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8. COMMUNICATION

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NEW BOOKS:

LABORATORY METHODS OF THE FEED QUALITY ESTIMATION IN FUR BREEDING. V.A. Berestov, G.S. Taranov. Code 7-8-14-M-F-0.

BLOOD PHAGOCYtic REACTIONS IN MINK AND POLAR FOX (COMPARATIVE CHARACTERIZATION). L. Nauka. Code 3-14-M-F.

RATIONAL MEANS OF FEEDING A BASIC MINK HERD. I.A. Samkov. Code 6-M.

KANINCHEN KRANKHEITEN. Friedrich Knorr, Ulf D. Wenzel, Günter Albert. Code 9-0.

ILTISSE - ZUCHT UND HALTUNG. B. Sacher. Code 12-13-14-0.

LETTERS TO THE EDITOR.





3e CONGRES INTERNATIONAL SCIENTIFIQUE
SUR LA PRODUCTION DES ANIMAUX A FOURRURE

3rd INTERNATIONAL SCIENTIFIC CONGRESS
IN FUR ANIMAL PRODUCTION

25, 26, 27 avril 1984, Versailles, France

NOTES

SCIENTIFUR, VOL. 8, NO. 1, 1984.

We hope that you will excuse the delay and the lay out of this issue of SCIENTIFUR. The institute has increased the staff of authors without thinking about the typing. As assistance for Ellen in preparing the journal we therefore have purchased a Typewriter Video System, but at first such a system is not very helpful, at the same time it cannot live up to our intensions regarding the lay out, which we have used during the last years. Therefore, we still hope to get 1000 subscribers, so there can be economical basis for printing SCIENTIFUR in a professional way.

It is stimulating to see that an increasing number of authors provide us with original reports for publication in SCIENTIFUR - also for these authors we feel that it could be an advance if our product can be some more professional.

You will receive this first issue of Volume 8 just before the 3rd International Scientific Congress in Fur Animal Production. We are sorry that we are not able to bring the congress programme, but, hopefully, after the congress we should be able to bring interesting information for SCIENTIFUR's readers. In the meantime we are looking forward to meeting - hopefully - the majority of scientists in our special field in wonderful Paris late April 1984.

We regret very much that the production of the INDEX is still delayed - and to such an extent that we will not be able to present it for the Paris Congress.

We are also sorry that we have not yet received information about the York

Conference and other important - more and less - international meetings regarding fur animal production. It looks like other people also are very busy.

A lot of books about fur animal production are produced all over the world. Under Communication we introduce some of them.

Finally we want to thank all the subscribers both for accepting the increasing of the subscription price and for sending the payment very prompt.

See you in Paris.

Best regards



Gunnar Jørgensen

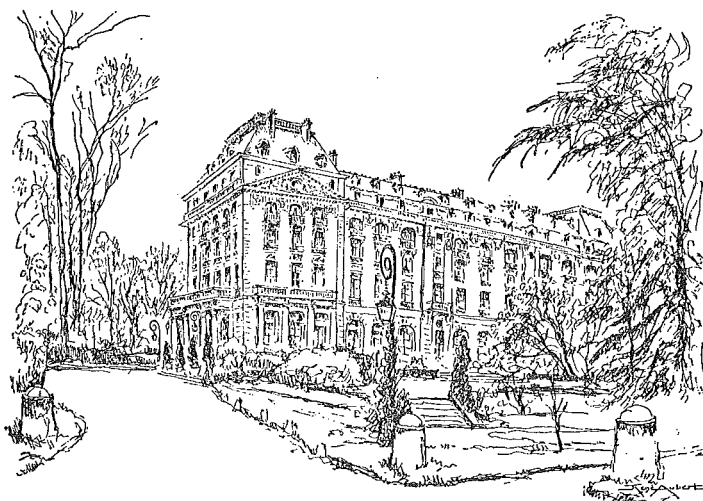
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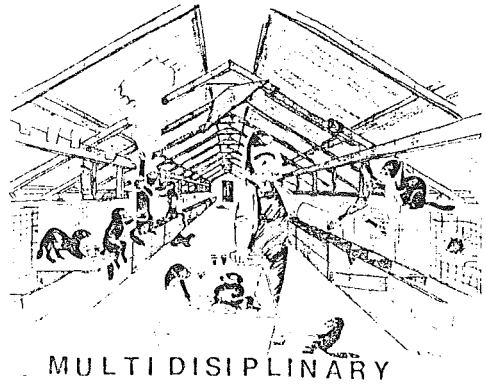
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A la lisière du Domaine National de Versailles, à proximité immédiate du Château et des deux « Trianons », dans un parc fleuri de 5 hectares aux arbres centenaires, fut édifié, de 1909 à 1911, par l'architecte Sergent, sur l'emplacement d'un ancien couvent de Capucins, le « Trianon Palace Hôtel ».



Original Report.

DIGESTIVE ENZYME ACTIVITY IN MINKS AND POLAR FOXES.

1. SPECIFIC CHARACTERISTICS OF ENZYME ACTIVITY.

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The dependence of digestive enzyme activity on the animal species and feed type is illustrated in many investigations (7,9, e.a.). However, most of the data is related to species eating vegetable and mixed feed. But fur-breeders are very interested in the works on the digestion of carnivorous as they include most of the objects, breeding on fur farms (2), since the results obtained on one species can not be always transferred to others (1,7). In the present study we have performed comparative investigation on proteolytic and amylolytic activities in the digestive tract of minks and polar foxes - carnivorous, rats - omnivorous and rabbits - herbivorous.

Material and methods.

The investigations were made on 6 months old minks (*Mustela vison* Schr.) and polar foxes (*Alopex lagopus* L.), on sexual mature male Wistar rats and on 5 months old rabbits of chinchilla race. Minks and foxes were feed with meat-fish paste-like diet with the following content of the digestive substances (g per 100 kcal): protein 7.5-9.0, fat 2.8-4.2, carbohydrate 6.2-8.5. The same diet was given to the experimental group of rats during 10-12 days. Control rats and rabbits were breded on grain diet.

In every group 6 individuals were studied: 3 males and 3

females, except rats, where only males were investigated. The animals were killed in 14-20 hours after last feeding. In one experiment minks and polar foxes were killed in 1 hour after feeding.

Pepsin activity (EC 4.4.1) was determined in the stomach content and mucosa, total proteolytic activity (EC 3.4.21.) and amylase activity (EC 3.2.1.) were determined in the pancreas and in the chyme and mucosa of the small intestine.

Proteolytic activity was determined according to Anson with some modifications, amylolytic one - according to Smith, Roe, in micromodification. Protein was determined according to Lowry. The activity was expressed in micromoles of tyrosine or respectively in mg of starch per 1 hour converted to 1 mg of protein.

Results and discussion.

High pepsin activity is mentioned in the stomach content of fasting minks and polar foxes. It reduces sharply in 1 hour after the feeding (Table 1). This decrease is caused by the dilution of gastric juice with the feed and is connected with the

Table 1. Pepsin activity in the stomach.

Degree of saturation	Animal species	Content	Mucosa
Fasting	Mink	21.59 [±] 2.89*	34.75 [±] 2.82
	Polar fox	20.09 [±] 2.68	47.87 [±] 3.25
	Rat control	7.77 [±] 0.82	24.50 [±] 0.90
	Rat experiment	6.34 [±] 0.71	27.28 [±] 1.20
	Rabbit	13.56 [±] 1.08	24.70 [±] 0.81
Fed	Mink	3.92 [±] 0.33	37.85 [±] 3.54
	Polar fox	0.97 [±] 0.15	49.09 [±] 4.58

x - Mean [±] SE of the mean.

the method of calculation converted to 1 mg of protein. The feed entrance in stomach increases pH of the content (in mink - 5.2 - 0.20, in polar fox - 6.4-0.05). Therefore, nutrient hydrolysis in the stomach cavity is mainly concentrated in the premucosal layer and directly in the mucose surface, where animals have high concentration of pepsin (Table 1) and where pH meaning may be low i.e. optimal for pepsin activity (3) even if pH of the content is high. Various gastro intestinal proteases having active optimums in wide range of pH can play important role in the digestion. The previous data on the presence of significant amount of hydrolysis products of protein in the stomach content of the fur-bearing animals indicates the intensive hydrolysis in it (6). However, use of the acidificated feeds would possibly promote effective digestion in stomach.

Comparison of the pepsinogen content in mucosa reveals the specific characteristics. In carnivorous it is higher than in rats and rabbits ($P \leq 0.001$). Protein increase in the diet causes the raise of the pepsinogen level in rats on 43% ($P \leq 0.1$). It was repeatedly marked in the previous studies. Antrivial is the fact of the lower pepsinogen concentration in mink mucosa in comparison with the polar fox, as the first are more typical carnivorous (7). We think that the differences in feeding for minks and polar foxes are revealed here. As the least need more feeding that the first so more of its mass correspond to the mucosa unit and so pepsinogen content must be higher for the effective digestion. It is confirmed by our results. Feed filling of the stomach has not considerable influence on the pepsinogen content i mucosa (Table 1), that is why this index is convenient in the comparative studies.

Pancreas. The change of rats diet influenced greatly on the enzyme content in pancreas tissue (Table 2,3): proteolytic concentration increased, amylase concentration decreased and the alteration of the latter was more expressed. Specific differences were more expressed in the comparison of amylolytic

Table 2. Proteolytic activity in pancreas and small intestine.

Degree of saturation	Animal species	Pancreas	Jejunum		Ileum	
			chyme	mucosa	chyme	mucosa
Fasting	Mink	51.23±3.52	4.53±0.50	3.17±0.17	5.27±0.70	3.29±0.29
	Polar fox	44.29±2.17	3.98±0.62	2.53±0.26	3.11±0.43	2.21±0.30
	Rat control	38.32±2.84	7.82±0.83	3.28±0.27	14.79±2.02*	3.65±0.39
	experim.	54.29±3.00	7.76±0.67	3.89±0.33	18.70±1.13*	3.75±0.34
	Rabbit	32.74±2.67	5.62±0.76*	0.76±0.04	9.54±0.98*	0.78±0.04
Fed	Mink	-	7.55±0.71	1.94±0.14	9.20±0.85	2.60±0.19*
	Polar fox	-	10.05±0.90*	1.37±0.09*	14.77±1.04*	2.50±0.15*

* - difference between jejunum and ileum is significant at 5% level ($P < 0.05$).

Table 3. Amylolytic activity in pancreas and small intestine.

Animal species	Pancreas	Jejunum		Ileum		
		chyme	mucosa	chyme	mucosa	
Mink	163.96±7.01	65.56±8.67	6.88±0.65	72.80±4.31	6.89±0.67	
Polar fox	261.24±12.15	69.57±7.68	9.89±0.93*	52.99±4.10	5.94±0.54*	
Rat	control	438.76±10.18	331.33±34.61	52.38±1.14	360.28±44.83	52.99±0.73
	experiment	233.99±9.32	185.54±31.90	42.92±3.24	251.70±29.47	41.14±3.64
Rabbit	694.07±18.00	289.48±27.70	28.00±2.35	399.70±75.84	26.14±2.54	

* - difference between jejunum and ileum is significant at 5% level ($P < 0.05$).

activity ($P \leq 0.001$), however according to the content of proteolytic proenzymes investigated animals lined up in the following sequence: mink, polar fox, rat, rabbit, although the significance of the differences between species was not large ($P \leq 0.2$).

Specific differences were even better expressed in the comparison of coefficient values which expressed the ratio of amylase/protease activities (Table 4). In this case the difference is large even in carnivorous. Our data differed slightly from those obtained by Kroghdahl & Holm (5), possibly it was connected with the diet used.

Small intestine The great individual variability of the enzyme activity is observed in the small intestine chyme (Table 2,3) and we think that it is connected with various speed of the feed

Table 4. Correlation of amylolytic and proteolytic activity in pancreas and small intestine.
(amylase/proteases).

Animal species.	Pancreas	Jejunum		Ileum	
		chyme	mucosa	chyme	mucosa
Mink	3.20	14.47	2.17	13.81	2.09
Polar fox	5.90	17.48	3.91	17.04	2.69
Rat control	11.45	42.37	15.97	24.36	13.94
Rat experiment	4.31	23.91	11.03	13.46	10.97
Rabbit	21.20	51.51	36.84	41.90	33.51

digestion. The specific differences may be revealed using the comparison of the coefficient mentioned above (Table 4). It is smaller in fur-bearing animals, intermediate in rats and the highest in rabbits. More certain results were obtained by determination of the digestive enzyme activity in the small intestine mucosa (Tables 2, 3). Investigation of the membrane digestion, which plays the main role in the final stages of nutrients hydrolysis (10) was not the purpose of our study, so our data reflect only the activity of pancreatic enzymes, absorbed on the enterocyte surface. Therefore, the activity studied corresponds in general to the pancreas activity although there are some unparallelity in proenzyme content and in the activity of the corresponding enzymes in various species.

For example, minks and polar foxes had lower proteolytic activity in mucosa than control rats, although the ration in the pancreas was inverse. However, the available data reported to be much higher peptidase activity in the small intestine mucosa of mink as compared to the rat (8) enable us to conclude that the first have in general more effective protein hydrolysis.

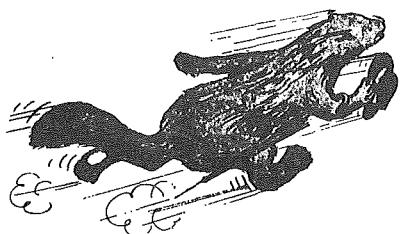
Our investigations revealed specific features in the digestion of fur-bearing animals: minks and polar foxes. They are: high pepsin activity in the stomach content and mucosa, high proenzyme concentration of proteases and low one of amylase in the pancreas, low amylolytic activity and moderate proteolytic ones in small intestine.

Enzymatic status depends greatly on the feed type since the rats which get meat-fish feed have indices similar to those of the

fur-bearing animals. Low proteolytic activity in the small intestine mucosa is possibly connected with the domestication of fur-bearing animals (4) and with the gradual adaptation of digestive system to the lowering of the diet protein component during their breeding.

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CONGRESS IN PARIS
25-27 APRIL 1984.



Original Report.

DIGESTIVE ENZYME ACTIVITY IN MINKS AND POLAR FOXES.

2. PROTEOLYTIC AND AMYLOLYTIC ACTIVITIES IN THE
DIGESTIVE TRACT OF FUR-BEARING ANIMALS
DURING POSTNATAL DEVELOPMENT.

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Science of the USSR, Karelian Branch, Pushkinskaya 11,
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The main regularities of the digestive functions formation in mammals were stated on rats and dogs (10). However, the specificity of this process gives no reasons for the free transfer of the results, obtained on one species to another (5). The digestion in kits of fur bearing animals was not studied yet and investigation made on this direction will of course promote the effectiveness of the youth feeding during intensive growth and development (1). In this work pepsin activity in the stomach content and mucosa, total proteolytic and amylolytic activity in the pancreas, chyme and small intestine mucosa during postnatal development of minks and polar foxes were studied.

Materials and methods.

The studies were performed on minks and polar foxes fed with common diet with the following content of digestive substances, for minks (g per 100 kcal): protein - 8.1-9.0, fat - 4.6-5.2, carbohydrate - 4.0 and for polar foxes: protein - 7.5-8.5, fat - 4.2-4.7, carbohydrate - 5.5. With the maturation fat amount in the diet was lowered with the increasing in carbohydrates amount

as it is accepted in fur-farms (4). Digestive enzymes activity is studied in 1 hour after the feeding in 35-, 60- and 180 days old animals and in 4 - 14 hours after the feeding in 15-, 25-, 60- and 180 days old animals. 6 animals were studied in every experiment. Methods of digestive enzyme activity estimation are indicated in the previous report. The activity was expressed in micromoles of tyrosine or respectively in mg of starch per 1 hour converted to 1 mg of protein.

Results and discussion.

In 1 hour after the feeding pH in the stomach content of the whelp was lower than in the adult ($P \leq 0,001$). It is caused by the consumption of lesser amounts of feed with high pH in the

Table 1. Pepsin activity in stomach.

Degree of saturation	Animal species	Age days	Content	Mucosa
Fasting	Mink	15	6,87 \pm 0,71	9.09 + 0.72*
		25	7,97 \pm 0,80*	14,08 \pm 0,70*
		60	57,97 \pm 6,47*	20,06 \pm 0,69*
		180	21,59 \pm 2,89*	34,75 \pm 2,82*
	Polar	15	4,07 \pm 0,27*	5,02 \pm 0,25*
	Fox	25	28,50 \pm 2,97*	13,88 \pm 0,70*
		60	95,10 \pm 11,82*	38,98 \pm 3,53*
		180	20,09 \pm 2,68*	47,87 \pm 3,25*
Fed	Mink	35	3,82 \pm 0,45*	17,94 \pm ,08
		60	2,78 \pm 0,19*	19,30 \pm 2,41*
		180	3,92 \pm 0,33*	37,85 \pm 3,54*
	Polar	35	2,50 \pm 0,44	35,80 \pm 3,60
	Fox	60	2,26 \pm 0,24*	43,90 \pm 4,72
		180	0,97 \pm 0,10*	49,09 \pm 4,58

* - difference between the adjacent age groups of animals of the same species is significant at 5% level.

beginning. Pepsin activity in mink whelps did not differ greatly

from that of the adults and in polar fox whelps was even higher (Table 1) what is also connected with the feed dilution of the content. Pepsinogen level in the whelps was high enough. So, even 35 days old animals have functionally mature stomach.

Pepsinogen content in the stomach mucosa of fasting animals differs slightly from that of fed ones at the same age. During milk rearing (15 days) and early mixed feeding (25 days) stomach level of pH was significantly higher than in the 2 months old and adult. Proteolytic activity was lower in the content during the suckling period. Lowering in the proteolytic activity of adults is possibly connected with a weakening of basal secretion characteristic of carnivorous (7). Greater amounts of pepsinogen are observed in the mucosa at the age of 25 days than at the 15 days age in minks, what possibly indicates earlier development of definitive function of their stomach as compared to that of foxes.

Proenzymes content in the pancreas increased with age and its correlation changed (Table 2). The most significant changes was observed during the transition to the definitive feeding which effect on the pancreas enzymes which is marked by many investigators (6, 9 e.a.). After the age of 2 months increase in proenzymatic content was not so significant except amylase content in polar foxes.

Specific differences were better expressed by the comparison of amylase activity and even more by comparison of the coefficient which forms enzyme correlation (Table 2). In fur-bearing animals as well as in the other animal species (6) the enzyme correlation during milk diet differs slightly. Significant changes take place under the influence of definitive feed.

Amylolytic activity in minks and polar foxes chyme (Table 3) had a tendency to increase with the growth of animals, however the age tendency was possibly masked under the influence of some other factors (8).

Table 2. Enzyme activity in the pancreas.

Animal species	Age days	Proteases	Amylase	$\frac{\text{Amylase}}{\text{Proteases}}$
Mink	15	12.46 \pm 0.92*	25.71 \pm 1.73*	2.06
	25	17.52 \pm 0.96*	35.92 \pm 1.34*	2.05
	60	49.48 \pm 1.42*	95.37 \pm 2.75*	1.93
	180	51.23 \pm 3.52	163.96 \pm 7.01	3.20
Polar fox	15	19.55 \pm 0.36*	26.14 \pm 2.13	1.33
	25	25.11 \pm 1.28*	30.66 \pm 0.73*	1.22
	60	42.73 \pm 1.63	109.10 \pm 6.48*	2.55
	180	44.29 \pm 2.17	261-24 \pm 12.15*	5.90

*) Differences between the adjacent age groups of animals of the same species is significant at 5% level.

