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**BEHAVIOR OF THE NORTH AMERICAN BEAVER, CASTOR CANADENSIS.** H.E. Hodgdon, R.A. Lancia. (Acta Zool. Fennica, 174, 99-103, 1983). Code 1-11-0.

**MECHANISMS AND ADAPTATION IN THE CONSTRUCTIVE BEHAVIOUR OF THE BEAVER (C. FIBER L.).** P.B. Richard. (Acta Zool. Fennica, 174, 105-108, 1983). Code 1-11-0.

**INTERACTIONS BETWEEN BEAVERS IN A MONTANE POPULATION IN CALIFORNIA.** P.E. Busher. (Acta Zool. Fennica, 174, 109-110, 1983). Code 1-11-0.

**BEHAVIOR OF FREE-RANGING BEAVER (CASTOR CANADENSIS) AT SCENT MARKS.** D. Muller-Schwarze, S. Heckman, B. Stagge. (Acta Zool. Fennic, 174, 111-113, 1983). Code 1-11-0.

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**ECOLOGICAL RESEARCH OF MUSTELIDS.** S. Erlinge. (Acta Zool. Fennica, 174, 167-168, 1983). Code 11-10-M-F.

**ALTERNATIVE MATING STRATEGIES OF MALE STOATS.** M. Sandell. (Acta Zool. Fennica, 174, 173-174, 1983). Code 10-11-5-0.

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**CHINCHILLA MUTATIONS IN THE PROCESS OF PELT PRODUCTION.**

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**CHINCHILLA MUTATIONS IN THE PROCESS OF PELT PRODUCTION.**

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- AN EXPRESS-METHOD FOR THE DIAGNOSIS OF AUJESZKY'S DISEASE IN FUR ANIMALS.** V.A. Chizhov. (Krolikovodstvo i zverovodstvo, (USSR) 5, 31, 1983). In RUSS. Code 9-F-M-O.
- CAUSES, SYMPTOMS AND CONTROL OF BOTULISM IN MINK.** Wolfgang Müller. (Deutsche Pelztierzuchter, 57, 5, 74-75, 1983). In GERM. Code 8-M.
- MEASURES AND POSSIBILITIES IN THE PROPHYLAXIS OF VIRAL ENTERITIS AND BOTULISM.** J. Erbslöh. (Deutsche Pelztierzuchter, 57, 7, 109-110, 1983). In GERM. Code 8-9-M.
- BACTERIOPHAGE TYPES AMONG SALMONELLA TYPHIMURIUM STRAINS OF ANIMAL ORIGIN.** Andrzej Hoszowski, Marian Truszczynski. (Bull. of the Vet. Inst. in Pulawy, Poland, 26, 1-4, 5-10, 1983). In ENGL. Code 9-M-F-O.



**MOLINEUS PATENS (DUJARDIN, 1845, PETROW, 1928, IN MUSTELA ERMINEA L.** Vesna Paradižnik. (Zbornik Biotehniske Fakultete Univerze Edvarda Kardelja v. Ljubljani, 20, 2, 219-220, 1983). In SRCR. Code 9-0.

**HELMINTHS OF THE RED FOX, VULPES VULPES L., IN WEST CENTRAL WISCONSIN.** Eric D. Dibble, William F. Font, Darwin D. Wittrock. (Journ. of Parasitology, 69, 6, 1170-1172, 1984). Code 9-F.

## 8. COMMUNICATION

### New book

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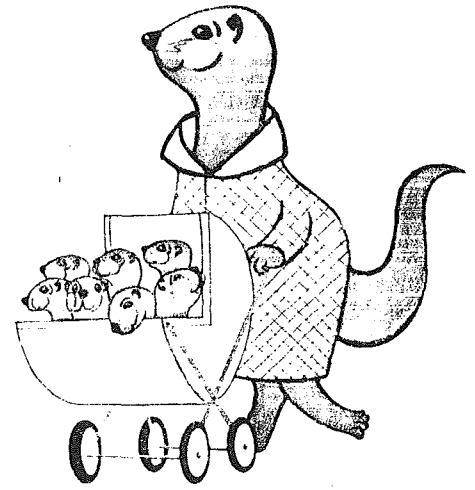
# SCIENTIFUR

SCIENTIFIC NEWSLETTERS IN FUR ANIMAL PRODUCTION



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## NOTES

**SCIENTIFUR, VOL. 9, NO. 2, 1985.**

Why not be optimistic. Until now, the 1984 crop of skins has been sold at very good prices. Many new farms are going to be established - except of in the USA, where the price of the dollar is giving our colleagues "over there" problems. A lot of reports and/or abstracts have arrived to the editor of SCIENTIFUR. The Fur Fashions has during the spring given rise to optimism in the whole fur industry. The very interesting York Conference - which your editor attended - had a record numbers of very happy and optimistic participants. The book MINK PRODUCTION has been ordered in such a number that it is going to be printed. The next book "BEAUTIES IN FARM BRED FUR ANIMALS, mutations and combinations" is in preparation, and everybody contacted in that connexion has been very positive.

Among others - therefore I am optimistic.

THE BUYERS OF MINK PRODUCTION HAVE ALSO TO BE OPTIMISTIC. We are, of course, very sorry to tell you that the book will be DELAYED UNTIL NOVEMBER 1985, mainly because of the fact that it has taken very long time to receive the sufficient number of pre-orders for the book necessary for producing.

In this issue of SCIENTIFUR we present 4 original reports - for which we thanks the authors. We also - under communication - present a thesis which will bring our colleague Anne-Helene Tauson in the row of doctors serving our industry. Congratulations with your new title, Anne-Helene.

In the notes of issue no. 1 this year we presented the first announcement in SCIENTIFUR and gave the conditions for these. In this issue

- and hopefully - many issues after this, the announcement of the SCHERING CORPORATION is present.

Regarding this we underline that announcements from serious international companies shall be welcome in SCIENTIFUR. We take it as a support of our service, a support which is needed for keeping the service level without astronomic subscription prices in the future. Therefore, we wish to make it clear that WE WELCOME ADVERTISING IN SCIENTIFUR ON THE FOLLOWING CONDITIONS:

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Max. 27 grams = US \$ 2000 pr. issue; US\$ 6000 pr. volume (4 issues).

In the latest issue of SCIENTIFUR we started to bring the address list of authors on the last pages of the journal. As we stated then we should appreciate very much if everybody will help us to get as many as possible of these addresses correct. Thank you in advance for your cooperation.

Have a good summer.

Best regards



Gunnar Jørgensen

Your editor



# Rhythm in Mink (*Mustela Vison Br.*) Kits Growth

Olga Yazan, Prof. B. M. Zhitkov All Union Research Institute of Game Management and Fur Farming, Kirov, U.S.S.R.

It is observed on the young of all examined mammalian species that after the average daily body weight increase follows its decrease. Such an undulated variation in weight increase is commonly believed to be a growth rhythm<sup>1</sup>. The very first analysis of the growth rhythm in standard mink kits (*Mustela vison Br.*) gave evidence of an existence of undulated variation in daily body weight increase<sup>2</sup>. The characteristics of undulating changes of growth are duration of the fluctuations or a growth wave length. The growth wave changes in two main parameters: time and quantity - that is, an amplitude. According to some of the scientific workers<sup>3</sup> growth wave length in mammals is a constant; others are of the opinion that it depends on external factors, animal maintenance conditions and that it changes with the animal's age<sup>4</sup>. Our studies on mink substantiated an opinion that growth wave length changes according to conditions of body development<sup>5</sup>.

In the present work we've tried to find out whether the growth wave length and its amplitude changes with age.

The studies were conducted from 1976 to 1983 on standard mink kits from the moment of birth till the age of 6 months, inclusively, in two managed areas with solid mink stock. One of the areas is in the south, in the Odessa region, the other - in the medium zone, in the Kirov region.

Totally, 900 kits of various age were weighed daily; we conducted 20660 weighing procedures. Data on daily average growth increase in the group of kits were computerized with technique used in the study<sup>2</sup>. 900 growth graphs were built from which growth curves were analysed. All information was treated by methods of biometry. We determined the significance

of the difference by chi-squares on a computer according to the designed program. For comparison in this work we present 4 histograms (1-4) obtained from growth curves of one month and 5 months old kits.

