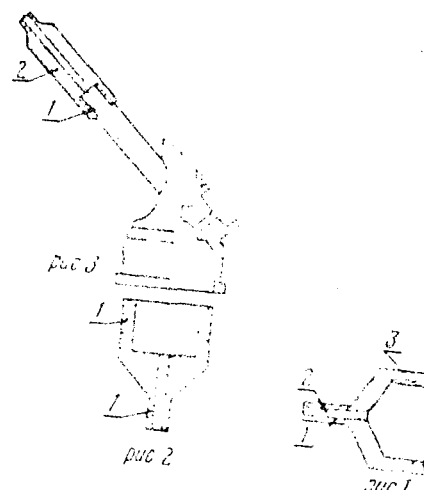
P.S. Strinadkin, Vsesdyuznyy Nii Veterinarnoi Entomologii i Arakhnologii, USSR.

An instrument for applying acaricides for control of psoroptes on rabbits and otodectes on fur animals is described. It is a modified 1-litre siphon, commonly used for the preparation of aerated drinks. The appropriate method of applying treatment and the advantages of the applicator are discussed.

Veterinariys, Moscow, 9, 44, 1980.

1 fig.

In Russian.



TRIAL OF KHIKOKKTSID (OR CHEMOCOCCID, A ROBENIDINE
ANALOGUE) FOR COCCIDIOSIS IN NUTRIA.

Испытание химкокцида
при кокцидиозе нутрий

Nukerbaeva, K.K., Svanbaev, S.K., Inst. Zoologii, Akademiya Nauk,
Alma-Ata, Kazakhskaya SSR, USSR.

Experiments were undertaken with coypu (*Myocastor Coypus*) artificially infected with 50,000 oocysts of *eimeria nutriae* and *E. Pellucida*. The maximum tolerated single dose of the Russian anticoccidial khimkoktsid was 200 mg/kg body weight, while the LD50 was 475 mg/kg. An effective concentration in feed was 0.003 percent. The drug was suitable for chemoprophylaxis because it was active against prepatent stages. It is not stated whether coccidiosis is a problem on the fur farms of Kazakhstan.

Veterinariya, Moscow, USSR, No.9, 43, 1980.

In Russian.

CAB-abstract,

AEROSOL-CIODRIN AGAINST PSOROPTES AND OTODECTES.

Аэрозоль-циодрин
против псороптоза и отодектоза

Simetskii, M.A., Vsesdyuznyi nii Veterinarnoi Sanitarii,
USSR.

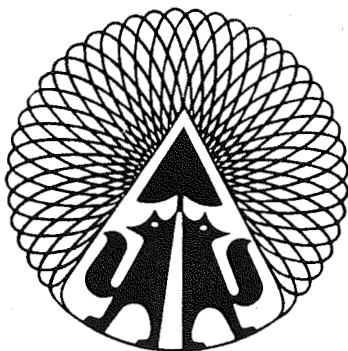
Foxes infested with a subspecies of *otodectes cynotis* (Her.) were treated with an aerosol containing crotoxyphos (ciodrin) without preliminary removal of the infested scab. The inner surfaces of the external ear were treated for 1-3 S from a distance of 15-25 cm twice, with an interval of 9-12 days. The aerosol foam disappeared after 1-2 min, and an oily solution impregnated the crust and brought the acaricide into contact with the mite. The mites died and the scab separated from the skin 3 days after the second treatment. No sign of infestation was seen 30 days later. For practical use, the acaricide can be applied by an atomising sprayer of local manufacture (Rosinka) in which no low-boiling propellant is used. Crotoxyphos was also tested for control of *psoroptes* on rabbits and *otodectes*

on fur-bearing animals. The atomising head of the sprayer is partly unscrewed so that the acaricidal solution emerges as a jet. For treatment of the inner surface of the external ear, the formulation used is a rapidly breaking foam that covers and permeates the scab in infested spots. It is necessary at the same time to treat the animals 1st cages with a 2 percent oil solution of crotoxyphos at rates of 49-50 g acaricide for rabbit cages and 70-80 g for fox cages.

Veterinariya, Moscow, 7, 39, 1980.

In Russian.

CAB-abstract.



NORDISKA JORDBRUKSFORSKARES FÖRENING
SCANDINAVIAN ASSOCIATION OF AGRICULTURAL SCIENTISTS

SUBSEKTIONEN FÖR PÄLSDJUR
Fur Animal Division

invites you to its annual scientific meeting 7-9 October,
1981, at hotel Cumulus, Forssa, Finland.

Preliminary program:

Physiological effects of different acids on mink.
by Gunnar Jørgensen, Denmark.

Amino-acid digestibility used as a parameter in feedstuff
evaluation.
by Anders Skrede, Norway.