Table 3. Amylolytic activity in small intestine chyme.

Animal species	Age days	Jejunum	Ileum
Mink	15	32.80 \pm 4.22*	8.77 \pm 2.32*
	25	92.69 \pm 10.74*	66.35 \pm 8.21*
	60	67.67 \pm 7.25	53.51 \pm 5.93
	180	65.56 \pm 8.67	72.80 \pm 4.31
Polar fox	15	14.48 \pm 2.22	18.89 \pm 2.85
	25	12.54 \pm 3.28	12.00 \pm 0.82
	60	35.87 \pm 4.51*	46.69 \pm 2.68*
	180	69.57 \pm 7.68*	52.99 \pm 4.10

In one hour after the feeding proteolytic activity in the small intestine chyme of the polar foxes whelps was lower than that of the adults (Table 4), the age differences of minks were not observed.

Table 4. Proteolytic activity in small intestine chyme.

Degree of saturation	Animal species	Age days	Jejunum	Ileum
Fasting	Mink	15	3.00 [±] 0.58	3.46 [±] 0.53
		15	12.77 [±] 2.13*	6.84 [±] 0.41*
		60	10.59 [±] 1.87*	6.59 [±] 0.95*
		180	4.53 [±] 0.50*	5.27 [±] 0.70*
	Polar fox	15	10.28 [±] 0.62*	7.47 [±] 0.73*
		25	7.32 [±] 1.34	9.09 [±] 0.61
		60	18.12 [±] 2.14	21.62 [±] 1.24
		180	3.98 [±] 0.62	3.11 [±] 0.43
Fed	Mink	35	7.50 [±] 1.45	9.58 [±] 1.36
		60	6.32 [±] 0.52*	10.71 [±] 0.80*
		180	7.55 [±] 0.71	9.20 [±] 0.85
	Polar fox	35	4.91 [±] 0.76	5.62 [±] 0.77
		60	4.48 [±] 0.47*	5.57 [±] 0.333*
		180	10.05 [±] 0.90*	14.77 [±] 1.04*

*) difference between jejunum and ileum is significant at 10% level.

The proximo-distal gradient in proteolytic activity was detected in all animals. The increase in proteolytic activity with age took place in fasting animals also. Some lowering of it in adults is connected with the presence of undigested feed remains in the chyme and possibly with weaker basal secretion.

The distinct increase in digestive enzyme activity with age took place when studying mucosa homogenates (Tables 5, 6), although even here this increase did not coincide with the proenzyme content in pancreas.

Table 5. Proteolytic activity in small intestine mucosa.

Degree of saturation	Animal species	Age days	Jejunum	Ileum
Fasting	Mink	15	0,82 ± 0,08	0,88 ± 0,06
		25	0,73 ± 0,06*	1,87 ± 0,19*
		60	3,21 ± 0,23	3,10 ± 0,19
		180	3,17 ± 0,17	3,29 ± 0,29
	Polar fox	15	1,93 ± 0,18*	1,06 ± 0,12*
		25	2,21 ± 0,22	1,69 ± 0,13
		60	2,71 ± 0,13	2,64 ± 0,28
		180	2,53 ± 0,26	2,21 ± 0,30
Fed	Mink	35	1,58 ± 0,26	1,60 ± 0,21
		60	0,47 ± 0,05*	1,04 ± 0,05*
		180	1,94 ± 0,14*	2,60 ± 0,19*
	Polar fox	35	1,34 ± 0,08	1,70 ± 0,25
		60	1,13 ± 0,09	1,18 ± 0,05
		180	1,37 ± 0,11*	2,50 ± 0,15*

Table 6. Amylolytic activity in small intestine mucosa.

Animal species	Age days	Jejunum	Ileum
Mink	15	4.83 ± 0.48	4.96 ± 0.46
	25	4.70 ± 0.40	6.13 ± 0.55
	60	6.00 ± 0.57	4.81 ± 0.46
	180	6.88 ± 0.65	6.89 ± 0.67
Polar fox	15	3.36 ± 0.36*	2.27 ± 0.21*
	...25	2.51 ± 0.20	2.32 ± 0.23
	60	8.93 ± 0.81*	6.59 ± 0.60*
	180	9.89 ± 0.93*	5.94 ± 0.54*

* - difference between jejunum and ileum is significant at 5% level.

In the fed animals proteolytic activity in small intestine mucosa at the age of 35 days was comparable with adult activity and at the age of 2 months it decreased. The proximo-distal gradient of the proteolytic activity, presence of which was shown on rats (3), was marked in all age groups. In fasting animals proteolytic and amylolytic activities increased with age in the homogenates of the small intestine mucosa, although in the adult animals protease activity decrease to some extent as compared to the 2 months old animals. The distribution of the proteolytic activity in the different parts of the small intestine in fasting animals was opposite to that of fed animals except 15 and 25 days old mink whelps. Amylolytic activity was distributed along the small intestine in similar way.

The investigations carried out allow us to characterize the digestive level in fur-bearing animals at the main stages of the postnatal development. The specific features of the whelps during milk rearing are less expressed. The enzyme activity in the main parts of digestive tract is not high. It increases during the first period of mixed nutrition and development of definitive function in mink whelps occurs more rapidly. At the age of 35 days animals are already able to utilize the definitive feeding. The digestion of 2 months old whelps is similar to that of adults according to the main parameters, although the specific features at that age are less distinctive as compared to the 6 months old animals.

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Original Report

ACTIVITY OF CHOLINE ESTERASIS IN THE BLOOD OF
FOXES AND MINKS.

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Summary.

A series of investigations aiming at determining physiological level of choline esterase (E.C. 3.1.1.8.) in whole blood of 18 black silver-foxes, 60 polar blue foxes and 60 minks, type standard were carried out. The designations used in the present paper are in accordance with the method of Hestrin in the modification by Juszkiewicz.

Activity of the enzyme stated as a result of the investigations ranged 110 ± 6 up to 112 ± 5 uM/ml/hr in the blood of black-silver foxes, 105 ± 10 up to 112 ± 5 uM/ml/hr in the blood of polar blue foxes and 65 ± 6 up to 78 ± 11 uM/ml/hr in the blood of minks.

It may be concluded that the activity of choline esterase in whole blood of the examined animals may be considered physiological.

Introduction.

The wide use of phosphorus organic agents in the protection of plants and in fighting against infestation diseases of animals creates potential danger of intoxication with these compounds. The fur-bearing animals are very much endangered with intoxication with the phosphorous organic compounds. It results from the fact that these animals are frequently fed with provenders which have been previously treated with the

phosphorus organic compounds. A very good indicator of that type of intoxication is the level of Ech activity in blood and other tissues of animals (2, 4, 5, 6, 7, 8, 9).

In accessible literature no data concerning the level of choline esterase in the tissues of foxes and minks could be found.

Hence, we have found it useful to carry out a series of investigations aiming at determining the physiological level of choline esterase (E.C. 3.1.1.8.) in whole blood of these animals.

Material and methods.

The investigations were carried out at animal-breeding farms in the Warsaw province. The material for the tests were 18 black-silver foxes, 60 polar blue foxes and 60 minks, type standard. The groups included equal number of animals of both sexes. The animals of both species came from the spring litter. Both foxes and minks were clinically healthy and free of any infectious and parasitical diseases.

The animals were fed with traditional pasty feed consisting of fresh meat and fish provenders with 12% admixture of green forage. The feed was complemented with mineral and vitamin premixes. Animals were fed ad lib. and had permanent access to water.

The blood was taken to analysis from 6 months old animals. The activity of choline esterase was determined in whole blood of the animals by means of the method of Hestrin (1) modified by Juszkiewicz and collaborators (3).

Results and description

The estimations of the Ech activity in the blood of foxes and minks are given in table 1. The juxtaposed data show that the

Table 1. Activity of choline esterase (E.C. 3.1.1.8) in whole blood of foxes and minks in $\mu\text{M}/\text{ml}/\text{hr}$.

Species	Consecutive year of investigations	Sex of animals	Number of animals	X	\pm S	Range of values
Black-silver fox	1st	males	9	110	\pm 6	98-114
		females	9	112	\pm 5	99-112
Polar blue fox	1st	males	15	108	12	101-126
	2nd		15	105	10	99-124
	1st	females	15	110	14	98-120
	2nd		15	107	9	96-115
Mink standard	1st	males	15	69	11	52-74
	2nd		15	65	6	51-69
	1st	females	15	78	11	71-88
	2nd		15	74	7	69-83

Designations: X = average; \pm S = standard deviation.

activity of choline esterase in the blood of foxes is higher than in the blood of minks. It could also be stated that the activity of Ech was greater in the blood of female animals than in the blood of male ones.

Since relatively few animals were taken to tests, the differences could not be considered statistically relevant. It seems that it would be desirable to prove this tendency on greater number of animals. Taking into consideration the stated levels of activity and the standard deviation, considerable stability of Ech level in the blood of foxes and minks may be concluded.

Lack of bibliographic data in accessible literature concerning Ech level in the blood of foxes and minks makes it impossible to compare the present results with the results of other observations. They may only be compared with the level of the enzyme in the blood of other species of farm animals.

Hence, it may be stated that the level of Ech activity in the blood of foxes is very much like the level of Ech in the blood of dogs and cattle animals, which is $100 \mu\text{M}/\text{ml}/\text{hr}$, while it is

considerably higher than Ech level in the blood of hens, rabbits and pigs. The level of Ech in the blood of minks is quite close to that of rabbits and higher than that of pigs (3).

The presented results are relevant from the comparative physiological point of view and may be used by medical and veterinary service to diagnose and estimate the severity of the animals intoxication with phosphorus organic compounds.

Conclusions.

1. The activity of choline esterase stated on the basis of the performed investigations of black-silver foxes, polar blue foxes and minks, type standard may be considered as physiological norms

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Enjoy your stay in Paris.

SOME BIOCHEMICAL AND HAEMATOLOGICAL VALUES FOR THE BLOOD
OF NUTRIA (MYOCASTOR COYPUS).

(Nektere biochemicke a hematologicke hodnoty krve nutrie).

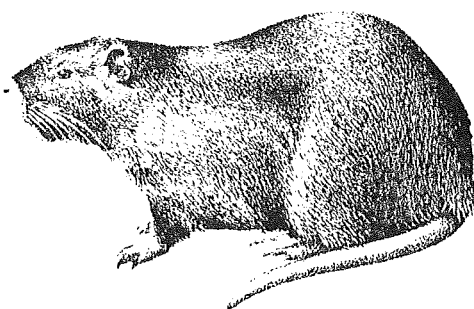
J. Komarek, SVŮ Pardubice, Czechoslovakia.

The author followed some biochemical and hematologic values and values of plasmatic proteins in 67 clinically healthy nutria of both sexes aged from 9 months to 2 years. Hematologic values were as follows: erythrocytes 5.03 ± 0.85 , leukocytes 7.71 ± 1.27 , hemoglobin 61.65 ± 10.87 g/l, hematocrit 0.40 ± 0.36 , neutrophil granulocytes 51.85 ± 14.76 , lymphocytes 43.95 ± 15.23 eosinophils 1.85 ± 1.89 , monocytes, $2.40 \pm 1.84\%$. Proteins: albumins $57.55 \pm 5.16\%$, alpha -globulins $12.41 \pm 5.50\%$, alpha -globulins $9.26 \pm 3.28\%$, beta-globulins $9.74 \pm 4.60\%$, gamma-globulins $11.05 \pm 3.52\%$. Biochemical values: calcium 2.51 ± 0.28 m mol/l, phosphorus 2.40 ± 0.51 , magnesium 1.46 ± 0.41 , sodium 146.56 ± 6.53 , potassium 6.45 ± 1.10 mmol/l, CB 61.73 ± 3.95 g/l, glucose 4.65 ± 2.52 mmol/l, urea 6.34 ± 2.30 , creatinine 74.79 ± 18.38 u mol/l, GOT 0.55 ± 0.20 u Kat/l, GPT 0.12 ± 0.06 , GGTP 0.33 ± 0.28 u Kat/l, cholesterol 2.25 ± 1.21 m mol/l, AF 2.23 ± 1.42 u Kat/l.

Sbornik Vedeckych Praci Ustredniho Statniho Veterinarniho Ustavu, 12, 148-152, 1982.

Author's abstract.

In CZEC, summaries ENGL, SPAN, RUSS.



RELATIONSHIPS AMONG HEMOGLOBIN, RELATIVE LIVER WEIGHT
AND PLASMA ALAT-ACTIVITY IN ALEUTIAN-POSITIVE MINK.

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Finland.

Blood samples obtained from 54 apparently healthy 6-month-old mink from the same farm were all positive for Aleutian disease by counterimmunoelectrophoresis. The mean haemoglobin concentration was 18.1 plus or minus 2.1 g/100 ml and mean alanine aminotransferase (ALAT) activity was 260 plus or minus 272 IU/l. The mean relative liver weight expressed as a percentage of body weight was 2.5 plus or minus 0.5 percent. There was significant correlation between all three values. The authors conclude that Aleutian disease status is a factor that should be considered in studies of ALAT, haemoglobin and relative liver weight in mink.

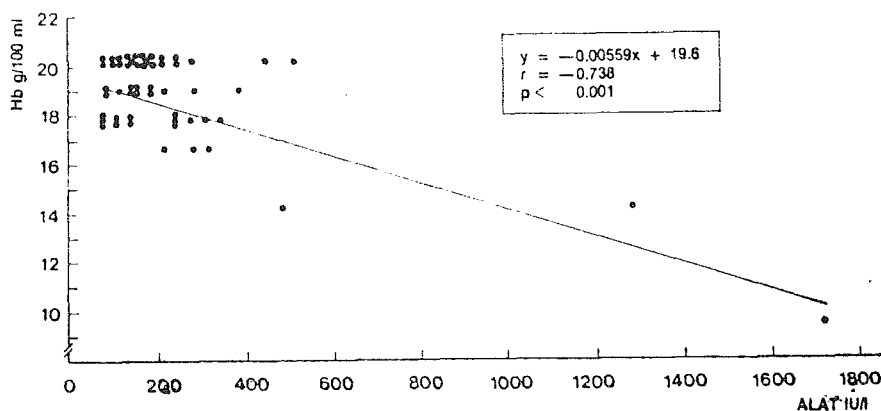


Figure 1. The relationship between the ALAT-activities and the Hb-concentrations in minks positive for Aleutian disease by counterimmunoelectrophoresis.

Acta Vet. Scand. 23, 4, 624-626. 1982.

2 figs., 6 references.

CAB-abstract.



3rd International Scientific Congress on Fur
Animal Production, April 1984.

ON and OFF LAYERS IN THE LATERAL GENICULATE NUCLEUS
OF THE MINK.

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The lateral geniculate nucleus (LGN), a major target of the optic nerve in mammals, is a laminated structure, although the pattern of lamination varies widely among different species. It has long been known that one function of the lamination is to segregate input from the two eyes. Many animals, however, have more than one layer innervated by each eye; the functional significance of these duplications has been only partially elucidated. In the mink, the principal layers innervated by the contralateral eye (layer A) and the ipsilateral eye (layer A1) are each split into two adjacent leaflets. We report here that the anterior leaflet of each pair contains ON-centre neurones and the posterior leaflets OFF-centre neurones.

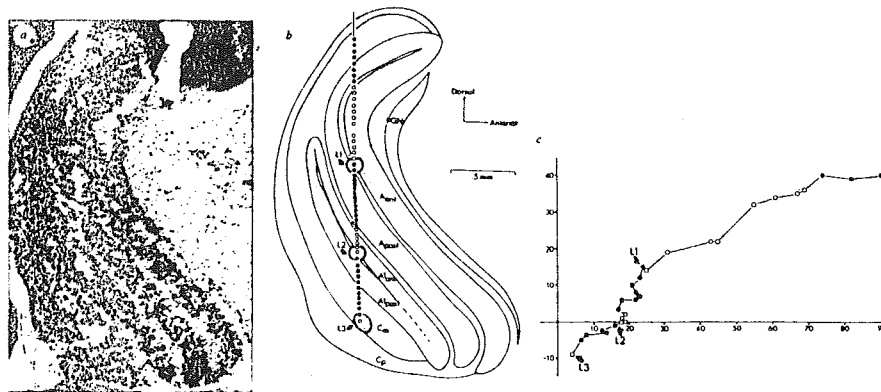


Fig. 1 Reconstruction of an electrode penetration through the left LGN of a mink. *a*, Parasagittal section (anterior to the right) stained with cresyl violet. Three electrolytic lesions made during the penetration are visible as pale spots. *b*, Key to *a*, showing the outlines of the layers, the positions of the three lesions (L1, L2, L3) and the responses obtained at 50- μ m intervals along the track (intervals were corrected for differential shrinkage). Circles indicate responses to the contralateral eye and squares to the ipsilateral eye. Open symbols indicate ON-centre responses, filled symbols indicate OFF-centre responses, and half-filled symbols indicate mixed responses. The first two lesions (L1 and L2) mark transitions from ON-centre to OFF-centre responses, and lie between the anterior and posterior leaflets of layers A and A1 respectively. The third lesion (L3) marks the end of the penetration. *c*, Progression of receptive fields across the contralateral (right) visual field, for the penetration illustrated in *a*, *b*. The axes represent the vertical and horizontal meridians. Symbols as in *b*. Each symbol is placed at the centre of the unitary or multi-unit activity recorded at a single site. Only those recording sites that gave distinct shifts in receptive field position are indicated. Fields moved downwards and medially during the penetration.

Nature, Vol. 300, Nov. 25, 1982, 350-351.

1 fig. 1 table, 16 ref.

Authors' summary.

HEAT LOSS OF FARMED FURBEARERS AS EVALUATED BY INFRARED
THERMOGRAPHY.

(Värmesvinn hos pälsdjur värmefotograferat).

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Finland.

An AGA Thermovision 720 infrared system was used to evaluate the differences in heat loss of various body regions of farmed canids and mustelids. By means of this thermographical method the warmer regions of the body could be seen lighter than the colder ones. The experimental animals were thermographed in late January at the ambient air temperature of about -10°C .

Heat loss of the raccoon dog (Nyctereutes procyonoides) is greatest from the chest, the head, the abdomen and the feet. Especially the abdomen and feet are significant heat loss routes under farm conditions. Representative infrared thermographs showed that the farmed blue fox (Alopex lagopus) is somewhat better insulated than the raccoon dog. This probably reflects differences in their original climatic habits: the blue fox is a circumpolar inhabitant and adapted to withstand long cold periods while the raccoon is basically adapted to a north temperate climate, and under natural conditions it generally hibernates the coldest part of winter in a den. Heat loss of polecats (Mustela putorius) was very high resulting from their high surface-to-volume ratios. This indicates that they have to maintain high metabolic rates to help constant body temperatures.

The results suggest that some kind of protection should be provided for farmed raccoon dogs, either a winter nest or at least a rest-shelf in the cage. These not only improve their wellbeing but also save on feeding costs by reducing

the amount of energy needed for the maintenance of homeothermy. The farmed mustelids cannot survive the Finnish winter without the thermal protection provided by the nest.

Turkistalous 55(10): 526-527, 1983.

2 figs., 1 reference.

In Finnish

Authors' summary

TEMPERATURE REGULATION IN HIGH-ARCTIC MAMMALS.

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University of Tromsø, Tromsø, Norway.

Small and poorly insulated mammals like ermine and lemming evade the brunt of the cold arctic winter in nests under the snow where convective heat loss is eliminated and ground heat creates a relatively comfortable micro-climate in the -10 to 0°C range.