It is evident on histograms 1-2 that in one month old kits waves distribution is significantly distracted in length; nevertheless, approximately 70% of data suggest that wave length usually equals 4 days both on females and males. Absence of waves 6-15 days in length is characteristic for adult kits histograms 3-4; their limits are within 8-10 days and peaks distribution is concentrated not only round 4 but also 5 days extending to 6 days. Hence mean values also became different (Table 1).

At the age of 2 months growth wave had a 1 day increase ( $P > 0.999$ ). During the following months its value somewhat dropped as if retreating to the original state. However, at 6 months of age its parameters significantly differ from those at the age of one month - in female, by 0.55; in males, by 0.61 day, correspondingly ( $P > 0.999$ ). It is notable that the data were obtained from kits from different parents and in different years. Certain period were analysed over a single year, other periods - over different years. One could expect that the results would diverge. As it was, in all cases no significant difference between data from different years existed. On the contrary, we observed significant difference between data obtained on kits of different age from the same parents in the same year. It substantiated our belief that the change in this parameter was mainly due to the animal's age. There was no significant difference between values of this parameter in females and males of all ages except the age of 5 months.

Table 1. Mean value of growth wave length (in days)

Age in days	Females		Males	
	n	M ± m	n	M ± m
1-33	299	4.30 ± 0.06	329	4.30 ± 0.06
34-60	243	5.31 ± 0.08	267	5.31 ± 0.08
61-90	280	5.04 ± 0.06	361	5.04 ± 0.06
91-120	257	5.18 ± 0.10	285	5.01 ± 0.09
121-150	303	4.84 ± 0.08	312	4.56 ± 0.07
151-180	260	4.85 ± 0.07	267	4.91 ± 0.07

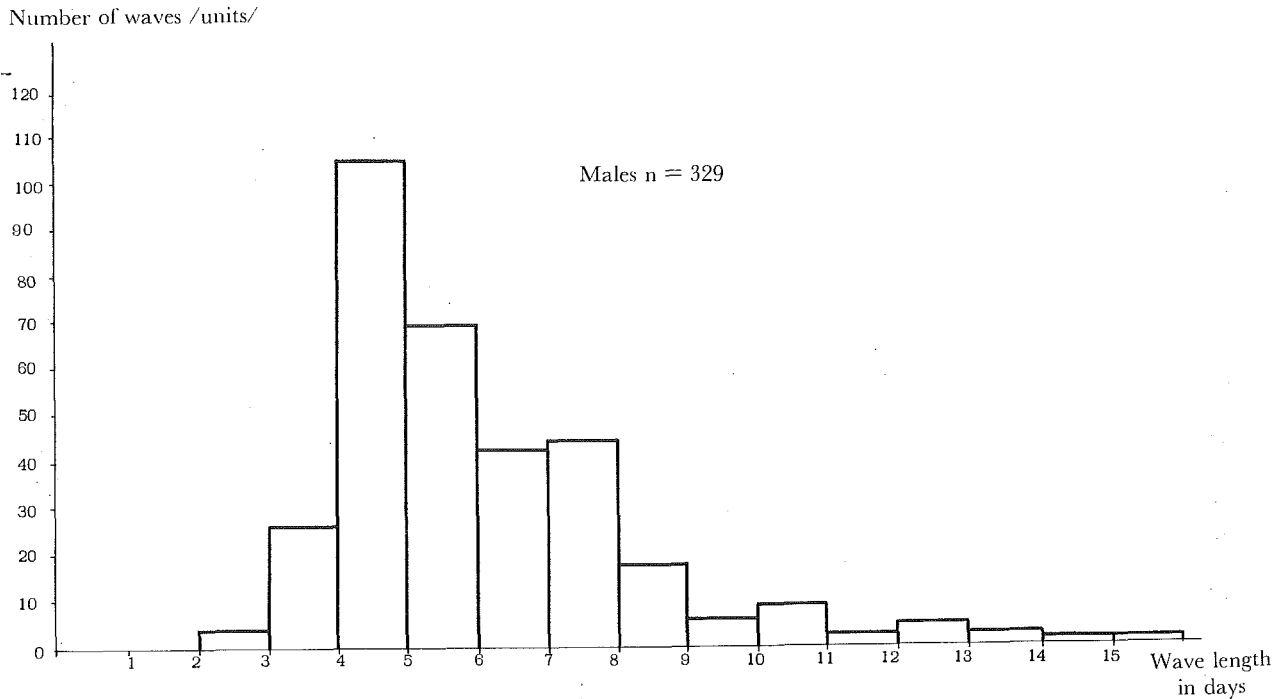


Fig. 2. Distribution of distances between peaks on body growth increase curves for 1 month old mink kits.

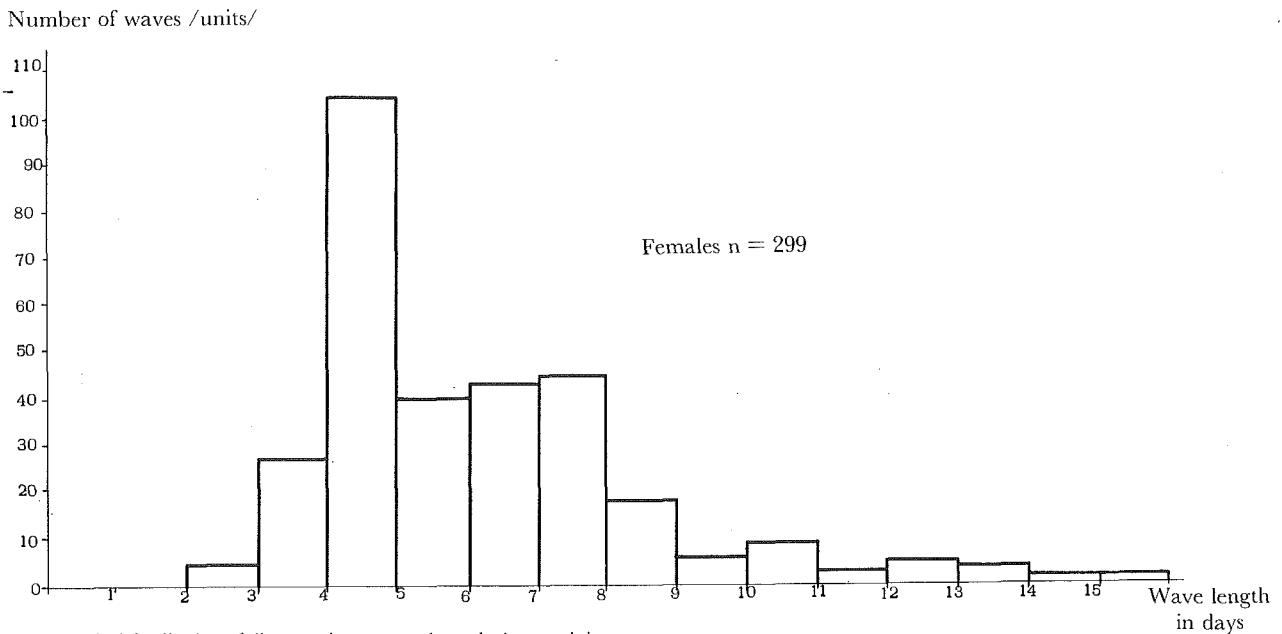


Fig. 1. Distribution of distances between peaks on body growth increase curves for mink kits at the age of 1 month.

Thus our data from standard mink confirm their possessing of age variation of the examined parameter.

Growth wave amplitude changes in the following manner: at the age of one month mean value of maximal daily weight increase for the group of kits was at the level of 8.5-9.8 grams, minimal - 4.0-4.9

grams. Only at that age value of minimal daily weight increases in a group of kits is close to their maximal value (Table 2).