Effects of N-decomposition on lactation and kit growth in
mink.
by Niels Glem Hansen, Denmark, and
Asbjørn Brandt, Denmark.

Use of trawl-fish to mink.
by Tapio Juokslahti, Finland.

Dry protein feedstuffs to mink.
by Hans Berg, Finland.

Research with pelleted rations for blue foxes.
by Jouni Kangas, Finland.

Energy metabolism in mink measured by slaughter technique.
by Niels Enggaard Hansen, Denmark.

The ration's contents of ashes insoluble in hydrochloric acid as tracer in digestibility trials.
by Tuomu Kiiskinen, Finland.

Energy supplement for mink from August to pelting.
by Hans Rimeslåtten, Norway.

Estimation of breeding value on mink.
by Knud Christensen, Denmark.

Use of index for selection in practice.
by Lars Elofson, Sweden.

Correlation between number of teats and litter size.
by Lennart Swenson, Sweden.

Gene symbols for foxes: suggested standard.
by Norodd Nes, Norway.

The Danish "red mink" and its genetics.
by Hans Toftegaard Hansen, Denmark.

Use of index for fertility.
by Ejnar Ejnarsson, Norway.

Different caryotypes in blue foxes. Research results and consequences.
by Norodd Nes, Norway, or
Ordin Møller, Norway.

Eradication of flies in fur farms.
by O. Skovmand, Denmark.

Morbus Aujeszky infection in mink farms.

by Torbjörn Mejerland, Sweden.

Experimental Encephalitozoonose. Research and consequences.

by S.F. Mohn, Norway.

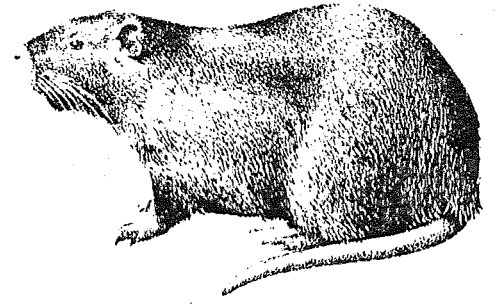
Eradication of *Sarcoptes scabiei* var. *vulpes*.

by K. Berge, Norway.

Plasmacytosis. Results of eradication in Scandinavia.

Discussion on the subject: Scandinavian Association of Agricultural Scientists, Fur animal division, and its role for research work regarding fur animal production in Scandinavia.

Language: Scandinavian languages will be used.



Ulf D. Wenzel

SUMPFIBER

Eine Anleitung über ihre Zucht, Haltung, Fütterung und Nutzung.
VEB Deutscher Landwirtschaftsverlag, Berlin.

A new book about nutria production has come out in Germany. The book is on 159 pages and is written in German.

This new book can be divided into six main parts:

- I. Biologi of the nutria.
- II. Reproduction.
- III. Farm and cage types.
- IV. Nutrition.
- V. Diseases.
- VI. Treatment of fur and meat.

First part of the book tells where in the nature one can find the nutria, and the way it got domesticated.

The second part deals with the different types of nutria, and the genetic symbols which are used. Further is a description of the different mating systems, and the selection of breeding animals.

Part three gives a short introduction in how to built up a nutria farm. The good and the bad sides of the different cage types are described, and the facilities which are necessary if the nutria farm shall be running satisfactory are mentioned.

The nutrition of the nutria is described in part four of the book. The first half of this part is dealing with the different kinds of food and the way to combinate them to give an optimum in the production. The second half is dealing with the requirments of the nutria on the different stages of the production cycle, and the right way to store the food.

In part five the most common diseases in a nutria farm and the way to treat them is mentioned. The main factors which course the diseases and the way to avoid these are also described.

The last part of the book tells how to treat the two products, fur and meat, so that the economic result can be as good as possible.

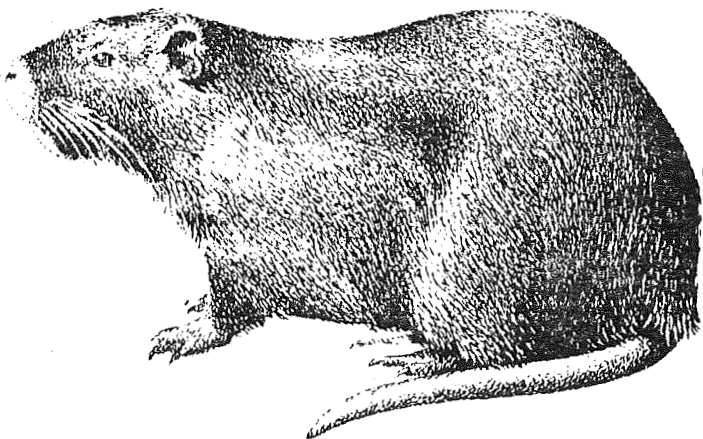
The book is dealing with all the important problems which occurs in the nutria production, and it is therefore good reading for anyone who already have one who wants to start a nutria production.