Large mammals like whales, seals, polar bear, arctic wolf and fox, reindeer and muskox, on the other hand, endure direct exposure to ice-water or ambient air, where the terrestrial forms have to maintain a thermogradient between body core and the grisly environment of up to 100°C for prolonged periods. Maintenance of core temperature in spite of such a gradient is primarily a matter of body size and prime insulation by fur (terrestrial mammals) or blubber (marine mammals) and controlled peripheral cooling by means of counter-current vascular heat exchange in the legs. Furthermore, in many arctic species, notably reindeer, additional thermal protection is achieved by counter-current vascular heat exchange in the nasal passages, whereby expiratory heat and water loss is minimized.

By such protective means the lower critical temperature of the Spitzbergen reindeer, for instance, is as low as -50°C in win-

ter, while it in summer when the winter coat is shed goes up to -15°C . Moreover, in winter/spring resting metabolic rate is regulated at only 66 per cent of the summer value.

The hormones T3 and free T4 fluctuates seasonally with an autumn high and an extreme spring low, but these changes do not coincide with the seasonal changes in metabolism. Indeed, evidence is accumulating for a regulation of metabolic rate in this species by food intake, which in turn is determined by a seasonal changes in appetite regulated by photo-period.

In high arctic mammals like reindeer with prime winter insulation and few avenues of heat loss grave thermal problems are incurred when the animal is forced to run to avoid predators or tourists, since trotting speed of only 10 km|h^{-1} increases metabolic heat production some 4 times. In such situations skin temperature is brought close to core temperature, allowing a significant amount of heat to be dissipated through the fur, with the counter-current vascular heat exchange in legs and nose eliminated to maximize heat loss. In some arctic species like the ungulates the vascular heat exchanger in the nose are moreover operated in conjunction with a carotid rete for selective cooling of the brain, while heat is stored in the rest of the body when the animal is running.

With few exceptions (whales and some seals) all newborn arctic mammals, contrary to the thermally well adapted adults, weigh less than 19 kg and are poorly insulated at birth. Nevertheless, some, like muskox, survive birth, wet and miserable, at ambient temperatures down to -30°C , although they are known to have a lower critical temperature as high as -70°C at birth. Such precocious forms including reindeer and several species of seals depend heavily on non-shivering thermogenesis in brown fat and skeletal muscle for maintenance of thermal balance in the cold. Evidence for a selective cell by cell activation of the brown adipocytes by the sympathetic nervous system has recently been obtained from newborn ringed seals where the brown fat embed

spectacular venous plexuses for effective heating of the cold venous return. Altricial forms like polar bear and lemming are born very small and naked and are virtually ecto-thermic at birth. They therefore depend on a shelter (den or nest) and body heat from the mother, but survive a temporary cooling of body core down to +2°C in her absence, when huddling very significantly reduce their rate of cooling.

All high arctic mammals produce an extremely rich milk (containing 40 per cent fat in seals) to support the high metabolic rate in the offspring.

Acta Physiologica Scand. Suppl., ISSN: 0302-2994.

Only summary received.

Author's summary.

LOCOMOTION IN THE NORTH AMERICAN MINK, A SEMI-AQUATIC MAMMAL.

I. SWIMMING ENERGETICS AND BODY DRAG.

Terrie M. Williams, Physiological Research Laboratory A-004,
Scripps Institution of Oceanography, La Jolla,
California 92093, USA.

Oxygen consumption (Vo_2) during surface swimming and total body drag were investigated in the North American mink, *Mustela vison* Schreber. Over the range of 0.13-0.70 m s⁻¹, Vo_2 increased curvilinearly with speed for minks swimming against a current in a water flume. Similarly, body drag of a mink carcass increased non-linearly with speed and was described by the equation, Drag = 1.24 velocity^{1.82}. A streamlined body shape, characteristic of many mustelids, aided in reducing drag at high speeds. Net swimming efficiencies were comparatively low (< 1.8%) and were attributed to high levels of drag when on the water surface and the absence of appendage specialization for aquatic locomotion. This lack of specialization probably contributes to high energy-

tic costs but enables the mink to forage in both the aquatic and terrestrial environments.

J. exp. Biol. 103, 155-168, 1983

6 figs., 1 table, 38 references.

Author's summary

ON THE OCCURRENCE AND REPELLING OF BIRD VISITORS ON
FUR RANCHERS IN EASTERN FINLAND.

(Om förekomst och bekämpningen av skadefåglar på
pälldjursfarmer inom Kuopion län).

*)

Occurrence of bird visitors were evaluated on fur farms of Kuopio province, in eastern Finland, during 1980-1981. Two methods of data collection were used: (1) interviews with the local farmers and (2) the author's personal observations. The study included about 83 % (76 farms) of the farms in Kuopio province. Because mink and polecat farms were uncommon in the area studied, this investigation was limited to raccoon dog and blue fox farms. Hygienic conditions and location of the farms were also recorded.

The most frequent birds were crows (Corvus cornix), magpies (Pica pica) and black-headed gulls (Larus ridibundus) which were found in 51, 31 and 25 % of the farms, respectively. The other birds (sparrows, starlings, wagtails, great tits, jays, etc.) were found to a lesser extent. The birds occurred most commonly on farms situated near rubbish dumps and lakes.

Repelling of bird visitors was generally performed to a small extent. The paper deals with some methods for preventing the visit of birds to farms. Because birds, like also other incidental animals visitors, come for feed, prevention of this can be achieved by well-constructed farm buildings.

*) Hannu Korhonen, Dept. of Applied Zoology, Univ. of Kuopio,
POB 6, SF 70211 Kuopio 21, Finland.

Turkistalous 55(5): 283-284, 1983.

Authors' summary

1 table, 4 references.

In Finnish



NEUROENDOCRINE MECHANISMS IN ANIMAL DOMESTICATION.

 НЕЙРОЭНДОКРИННЫЕ МЕХАНИЗМЫ
 ПРИ ДОМСТИКАЦИИ ЖИВОТНЫХ

E.V. Naumenko, D.K. Belyaev, Institute of Cytology and Genetics,
 Siberian Branch of USSR Academy of Sciences, Novosibirsk,
 USSR.

A review of Soviet work on the silver fox, with brief reference
 to fine-wooled sheep.

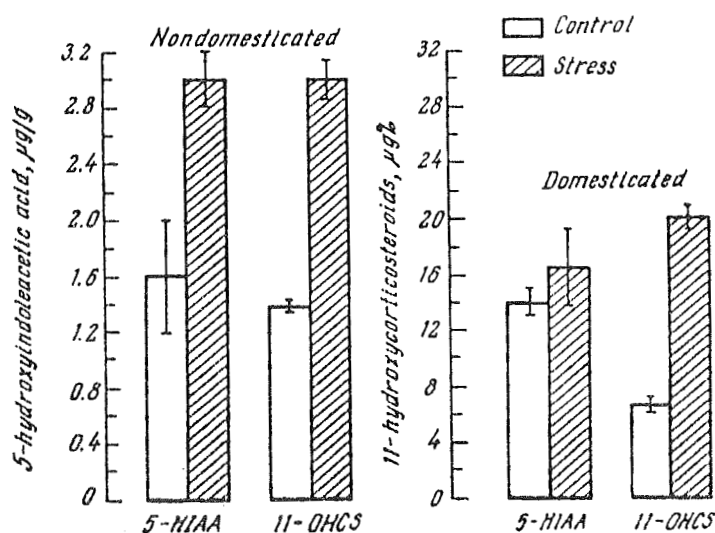


Fig. 15. The effect of emotional stress on serotonin catabolism in the brain and on the reaction of the hypothalamic-pituitary-adrenal system in silver foxes selected for behaviour

Moscow, USSR, MIR.

Problems in General Genetics. Proceedings of the XIV Internat. Congress of Genetics. Vol. II, Book 2. Part of collective document. pp 12-25, 1980.

The review is available both in RUSS and fully translated into ENGL.

15 figs., 16 refs.

CAB-abstract.

THE GENETICS AND PHENOGENETICS OF DOMESTIC BEHAVIOUR.

ГЕНЕТИКА И ФЕНОГЕНЕТИКА
ДОМСТИКАЦИОННОГО ПОВЕДЕНИЯ

L.N. Trut, Inst. of Cytology and Genetics, Siberian Branch of
the USSR Academy of Sciences, Novosibirsk, USSR.

A discussion of Soviet work on the selection of lines of silver
foxes for tameness.

Moscow, USSR (MIR) Academia Nauck CCCP, 1981, 323-332.

Problems in General Genetics. Proceedings of the XIV Internat.
Congress of Genetics. Vol. II, Book 2. Part of collective
document. pp 123-137.

5 tables, 10 figs.

CAB-abstract.

The review is available both in RUSS and fully translated into
ENGL.



Fig. 4. Behaviour of foxes from the population selected for tameness

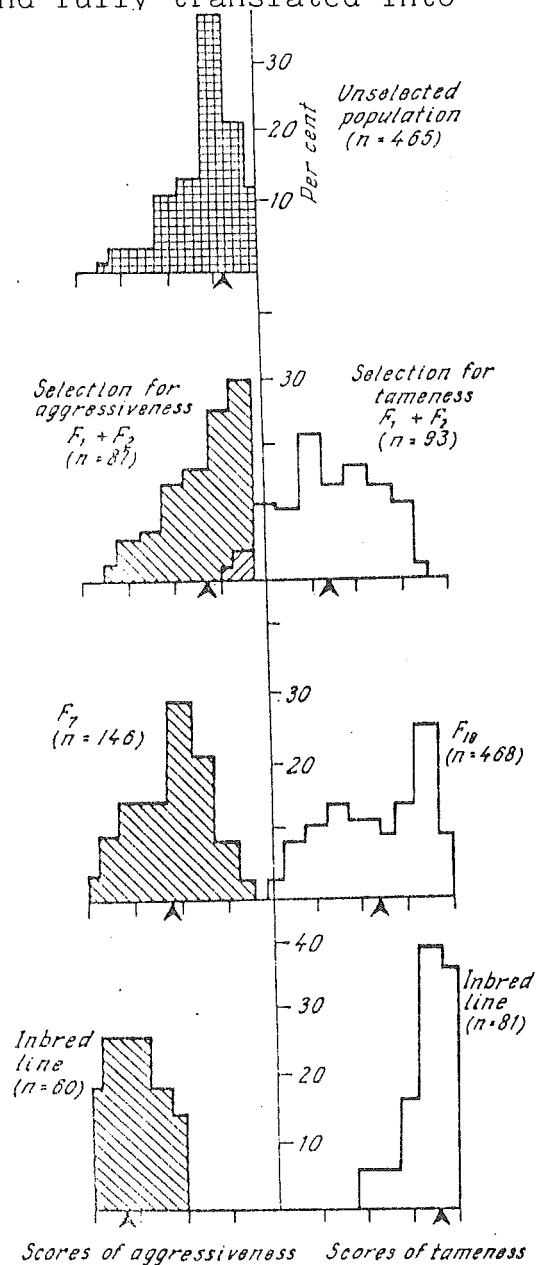


Fig. 2. Distribution of silver foxes with respect to behaviour

CHROMOSOME LOCALIZATION OF THE LOCI GOT1. PP, NP, SOD1, PEPA
AND PEPC IN THE AMERICAN MINK (MUSTELA VISON).

N.B. Rubtsov, A.A. Gradov, O.L. Serov, Inst. of Cytology and
Genetics, Siberian Branch of the Academy of Sciences of
the USSR, Novosibirsk, USSR.

Twenty eight American mink x Chinese hamster somatic cell
hybrids were analysed for the expression of mink enzymes and
chromosome segregation. This analysis made it possible to as-
sign the genes for glutamate-oxaloacetate transaminase-1 (so-
luble) (EC 2.6.1.1), inorganic pyrophosphatase (EC 3.6.1.1),
purine nucleoside phosphorylase (EC 2.4.2.1) to mink chromosome
2, superoxide dismutase-1 (soluble) (EC 1.11.1.1) to chromosome
5, peptidase A (EC 3.4.11 or 3.4.13) to chromosome 4, and pepti-
dase C (EC 3.4.11 or 3.4.13) to chromosome 13. It is suggested
that the syntenic gene group GOT1-PP-NP is located on the short
arm of mink chromosome 2.

Theor. Appl. Genet. 63, 331-336, 1982.

2 tables, 7 figs. 11 refs.

Authors' summary.

CHROMOSOMAL ANALYSIS OF THE JAPANESE RACCOON DOG BASED ON
THE G- AND C-BANDING TECHNIQUES.

Mitsutoshi Yoshida, Hiroshi Noda, Hajime Nagahata,
Hiroshi Kanagawa and Tsune Ishikawa, Dept. of Vet.
Obstetrics, Fac. of Vet. Med., Hokkaido University,
Sapporo 060, Japan.

The chromosomes of two subspecies of the Japanese raccoon dog
(*Nyctereutes procyonoides viverrinus*; 4 individuals & *N.p.*
albus; 2 individuals) were analysed using the G- and C-banding
techniques.

The Japanese raccoon dog had 42 chromosomes in dipliod number and the fundamental arm number (NF, 'nombre fundamental') was 70. The autosomes comprised 13 pairs of meta or submetacentrics and 7 pairs of acrocentrics. The X chromosome was metacentric and intermediate in size between Nos. 12 and 13 while the Y was the smallest acrocentric with a satellite.

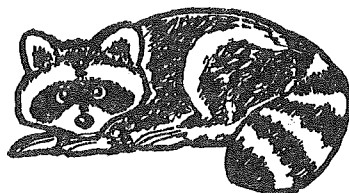
The G- and C-banding patterns of *N.p. albus* were similar to those of *N. p. viverrinus*. The homologous pair of chromosomes could be identified by the G-banding pattern. Most of the chromosomes were C-band positive and contained centromeric heterochromatin.

In one male individual (*N. p. viverrinus*), modal chromosome numbers showed 41, XY because of the elimination of one acrocentric autosome. However, this male did not show any abnormal features except in diploid number.

Jpn. J. Vet. REs., 30, 68-78, 1982.

4 tables, 17 figs., 27 references.

Authors' summary.



THE CYTOGENETICS OF SOME FUR ANIMALS.

I. THE NORMAL KARYOTYPE ESTABLISHED BY THE USE OF G-BANDING IN THE COYPU (*MYOCASTOR COYPUS*).

Agripina Lungeanu, St. Nemteanu, N. Avram, O. Sava, Romania.

The normal karyotype of the nutria (*Myocastor coypus*) established by classical staining and by G-banding of the chromosomes is presented. The characteristics of each pair of chromosomes obtained by trypsin G-banding, making possible the cor-

rect identification both of the autosomes and of the sex chromosomes are rendered evident.

Archiva Veterinaria - Institutul de Cercetari Veterinare si Biopreparate "Pasteur", Bucuresti, Romania, V. 16, 157-162, 1982.

3 figs., 3 references.

Authors' abstract.

IMMUNOLOGIC AND GENETIC ASPECTS OF ALEUTIAN DISEASE.

Donald L. Lodmell, John L. Portis, Lab. of Persistent Viral Diseases, Rocky Mountain Laboratories, Natl. Inst. of Allergy and Infectious Diseases, Natl. Inst. of Health, Hamilton, Montana 59840.

Aleutian disease of mink is a progressive lethal disease induced by a nondefective parvovirus. It is manifested by rapid viral replication, persistent virus infection, extreme hypergammaglobulinemia, and immune-complex-mediated lesions. The tempo of disease appears to be under genetic control in that mink of the Aleutian color phase have a rapidly progressive course, and non-Aleutian mink a slowly progressive course. Animals generally die in uremia due to a glomerulopathy often complicated by hemorrhage.

In this report we have addressed several aspects of AD including viral persistence, the exaggerated antibody response to the virus, and the pathogenesis of the histologic lesions. In examining the genetic aspects of this disease, we have discussed differences between the immune response of Aleutian and non-Aleutian mink to ADV and non-ADV antigens.

The exaggerated antiviral antibody response seen in AD may be a manifestation of an imbalance in the immunoregulatory system of

AD-affected mink. Possible mechanisms for this phenomenon are discussed.

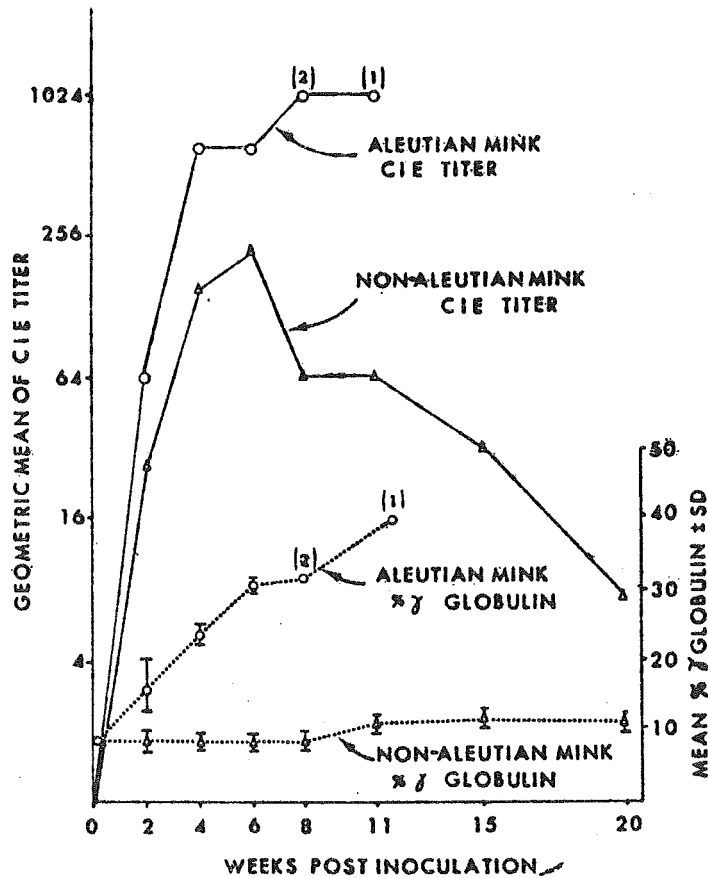
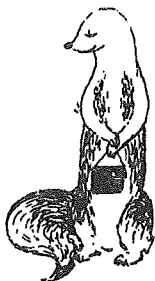


FIGURE 5. Antibody and serum gamma-globulin responses of groups of three Aleutian and non-Aleutian mink inoculated intraperitoneally with 300,000 LD₅₀ Pullman-strain ADV. Antibody is expressed as group geometric mean of counterimmunoelectrophoresis titers (CIE). Serum gamma globulin is expressed as group mean percent gamma globulin \pm standard deviation. Numbers in parentheses represent number of mink remaining in group (data provided by M. E. Bloom).

Immunologic defects in Laboratory Animals. ISBN 030640673X, Ed. M.E. Gershwin & B. Merchant (New York: Plenum, 1981, 39-75. 6 figs., 202 refs. Authors' summary.



See you in Paris!

ELECTROPHORETIC VARIATION IN LARGE MAMMALS.

II. THE RED FOX, *VULPES VULPES*, THE STOAT, *MUSTELA ERMINEA*, THE WEASEL, *MUSTELA NIVALIS*, THE POLE CAT, *MUSTELA PUTORIUS*, THE PINE MARTEN, *MARTES MARTES*, THE BEECH MARTEN, *MARTES FIONA*, AND THE BADGER, *MELES MELES*.

V. Simonsen, Inst. of Ecology and Genetics, Univ. of Aarhus, Ny Munkegade, DK-8000 Århus C, Denmark.

Twenty-one enzyme loci have been resolved by starch gel electrophoresis in liver and muscle tissue of samples of 282 red foxes, 39 stoats, 13 weasels, 24 pole cats, 2 pine martens, 121 beech martens, and 5 badgers. No variation in the mobility of electrophoretic bands within the several species of carnivores was observed. The genetic variability, is, thus, low as in several large mammals.