Therefore the value of growth amplitude is small; we do not observe deep depression in one month year old kits and growth intensity is considerably greater than at an older age. Perhaps, this is the reason of

Number of waves /units/

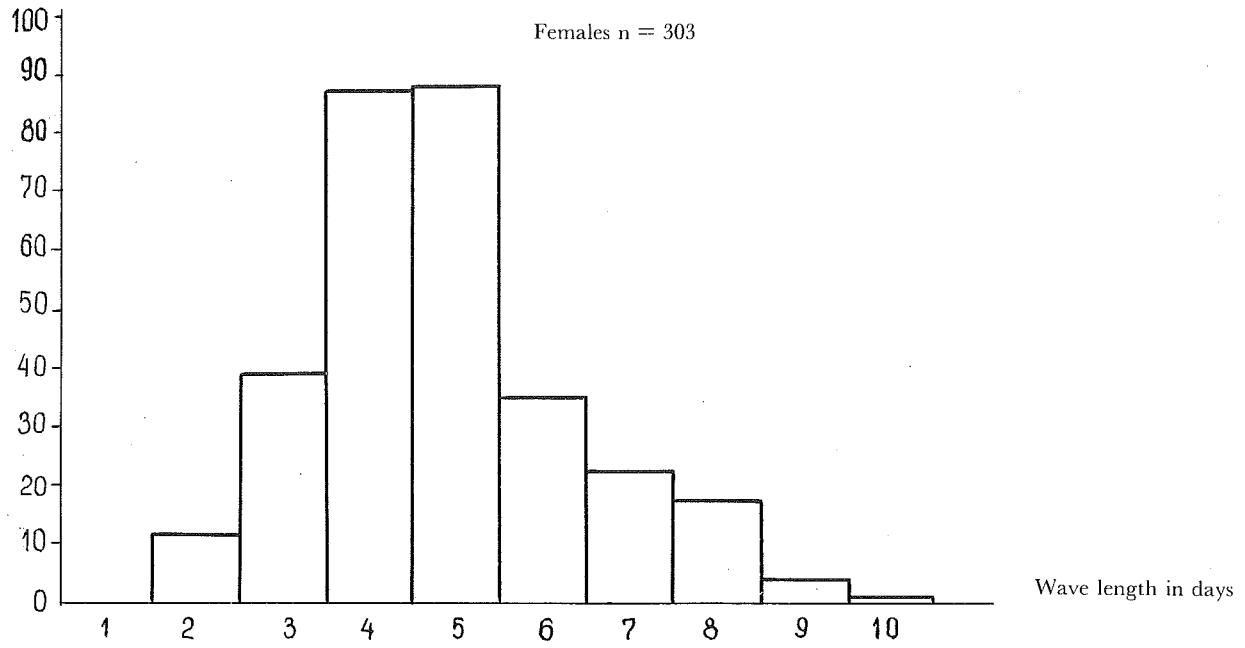


Fig. 4. Distribution of distances between peaks/waves/ on body growth increase curves for 5 months old mink kits.

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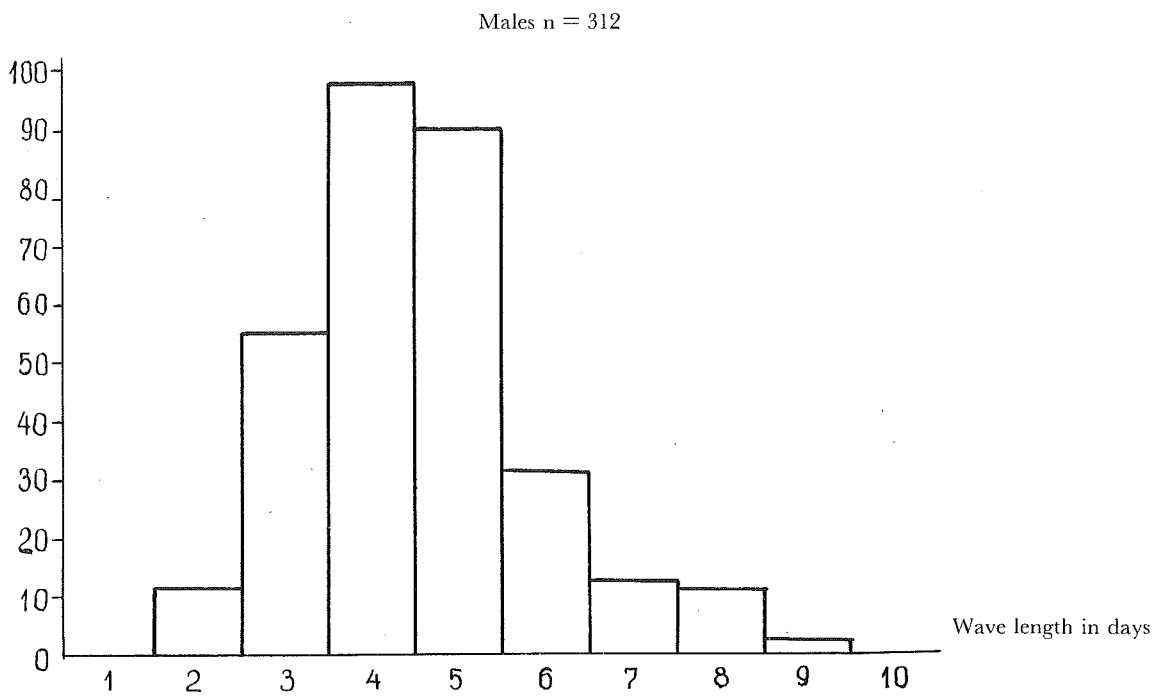


Fig. 3. Distribution of distances between peaks/waves/ on body growth curves for 5 months old mink kits.

Table 2. Analysis of kit growth wave (amplitude, g)

Age in days and sex of kits	Maximum		Minimum	
	lim	M ± m	lim	M ± m
1-33 Females	6.0-12.9	8.5 ± 0.25	3.1-6.99	4.9 ± 0.16
1-33 Males	6.8-14.1	9.8 ± 0.28	3.5-9.1	4.0 ± 0.22
34-60 Females	21.8-43.4	30.3 ± 0.62	÷ 16.5-1.8	÷ 6.0 ± 0.41
34-60 Males	29.2-70.2	38.8 ± 0.78	÷ 17.7-5.3	÷ 3.7 ± 0.55
61-90 Females	17.8-36.0	26.9 ± 0.48	÷ 15.6-2.8	÷ 6.0 ± 0.47
61-90 Males	28.8-55.0	40.4 ± 0.74	÷ 16.8-7.3	÷ 2.9 ± 0.64
91-120 Females	14.4-53.3	26.83 ± 0.98	÷ 2.8-(÷ 26.1)	÷ 16.45 ± 0.77
91-120 Males	23.5-67.0	33.85 ± 1.36	÷ 7.2-(÷ 35.5)	÷ 20.21 ± 1.02
121-150 Females	13.6-47.3	31.15 ± 1.01	÷ 11.4-(÷ 47.0)	÷ 25.15 ± 1.11
121-150 Males	28.8-65.0	45.01 ± 1.29	÷ 18.5-(÷ 57.5)	÷ 34.29 ± 1.20
151-180 Females	18.2-45.6	29.55 ± 0.91	÷ 15.6-(÷ 63.3)	÷ 27.60 ± 1.19
151-180 Males	26.4-66.0	46.25 ± 12.6	÷ 22.7-(÷ 60.0)	÷ 37.21 ± 1.29

doubling of the kits weight twice at the age of one month: the first time on the 6th or 7th day, the second time - on the 12th or 13th day.

Since the age of 2 months maximal values of daily growth for the group of kits sharply multiply 4-5-fold. Besides, simultaneously their minimal values fall down to negative values. This results in sharp increase of the amplitude which demonstrates considerable fall in the ability of the kits bodies to maintain high intensity of growth rate at a month's age. Evidently, at that age the process of morphological structures differentiation reaches its highest level<sup>6</sup>; indices of all kinds of metabolism rise<sup>7</sup> and aplastic growth delays. Further the amplitude would remain high in all age classes.

Summarizing it all the amplitude undergoes a change associated with age. Our data obtained on standard mink kits agree with the data of research which deny the age stability of the said parameters.

Application of growth rhythm laws in actual practice is quite promising. Knowing peculiarities of growth depression by proper feeding. Besides that, knowing growth rhythm patterns and adapting nutrition to them we can use potential abilities of animals without additional expenditure of food. That is, we can grow larger animals using the amount of food but considering growth rhythms, actually, regulate growth of animals.