REVIEWED BY VILHELM WEISS.

BfK

Ulf D. Wenzel
Sumpfbiber

Eine Anleitung
über ihre Zucht, Haltung,
Fütterung und Nutzung



BfK

Sumpfbiberhalter produzieren Felle und Fleisch. Um dies mit größtmöglichem Erfolg tun zu können, sei dieses Buch eine kleine Hilfe für die tägliche Arbeit. Hier geht es um Fragen von Haltung, Fütterung und Krankheiten, die einzelnen Rassen werden vorgestellt, und auch auf Probleme der Zucht und Aufzucht geht der Autor ein. Besonders wertvoll für jeden Sumpfbiberhalter sind die Ausführungen über das Pelzen und die erste Behandlung des Felles.

BfK

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MICHIGAN STATE UNIVERSITY

DEPARTMENT OF ANIMAL SCIENCE
ANTHONY HALL

EAST LANSING • MICHIGAN • 48824

April 20, 1981

Gunnar Joergensen
NJF's Fur Animal Division
Scientifur
48H Roskildevej
DK-3400 Hilleroed
Denmark

Dear Gunnar

Enclosed are copies of two publications that may be of interest to readers of Scientifur. The Bibliography of Mustelids, Part VIII: Marten and Fisher will be sent free on request. We are selling the Bibliography of Foxes for \$5.00 per copy to cover printing costs. Requests for these publications should be sent to:

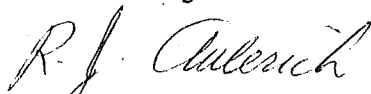
Dr. Richard J. Aulerich
Animal Science Department
Michigan State University
East Lansing, MI 48824

Orders for the Fox Bibliography should be accompanied by a check or money order, made payable to Michigan State University.

I'm also enclosing a reprint of an article on chinchilla that I don't think I sent to you before. You may wish to print the abstract in Scientifur.

Hope you have a good whelping season.

Kindest regards



Richard J. Aulerich
Professor

RJA/cmd

Enclosures

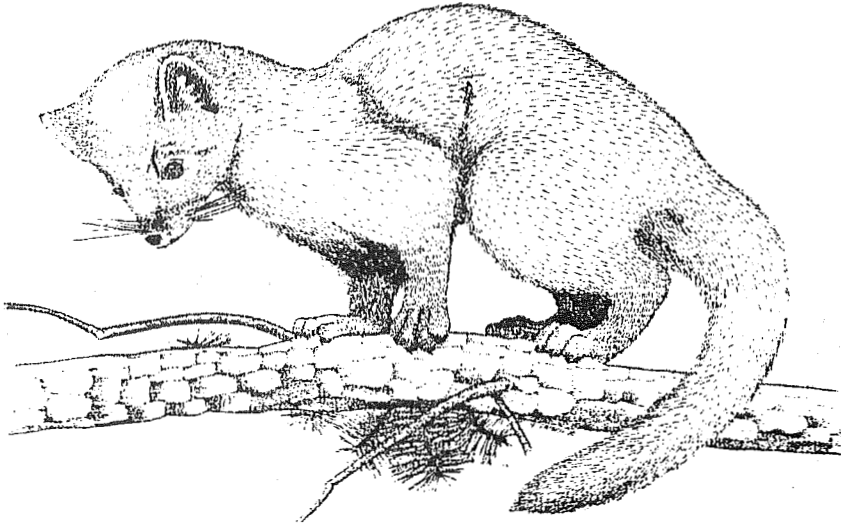
A BIBLIOGRAPHY OF MUSTELIDS

Part VIII: Marten and Fisher



A BIBLIOGRAPHY OF MUSTELIDS

Part VIII: Marten and Fisher



Containing more than
300 titles.

A Bibliography of Mustelids,
Part VIII: Marten and Fisher¹
1981

Compiled by

Karl A. Shump, Jr.², Ann U. Shump²,
Martha LaMarre², and Richard J. Aulerich³

This is the eighth of a series of bibliographies on Mustelids prepared to assist individuals interested in these species to obtain information published from 1900 through 1980. Although a fairly thorough search has been undertaken, this bibliography is not entirely complete. There are many general texts that pertain to Mustelids, as well as other animals, which are not included. Undoubtedly some foreign references have been omitted, although many are cited.