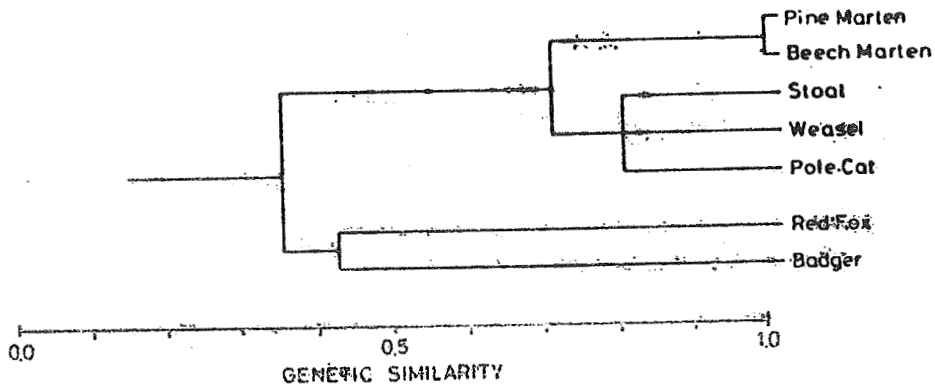
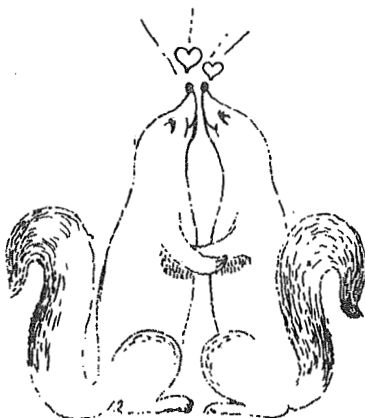


Fig. 1. The genetic similarity (I) among seven species of carnivores, based on twenty-one enzyme loci.

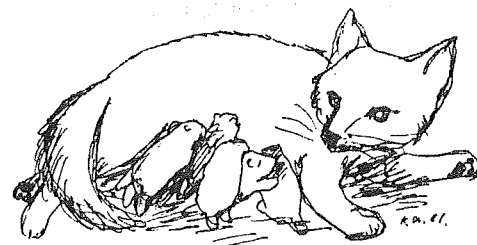
Hereditas, 96, 299-305, 1982.

5 tables, 1 fig., 31 refs.

Author's summary.



3rd International Scientific
Congress on Fur Animal
REproduction.



REPRODUCTION

THE TIMING OF ARTIFICIAL INSEMINATION FOR THE ARCTIC FOX, ALOPEX LAGOPUS L.

S. Pasanen*, J. Lumme+, J. Meriläinen*, *University of Joensuu and +University of Oulu, Finland.

Artificial insemination has been carried out on the fox in Norway for over ten years (Aamdal et al., 1972; Fougner, 1981) although the method, in which the semen is introduced into the uterus using a long catheter, is not easy to use. Efforts have been made recently at the University of Joensuu to find an alternative method, and six litters were produced in spring 1982 (Meriläinen & Pasanen, 1983). The method was then tested in 1983 by performing 252 inseminations (Pasanen et al., 1984) and proved easy and practicable. The results obtained the crossing of *Vulpes* x *Vulpes* were as good as with natural copulation, but in the case of *Alopex* the pregnancy percentage was low (about 40 - 50 %). One reason for this result was that all the *Alopex* females were inseminated with *Vulpes* sperm and there were large numbers of miscarriages caused by interspecies crossing. A second reason seemed to lie in the difficulty of determining the right time for insemination, especially in the case of the Arctic fox. In view of this problem we set out to collect material from farms using the electric rut-diagnosis (Møller & Fougner, 1981) in order to establish what is the right time for artificial insemination in the Arctic fox.

MATERIAL AND METHODS

The Norwegian apparatus (Møller, 1980) was used on a total of 136 females (40 Arctic foxes, 76 carrier blue foxes and 20 blue foxes), comprising 90 artificial inseminations and 46 natural copulations. 69 had become pregnant and 67 failed to do so. A curve for the rut in each female was drawn according to the daily measurements, and the difference (in days) between the top of the curve and the insemination or copulation was determined. If several identical values appeared at the top of the curve, the point nearest to the insemination was taken. This difference was then used to group the material and examine the effect on the results of the artificial insemination or natural copulation.

RESULTS

The rut curves for the Arctic fox, the carrier blue fox and the blue fox are practically identical (Figs 1, 2, 3). It seems that the farmers bring their animals for artificial insemination a little later than for natural copulation (Table 1).

Table 1. Grouping of the material by time of insemination or copulation. D = days from the peak in the rut curve. A = artificial insemination, C = natural copulation.

D	ARCTIC FOX		CARRIER BLUEFOX		BLUEFOX	ALTOGETHER	
	A	C	A	C	A	A	C
0	0	1	0	2	0	0	3
1	7	11	7	10	4	18	21
2	7	4	21	5	4	32	9
3	4	3	9	5	4	17	8
4	1	0	9	3	7	17	3
5	0	0	2	0	0	2	0
6	1	0	1	1	0	2	1
7	1	0	0	1	1	2	1

The pregnancy percentage is highest 0 - 2 days after the peak in the curve, decreases markedly at 3 - 4 days, and is zero after day 4 (Table 2). There are no clear differences between the Arctic fox, carrier blue fox and blue fox in this respect.

The size of the litter decreases as insemination occurs further away from the top of the curve, but the change is not so great as in the case of the pregnancy percentage (Table 3).

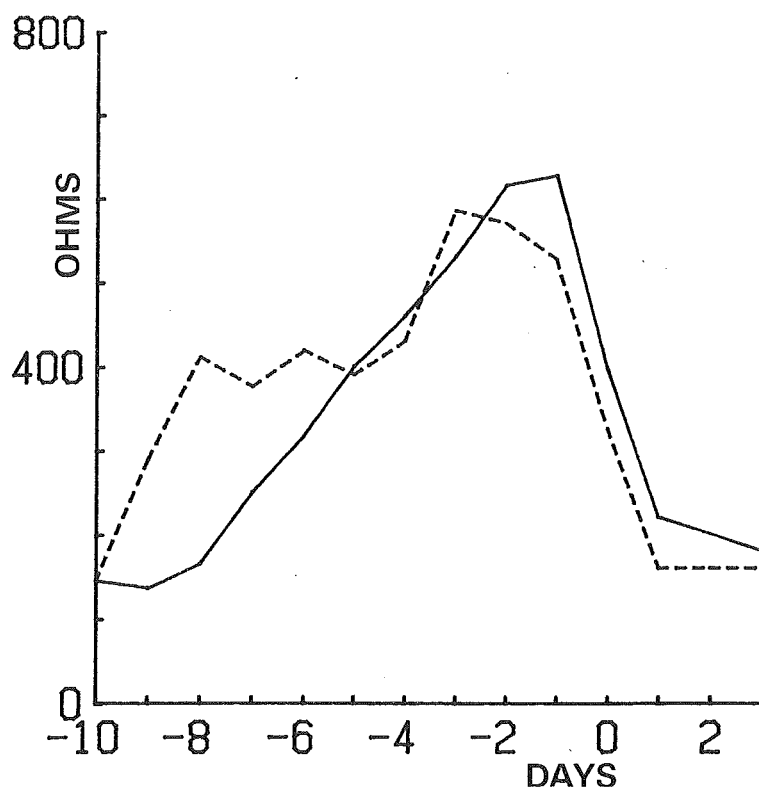


Fig. 1. Rut curve for the Arctic fox. x-axis = days before (-) and after (+) insemination or copulation, y-axis = electric resistance (ohms), solid line = pregnant females, broken line = non-pregnant females.

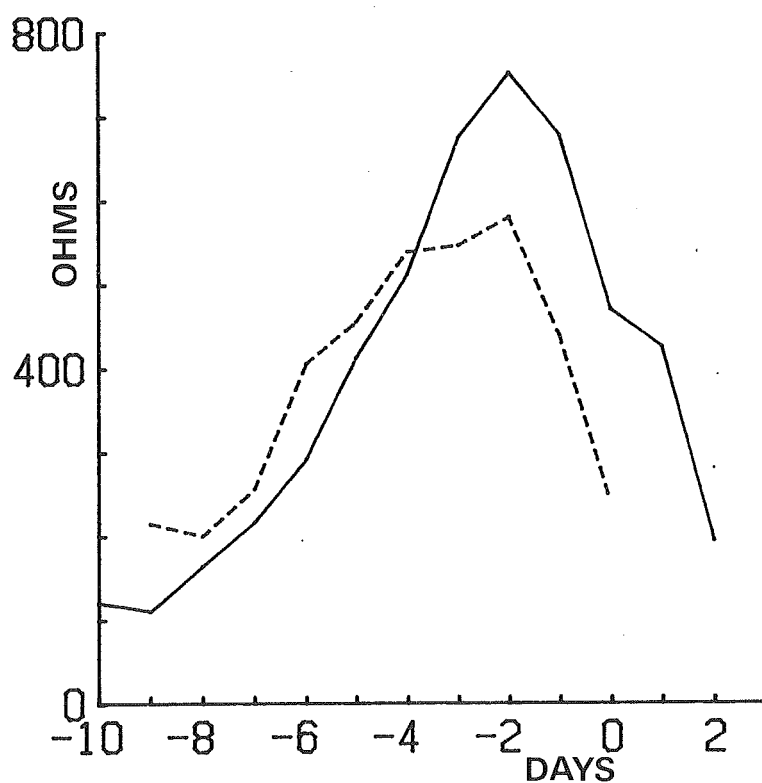


Fig. 2. Rut curve for the carrier bluefox (the hybrid between the arctic fox and the blue fox). For key see Fig. 1.

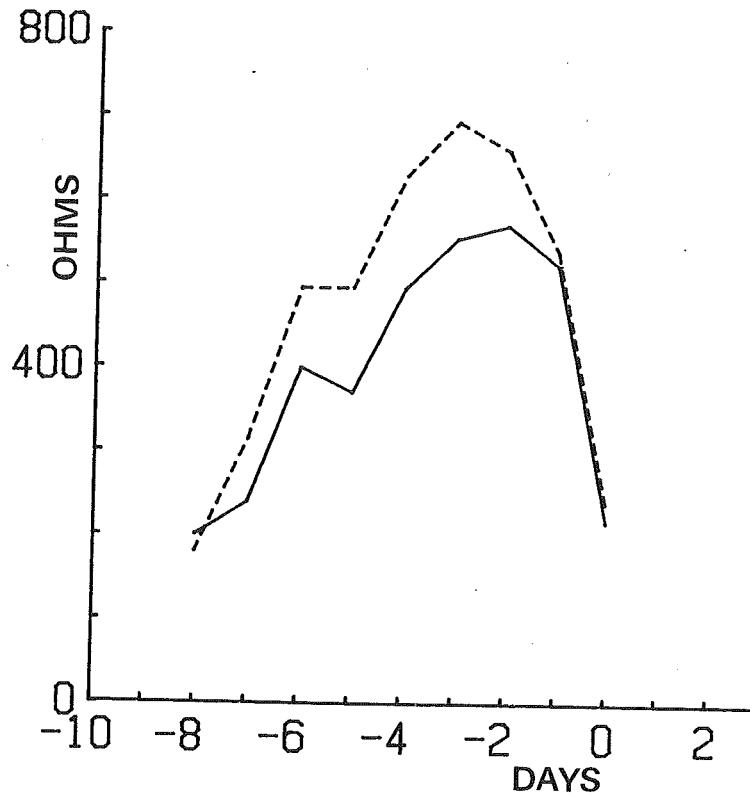


Fig. 3. Rut curve for the bluefox. For key see Fig. 1.

Table 2. Timing of insemination or copulation and pregnancy. D = days from the peak in the rut curve, N = number of foxes, P = number pregnant.

D	ARCTIC FOX			CARRIER BLUEFOX			BLUEFOX			ALTOGETHER		
	N	P	%	N	P	%	N	P	%	N	P	%
0	1	0	0	2	2	100.0	0	0	-	3	2	66.7
1	18	13	72.0	17	12	70.6	4	3	75.0	39	28	71.8
2	11	8	72.7	26	18	69.2	4	2	50.0	41	28	68.3
3	7	2	28.6	14	3	21.4	4	1	25.0	25	6	24.0
4	1	1	100.0	12	4	33.3	7	0	-	20	5	25.0
5	0	0	-	2	0	0	0	0	-	2	0	0
6	1	0	0	2	0	0	0	0		3	0	0
7	1	0	0	1	0	0	1	0		3	0	0
Alto- gether	40	24	60.0	76	39	51.3	20	30.0		136	69	50.7

Table 3. Litter size. D = days from the peak in the rut curve. C = natural copulation, A = artificial insemination, N = number of litters, S = size of litter.

D	ARCTIC FOX					CARRIER BLUEFOX					BLUEFOX		ALTO-GETHER	
	C		A		TOTAL	C		A		TOTAL	A		N	S
	N	S	N	S		N	S	N	S		N	S		
0	0	-	0	-	-	2	7.5	0	-	7.50	0	-	2	7.50
1	9	6.00	4	7.6	6.31	9	9.3	3	9.0	9.23	3	6.67	28	7.60
2	3	8.67	5	5.6	6.75	4	8.0	14	6.5	6.83	2	5.00	28	6.68
3	1	6.00	1	ate	-	1	9.0	2	7.0	7.67	1	9.00	6	6.33
4	0	-	1	4.0	4.0	0	-	4	5.5	5.55	0	-	5	5.20

DISCUSSION

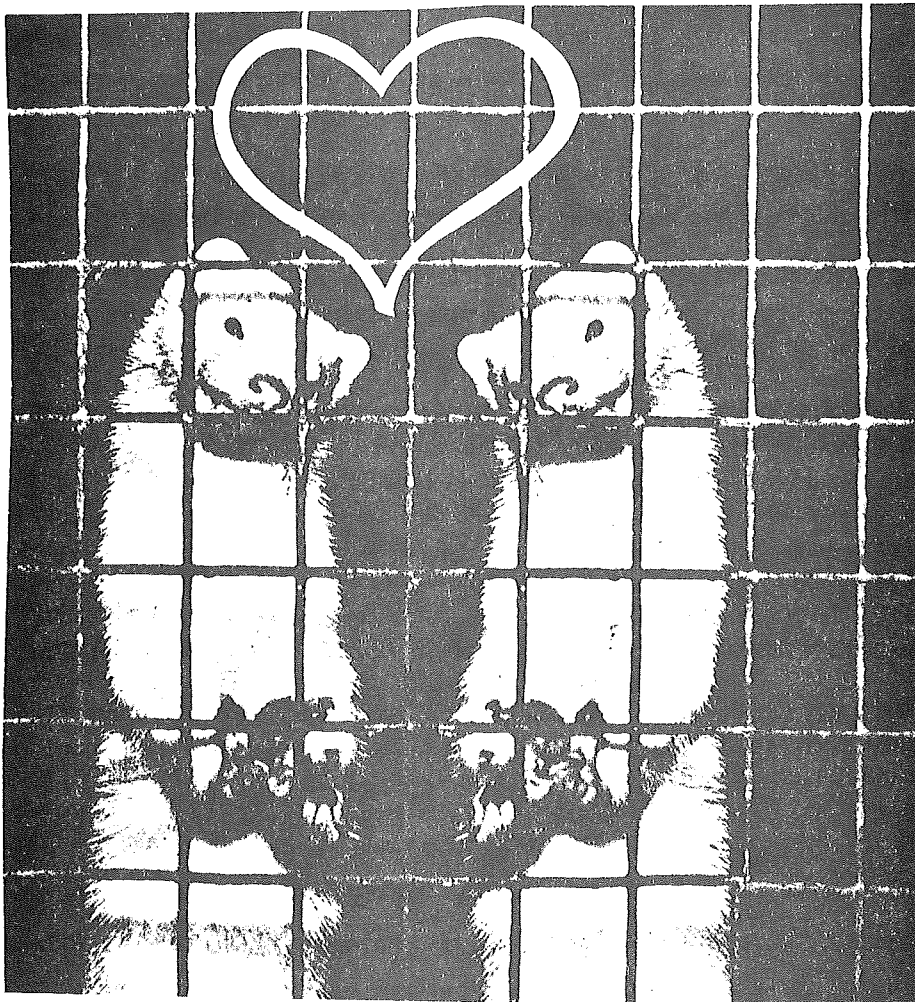
Comparison of the shape of the rut curve obtained here with the curves given by Møller & Fougner (1981), shows the decrease observed in the case of the Arctic fox to be a particularly rapid one. This means that insemination must take place just after the rut peak in order to be successful. One insemination should be enough, but if double insemination is thought desirable, this should occur on the first and second days after the peak.

It is not always easy to determine the peak in the curve, and animals of this kind are somewhat enigmatic. If the aim of artificial insemination is to get as good results as possible, problematical animals should be rejected. On the other hand, artificial insemination is very suitable method for use in difficult cases, even though the results will obviously not be as good as in normal animals.

It is an interesting observation that farmers bring their animals for artificial insemination later than they do in the case of natural mating. Perhaps farmers take a different attitude towards artificial insemination, regarding it as some kind of reserve method. This is connected with the fact that artificial insemination can also be used for problematical foxes, where farmers think that it is better to try insemination than knowingly to leave the animal without a litter.

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- Pasanen, S., Lumme, J. & Meriläinen, J. (1984). A new device (Articop-instrument) for artificial insemination. Scientifur (in print).



Have a lovely time
in Paris !

A NEW DEVICE (ARTICOP-INSTRUMENT) FOR THE ARTIFICIAL INSEMINATION OF THE FOX

S. Pasanen*, J. Lumme⁺, J. Meriläinen*, *University of Joensuu and ⁺University of Oulu, Finland

Artificial insemination of the fox was experimented with in the Soviet Union already in the beginning of 1930's, and in Norway in the years 1936 - 39 (Fougner, 1981) but the results were not very promising and the matter was almost forgotten for a long period. Sperm manipulation and conservation was improved during the 1960's (Chronopulo, 1961; Creed, 1964; Aamdal & Andersen, 1968), but real progress in the artificial insemination of the fox was not gained earlier than the beginning of the 1970's (Aamdal et al., 1972).

According to the Norwegian method semen is transported through the cervical opening to the uterine cavity and dispensed there by a catheter instrument (Fougner et al., 1973; Aamdal et al., 1978). This method has produced very good results (Fougner, 1979, 1981) and the training of seminologists for the benefit of fox farming was established some years ago. The method is, however, rather difficult and it requires a long and detailed training. Therefore its application to individual farms has limitations. Our aim was to develop a new instrument which could be used alongside of the Norwegian method, avoiding some of the earlier difficulties. With the new method first litters were produced in 1982, and a large experiment was carried out in 1983.

The new instrument combines the two functions: delivering of the sperm into the restricted volume of vagina around the cervix area and stimulating the female with an inflating rubber penis. The stimulation is comparable to the psychological and physiological reaction occurring in the natural mating.

Earlier an instrument for placing a drug material into the canals of the Fallopian tubes of the female was constructed elsewhere (European Patent Application number 78101386.7). In it an expandable sleeve was used to discharge drug material into the canals of the Fallopian tubes of a primate female. In that method the drug is moved from the uterine cavity into the canals by expanding the sleeve and decreasing the volume of the uterine cavity. The fully collapsed sleeve is inserted through the cervical opening into the uterine cavity. The application of this method, however, is impossible in the artificial insemination of wild or farmed fur bearing animals. Recently there was developed an instrument and method for promoting artificial breeding, particularly of dogs (UK Patent Application

GB 2067413A). This instrument comprises a phallus simulator, and inflatable bag surrounding the simulator near the proximal end for simulating a bulbus glandis. The apparatus does not include, however, any kind of instrument for dispensing of semen into the vaginal cavity but is introduced there separately. The application of this method is difficult for undomesticated animals. For foxes a psychological reaction comparable to that occurring during natural mating is usually needed to make them peaceful for insemination. On the other hand, by using this instrument for semen the vaginal cavity remains too large to make the operation of this instrument economical and available for the fox.