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# The Influence of the Photoperiodism on the Quality and Formation Rhythm of the Fur at Mink

*Nicolae Pastirnac and Romulus Gruia*, Dept. Agric of State, I.A.S. Prejmer, jud. Brasov, R. S. Romania

Researches, as well as different systems and technologies elaborated more and more efficient under the economic aspect concerning fur animal breeding and production, led to new orientations during the last half of century, as, for example, the exploitation of the bio-physiological effects caused by the action of several physical surrounding agents or of another nature.

From the physical characteristics of the environment, the light is undoubtedly situated on the first place, as it is directly or indirectly responsible of the majority of the biological processes. The great influence of the element »light« on the reproduction capacity or the quantitative aspect, as well as on the somatic growth the formation and maturation of the animals' fur or the qualitative aspect, are only two examples of the influence this element has on the fur production.

A series of researches dealing with the photoperiodism (1, 2, 3, 5, 6, 7, 9, 10) have demonstrated that the artificial reduction of the animals in there sheds to a few hours a day, beginning when the kids were weaned, determined the diminishing of the growth and fur maturation period with almost 6-8 weeks, which of course represented considerable economical advantages.

Taking all these facts into account we have initiated and carried out a series of observations concerning the effects of the surrounding physical elements on the biological systems and the conditions under which the variations of these physical parameters can influence different qualitative characteristics, as, for example, the colour brightness or luminosity and the fur thickness or, shortly, the fur.

The lots had different natural conditions of the physical elements (luminosity and temperature) which have been associated to the parenteral administration of some products containing ferrum. Our purpose was in fact to elaborate a method accessible for the production that can be applied into the intensive system of the mink breeding, in order to obtain animals with superior qualitative characteristics of the fur, under the conditions of a growth period as short as possible.

We consider that the variations that resulted from the modification of the period as well as of the intensity of the light impulses of the temperature and generally, of the new microclimate created, were responsible of a series of orto-hypofizo-sexual modifications, but especially of having stimulated and, implicitly, elaborated the melatonin by the epiphysis, the main compound having a melatonin-conforting effect.

In our case the melatonin has also acted as a chemical mediator in a modulation of the biorhythms, being a neurochemical secretory transductor, through which the link between the light radiations, the nervous secretion and the function of different organs was done. We ment that these interactions led to the accomplishment of the biorhythms of the animal, represented by a series of biochemical and physiological activities whose evolution goes on rhythmically or cyclically as for example the sexual cycle, the season variability of the fur, the hormonal secretion, the gastric one, the proteine biosynthesis etc.

The reduction of the natural luminosity in the mink sheds has influenced positively the epiphysis secretion of melatonin, which hurried the hair shedding and, implicitly, the melatonin grains migration from the radicular part of the hair to its stalk. The darkening of the hair colour to the detriment of the tegument colour, as well as the other modifications produced at the level of the fur, which outran the sacrificing period, were practically determined by the artificial regulation of the natural light.

## Material and method used

In order to obtain the wanted photoperiodicity the coefficient of natural luminosity was modified by fixing some panels made of plastic substances of different opacity at the experience sheds (beginning with the 25th of June). In comparison with other species of animals the specificity of the mink shed construction is characterised by a very high coefficient of natural luminosity, being calculated at 1/1,25, in comparison (4) with 1/8 at fowl for meat, 1/25 at bovine to fatten etc.



Tabel 1. The medium of natural and experimental illumination unity (lx)

Specification	Jul. 21	Aug. 21	Sept. 21	Oct. 21 (optimal)	The medium per June-Oct.
Natural illumination	20000	13000	10500	8700	13050
The illumination from the interior of the sheds	940	900	820	700	840
Reduced illumination (gray plastic)	110	95	85	70	90
Very reduced illumina- tion (black plastic)	65	60	55	40	55

The measurements of the degree of illumination have been done with the help of a luxmeter with photoelement S 60 and a scale from 0 to 100000 lx. The results of the measurements that have been done in the common sheds as well as in the experimental ones on the 21st day of each month at 12.00, are to seen on the table 1.

From the tabel 1 can be observed the fact that in comparison with the light flood from the interior of the sheds naturally illuminated, the light flood from the experimental sheds with grey plastic represent 10.7% and that one from these with black plastic only 6.5%. In comparison with the optimal period of the fur complete maturation (natural illumination of 700 lx), one can observe that in the experimental lots the medium illumination all over period was 8 times and respectively 13 times reduced (depending on the panels opacity).

We mention that the temperature differences from the sheds as a result of the installation of the panels weren't significative all over the period of the experiment.

As the tryptophan, from which the melatonin derives, on the process of catabolisation begins with an oxidation at the level of the indolic cycle under action of the tryptophanperoxidaze containing iron, we have associated the parenteral administration of substances containing ferrum to the experiment too. Thus, the first lot was administrated 100 mg, and the second one 200 mg Fe, at the middle of August, i.e. just the middle of the experiment period.

Tabel 2. The variants of the experimental lots taking into consideration the function of the analysed elements ( $n = 10$  cap./lot)

Illumination Ferrum	Normal (n) 840 lx	Reduced (R) 90 lx	Very reduced (VR) lx
	Control lot (CL) 0 mg	C.L.-N	C.L.-R
Lot 1 (L.1) 100 mg	L.1 -N	L.1 -R	L.1 -VR
Lot 2 (L.2) 200 mg	L.2 -N	L.2 -R	L.2 -VR

The animals which were the object of our experiment were adult female minks from the Standard variety, which were distributed in 3 lots, each of them having 3 variants, as shown in tabel 2.

The minks have been killed during the second decade of October, when, from an organoleptic point of view the fur was mature.

### Results and discussions

The technologies of mink breeding and exploitation provides the fur sacrifice to be done between the 15th of November and the 15th of December this period being considered the optimal one for the maturation and formation of the winter fur.

The diminishing of the maintenance period with 4 weeks and the animals sacrificing at the half of October led, as it was expected, to a series of advantages as for example the reduction of the expenses concerning food and manpower, the last one being directed more efficiently towards the fur primary processing.

At last some time, by reducing the animals life were diminished the negative effects of the atmospheric elements (cold and humidity) upon the health and the fur, which led to less cases of trycophagia and to cleaner furs than those of the witness lot.

Besides these notable advantages, all the other characteristics that form the fur quality, respectively the colour, thickness, lenght etc., had in all the cases the tendency to positive deviations, in spite of the fact that the shedding and change of the hair was shortened with approximately a month.

A little before the animals were killed 27 blood tests had been taken, 3 from each kind of lot and it could be observed, as expected, that the minks had a reaction at the ferrum inoculation that didn't change in function with the different illumination they had been subject to. That's why the blood indicators were analized in the case of the 3 lots, taking into account the quantity of inoculated ferrum (tabel 3). One can observe the predisposition to anaemia of all the effective due to some feeds containing anaemiogene elements that were administrated to the minks. At the same time one could observe a decline of the level of E vitamine in the body of the animals, directly

Tabel 3. The analysis of the blood samples from the lots inoculated with ferrum

Type of lot	n	No. leucocytes	No. red cells	Hb (g %)	Ht (g %)	T. P. (g %)
C.L. - (N+R+VR)	9	5537	2476250	14.3	41.6	9.1
L.1 - (N+R+VR)	9	6975	3287500	14.6	47.7	-
L.2 - (N+R+VR)	9	6825	3755000	15.4	45.7	8.7

proportional to the quantity of ferrum inoculated, generated by some added substances with a lytopip action, that were to be found in the products based on ferrum utilised at the witness lots.

In order to appreciate the furs of the experimental minks, a series of measurement were done to estimate the effect of the reduced illumination associated to the ferrum administration upon the colour brightness as well as upon the development of the fur (thickness, lenght growth).

In order to estimate the colour luminosity (brightness) of the furs were done a series of determinations with the help of a colourimetre with numerical bill sticking. We used as standard of 100% white degree oxide magnezium, in comparison with which had been considered the light intensities reflected under a 45° angle by the furs. Under these conditions the apparatus billed the colour luminosity (Y) of the furs. As the registration of the reflected luminous intensity was done with a round selenium cell, it wasn't influenced by the relative direction of the hair.

A first remark concerning the heterogeneity of the fur colour was that one of the existent variation being

correlated with the stadium of the change and maturation of the fur from each region of the body, this one having a strictly chronological evolution in the case of this species. That's why the determinations have been done in 4 distict points on the dorsal part as well as on the ventral one of the furs at a distance of 10 cm from the other in order to establish the medium of the colour brightness.