References in the bibliography are listed alphabetically by senior author under the following headings:

	<u>Page</u>
I. Anatomy	1
II. Behavior and Ecology	5
III. Distribution	9
IV. Evolution and Genetics	17
V. Feed and Nutrition	18
VI. Parasitism and Disease	21
VII. Physiology	25
VIII. Reproduction	26
IX. Taxonomy and Paleontology	29
X. Miscellaneous	31

Articles pertaining to more than one subject are listed under each appropriate heading. All authors names appear in the author index (Page 36).



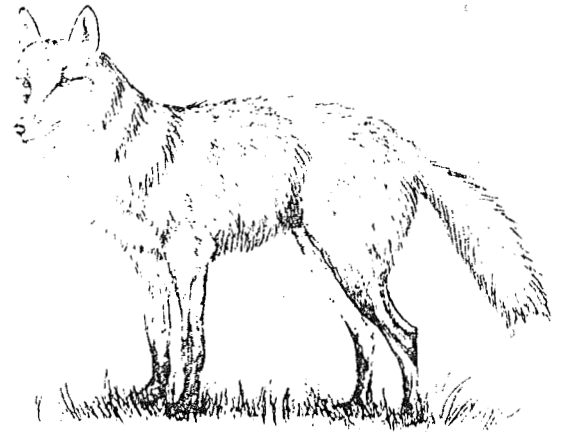
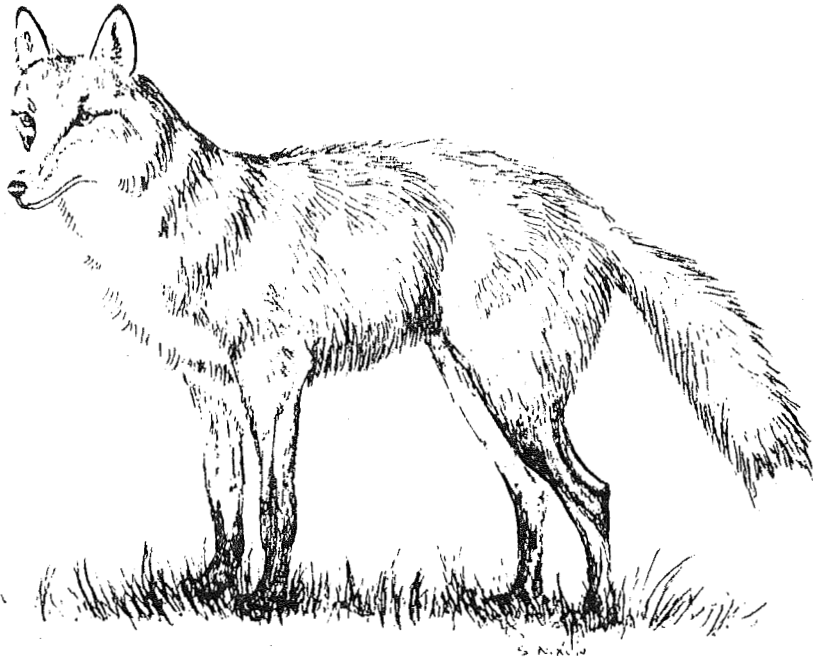
"Would I be getting too intimate if I ask
who does your indexing?"

¹ Journal Article No. 9904, Michigan Agricultural Experiment Station, Michigan State University, East Lansing, MI 48824.

² Department of Biological Sciences, State University of New York, Brockport, NY 14420.

³ Department of Animal Science, Michigan State University, East Lansing, MI 48824.

BIBLIOGRAPHY OF FOXES



Compiled By

Ross E. Jones and Richard J. Aulerich

BIBLIOGRAPHY OF FOXES^{1,2}

Compiled by

Ross E. Jones and Richard J. Aulerich
1981

This bibliography was compiled to assist individuals in obtaining information concerning foxes published from 1900 through 1980. Although a fairly thorough search has been undertaken, this bibliography is by no means complete. There are many general texts which concern foxes, as well as other animals, which are not included. Undoubtedly some foreign references have also been omitted, although many are cited.

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	<u>Page</u>
I. FEED AND NUTRITION	1
II. BREEDING AND REPRODUCTION	20
III. PHYSIOLOGY AND BIOCHEMISTRY	31
IV. DISEASES AND PARASITISM	45
V. ANATOMY AND MORPHOLOGY	74
VI. GENETICS	84
VII. CONSERVATION AND MANAGEMENT	95
VIII. BEHAVIOR AND ECOLOGY	105
IX. DISTRIBUTION, TAXONOMY, AND PALEONTOLOGY	119
X. FARMING	129
XI. MISCELLANEOUS	133

Articles pertaining to more than one subject are listed under each appropriate heading.



This Bibliography
covers more than
2100 titles.

¹ Journal article No. 9871, Michigan Agricultural Experiment Station.

² Animal Science Department, Michigan State University, East Lansing, MI 48824.