MATERIAL AND METHODS

The investigation was made on five farms in western Finland. The laboratory was built and installed in connection with one of them. The laboratory consisted of separated rooms for manipulation of male and female foxes. The facilities and technics for taking the sperm were the same as described by Fougner (1981). A microscope was used to determine the density and the vitality of the spermatozoids. Sperm was diluted by the IVT-solution and stored in room temperature (Van Demark & Sharna, 1957). Insemination was carried out by unfrozen sperm, stored for a maximum of ten hours (usually 0.5 - 2 hours). The volume of the insemination portion was 1 ml, consisting usually 150 - 600 million spermatozoids.

This study consists of 252 inseminated females, including 74 real polar foxes (with white winter fur), 38 crossings between polar fox and blue fox, six shadow foxes and two dark tundra modifications of the blue fox (altogether 220 females of genus *Alopex*), and 24 silver foxes and 8 red foxes (altogether 32 foxes of genus *Vulpes*). Intraspecific insemination was used for silver foxes and red foxes (*Vulpes* x *Vulpes*), and interspecific insemination (*Vulpes* x *Alopex*) for the rest of the animals. The females were transported to the insemination laboratory from the farms (the maximum distance 20 km), and all animals were also inseminated, but each only once.

The basic idea of our insemination technique is an artificial copulation which imitates the natural mating. The operation was made by a special Articop-instrument (Fig. 1). The instrument contains the following complexes of the parts: 1) erectile phallus, and 2) syringe for semen delivery through nozzle to the cervix. The nozzle is situated on the center of the rubber penis. The erection is produced by squeezing a rubber bulb which is connected with the penis by flexible tube provided with a valve. The length of the erectile part of the penis can be adjusted along the nozzle to fit with the length of the vagina of each animal. As a nozzle we have used a long injection needle with rounded, blunt tip. The

connection between the syringe and the nozzle can be closed or opened by turning the valve.

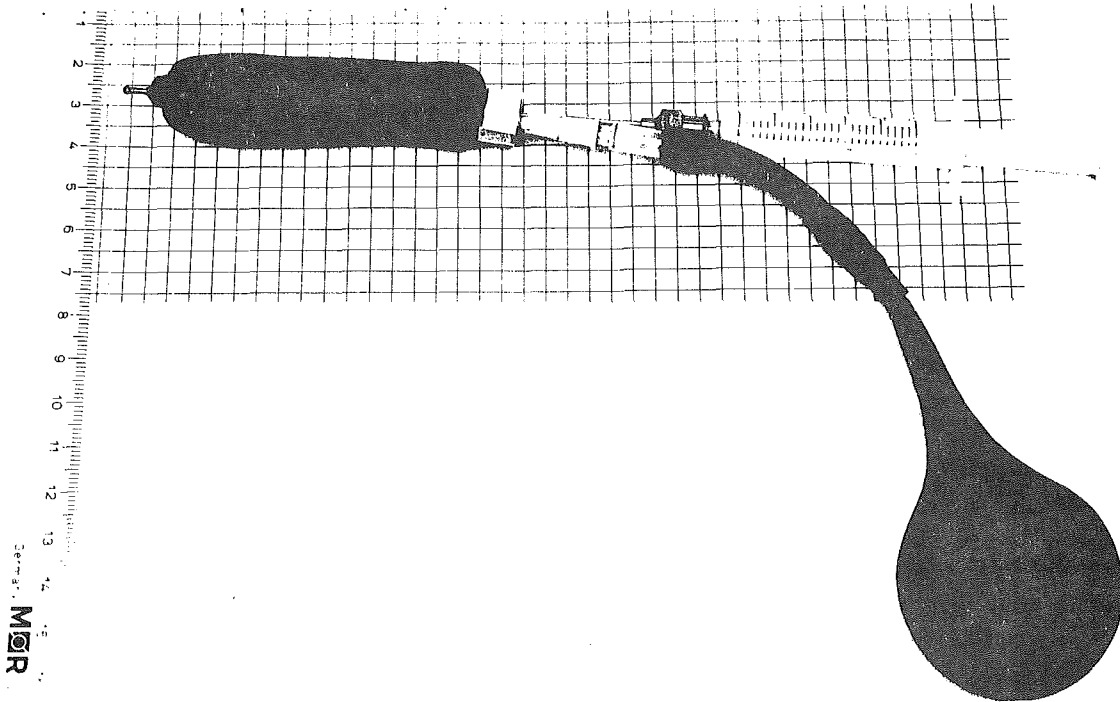


Fig. 1. The Articop-instrument. The details see text.

In the operation the following procedure is followed:

- 1) Non-erected phallus is inserted into vagina,
- 2) phallus is erected by air pressure,
- 3) insemination portion (1 ml) is transported to cervix area and further to uterus. Transportation is agitated by female herself and the hydraulic pressure, which is improved after some minutes by additional portion (1 ml) of IVT or prostata liquid,
- 4) the peristaltics of smooth muscles are further agitated by touching the clitoris region,
- 5) to accelerate the inflow of sperm to uterus the papilla area is massaged.

The artificial erection of 15 minutes is used which corresponds with the length of the tie period in nature.

RESULTS

In general, the cub numbers were controlled quite late, on June 16th on one and on July 13th on two farms (table 1). One farm, however, made continuous observations on the whelping and tried also to register the miscarriages and the number of destroyed cubs. In

hybridizing *Vulpes* and *Alopex* about 20 % of the cubs were destroyed. On this farm 69.2 % of the polar foxes and 73.7 % of the carriers of polar fox became pregnant by artificial insemination with *Vulpes* sperm.

The poor pregnancy rate in interspecific crossing may be explained by miscarriages which is supported by the later histological investigation of ten females without a litter. Nine of ten had developed 53 embryos but terminated to miscarriage.

The average number of spermatozooids in the succesful inseminations was 255.4 ± 76.1 milj. ($\bar{x} \pm S.E.$). The number is almost the same as the average in all inseminations of the investigation (256.3 ± 80.7 milj.). The smallest number (90 milj.) of spermatozooids per insemination portion gave 9 cubs.

There was no significant correlation between the size of the litter and the number of the spermatozooids (Fig. 2) or the preservation time of the semen (Fig. 3).

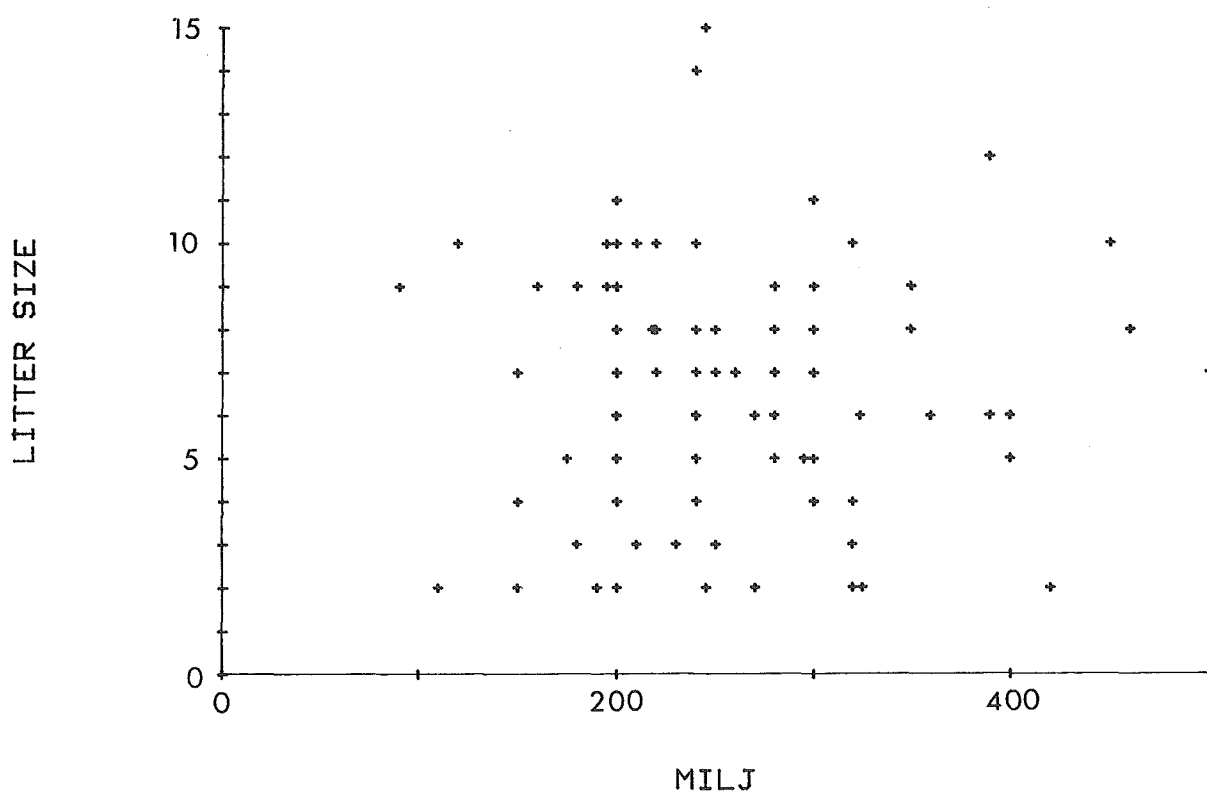


Fig. 2. The correlation between the size of the litter and the number of the spermatozooids (millions). $r = 0.009$, $N = 107$. $p =$ non-significant

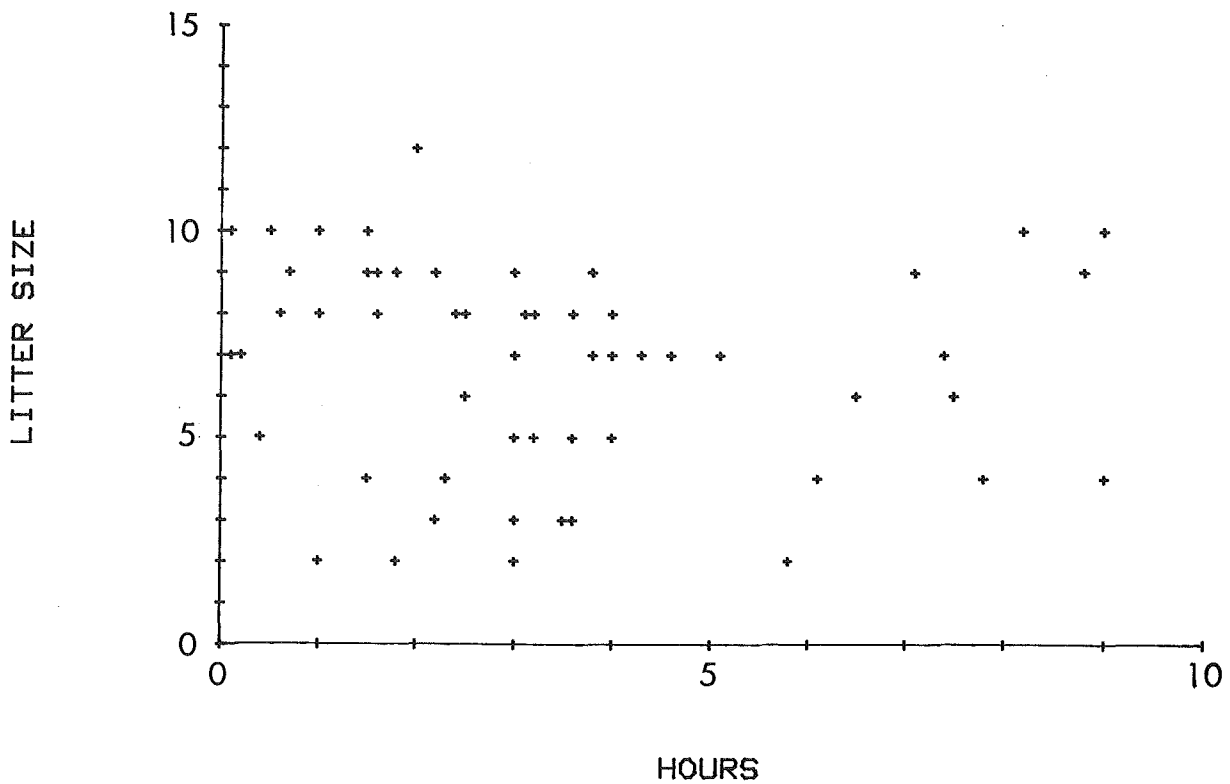


Fig. 3. The correlation between the size of the litter and the preservation time of the semen (hours). $r = -0.060$, $N = 62$, $p = \text{non-significant}$

Table 1. Results of the insemination

	No. of ins. females	Litters		No. of cubs	Cubs/ins. female	Cubs/ litter
		no.	%			
Polar fox	74	29	39.2	168	2.27	5.79
Blue x polar	138	53	38.4	336	2.43	6.34
Shadow	6	3	50.0	14	2.33	4.67
Tundra (blue)	2	1	50.0	3	1.50	3.00
Vulpes x Alopex	220	86	39.1	521	2.37	6.06
Silver	24	16	66.7	65	2.71	4.06
Red	8	5	62.5	16	2.00	3.20
Vulpes x Vulpes	32	21	65.6	81	2.53	3.86

DISCUSSION

The silver fox produced by natural copulation 2.97 cubs per copulated female in Finland in 1982 according to official statistics and 6.33 cubs by blue and shadow foxes, respectively (Anon. 1983). The statistics do not, however, include those females (usually 20 - 25 % of the females of the farm) which were impossible to be copulated. On the contrary, our data consists of 100 % of animals offered for the experiment. The result obtained by the silver fox is quite comparable with natural mating, but *Vulpes* x *Alopex* hybridizing gave clearly lower results than intraspecific coupling of *Alopex*. The great proportion of miscarriages and destroyed cubs indicates that this is caused at least in part by the problems of interspecific hybridizing. In addition, the limited knowledge and experience on the dating of the rut of the real polar fox and the carrier (blue fox x polar fox) also was likely to influence the results. The comparison of the rut curves (Møller & Fougner, 1981) with the insemination moment indicates that the insemination period of a part of the females came too late. The mistake was caused by the unexpectedly steep decline of the rut curve in the end of the heat.

A significant result is, that using the Articop-instrument the number of spermatozoids can be decreased considerably from that used with the catheter method. The insemination portions with less than one hundred million spermatozoids are expected to be satisfactory. On the other hand, the treatment time by the Articop-instrument can be shortened from the used 15 min. down to 5 min. Both these improvements increase efficiency and the economy of the method in the routine practice.

The best fur farmer in our experiment reached the results in which 75 - 80 % of *Vulpes* became pregnant by intraspecific insemination and produced 3.5 - 4.0 cubs per inseminated female. On this farm the interspecific insemination of *Vulpes* x *Alopex* produced pregnancy of 60 - 75 % and 4.5 - 5.0 cubs per insemination.

A great advantage of the new Articop-method is also the ease of the operation which permits the safe insemination on the individual farms by fur farmers.

ACKNOWLEDGEMENTS

The study was financed by five fur farms in Veteli, western Finland, and the company Vetelin Eläinjalostusyhdistys Oy Limited.

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CAUSES OF NON-INFECTIOUS PERINATAL KIT LOSSES
IN FARM MINK.

(Ursachen nichtinfektiöser perinataler Welpenverluste
bei Farmnerzen).

Ulf D. Wenzel, A. Reinsberger, P. Zunft, Bezirksinstitut für
Veterinärwesen, Leipzig, DDR.

The success in mink breeding is decisively influenced by un-
disturbed and healthy raising of kits and young animals. With
mink, more than 80 per cent of the total losses occur during the
raising period. It has been established that on an average up
to 20 per cent of all mink kits born die during the raising pe-
riod. Mink Kit losses are largest within the first four days of
life.

Between 1976 and 1982, 1491 litters with 7,805 born kits were
checked within the first four days of life. Causes of kit los-
ses are shown in the following table:

Causes of losses	number of kits alto- gether 7,805	proportion of born kits in %	proportion of total kit losses in %
1 Stillborn kits	249	3.2	15.0
2 Losses of kits born alive			
2.1 Underweight kits	328	4.2	20.0
2.2 Eating up kits	523	6.7	30.4
2.3 Losses caused by raising and maintenance faults	218	2.8	13.2
2.4 Losses due to lack of milk	187	2.4	11.2

2.5	Losses due to extreme litter size	39	0.5	2.5
2.6	Deformities	39	0.5	2.5
2.7	Losses without any noticeable changes	85	1.1	5.2
	Altogether	1.668	21.4	100

From this tables arises that it is recommendable to take the following measures for reducing kit losses:

- Insertion of special bottoms into the pens.
- Organization of shift work during the breeding period with the aim of checking the ground below the pens from sunrise to sunset.
- Carrying out bird and rodent controls at regular intervals.
- Use of clean and well-isolated nest boxes.
- Early and regular checking of litters.
Appropriate preparation of the females for the lactation period.
- Satisfactory supply of females with water.
- Satisfactory supply of females with vitamins, minerals, and trace elements during pregnancy and lactation period.

Brühl, 24, 4, 11-14, 1983.

3 tables, 7 photos.

Author's summary.

In GERM.

LUTEAL CONTRIBUTION OF THE TERMINATION OF PREIMPLANTATION
DELAY IN MINK.

Bruce D. Murphy, Rodney A. Mead, Pauline E. Mc Kibbin, Dept. of
Biology, Univ. of Saskatchewan, Saskatoon, Sask., Canada
S7N 0W0.

Five group of mink were mated once between March 17-19 (Day 0). Group 1, designated intact controls, received no further treatment. The remaining four groups of mink underwent unilateral ovariectomy on the day following mating. At that time, pre-ovulatory follicles were transplanted to the ipsilateral kidney capsule of two groups (3 and 5) to become ectopic corpora lutea (CL). The second ovary was removed from all of the animals in Groups 2-5 on Day 8 after mating. At that time animals in Groups 4 (ovariectomized) and 5 ovariectomized + ectopic CL) received 1-g Silastic implants releasing progesterone. Similar Silastic implants without progesterone were administered to Groups 2 (ovariectomized only) and 3 (ovariectomized + ectopic CL). Blood samples were taken for progesterone analysis and laparotomies performed on all mink through Day 44 of the experiment.

Embryos implanted in all (7/7) of the animals in Group 1 (intact controls) at an average of 23.7 days after mating. In Group 5 (ectopic CL + progesterone implant) 6/8 mink were found to have embryos which were calculated to have implanted at an average of 36.3 days after mating. No embryo implantation occurred in Groups 2, 3 and 4 although some unattached blastocysts were recovered from the uteri of the latter two groups.

Progesterone was elevated by implants to levels typical of mink gestation. Ectopic corpora lutea further increased progesterone levels in the presence of a progesterone-releasing Silastic implant.

The results demonstrate the absolute necessity of the ovary for

embryo implantation in mink. Further, the hormonal requirements for implantation consist of progesterone as well as some other factor or factors of luteal origin.