From all the tricromatic components, the colour luminosity was evaluated at several types of mink colours, which, by the intensity it shows represents practically the percentage quantity of the mixture between the colour and white, considered 100% while complete black is considered as zero. As for our experiment, we have taken as a reference point the brightness scale of the furs situated between the value of the Standard minks (3,60%) and that one of the Jett black minks (3,11%). In figure 1 one can see the variation of the colour luminosity at all variants of the experimental lots.

As one can observe from tabel 1, the fur colour at the dorsal level presents a reduced brightness of the fur, thus indicating a shade a little bit darker than that one of the ventral part. The degree of reduced

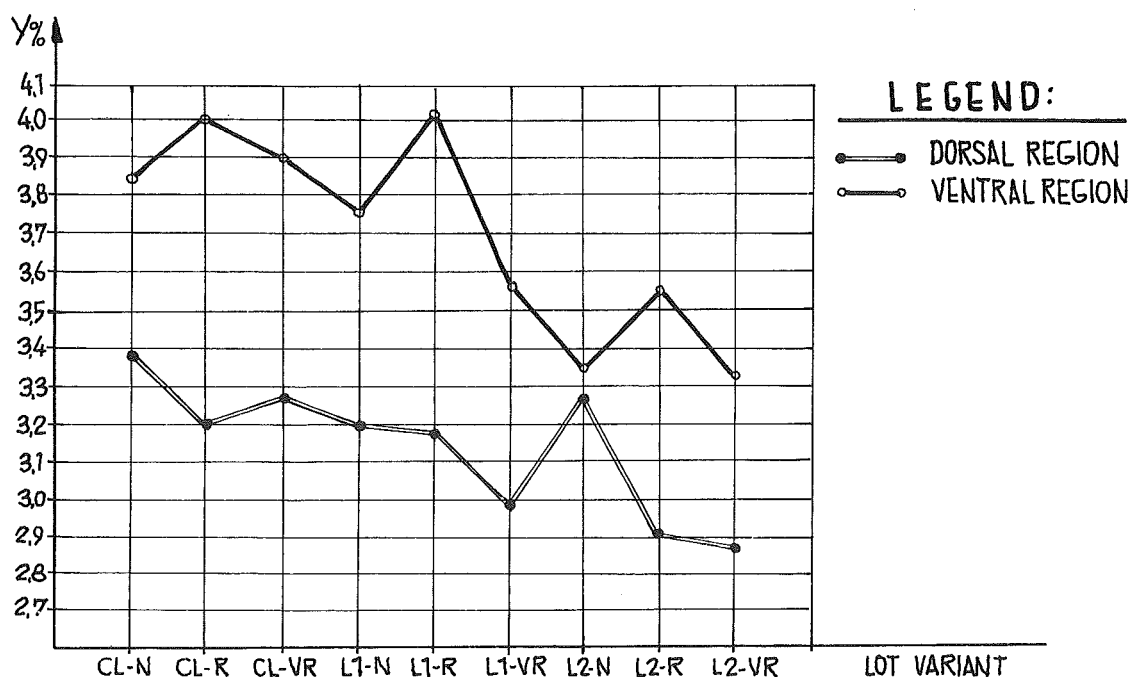


Fig. 1. The luminosity variation of the Standard mink fur colour at the experimental lots.

*Tabel 4. The luminosity variation of the Standard mink fur colour, taking into account the illumination and the ferrum inoculation (in %)*

Lot variant	$\bar{x} \pm s\bar{x}$	v
C.L. - N	3.69 ± 0.06	6.60
C.L. - R	3.61 ± 0.12	14.48
C.L. - VR	3.59 ± 0.09	10.67
L.1 - N	3.48 ± 0.10	12.70
L.1 - R	3.61 ± 0.12	15.32
L.1 - VR	3.33 ± 0.10	13.31
L.2 - N	4.31 ± 0.04	6.07
L.2 - R	3.23 ± 0.39	11.95
L.2 - VR	3.10 ± 0.07	9.45

illumination had influenced the fur brightness by darkening their colour. One can also observe clear difference in the case of the ferrum inoculation, which, having been done during a period with reduced light, had accentuated the fur pigmentation having as a result the diminishing of the percentage of the colour luminosity and respectively, of the variation curve. From this we can deduce that the two elements have an effect synergically positive upon the melanogenesis process in mink and the intensity of the effects is directly proportional with the degree of action of each element taken separately. That's why the furs, by modifying their brightness had darkened their colour little by little up to 16% (tabel 4).

Therefore from cumulation of the two factors analyzed was in fact obtained the darkening of the colour shade of the Standard mink up to the level 3,10% (L2-VR), in comparison with 3,11% at the Jett black minks. At the same time uniformity of the colour increased too, on the dorsal part as well as on the ventral part, having a result lots with homogenous furs, as we can observe from the diminishing of the variability percentage with approximately 2-4%.

The effects of the above mentioned elements upon the quality of the furs were determined not only from the colour point of view, but also from that one of the development of the fur, of its density practically.

In order to determine the fur thickness it is generally used the method of vizual judgement (organoleptical), or the microscopical analysis of the fur samples (12), or that one with the help of the radiations. In our experiment we used the last method

and, in order to appreciate this characteristic we appealed to the estimation of the coefficient of infrared transmission.

For this purpose we have used a source of infrared radiations with a wavelength of 0.95 micrometres and a registering head endowed with a semi-conductor photocell. The results had been expressed on arbitrary units and it was observed that the transmission is inversely proportional to the thickness of the furs. In order to avoid variations or errors concerning the registered values, the furs were introduced in the detectors with the fur normally directed, from the anterior to the posterior direction, because the cuticle too by its structure influences the colour of the fur. At mink, as it is known, the cuticle is relatively rough because its scales determining the phenomenon of reflexion of the light from the hair surface. Thus, in order to obtain corresponding mediums were done 3 measurements on the median line of the fur dorsally as well as ventrally.

The furs whose hair has reached maturation present the best thickness and a particularly good uniformity. All these can be observed from tabel 5, the thickness being under 10%, and the coefficient of variability of about 1%.

When comparing the registered measurements at the experimental lots to the values established for different categories of furs, we can notice between what values they variate, as well as the variation curve of these determinations (figure 2).

One can observe that the furs are a little bit thicker on the dorsal part at all the lots in comparison with the ventral region. When analysing the whole surface of the furs, we can notice that the thickness or the fur development wasn't influenced by the administration of ferrum (tabel 6). As for the illumination programme, one can observe that its reduction, in the case of the variants of the three categories of lots, leads to the simultaneous result of reduced values, indication in fact an increased thickness of the hair.

As a result of the analysis of the variation an F variants ratio were obtained, by calculation, values much beyond the tabel point for  $P < 0.05$ ,  $P < 0.01$  and even  $P < 0.005$ , demonstrating that between the analysed lots, as for the brightness of the colour as well as the development of the fur or of the hair thickness, from a statistical point of view there are very significant differences.

*Tabel 5. The fur thickness by measuring the coefficient of infra-red transmission (in-%)*

The fur category	Dorsal region		Ventral region		Whole fur surface	
	$\bar{x} \pm s\bar{x}$	v	$\bar{x} \pm s\bar{x}$	v	$\bar{x} \pm s\bar{x}$	v
Winter fur	9.63 ± 0.03	0.82	9.70 ± 0.04	1.04	9.67 ± 0.03	1.03
Moulted fur	10.27 ± 0.43	9.44	10.89 ± 0.63	12.95	10.59 ± 0.34	10.07
Summer fur	11.35 ± 0.93	18.26	10.89 ± 0.63	12.96	11.12 ± 0.53	15.18