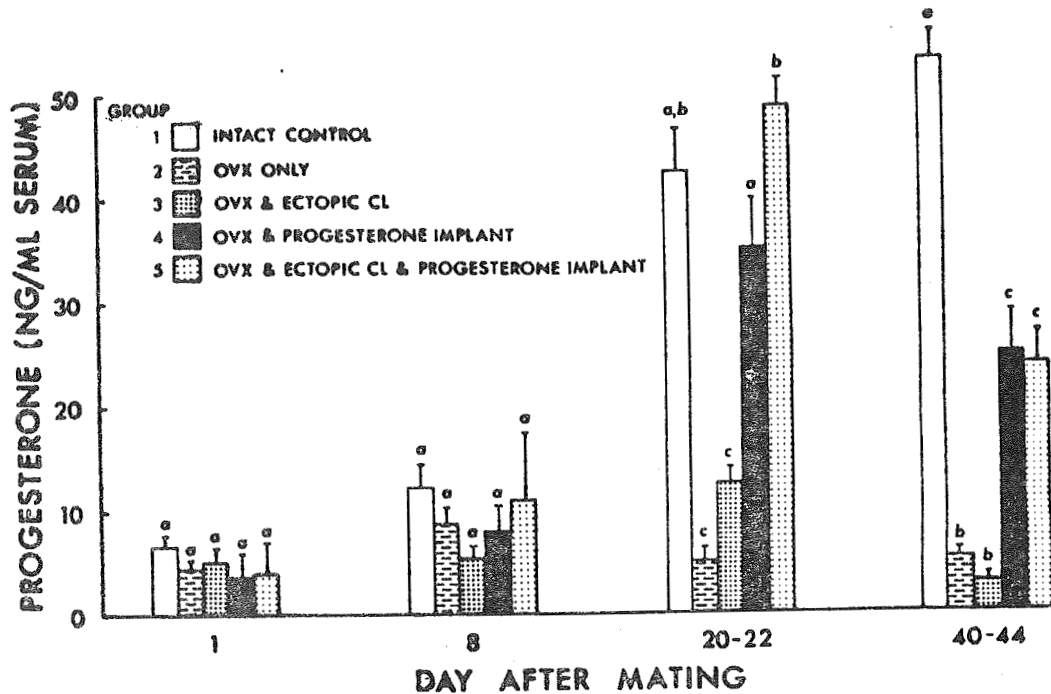
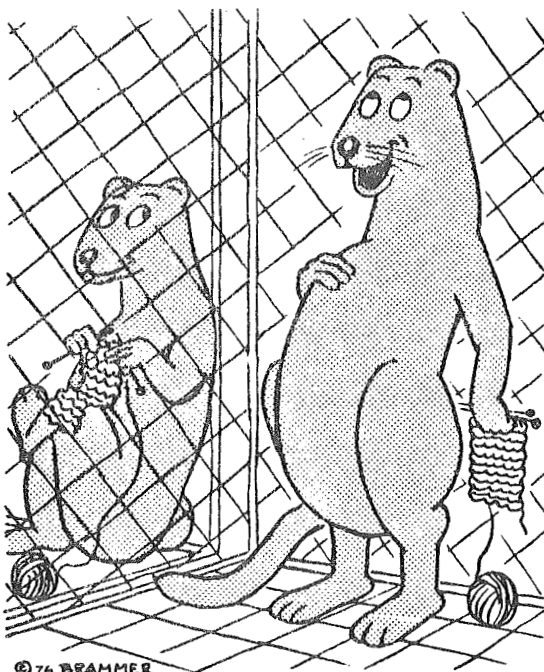


FIG. 3. Mean serum progesterone levels (\pm SEM) in five groups of female mink. Samples were taken 24–26 h after mating on Day 1 immediately prior to removal of the left ovary in Groups 2–5, prior to removal of the remaining ovary on Day 8, at laparotomy (Days 20–22) and autopsy (Days 40–44) in Groups 2–5. Group 1 (intact controls) were bled on the same days of pregnancy. Means bearing different letters at a particular bleeding date are significantly different from one another ($P < 0.05$).

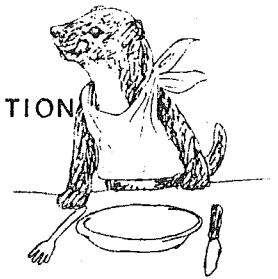
Biology of Reproduction, 28, 497–503, 1983.

1 table, 3 figs., 26 refs.

Authors' abstract.



The implantation terminated well this year!



NUTRITIONAL FACTORS INFLUENCING IRON STATUS IN MINK.

(Ernæringsmessige faktorer av betydning for jernstatus hos mink).

Anders Skrede, Agric. University of Norway, Dept. of Poultry and Fur Animal Science, 1432 Ås-NLH, Norway.

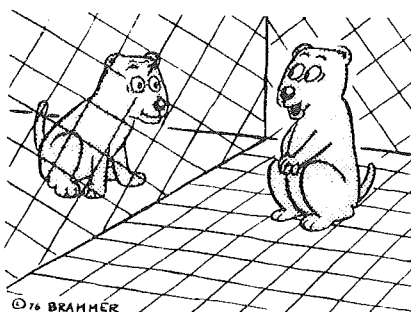
The report aims at reviewing possible causes for iron deficiency anemia in mink, and the possibilities for improved iron status by regulation of diet composition and iron supplementation. Fish-induced iron deficiency anemia is a common problem in mink nutrition. The occurrence of anemia seems to be associated with the feeding of raw fish, particularly species belonging to the cod family. It is suggested that trimethylamine oxide and formaldehyde to some extent are responsible for the anemia-causative effect of raw fish. However, a large number of factors may influence the chemical environment for iron and thus the availability and the absorption of iron. There is still incomplete knowledge for judgement of the importance of these factors. This would also apply to the value of different iron compounds used for iron fortification. It is indicated, however, that certain organic iron compounds or complexes may be more suitable than highly soluble iron salts as ferrous sulfate.

Agricultural University of Norway, Dept. of Poultry and Animal Science, Report no. 73. Vol. 62, no.4, 1983, 18 pp.

3 tables, 1 fig., 78 refs.

Author's summary.

In NORG, subtitles and summary in ENGL.



My Hb % was OK !

VARYING FAT:CARBOHYDRATE RATIOS IN MINK DIETS.

II. FEEDING OF KITS DURING THE WEANING-PELTING PERIOD.

(Varierende feitt:karbohydrat-tilhøve i fôr for mink.

II. Fôring av kvelpar i perioden mellom fråvenjing og pelsing).

Anders Skrede, Agricultural University of Norway, Dept. of Poultry and Fur Animal Science, 1432 Ås-NLH, Norway.

A series of three feeding experiments was conducted to investigate the effects of varying fat:carbohydrate ratios in diets for mink kits from July-August to pelting time in November. The experiments were carried out in 1976, 1977 and 1981. The study involved 1160 mink kits (mostly dark mink), half males and half females. Expt. 1 comprised the fat:carbohydrate ratios (% of ME from fat:% of ME from carbohydrate) 30:35, 37:28, 44:21, 51:14 and 58:7). In Expt. 2 the fat:carbohydrate ratios were studied in a factorial approach with 2 protein levels, 28 and 40% of ME from protein. The fat:carbohydrate ratios in Expt. 2 were with 28% of ME from protein, 30:42, 42:30, 54:18 and 66:6, and with 40% of ME from protein, 25:35, 35:25, 45:15 and 55:5. In Expt. 3 there were two fat:carbohydrate ratios, 31:35 and 56:10. In all experiments, the fat:carbohydrate ratios were changed by varying the amounts of lard and a precooked cereal containing 65% wheat and 35% oats. Slight adjustments of the levels of other feed ingredients were carried out to control protein level and feed consistency.

Increasing fat:carbohydrate ratios caused more rapid initial growth in all experiments. When carbohydrate supplied less than about 30% of ME, this effect faded towards the termination of the experiments. Thus, body weights and body lengths at pelting and skin lengths showed small differences between groups. However, carbohydrate levels above 30% of ME created in general lower final weights and smaller skins. The optimal relationship between fat and carbohydrate appeared to increase with a decrease in the protein level from 40 to 28% of ME. In two experiments, the lowest fat:carbohydrate ratios caused increased mortality among young male kits. The necropsy revealed in most cases gastrointestinal inflammation and fatty liver. With this exception, the treatments

number of empty females in the control group compared to the experimental group.

Nord. Vet.-Med., 35, 1983, 91-94.

15 references.

Authors' summary.

FEEDING GREAT LAKES FISH TO MINK: EFFECTS ON MINK AND
ACCUMULATION AND ELIMINATION OF PCBS BY MINK.

T.C. Hornshaw, R.J. Aulerich, H.E. Johnson, Dept. of Animal Science,
Michigan State University, East Lansing, Michigan 48824.

The effects of feeding Great Lakes fish or fish products (carp, sucker, perch scraps, whitefish racks, and alewife fishmeal) to mink were studied. Growth and furring of mink were normal for all species of fish tested. However, mink fed carp failed to reproduce, and the reproductive performance and/or kit survival in groups fed the perch, whitefish, and sucker were inferior to the control. Only the alewife fishmeal diet supported reproduction and kit survival comparable to the control. PCB residues (as Aroclor 1254) accumulated in mink subcutaneous body fat to as much as 38 times the dietary level, while some individual congeners accumulated up to 200 times. The half-life of PCB in mink adipose tissue was determined to be 98 d. The toxicity of PCBs derived from Great Lakes fish was greater than that observed in previous studies with mink fed comparable levels of technical-grade PCBs.

J. of Toxicology and Environmental Health, 11, 1983, 933-946.

Michigan Sea Grant College Program, Project No. R/TS-2, MICHU-SG-83-300.

7 tables, 2 figs., 27 references,

Authors' summary.

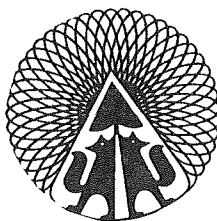


BREWERS' MASH IN DIETS FOR FARMED RACCOON DOGS

H. Korhonen, M. Harri, T. Laitila, Department of Applied
Zoology, University of Kuopio, POB 6, SF-70211 Kuopio
21, Finland

This research was conducted to evaluate suitability of Brewers' mash as a feed component for conventional, ready-mixed farm feed for growing juvenile and adult raccoon dogs (Nyctereutes procyonoides). The following feeding test groups were used: (1) basal feed, control, (2) basal feed containing 25% (w/w) Brewers' mash, and (3) basal feed containing 40% (w/w) Brewers' mash. These feeding arrangements were performed with growing raccoon dogs during the period June-November. The adult raccoon dogs were assigned separately to two experimental groups in July: (1) basal feed, control, and (2) basal feed containing 50% (w/w) Brewers' mash until mid-September and 40% (w/w) Brewers' mash from then onwards to early November. Tolerance of raccoon dogs to a change from mash diets to basal one was also evaluated. The basal feed ration averaged 550 g per animal per day for the whelps, and 300 g per animal per day for the adults. The mash was hand-mixed with the basal feed to a porridge-like mass at the research farm. Water was freely available. The animals were housed in standard rearing cages, whelps in pairs and adults alone.

The growing raccoon dogs did well on the diet containing 25% (w/w) Brewers' mash while juvenile and adult raccoon dogs on the diet containing 40% (w/w) or more Brewers' mash gained weight at a slightly lower rate than the controls. In Brewers' mash groups, feed spillage tended to increase as the amount of mash in the diet increased. The same trend was seen in the amount of faeces and faeces/feed intake ratios. Furthermore, apparent



digestibility (AD) of protein and carbohydrates decreased with the increase of mash content in the diet. There were no marked differences in fat AD's except in the 40% (w/w) Brewers' mash group where it was slightly lowered. There were no significant differences in haemoglobin values between feeding test groups. In addition, no differences in pelt quality were found. The diet composition changes did not cause any problems although 1-2 days after diet changes some diarrhea was found. General structure of faeces containing mash was suitable for compostion.

The results support the idea that basal feed containing 25% (w/w) Brewers' mash is a suitable ration in raccoon dog diet. Further studies for more accurate digestibility experiments are in progress.

Turkistalous, 55(10):528-530, 1983.

3 tables, 1 fig.

In Finnish

Authors' summary.



EFFECT OF EXCESSIVE DIETARY ZINC ON THE INTRAUTERINE AND
POSTNATAL DEVELOPMENT OF MINK.

Michael R. Bleavins, Richard J. Aulerich, John R. Hochstein,
Thomas C. Hornshaw, Angelo C. Napolitano, Dept. of Animal
Science and Center for Environmental Toxicology, Michigan
State University, East Lansing, MI 48824-1225.

Dietary exposure to 1000 ppm of supplemental Zn did not result in grossly observable Zn toxicity or Zn-induced Cu deficiency in adult mink. These same concentrations did, however, produce achromatrichia, alopecia, lymphopenia and a reduced rate of growth in the offspring produced by the Zn-treated females. These mink kits also exhibited profound immunosuppression. The in vitro blastogenic response of peripheral blood lymphocytes to concanavalin A was significantly ($P \leq 0.001$) lower in kits born to Zn-treated dams than the response of those born to control dams. The depressed immunoresponsiveness was not a permanent defect since a normal lymphocyte response was seen approximately 14 weeks after weaning and being placed on an unsupplemented basal diet. The impaired lymphocyte reactivity is believed to be the result of altered DNA synthesis in these cells and/or an inhibition of macrophage functions necessary for normal response to the mitogen concanavalin A.

J. Nutr. 112, 1983, 2360-2367.

5 tables, 40 refs.

Authors' summary.

RESPONSES OF SIBERIAN FERRETS TO SECONDARY ZINC PHOSPHIDE
POISONING.

Elwood F. Hill, James W. Carpenter, US Fish and Wildlife Service,
Patuxent Wildlife Res. Ctr., Laurel, MD 20811, USA.

The hazard of operational-type applications of zinc phosphide (Zn_3P_2) on a species closely related to the black-footed ferret (*Mustela nigripes*), was evaluated by feeding 16 Siberian ferrets

(*M. evermanni*) rats that had been killed by consumption of 2% zinc phosphide-treated bait or by an oral dose of 40, 80 or 160 mg of Zn_3P_2 . All ferrets accepted rats and a single emesis by each of 3 ferrets was the only evidence of acute intoxication.

All ferrets learned to avoid eating gastrointestinal tracts of the rats. Subacute zinc phosphide toxicity in the ferrets was indicated by significant decreases (18-48%) in hemoglobin increases of 35-91% in serum iron, and elevated levels of serum globulin, cholesterol, and triglycerides. Hemoglobin/iron, urea nitrogen/creatinine, and albumin/globulin ratios also were altered by the treatments. This study demonstrated that Siberian ferrets, or other species with a sensitive emetic reflex, are afforded a degree of protection from acute zinc phosphide poisoning due to its emetic action. The importance of toxicity associated with possible respiratory, liver, and kidney damage indicated by altered blood chemistries is not known.

J. Wildl. Manage, 46, 3, 1982.

3 tables, 1 fig., 23 refs.

Authors' summary.

HEXACHLOROBENZENE INDUCED EFFECTS ON REPRODUCTION IN MINK AND EUROPEAN FERRETS.

M.R. Bleavins, R.J. Aulerich, R.K. Ringer, Michigan State Univ.,
East Lansing, Michigan 48824.

Mink and European ferrets were fed diets that contained 0, 1, 5, 25, or 125 ppm supplemental hexachlorobenzene (HCB) to investigate the effects of this widespread agricultural and industrial pollutant on the reproductive performance of these two closely related species.

Mink fed diets that contained 1 ppm, or more, supplemental HCB for 6 weeks prior to breeding, produced offspring (kits) with reduced birth weights. Feeding mink 5 or 25 ppm HCB resulted in decreased kit body weight gains up to 6 weeks of age. During this period, mink kit mortality was positively correlated with HCB exposure. No kits were produced by the female mink or ferrets fed 125 ppm HCB. The ferrets fed 5 or 25 ppm HCB whelped smaller kits

than the controls but no reduction in post-partum kit growth was observed, although mortality increased in direct proportion to the level of HCB in the diet.

Journ. of Animals Science, 55 (Suppl. 1) 327, 1982.

Only abstract received.

Authors' abstract.

BLACK-FOOTED FERRET PREY REQUIREMENTS:
AN ENERGY BALANCE ESTIMATE.

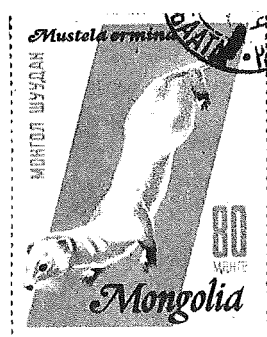
Mark E. Stromberg, R. Lee Rayburn, Tim W. Clark, The Nature Conservancy, 1732 Pearl St., Denver, CO 80203.

A model based on calculations of metabolizable energy requirements estimated the annual prey requirements for 1 reproductive female black-footed ferret (*Mustela nigripes*) and her young. Both white-tailed and black-tailed prairie dogs (*Cynomys leucurus* and *C. ludovicianus*) were considered as prey. Gestation, lactation, and ferret pup growth were modelled. A general regression of mustelid prey biomass requirements helped verify metabolizable energy calculations. Populations of between 474 and 1,421 black-tailed prairie dogs and between 412 and 1,236 white-tailed prairie dogs are predicted as necessary to sustain the annual predation by the female and young ferrets. Minimum ferret densities expected to occur and sizes of ferret preserve areas were calculated. These results can be used by administrators and managers charged with black-footed ferret surveys and conservationists planning preserved for this endangered species.

J. Wildl. Manage 47, 1, 67-73, 1983.

1 fig., 39 references.

Authors' summary.





HAEMAGGLUTINATION-TEST APPLIED TO THE DISTINCTION BETWEEN
FELINE AND CANINE PARVOVIRUS.

(Isolement d'un rotavirus sur lapins à diarrhée recherche
du pouvoir pathogène).

Anne Moraillon, R. Moraillon, Chaire de Médecine des Équidés et
des Carnivores, École Natl. Vét., 94704 Maisons-Alfort Cédex,
France.

The study of the haemagglutinating properties of parvovirus in
carnivores has led to a technique that makes possible to distinguish
between strains of feline origin (cat panleukopenia virus) and
strains of canine origin (responsible for cat parvovirosis). The
two strains of mink enteritis which were studied behave like viruses
of feline origin.

Rec. Méd. vét., 1982, 158, 12, 799-804. Authors' summary.
In FREN, summary in FREN, ENGL, SPAN.

CANINE PARVOVIRUS: RELATIONSHIP TO WILD-TYPE AND VACCINE STRAINS
OF FELINE PANLEUKOPENIA VIRUS AND MINK ENTERITIS VIRUS.

Jon-Duri Tratschin, Gary K. McMaster, Gertrud Kronauer, Günter
Seigl, Inst. for Hygiene and Med. Microbiology, University
of Bern, Friedbühlstrasse 51, CH-3010 Bern, Switzerland.

Canine parvovirus (CPV), feline panleukopenia virus (FPLV) and
mink enteritis virus (MEV) were compared serologically, by deter-
mination of their host range in cell cultures, as well as by re-
striction enzyme analysis. Maps of the virus genomes were esta-
blished using seven different restriction enzymes cutting at a
total of 56 sites. MEV and FPLV gave maps which were identical
except for one restriction site. The map of CPV is closely related
to those of FPLV/MEV since their DNAs share about 80% of the re-
striction sites tested. However, CPV is clearly distinct from

FPLV/MEV since either eight (German isolate) or nine (Belgian, Swiss and American isolates) restriction sites are different. The DNAs of six vaccine strains of FPLV and MEV were also analysed. They gave maps which closely resembled those of the respective wild-type strains. CPV and FPLV/MEV also differed with respect to antigenicity, as well as to host range in cell cultures.

J. gen. Virol. (1982) 61, 33-41.

3 figs., 1 table, 23 references.