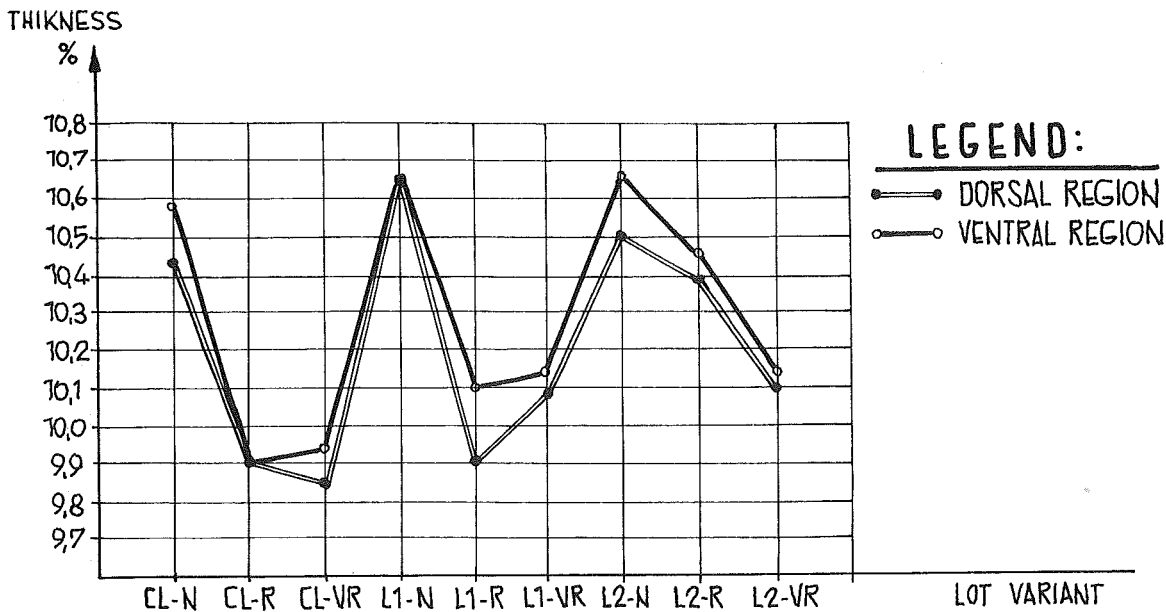


Fig. 2. The thickness variation of the mink furs taking into account the photoperiodism and the ferrum inoculation.

Table 6. The thickness differences of the mink furs from the experimental lots (in %)

The lot variant	$\bar{x} \pm s_{\bar{x}}$	v
C.L. - N	10.52 $\pm$ 0.04	1.67
C.L. - R	9.91 $\pm$ 0.05	1.33
C.L. - VR	9.90 $\pm$ 0.03	1.33
L.1 - N	10.65 $\pm$ 0.18	7.40
L.1 - R	10.00 $\pm$ 0.04	1.96
L.1 - VR	10.11 $\pm$ 0.06	2.45
L.2 - N	10.59 $\pm$ 0.05	2.22
L.2 - R	10.43 $\pm$ 0.04	1.89
L.2 - VR	10.12 $\pm$ 0.05	1.57

### Conclusions

1. The diminishing of the mink sheds illumination from June to October, besides the fact that hurries the formation of the winter fur from which result the economical advantages we know, is also an element of endocrine regulation stimulating of melanogenesis, which leads implicitly to the improvement of some qualitative characteristics of the furs (colour, thickness etc).

2. The alert rhythm of change, growth and maturation of the fur has interfered with that of darkening of the colour brightness (luminosity) of the Standard minks with 2.7-6.3% at the lot illuminated with 55 lx, in comparison with the control lot and respectively with the development of the fur, especially of the hair thickness, the values registered indicating a growth with 4.4-5.9% in comparison with the control lot.

3. The parenteral administration of ferrum, simultaneously with the modification of the hematologic indicators, had an impact on the process of the

melatonin hormone elaboration, which had stimulated at its turn the fur pigmentation by changing the colour brightness. So, in comparison with the values registered at the control lot, the minks that benefited of 100 mg Fe, the luminosity diminished on an average of 4.4%, and at the ones inoculated with 200 mg Fe the colour brightness darkened on an average of 11.6%. As for the hair thickness, the presence of the ferrum in the organism hasn't influenced significantly the fur formation, having therefore an indifferent effect.

4. By the association of the light element with the administration of substances containing ferrum was obtained a synergical positive effect in the hormonal stimulation, having as a main result, through the modification of the fur brightness, the darkening of the Standard mink colour. Thus, the value of 3.10% of the colour luminosity parametre (Y) at the lot illuminated with 55 lx and combined with the administration of 200 mg Fe led the colour darkening at the same degree the black minks hereditarily possess (3.11%). This aspect may be also correlated with an increased colour uniformity all over the fur surface, but a thicker hair too at most of the samples from the lot, illuminated by the diminishing of the variability coefficient and by the relatively constant value of this one in different regions of the body.

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**SCIENTIFUR, Vol. 9, No. 2, 1985.**

# Effect of Nutritional Status on Size of Baculum, Penis and Testicle in the Raccoon Dog

Hannu Korhonen, Department of Applied Zoology, University of Kuopio  
POB 6, 70211 Kuopio 21, Finland

## Summary

An examination was made to evaluate the effect of nutritional status on size of baculum, penis, testicle and body composition in the farmed raccoon dog (*Nyctereutes procyonoides* Gray 1834). Body weight, body length and obesity index values of undernourished animals were significantly ( $p < 0.001$ ) smaller when compared to normally fed ones. Undernourished raccoon dogs had significantly lighter bacula ( $p < 0.05$ ) and testicles ( $p < 0.01$ ) than conventionally fed ones. Restricted feeding did not affect the baculum length and width or the penis weight and width. The testicle and baculum weight as well as the baculum length depended significantly on the body weight. Penis weight very positively correlated with penis width. Baculum weight correlated with baculum width and length.

## Introduction

The raccoon dog (*Nyctereutes procyonoides* Gray 1834) is a canid which originally inhabited the woodland zones of eastern Asia. During 1927-55 this dog-like species was introduced into the European part of the U.S.S.R., and from there it spread into Finland and many other European countries (Nowak & Pielowski 1964, Barbu 1972, Safonov 1980, Viro & Mikkola 1980). The raccoon dog has long, coarse hair, and unlike the other members of the family Canidae, it hibernates during the coldest part of the winter. Its mating season occurs during February-March. Similar to many other carnivores, the raccoon dog has a baculum or penis bone (Walton 1968, Schitoskey 1972, Alaja 1981). Generally, however, this important reproductive organ of this species has not reached very much interest in the literature.

It is known that many body parameters including organ sizes are influenced by nutritional factors (Korhonen & Harri 1983). Most of earlier studies on the consequences of undernutrition have been directed towards the effects on body weight, size and many important organs like liver, kidneys and adrenals (c.f. Macho et al., 1973). Only a few

attention has been focused to the influence of undernutrition on the baculum of the carnivores, and no data are available for the raccoon dog. The intraspecies size variation, and its possible correlation with other body features such as body mass, obesity, testicle and penis size are unknown for this species. This study was undertaken to clarify these relationships, and to evaluate the influence of undernutrition on reproductive male organs, including the baculum.

## Materials and methods

Data were collected from farmborn and -bred raccoon dogs close the city of Kuopio in eastern Finland. Twenty five bacula from the animals of good nutritional condition were obtained during pelting time in mid-December. All animals were adults (approximately 9 months in age), and had been fed conventional ready-mixed farm feed, the amount and composition of which varied according to the feeding instructions of Finnish Fur Breeders' Association (composition of the diet is given in Tables 1 and 2). Fourteen bacula of undernourished raccoon dogs were also obtained during pelting time in mid-December. These animals were farmed at undernutrition from weaning in mid-June until pelting. All experimental animals were housed in standard rearing cages (105 cm wide x 120 cm long x 60 cm high) in pairs. After having been killed with an electric shock, the animals were weighed, and the testicles, penis and bacula were removed and carefully plotted. The bacula were air-dried to constant weight and weighed to the nearest 0.01 g on a Sartorius 1364 MP balance. The maximum length and width of the baculum and penis were measured to the nearest 0.1 mm with a ruler. The obesity index (OI), which roughly shows the amount of extra fat in the animal in question, was calculated according to the equation:

$$OI = \frac{ABM}{LBM} \times 100 \quad (1)$$

where ABM = actual body mass, and LBM = lean

body mass. The LBM was derived from the body length values as follows:

$$\text{LBM} = A \times l^3 \quad (2)$$

where  $l$  = body length in cm, and  $A$  = constant (0.026). The equations are based on detailed examination of 100 adult raccoon dog carcasses

Table 1. Dietary composition of the diet

Ingredient	Amount (%)
Slaughter-house offals	20.0
Slaughter blood	2.0
Cod filleting offals	23.0
Whole fish	22.0
Fish meal	2.0
Meat meal	2.0
Meat meal, extruder boiled	10.0
Brewer's yeast	0.5
Vitamin mixture <sup>a</sup>	1.5
Water	14.0
Total	100.0

<sup>a</sup>Containe (per kg) vitamin A, 500,000 I.U.; vitamin D<sub>3</sub>, 150,000 I.U.; ascorbic acid, 5,000 mg; vitamin E, 2,000 mg; vitamin K, 10 mg; Thiamine hydrochloride, 400 mg; riboflavin, 300 mg; pyridoxine hydrochloride, 120 mg; vitamin B<sub>12</sub>, 1 mg; cholin, 1,700 mg; pantothenic acid, 500 mg; niacin, 1,400 mg; folic acid, 50 mg; biotin, 3 mg.

Table 2. Chemical composition of the diet

Ingredient	%
Dry matter	33.7
Ash	3.1
Crude protein	14.1
Crude fat	9.8
Carbohydrate	7.6
Gross Energy (MJ/kg)	7.1
Metabolizable Energy (MJ/kg)	6.1
Protein % of ME	37.1
Fat % of ME	42.9
Carbohydrate % of ME	20.0

obtained from five different fur farms during the pelting season. For further description see Korhonen & Harri (1983).

The data was treated statistically using the Student's t-test. Correlations were calculated using Pearson product moment correlation scattergram figures. The data were processed by the VAX 11/780 computer and SPSS (Statistical Package for Social Sciences) program.

## Results

The basic data on the conventionally fed and undernourished raccoon dogs are presented in Table 3. Body weight, body length and obesity index, as expected, were significantly ( $p < 0.001$ ) smaller in undernourished animals when compared to normally fed ones. Undernourished raccoon dogs, moreover, had significantly lighter bacula and testicles than normally fed. Undernutrition, on the other hand, did not affect the baculum length and width or the penis weight and width.

An attempt to find relationships between different parameters in raccoon dogs of normal body composition (controls, conventionally fed) is depicted in Table 4. Several statistically significant correlations

Table 3. Body composition, and the size of testicle, baculum and penis of conventionally fed (controls) and undernourished raccoon dogs. The results are expressed as mean  $\pm$  SD.

Variable measured	Controls <sup>1</sup>	Under-nourished
Body weight, kg	8.0 $\pm$ 1.2	4.1 $\pm$ 0.8***
Body length, cm	61.2 $\pm$ 2.9	58.7 $\pm$ 3.3***
Obesity index	147 $\pm$ 13	89 $\pm$ 19***
Testicle weight, g	5.9 $\pm$ 2.1	3.7 $\pm$ 1.9**
Baculum weight, mg	548 $\pm$ 130	407 $\pm$ 82*
Baculum width, mm	6.6 $\pm$ 0.6	6.1 $\pm$ 0.9
Baculum length, cm	5.9 $\pm$ 0.5	6.1 $\pm$ 0.7
Penis weight, g	3.5 $\pm$ 0.9	3.9 $\pm$ 0.7
Penis width, mm	9.0 $\pm$ 1.5	8.9 $\pm$ 1.0

<sup>1</sup> normally fed

Significantly different from the controls:

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.0/1$  (Student's t-test).

Table 4. Coefficients of cross correlation between different parameters. Only statistically significant correlation coefficients are given

	Body weight	Obesity index	Testicle weight	Baculum weight	Baculum width	Baculum length	Penis weight	Penis width
Body weight	1	.48*	.41*	.40*	.27	.56**	.10	$\div$ .01
Obesity index		1	.01	.19	.18	.37*	$\div$ .02	$\div$ .25
Testicle weight			1	$\div$ .02	.35*	.47**	$\div$ .04	$\div$ .14
Baculum weight				1	.38*	.58**	.35*	.25
Baculum width					1	.35*	.16	$\div$ .22
Baculum length						1	$\div$ .03	$\div$ .13
Penis weight							1	.81***
Penis width								1

Significance: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  (Pearson product moment correlation).

were found. The testicle and baculum weight as well as the baculum length depended significantly on the body weight. There was a significant positive correlation between penis weight and penis width and between baculum weight and baculum width on one hand and between baculum weight and baculum length on the other hand. Weight and width of the penis, surprisingly, did not depend on the body weight or obesity.

### Discussion

It is known that reproductively important organs often vary less than other structures and that if affected in undernourished individuals they are often among the last (c.f. Macho et al., 1973). This partly holds true also in the present study. However, as the results showed, the size of the baculum - especially its length and width - showed little variation and, thus, seems to be rather uninfluenced by the nutritional status. The same concerns the size of penis. Thus it is tempting to conclude that these important reproductive organs have to be rather constant in size and shape - probably just because of copulation process in which male and female are clasped together by genitals for a shorter or longer periods of time (c.f. Ikeda 1982). Testicle weight, on the other hand, significantly differed between the nutritional test groups studied. This kind of influence of undernutrition on the development of gonads have been evaluated earlier e.g. in rats (Kennedy 1957). Testicle weights, moreover, seem to vary significantly even between different fur farms though the animals are fed the same feed and have a normal body composition (Korhonen & Harri, unpublished). It is thus incorrect to explain the differences found in testicle weights only by the nutritional status of the animals. More details are needed to clarify the situation.

Baculum weight, interestingly, was significantly smaller in undernourished animals although its length and width did not differ from those of conventionally fed ones. These differences probably could be explained by the differences in calcium and phosphorus concentration of the bacula. Calcium and phosphorus, as it is well known, are required in large quantities for bone building. Their concentrations in the bone are thus markedly influenced by the nutritional status of the animals (c.f. Mellentin 1977, Yuen & Draper 1983).

The data on the baculum size of the canids is scarce in the literature. Some comparisons could be made with mustelids, the polecat (*Mustela putorius*), for instance. The mean baculum weights of the polecat and raccoon dog are 450 and 550 mg, respectively

(Walton 1968). Furthermore, the average body weight of the polecat male is 1.8 kg and that of the raccoon dog 8.0 kg. Thus, within these species, the size of baculum is not positively correlated with body mass. More information is needed in order to be able to make comparisons with other species.

The undernutrition, interestingly, did not affect the shape but only the weight of the baculum. The morphology of the baculum, moreover, appears to be species-specific, as has been shown in mustelids (Friley 1949, Elder 1951, Walton 1968, Harrison 1982). This also holds true in canids; the baculum of the raccoon dog differs from that of other carnivores. It does not consist of an expanded knobby base of hooked tip like in many mustelids. It is also wider than in many canids of same size (Alaja 1981), e.g. when compared to that of the red fox (*Vulpes vulpes*). Viewed from the ventral side the baculum appears to be asymmetrical, curving slightly towards the tip. The general form of the penis bone is somewhat like a cone. The shaft bears the urethral groove running along the distal half.

### Acknowledgements

This study was supported by the Finnish Research Council for Natural Sciences and by the Alfred Kordelin Foundation. Thanks are due to Miss Teija Laitila for technical assistance in bacula handling.

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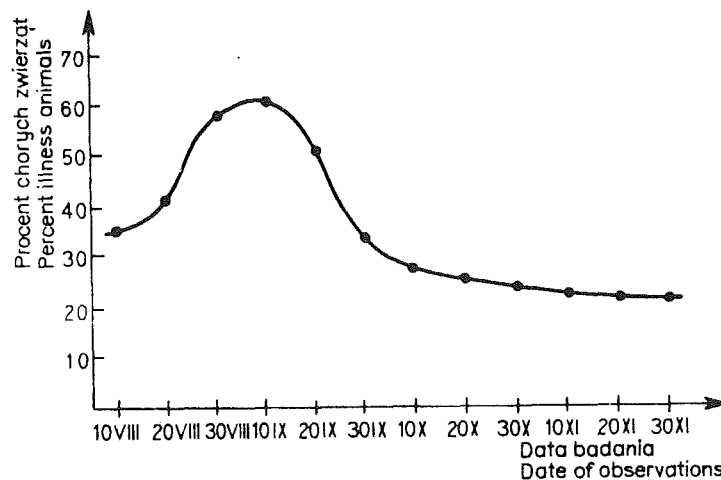


## THE INVESTIGATIONS OF THE WET BELLY DISEASE AND THE BITING ONE'S FUR /AUTOMUTILATIO/ IN MINKS.

(Obserwacje dotyczące moczenia sie i ogryzania wlosow przez norki).