Authors' summary.

FERRET AS A POTENTIAL RESERVOIR FOR HUMAN CAMPYLOBACTERIOSIS.

James G. Fox, Joel I. Ackerman, Christian E. Newcomer, Div. of Comparative Medicine, Massachusetts Inst. of Technology, Cambridge, MA 02139.

A survey was conducted to determine the frequency of *Campylobacter fetus* subsp *jejuni* in feces of ferrets purchased for use in biomedical research. Over a 12-month period, 168 ferrets from 2 commercial breeders were examined by bacteriologic cultural procedures for *Campylobacter* spp; 61% were culturally positive for *C fetus* subsp *jejuni*. In a therapeutic trial with 16 ferrets shedding *C fetus* subsp *jejuni* in feces, erythromycin given orally failed to eliminate intestinal carriage of the organism in 15 of the animals.

Am. J. Vet. Res. Vol. 44, no.6, 1049-1052, 1983.

2 tables, 22 references.

Authors' summary.

CAMPYLOBACTER FETUS SS JENUNI INFECTION IN FERRETS: CLINICAL AND THERAPEUTIC INDICES.

J.G. Fox, C.E. Newcomer, J.I. Ackerman, Div. of Comparative Med., MIT, Cambridge, MA 02193.

Ferrets (*Mustela putorius*) are being used increasingly in biomedical

research and becoming popular as a pet. Previously, this laboratory described a proliferative colitis in the ferret which was characterized clinically by mucohemorrhagic stools, dehydration, and anorexia. *Campylobacter fetus* subsp *jejuni* (Cfj), a leading cause of diarrhea in man, was isolated from six of nine ferrets with proliferative colitis. Clinical signs of diarrhea were reproduced in an experimental Cfj infectivity study in Cfj-free ferrets. *Campylobacter fetus* subsp *jejuni* was recovered from the feces of 63% (103/166) ferrets surveyed. The majority of these isolates were from asymptomatic carriers; however, experimental stress precipitated an outbreak of episodic diarrhea in 38 of 66 animals as evidenced by loose, mucus and blood tinged stools. Clinical signs of diarrhea persisted for a period of 4 weeks, but subsided after removal of experimental stress. Therapeutic trials with erythromycin (40-65 mg/kg, twice daily) for 10 days in 16 animals shedding Cfj (10 controls also positive for Cfj) were unsuccessful in eliminating the carrier state. *Campylobacter* infection in ferrets therefore presents several interesting problems; long-term carriage of the organism with potential zoonotic implications, clinical disease under experimental stress, and difficulty in eliminating Cfj from asymptomatic carriers.

Laboratory Animal Science, Vol. 32, no. 4, 1982.

Only abstract received.

Authors' abstract.

FAILURE TO TRANSMIT SARCOCYSTIS SPECIES FROM OX, SHEEP,
GOATS, MOOSE, ELK, AND MULE DEER TO RACCOONS.

J.P. Dubey, Byron L. Blagburn, Vet. Res. Lab., Department of Vet.
Science, Montana State University, Bozeman, MT 59717, USA.

Meat infected with *Sarcocystis cruzi* of ox, *S tenella* of sheep, *S hemionilatrans* of mule deer, *S capracanis* of goats, *S wapiti* of elk, and *S alceslatrans* of moose was fed to 6 *Sarcocystis*-free raccoons, 1 raccoon for each species of *Sarcocystis*. None of the raccoons shed *Sarcocystis* sporocysts in the feces.

Am. J. Vet. Res., 44, 6, 1983.

9 references.

Authors' summary.

SARCOCYSTIS AND OTHER COCCIDIA IN FOXES AND OTHER WILD
CARNIVORES FROM MONTANA.

J.P. Dubey, Vet. Res. Lab., Dept. of Vet. Science, Montana State
University, Bozeman, MT 59717, USA.

Sarcosystis spp sporocysts were found in feces of 10.1% of 198 red foxes (*Vulpes vulpes*), in 3.2% of 61 bobcats (*Lynx rufus*), in 16.6% of 12 mountain lions (*Felis concolor*), in 16.6% of fisher (*Martes pennanti*), and in none of 20 wolverines (*Gulo gulo*), 4 mink (*Mustela vison*), or 10 raccoons (*Procyon lotor*). *Sarcocystis muris* and *toxoplasma gondii* were not found in laboratory mice inoculated with feces of bobcats and mountain lions.

J. Amer. Vet. Med. Ass., 181, 11, 1270-1271.

14 references.

Author's summary.

MANGE IN ARCTIC FOXES ON FARMS AND ITS CONTROL.

(Swierzb drazacy u hodowlanych piesakow i jego zwalczanie).

Franciszek Kamyszek, Zaklad Hygieny Weterynaryjnej, 60-126, Poznan,
Poland.

The aim of the study was to determine the occurrence of scab in arctic foxes and the ways in which it spreads and to control it. In 1979 the investigations were carried out in 3 farms on 381 arctic foxes aged 3 weeks to 4 years. The clinical examinations in the farms and laboratory analyses of scrapes showed that 302 animals (79.3%) animals were infested by *Sarcoptes scabiei* var. *vulpis*. The infestation in individual farms ranged from 65.4-85.0%. The animals were divided into 3 groups and each of them was bathed 2 or 3 times at 8-10 days intervals an aqueous solution of a different preparation. Group a was dipped in a 0.05% solution of Taktic, group b in 0.025% Neocidol and group c in 1% Neguvon. In the parts of skin affected by more serious lesions, the preparation was rubbed in with a hard brush. Simultaneously the farms were mechanically cleaned and disinfected. The examination after treatment showed that 97.4% of the animals were cured. As one

farm was situated near a forest, the source of infestation was probably in the wild red foxes in which the breeder noticed some skin changes. The infestation had probably spread during contact of animals while mating and as a result of the exchange of males in all three farms in this period.

Conclusions: The scab infestation ranged from 65.4-85.0% of animals in individual farms (mean 79.3%). After dipping repeated 2 or 3 times, 97.4% of the treated animals were cured. Taktic appeared to be most effective preparation.

Wiadomosci Parazytologiczne, 28 (1/2), 295-298, 1982.

10 references.

Author's summary.

In POLH, summary in ENGL.

NOCARDIOSIS IN A FOX AND IN A MONGOOSE.

(Nocardiose bei einem Rotfuchs (*Vulpes vulpes*) und einem Kleinen Mungo (*Herpestes javanica*)).

G. Loupal, M. Schönbauer, Angelika Schönbauer-Längle, Inst. für Pathologie und Gerichtliche Veterinärmedizin, Linke Bahngasse 11, A-1030 Wien.

A case of nocardiosis in a fox (*Vulpes vulpes*) and another one in a mongoose (*Herpestes javanica*) are described. In both animals severe exudative pleurisy was found. In the exudate there were many pinhead-sized granules. Histologically we saw large quantities of slender, branching, gram-positive and acid-fast bacteria in these granules. Thought attempts to culture these microorganisms failed, we identified them as bacteria of the genus *nocardia* because of their morphology and their staining properties.

Berliner Münch. Tierärztl. Wschr. 95, 312-315, 1982.

3 figs., 13 references.

Authors' summary.

In GERM, summaries in GERM and ENGL.

EXPERIMENTAL ENCEPHALITOOZONOSIS IN THE BLUE FOX.
CLINICAL AND SEROLOGICAL EXAMINATIONS OF AFFECTED PUPS.

Svein Fredrik Mohn, Natl. Vet. Inst., P.O. Box 8156, Dep., Oslo
1, Norway.

Two groups of blue fox pups about 1 1/2-2 and 2 1/2-3 months old, respectively, suffering from experimental encephalitozoonosis, were examined clinically and serologically. Antibodies to Encephalitozoon cuniculi were detected in all pups, the titres varying within the range 10-12,800. In addition to unspecific signs of disease the pups showed various neurological disturbances including ataxia, posterior weakness, lameness and circling behaviour, terminating in recumbency, paralysis or convulsions. Reduced sight or blindness was observed occasionally. Some of the pups appeared thirsty. Haematological examinations revealed pronounced leukocytosis without any conspicuous shift within the various groups of leukocytes. Biochemical examinations of serum showed significant elevated values of urea nitrogen, creatinine, and magnesium concentrations, reflecting renal dysfunction. Alanine aminotransferase was found significantly depressed in both groups. Raised levels of total protein were demonstrated due to pronounced hyperglobulinaemia. This finding together with the common occurrence of generalized polyarteritis nodosa and proliferations of plasma cells in clinically affected pups, is probably a result of autoimmune disturbances initiated directly or indirectly by the protozoan infection.

Acta vet. scand. 1982, 23, 503-511.

2 tables, 28 references.

Author's summary.

In ENGL, summary in NORG.





3e CONGRES INTERNATIONAL SCIENTIFIQUE
SUR LA PRODUCTION DES ANIMAUX A FOURRURE

3rd INTERNATIONAL SCIENTIFIC CONGRESS
IN FUR ANIMAL PRODUCTION

25, 26, 27 avril 1984, Versailles, France

Jouy-en-Josas, February 23, 1984

Dear Colleague,

Please find enclosed final registration forms. Send them in due time because room reservation is very doubtful after March 25.

The Congress programme is full : 57 speeches and 16 posters ! Thus we will have plenty of work. But I think it was best to accept a maximum number of participants ... no more can be accepted now !

You will receive the book of abstracts soon. Printing was delayed by some late authors.

While we are working, the ladies will pay a visit to the Palace of Versailles on the afternoon of Wednesday 25. On Thursday 26 they will have a sight-seeing tour in Paris, lunch and a fashion show in the afternoon. On Friday morning they will visit Malmaison.

I hope to hear from you soon.

Best regards,

The Chairman of the
Organizing Committee,

J. ROUGEOT

J. Rougeot

Petrozavodsk
16 January, 1984

Dear Dr. Jørgensen,

I have just got your New Year greetings. Thank you for your kind wishes.

I am glad that you are going to expand your studies. All of them seem to be very interesting and long-range plans. We can cooperate with you in some of these investigations. We have just initiated studies on digestion physiology of minks and polar foxes. The information about our results has been recently sent to you, so you can get an idea of the main trend of our investigations. We have also some interesting data on vitamins. If the object is interesting for your journal we can prepare a number of articles (vitamins A, B₁, B₂). The same can be done for prophylaxis of stress in animals.

It is very difficult to translate our publications from Russian into English here. Could you, please, excite the curiosity of publishers for publication of our books in English? The book "Fur-bearing animal diseases" will be of interest for fur farmers in all countries. Now Prof. Ulf Wenzel and myself are making the book ready for Publishing House "VEB Gustav Fisher Verlag Jena" (GDR). It will be published in German and then in Russian. It will be a good book which will cover methods for investigations, non-infectious, contagious and invasional diseases of fur-bearing animals. Colour and black-and-white illustrations are given there. I think that Ulf Wenzel will send you detailed information on the book.

Very interesting book "Scientific problems of fur breeding" will be published in the USSR, "Nauka" in 1985. It can be also recommended for translation. Now I am preparing information about this book and I shall send it to you later. The book "Laboratory methods for assessing food quality in fur breeding" was mentioned in my last letter.

Thus, if any publishers become interested in publication (and translation) of the books, the experience of Soviet fur breeders will be the property of fur farmers in many countries. According to the existent regulations in our country publishers should apply

to the All-Union Agency for Copyright (VNIIP) to the address: 103104 Moscow K-104, Bolshaya Bronnaya, 6a'.

As regards to my participation in the congress in Paris, an interpreter will be required. As it is a matter of money, could you, please, ask Prof. Rougeot to apply for helping to the French-Soviet Association? I hope they will respond positively.

I wish you every success in the fulfilment of your plans for 1984.

Sincerely yours

B. Berestov
Prof. Berestov

16 01-84

EXPERIMENTAL ENCEPHALITOOZONOSIS IN THE BLUE FOX.
CLINICAL, SEROLOGICAL AND PATHOLOGICAL EXAMINATIONS OF
VIXENS AFTER ORAL AND INTRAUTERINE INOCULATION.

S.F. Mohn, K. Nordstoga, I.W. Dishington, Natl. Vet. Inst.,
P.O. Box 8156, Dep., Oslo 1, Norway.

Inoculation of vixens with *Encephalitozoon cuniculi* (*E. cuniculi*), performed orally, either before or in the gestation period, or directly into the uterus at oestrus, induced clinical encephalitozoonosis in the offspring. The infection of the vixens, indicated by a general *E. cuniculi* antibody response, appeared to run a sub-clinical course. Endometritis was detected in some of the vixens when examined at the end of the trial. A temporary increase of total protein, albumin and globulin in the inoculated vixens compared to the controls was detected in the final 2 weeks of the gestation, concomitantly with the rise in humoral *E. cuniculi* antibody titres. The antibody levels appeared significantly higher in the group of vixens inoculated directly into the uterus than in the orally inoculated groups. Vixens exposed to the parasite seemed to possess a certain degree of acquired resistance to re-infection with the parasite when exposed in the following breeding season.

Acta vet. scand. 1982, 23, 490-502.

3 tables, 4 figs., 24 references.

Authors' summary.

In ENGL, summary in NORG.

HUMAN INFLUENZA VIRUS INFECTION IN MINK:
SEROLOGICAL EVIDENCE OF INFECTION IN SUMMER AND AUTUMN.

Katsunori Okazaki, Ryo Yanagawa, Hiroshi Kida, Dept. of Hygiene
and Microbiology, Fac. of Vet. Med., Hokkaido University,
Sapporo, Japan.

During the period from July to November 1981, 42 out of 128 young mink of a flock were found to possess antibodies against the viruses

A/Bangkok/1/79 (H3N2) and A/Kumamoto/37/79 (H1N1), which were currently prevailing human influenza viruses. Seroconversion against A/Bangkok/1/79 was found in 12 mink from August to November. HI antibody titers of 1:128 were found in 8 out of 42 mink at the first examination in July and August.

These findings suggest that infection with these human influenza viruses was present in this flock during the period from birth (the beginning of May) to autumn, the non-prevalent season in man. Attempts at virus isolation were unsuccessful.

Veterinary Microbiology, 8, 1983, 251-257.

2 tables, 1 fig., 9 references.

Authors' abstract.

COMPARATIVE PATHOGENICITY OF FOUR STRAINS OF ALUTIAN DISEASE
VIRUS FOR PASTEL AND SAPPHIRE MINK.

William J. Hadlow, Richard E. Race, Richard C. Kennedy,
Epidemiology Branch, Natl. Inst. of Allergy and Infectious
Diseases, Rocky Mountain Laboratories, Hamilton, Montana 59840.

Information was sought on the comparative pathogenicity of four North American strains (isolates) of Alutian disease virus for royal pastel (a non-Aleutian genotype) and sapphire (an Aleutian genotype) mink. The four strains (Utah-1, Ontario (Canada), Montann, and Pullman (Washington), all of mink origin, were inoculated intraperitoneally and intranasally in serial 10-fold dilutions. As indicated by the appearance of specific antibody (counterimmunoelectrophoresis test), all strains readily infected both color phases of mink, and all strains were equally pathogenic for sapphire mink. Not all strains, however, regularly caused Aleutian disease in pastel mink. Infection of pastel mink with the Utah-1 strain invariably led to fatal disease. Infection with the Ontario strain caused fatal disease nearly as often. The Pullman strain, by contrast, almost never caused disease in infected pastel mink. The pathogenicity of the Montana strain for this color phase was be-

tween these extremes. These findings emphasize the need to distinguish between infection and disease when mink are exposed to Aleutian disease virus. The distinction has important implications for understanding the natural history of Aleutian disease virus infection in ranch mink.

Infection and Immunity, 41, 3, 1983, 1916-1023.

3 tables, 1 fig., 29 references.

Authors' summary.

DENTAL CARIES IN NUTRIA (MYOCASTOR COYPUS, MOL.)

FROM CLOSED HUSBANDRIES.

(Występowanie próchnicy zębów u nutrii (Myocastor coypus, Mol) pochodzących z hodowli zamkniętych).

Witold Scheuring, Rita Scheuring, ul. Kilińskiego 92, 66-210 Zbaszynek, Poland.

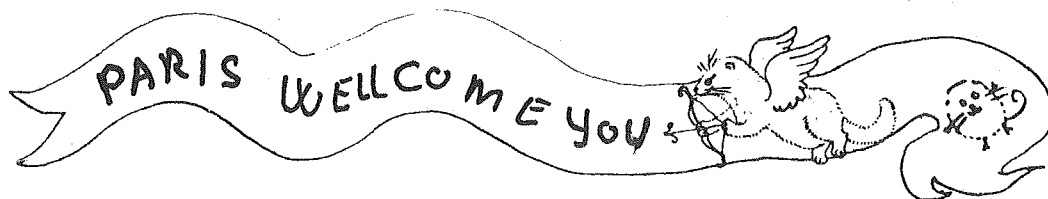
The purpose of the studies was to determine morbidity and intensity of dental caries in nutria. The studies were performed on 250 animals of different age and varieties. Dental caries of various degree of intensity was diagnosed in 67.2% of animals. A mean intensity of the disease was 2.8, and Turkheim's index was 0.065-0.75. In prophylaxy of the disease main role plays a proper feeding contributing demands of mineral salts and vitamins, and completion of Fluor deficiency by adding of Fluor into drinking water, common salt or food.

Medycyna Weterynaryjna (Poland) 38, 7, 1982, 363-365.

3 tables, 7 references.

Authors' summary.

In POLH, summaries in RUSS and ENGL.



TERATOGENICITY AND EMBRYOTOXICITY OF ORALLY ADMINISTERED
FENCHLORPHOS IN BLUE FOXES.

Gunnar N. Berge, Inger Nafstad, Dept. of Pharmacology and Toxicology,
Vet. College of Norway, P.O. Box 8146, Oslo 1, Norway.

Pregnant blue foxes (*Alopex lagopus*) were administered fenchlorphos (O-O-dimethyl-O-(2,4,5-trichlorophenyl) phosphorothioate) orally at a dose of 100 mg/kg/day in different periods of gestation. The dose chosen represents the therapeutic dose for the treatment of parasitic lesions. At term the mean number of whelps were recorded, and they were killed and examined for external, visceral and skeletal malformations. Of 19 medicated vixens the mean number of live whelps at term was 1.2 per vixen versus 9.5 in the control group. There was an evident predominance of males in the medicated groups. Several malformations of the head were registered, among them incomplete ossification of the skull bones, cleft palate, hydrocephalus internus and externus. Minor malformations like extra ribs or missing ribs occurred in the medicated groups. Congenital alopecia, hypoplastic kidneys, and hydronephrosis were observed in all the brain weight, cerebellum weight or the cerebellum-to-total-brain weight was observed.

Histological examination of the cerebellum showed a narrowing or absence of the granular and the molecular layers of the cortical zone.

Acta. Vet. Scand. 24, 1982, 99-112.

4 tables, 4 figs., 18 references.

Authors' summary.

In ENGL, summary in NORG.



Figure 2. Brain edema and haemorrhages in whelp from fenchlorphos-treated mother.

LIQUID-INDUCED DISSEMINATED INTRAVASCULAR COAGULATION
IN THE BLUE FOX.

B. Lium, J. Dale, A.O. Aasen, Dept. of Pathology, Norwegian Coll.
of Vet. Medicine, P.O. Box 8146, Dep., Oslo 1, Norway.

The present experiments were performed to study the effects of a single high intravenous dose of Liquoid (10 mg/kg body weight) upon platelets, coagulation activities and hematocrit in blue foxes, and their correlation with the survival time. Both "short-living" (< 9 h) and "long-living" (24 h or more) blue foxes showed a marked consumption of coagulation factors, initial fall in fibrinogen, positive ethanol gel test and a gradual decrease in platelet counts. In addition "short-living" animals developed a marked rise in hematocrit, reflecting a considerable increase in vascular permeability. We conclude that activation of plasma proteases has as one of its effects increased permeability in microvasculatory vessels and that this may play a central role for the course and outcome of Liquoid-induced disseminated intravascular coagulation.

Acta vet. scand. 23, 1982, 570-580.

6 figs., 31 refs.

Authors' summary

In ENGL, summary in NORG.

FLUID FLUXES IN THE FERRET TRACHEA.

G.M. Loughlin, G.A. Gerencser, M.A. Crowder, R.L. Boyd, J.A.
Mangos, Pediatric Pulmonary Ctr., Dept. of Pediatrics, Coll.
of Med., University of Florida, Gainesville, Florida 32610.

A net absorption of fluid was observed in isolated ferret trachea under control conditions. Gholinergic stimulation resulted in net secretion of fluid while atropine blocked this response without any effect on the basal process of fluid reabsorption.

Experientia, (Basel), 38, 12, 1982. 1451-1452.

2 figs., 14 references.

Authors' summary.

LOCALIZATION AND RELEASE OF LYSOZYME FROM FERRET TRACHEA:
EFFECTS OF ADRENERGIC AND CHOLINERGIC DRUGS.

M. Tom-Moy, C.B. Basbaum, J.A. Nadel, 1315-M, Cardiovascular Res.
Inst., University of California, San Francisco, CA 94143,
USA.

Lysozyme is a bacteriolytic enzyme found in respiratory tract fluid. In this study, immunocytochemistry was used to determine the cells of origin of tracheal lysozyme in the ferret. Lysozyme was found in secretory granules of serous but not mucous cells in the submucosal glands, and was absent from the surface epithelium, cartilage, and connective tissue. The exclusive presence of lysozyme in serous gland cells renders it useful as a biochemical marker of that cell type.

Measurements of lysozyme assayed from the incubating medium indicated that bethanechol stimulated lysozyme release by $260 \pm 80.9\%$ (mean \pm SE), phenylephrine by $80 \pm 16.4\%$, and terbutaline by incubated tissues revealed loss of serous granules and lysozyme immunoreactivity in response to the drugs. Atropine, propranolol, and phentolamine blocked the stimulatory effects of bethanechol, terbutaline, and phenylephrine, respectively.

These findings establish the usefulness of lysozyme as a serous-cell marker and demonstrate that secretory responses of different magnitude are evoked by equimolar concentrations of alpha- and beta-adrenergic and cholinergic drugs.

Cell Tissue Res. 228, 1983, 549-562.

13 figs., 22 references,

Authors' summary.

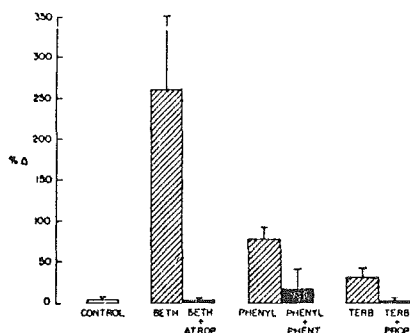


Fig. 5. Agonist-induced release of lysozyme, expressed as percent of control values. Open bar represents control tissues in which no agonists were added ($n=17$). Hatched bars represent tissues treated with agonists (10^{-3} M); bethanechol ($n=8$), phenylephrine ($n=10$), and terbutaline ($n=8$). Opaque bars represent tissue treated with agonists (10^{-3} M) and antagonists (10^{-4} M); bethanechol + atropine ($n=6$), phenylephrine + phentolamine ($n=10$), and terbutaline + propranolol ($n=6$).

TOXOPLASMOSIS IN RABBITS.

VR Dr. U.D. Wenzel and Dr. G. Albert, Bezirksinstitut für Veterinärwesen Leipzig, Goldschmidtstrasse 21, 7010 Leipzig.

Toxoplasmosis is widely spread among domestic animals and productive live stock. Whereas most animals have latent infections only, without any clinical symptoms and animals losses, toxoplasmosis may occur as an epizootic in rabbit stocks and cause a large number of losses.

Under natural conditions, rabbits are infected orally after contamination of their feed with the faeces of toxoplasmotic cats.

Apart from latent infections with toxoplasms, acute, sub-acute and chronic forms of toxoplasmosis occur in rabbits. In most cases toxoplasmosis then entails the death of the animal within six of nine days. Clinical symptoms of rabbit toxoplasmosis are hardly characteristic and depend on the organ which is mainly affected. Frequent symptoms are diarrhoea, vomiting, cough, or central-nervous disturbances. The abdominal walls of diseased animals are tense, palpation is painful to the animals. In case of acute toxoplasmosis, the animals always run a high temperature, breathe quickly, do not eat and get emaciated within a few days. Stock losses may run up to 50 per cent within a short period.

Autopsy findings of toxoplasmosis may easily be mistaken for pseudo-tuberculosis. When the animals are opened, an increased amount of liquid is found in the thoracic and abdominal cavities. The lungs frequently are oedemic, sometimes with pneumonic lesions. The spleen is greatly enlarged, soft, and contains numerous necroses up to bean size. Within the swollen liver, necroses up to the size of the grain of mustard-seed are found, frequently surrounded by haemorrhagic lining. Another striking symptom are the greatly enlarged intestinal lymph glands, which are frequently cheesy.

Histological examination reveals typical pseudocysts, mainly in

the intestinal lymph glands and in the spleen. Toxoplasmosis may occur in rabbits throughout the year, according to our investigations it is, however, concentrated on the period between August and November. Autopsy findings revealed that toxoplasmosis was the cause of death in 3.96 per cent of the rabbits examined at our institute between 1975 and 1981.

Brühl, 22, 6, 1982, 34-35.

Authors' summary.

In GERM.

ANTIGENIC STRUCTURE AND VARIATION OF CANINE PARVOVIRUS TYPE-2
FELINE PANLEUKOPENIA VIRUS, AND MINK ENTERITIS VIRUS.

C.R. Parrish, L.E. Carmichael, James A. Baker Institute for Animal Health, New York State College of Veterinary Medicine, Cornell University, Ithaca, New York 14853.

The antigenic structure and variation of canine parvovirus type-2 (CPV), feline panleukopenia virus (FPV), mink enteritis virus (MEV), and a closely related virus of raccoons (RPV) was investigated using a panel of 13 monoclonal antibodies (mAb) formed against CPV and 8 mAb formed against FPV. Each mAb both neutralized and inhibited the hemagglutination of the homologous virus. All mAb tested immunoprecipitated the two capsid proteins. Five mAb were specific for the CPV isolates and one reacted with the FPV, MEV, and RV isolates, but not the CPV. Another mAb reacted only with certain FPV and MEV isolates. The remaining 14 mAb reacted with most parvoviral isolates from the four animal species. Antigenic variation was observed both within and between the parvovirus isolates from each species. The 12 MEV isolates could be grouped into three antigenic types based on their reactivity with the panel of mAb. Antigenic variants of either CPV or FPV were readily selected with several mAb. Analysis of these variant viruses by direct serological tests and competition radioimmune assays between different mAb revealed that the capsid surface contained at least two determinants, each being comprised of many different but overlapping epitopes.

Virology, 129, 401-414, 1983.

2 tables, 7 figs., 42 refs.

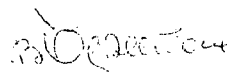
Authors' abstract.

NEW BOOKS

Dear Gunnar Jørgensen.

I would like to present you our new book issued in the "Karelia" publishing house in New Year's eve "Laboratory methods of the feed quality estimation in fur-breeding". I think that it will be interesting for fur breeders, so it would be advisable to publish it in English. Together with doctor Taranov G.S. (he is at the head of the laboratory of biochemistry in fur breeding research institute) we plan to add this book with mycological studies and also to expand the list of the investigated feeds used in cow- and rabbit-breeding.

With best wishes
Prof. V. Berestov



Berestov V.A., Taranov G.S.

"Laboratory methods of the feed quality estimation
in fur breeding".

Petrosavodsk, "Karelia", 1983
Summary.

This publication is the reference book for veterinary specialists and workers of veterinary laboratories. It includes the methods of investigation of the used feed quality having for an object to determine its fitness for feeding.

Contents.

Microbiological methods of the feed study

Chemical methods of the feed study

Veterinary-sanitary estimation of the subproducts

Whale meat study

Fish study

Animal fat study

Milk and milk products study

Dry animal feeds

Concentrated feed study

Some ways of laboratory techniques

Берестов В. А., Таранов Г. С.

В 48 Лабораторные методы оценки качества кормов в звероводстве.— Петрозаводск: Карелия, 1983.— 80 с., ил.

Книга является справочным пособием для ветеринарных специалистов звероводческих хозяйств и работников ветеринарных лабораторий. В ней описаны методы исследования качества используемых в звероводстве кормов с целью определения пригодности их к скормлению.

4001020000—117
M127(03)—83 26—83

47.1—4(2P—6K)

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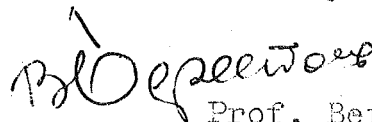
Dear Dr. Jørgensen,

I take an opportunity to thank you for your presents and kindness. I believe, that Mr. Brandt has shared his impression on his visit to Karelia. Unfortunately, the visit was rather short, and we could only tell our guests about the main trends of our investigations but we had no time to discuss methodic problems and the results obtained. We shall try to bridge partially the gap by publishing our articles and information on our new publications in Scientifur.

Now I am sending you our new book "Blood phagocytic reactions in mink and polar fox". I hope that it will be of interest to you and to the readers of your journal. If you find it expedient we can send you a brief account of the materials of these studies.

With best regards

Yours sincerely



Prof. Berestov

**Вячеслав Алексеевич Берестов,
Людмила Борисовна Узенбаева**

**ФАГОЦИТАРНАЯ РЕАКЦИЯ КРОВИ У НОРОК И ПЕСЦОВ,
СРАВНИТЕЛЬНАЯ ХАРАКТЕРИСТИКА**

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В. А. Берестов, Л. Б. Узенбаева

**ФАГОЦИТАРНАЯ
РЕАКЦИЯ КРОВИ
У ПЕСЦОВ И НОРОК**

V.A.Berestov, L.B.Uzenbaeva.

Blood phagocytic reactions in mink and polar fox.
(comparative characterization). - L.: Nauka, 1983.-112 p.

Abstract

The results of the studies on leucocytic phagocytosis in two representatives of predators, cage-bred minks and polar foxes, are presented in the monograph. Sexual, age, seasonal and specific differences are discussed in terms of the known morphological-functional characteristics of the animals and their different ecological conditionality in natural environment. Morphological characteristics of leucocyte granules are shown for the mutant mink of sapphire colour. The relationship between this poorly studied phenomenon, similar to the human Chediak-Hidashi syndrome, and the known factors of decreased vital activity in sapphire-coloured minks is considered.



112 pp, 32 tables,
29 figs., 333 refs.
In RUSS.

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SAMKOV, I.A.

RATIONAL MEANS OF FEEDING A BASIC MINK HERD. (RUS)
 [RATSIONAL'NYE SPOSOBY KORMLENIIA OSNOVNOGO STADA
 NOROK / IU.A. SAMKOV. --]

BOOK

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Обзорная информация

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Ein Leitfaden
für Kaninchenzüchter und Kaninchenhalter

KANINCHEN KRANKHEITEN



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Landwirtschaftsverlag
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Dr. Friedrich Knorr †
und Vet.-Rat Dr. Ulf D. Wenzel
unter Mitarbeit
von Dr. Günter Albert

The new book from Dr. Ulf D. Wenzel deals with diseases of the domestic rabbit. The purpose of the book is delivery of detailed information to the rabbit breeders.

In the first chapter hygiene, feeding, breeding and housing are discussed briefly, and these passages are especially useful for the new breeder.

The second chapter deals with the rabbit in health and disease. I am sure, that the rabbit breeder will find the description of the clinical examination and handling of the rabbit interesting and useful, and the introduction to infectious agentia are well written. Desinfection and preparing dead animals for mailing to a lab. for post-mortem is useful information for any breeder. The diseases caused by infectious agentia (virus, bacteria, fungi and parasites) are reviewed with typical german thoroughness and might be a little to difficult for the common breeder to read because of the wide-spread use of latin words.

The handling of vitamins and macro-microminerals is easily read and understood. The sporadic diseases in chapter 8 deal with some important conditions in modern rabbit production such as mucoid enteropathy and gastro-enteritis. These diseases or syndromes cause a lot of problems for the breeder and he feels a demand for the information, which Dr. Wenzel gives.

Dr. Wenzel's book about "Kaninchen Krankheiten" can be recommended to the rabbit breeder as a necessary information about all areas of rabbit production. In general, this book is as well written as the previous "Pelztiergesundheitsdienst". Also the veterinarian with little experience in rabbit diseases will have great advantage in reading the book.

Reviewed by Per Henriksen.

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DER DEUTSCHE PELZTIERZÜCHTER

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Offizielles Organ
des Zentralverbandes
Deutscher
Pelztierzüchter e. V.

Tag 5. Jan. 1984

Lieber Herr Jørgensen,

anliegend übersende ich Ihnen ein Exemplar des bei uns erschienenen Heftes

"Iltisse - Zucht und Haltung - von Dr. B. Sacher
mit der Bitte, dieses in Scientifur zu besprechen.

Mit freundlichen Grüßen


Dr. Scheelje

PELZTIERZUCHTBÜCHER DES ANIMAL-VERLAGES
- Band 3 -

Iltisse - Zucht und Haltung

von Dr. Bernhard Sacher.

Das Buch hat einen Umfang von 44 Seiten. Der Preis beträgt einschl. Mehrwertsteuer 14,40 DM zuzügl. 1,60 DM Verpackungs- und Portokosten.

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- Zucht und Haltung -

von

Dr. Bernhard Sacher

(FITCH - BREEDING AND PRODUCTION).



Iltisse beim Deckakt



NATIONAL BOARD OF FUR FARM ORGANIZATIONS

December 23, 1983

We Have Moved

~~2055 North Brookfield Road
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Mr. Gunnar Jørgensen
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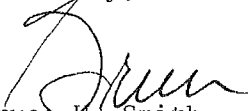
Dear Friend Gunnar:

We regret to inform you of the sudden and unexpected death of Roland E. Howell, a prominent fur animal scientist in the United States for 40 years. Mr. Howell died in his sleep in Salt Lake City on December 11. Many of the readers of Scientifur knew our friend Roland, either personally or through his many publications. We thought you would like to know.

Early in January, the Executive Committee of our organization will be making plans for the speaking program for our 1984 short course on August 8. Your name has been suggested as a possible speaker and we will be in contact with you once the planning committee has completed its work. Like other fur farmer organizations, we have a limited budget and it is not always possible to invite some of the speakers, particularly from a long distance away, to appear on our program.

Best wishes to you and yours for a happy and prosperous 1984.

Cordially,


Bruce W. Smith
Administrative Officer

k1

cc: Dale Schmeltzer
Anthony Rietveld



3e CONGRES INTERNATIONAL SCIENTIFIQUE
SUR LA PRODUCTION DES ANIMAUX A FOURRURE

3rd INTERNATIONAL SCIENTIFIC CONGRESS
IN FUR ANIMAL PRODUCTION

25, 26, 27 avril 1984, Versailles, France

Jouy-en-Josas, February 23, 1984

Dear Colleague,

Please find enclosed final registration forms. Send them in due time because room reservation is very doubtful after March 25.

The Congress programme is full : 57 speeches and 16 posters ! Thus we will have plenty of work. But I think it was best to accept a maximum number of participants ... no more can be accepted now !

You will receive the book of abstracts soon. Printing was delayed by some late authors.

While we are working, the ladies will pay a visit to the Palace of Versailles on the afternoon of Wednesday 25. On Thursday 26 they will have a sight-seeing tour in Paris, lunch and a fashion show in the afternoon. On Friday morning they will visit Malmaison.

I hope to hear from you soon.

Best regards,

The Chairman of the
Organizing Committee,

J. ROUGEOT

J. Rougeot

Petrozavodsk
16 January, 1984

Dear Dr. Jørgensen,

I have just got your New Year greetings. Thank you for your kind wishes.

I am glad that you are going to expand your studies. All of them seem to be very interesting and long-range plans. We can cooperate with you in some of these investigations. We have just initiated studies on digestion physiology of minks and polar foxes. The information about our results has been recently sent to you, so you can get an idea of the main trend of our investigations. We have also some interesting data on vitamins. If the object is interesting for your journal we can prepare a number of articles (vitamins A, B₁, B₂). The same can be done for prophylaxis of stress in animals.

It is very difficult to translate our publications from Russian into English here. Could you, please, excite the curiosity of publishers for publication of our books in English? The book "Fur-bearing animal diseases" will be of interest for fur farmers in all countries. Now Prof. Ulf Wenzel and myself are making the book ready for Publishing House "VEB Gustav Fisher Verlag Jena" (GDR). It will be published in German and then in Russian. It will be a good book which will cover methods for investigations, non-infectious, contagious and invasional diseases of fur-bearing animals. Colour and black-and-white illustrations are given there. I think that Ulf Wenzel will send you detailed information on the book.

Very interesting book "Scientific problems of fur breeding" will be published in the USSR, "Mauka" in 1985. It can be also recommended for translation. Now I am preparing information about this book and I shall send it to you later. The book "Laboratory methods for assessing food quality in fur breeding" was mentioned in my last letter.

Thus, if any publishers become interested in publication (and translation) of the books, the experience of Soviet fur breeders will be the property of fur farmers in many countries. According to the existent regulations in our country publishers should apply

to the All-Union Agency for Copyright (VAINP) to the address: 103104 Moscow K-104, Bolshaya Bronnaya, 6a.

As regards to my participation in the congress in Paris, an interpreter will be required. As it is a matter of money, could you, please, ask Prof. Rougeot to apply for helping to the French-Soviet Association? I hope they will respond positively.

I wish you every success in the fulfilment of your plans for 1984.

Sincerely yours

B. Berestov
Prof. Berestov

16 01-84

appeared not to influence the general health conditions of the animals.

The evaluation of fur characteristics revealed mostly small and insignificant differences between treatments groups. The results of Expt. 1 indicated a causal relationship between high fat:carbohydrate ratios and light color in dark mink and increased frequency of the fur defect "metallic". This was not supported by the later experiments. There was apparently no association between the fat:carbohydrate ratio and the incidence of wet belly disease.

The total consumption of metabolizable energy during the experiments, tended to increase with increasing fat:carbohydrate ratio. This may be explained by different growth curves and maintenance requirements or by variable feed wastage.

Agric. Univ. of Norway, Dept. of Poultry and Fur Animal Science,

Report no. 74, Vol. 62, no. 15, 1983, 20 pp.

11 tables, 21 references.

Author's summary.

In NORG, subtitles and summary in ENGL.

THE EFFECT OF COLISTIN FEEDING DURING THE MATING, GESTATION
AND LACTATION PERIODS ON WHELPING RESULT IN MINK.

T. Pekkanen, P. Lindberg, Satu Sankari, Dept. of Food Hygiene
and Dept. of Biochemistry, Coll. of Vet. Med., PL 6, SF-00551
Helsinki 55, Finland.

Colistin (100,000 IU/kg) was given in the feed during the mating, gestation and lactation periods to 49 female standard minks. 99 similar animals served as control without the antibiotic. The whelping results, expressed as the number of puppies living three weeks post partum per mated females, was 3.22 in the experimental group and 2.67 in the control group. The difference in the whelping result between the groups was mainly due to the significantly greater