Andrzej Frindt, Izabella Krasowska, Ewa Gmiter.

In this experiment there was tried to estimate the influence of the feeding animals upon the intensity of appearance the wet belly disease and the biting one's fur in the second period of the rearing young minks. There were used 206 animals a kind of standard and 48 pastel. The observations have been running from 15 August to 30 November every 10 days. In the same time, the feeding of animals was analysed. The high intensity of the biting one's fur disease in standards was observed at the beginning of September /60%/ , the lowest intensity - near the end of November /22%/ . Only one case of the wet belly disease was observed during experiment. The results of feeding's analysis showed, that the level of the proteins was low /5.1-2.8 g/100 kcal/. This proteins had a low biological quality. In the same periods, the level of the carbohydrates was so high, had twice higher of the best dose. Making a comparison between the graphs showing the level of the feeding and the intensity of an appearance the biting one's fur disease, indicates, that may be there is dependence between these two factors.



Rys. 1. Intensywność samoogryzania u standardów

Fig. 1. The intensity of the biting one's for disease in standards

Zeszyty Problemowe Postepow Nauk rolniczych, 302, 103-111.

2 figs., 2 tables, 12 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.

**EVALUATION OF VARIATION IN MILK YIELD IN BLUE FOX FEMALES  
BASING ON LIVE WEIGHT OF THEIR LITTERS.**

**(Ocena zmienności cechy mleczości lisow polarnych na podstawie  
masy miotu).**

Ryszard Cholewa.

For the first three weeks of life the puppies live only on sucked milk. Thus their growth and development depend on the milk yield of their dams. Assuming that the live weight of the puppies could serve as evidence of milk yield of their dams the author weighed 119 litters i.e. 989 puppies 3 weeks old.

It was found that the milk yield in blue fox females was influenced by their age or the number of litters born by them. The lowest live weight of the litter was in primipara vixens /mean 2.80 kg/ and the highest in 3 years old females /mean 3.75 kg/.

Zeszyty Problemowe Postepow Nauk rolniczych, 1983, 302, 99-102.

1 table, 3 references.

Author's summary.

In POLH. summary in ENGL and RUSS.

**SEASONAL CHANGES IN HEMATOLOGICAL AND RESPIRATORY PROPERTIES  
OF MUSKRAT (ONDATRA ZIBETHICUS) BLOOD.**

Robert A. MacArthur.

Hematological and respiratory properties of muskrat blood were measured in summer and in late winter. Field-acclimatized muskrat captured in August and February were compared with muskrats acclimated for 30-60 days in the laboratory during summer, and also with Sprague-Dawley rats. Hematocrit, hemoglobin (Hb), erythrocyte count, and mean corpuscular Hb concentration were highest in winter-trapped animals. Estimated  $O_2$  capacity of muskrat blood increased from 17.2 vol. % in August to 23.6 vol. % in February. Mean  $P_{50}$  of whole blood at 37°C and pH 7.4 was reduced from 29.0 mm Hg in summer to 23.2 mm Hg in winter (1 mm Hg = 133.322 Pa). The  $P_{50}$  of acclimated muskrats (29.1 mmHg) averaged 23% below that of the laboratory rat (35.7 mmHg). Enhanced

$O_2$  affinity of muskrat blood in winter correlated with a reduction in mean 2,3-disphosphoglycerate concentration from  $5.56 \mu\text{M}/\text{mL}$  packed red cells ( $16.27 \mu\text{M}/\text{g Hb}$ ) in August to  $3.04 \mu\text{M}/\text{mL}$  packed red cells ( $7.94 \mu\text{M}/\text{g Hb}$ ) in February. Hill plots for muskrat blood were highly linear over a saturation range of 10–90%, with  $n$  coefficients varying from 2.62 to 2.93. The Bohr effect ( $\Delta \log P_{50}/\Delta \text{pH}$ ) increased slightly from  $-0.536$  in acclimated and  $-0.573$  in acclimatized muskrats in summer to  $-0.626$  in winter-acclimatized animals. Buffering capacity was evaluated by titrating whole blood with  $\text{CO}_2$  and regressing  $\log \text{PCO}_2$  on blood pH. The buffer slope obtained for muskrat blood in February ( $-1.453$ ) was marginally elevated compared with that in August ( $-1.328$ ) and indistinguishable from that recorded in the laboratory rat ( $-1.449$ ).

Cann. J. Zool., 62, 537–545, 1984.

3 tables, 5 figs., 47 references.

In ENGL. Summary in FREN.

Author's summary.

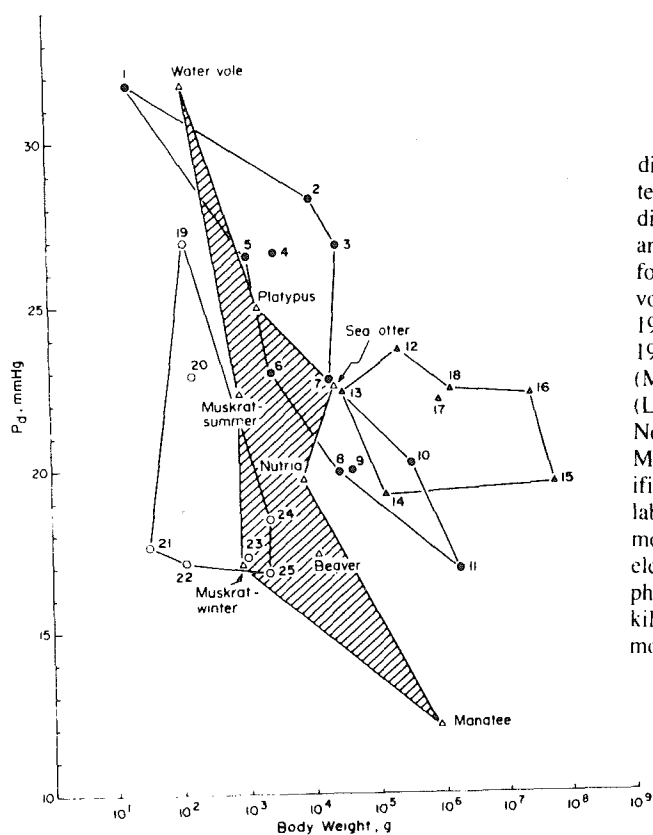


FIG. 5. The relationship between deflection point ( $P_d$ ) of the  $O_2$  dissociation curve ( $37^\circ\text{C}$ ,  $\text{pH}$  7.4) and body weight in mammals (see text). Data are presented for burrowing and fossorial ( $\circ$ ), shallow-diving aquatic and marine ( $\triangle$ ), moderate- to deep-diving marine ( $\blacktriangle$ ), and nondiving, nonburrowing ( $\bullet$ ) species.  $P_d$  values were calculated for: nutria (Hall 1966); platypus (Parer and Metcalfe 1967a); water vole and beaver (Clausen and Erland 1968); sea otter (Lenfant *et al.* 1970); manatee (White *et al.* 1976); Nos. 1, 3, 7, 10, and 11 (Prosser 1973); Nos. 2, 4, 5, and 8 (Lenfant and Aucutt 1969); Nos. 6 and 9 (Mauk *et al.* 1975); Nos. 12 through 18 (Lenfant 1969); No. 19 (Lechner 1976); No. 20 (Ar *et al.* 1977); No. 21 (Bartels *et al.* 1969); No. 22 (Johansen *et al.* 1976); No. 23 (Hall 1965); No. 24 (Parer and Metcalfe (1967b); No. 25 (Dhindsa *et al.* 1971). This figure is modified and expanded from Ar *et al.* (1977). Key to the numbers: 1, laboratory mouse; 2, baboon; 3, sheep; 4, rhesus monkey; 5, squirrel monkey; 6, cat; 7, dog; 8, chimpanzee; 9, man; 10, horse; 11, African elephant; 12, Steller's sea lion; 13, harbour seal; 14, bottlenose dolphin; 15, sperm whale; 16, grey whale; 17, northern elephant seal; 18, killer whale; 19, pocket gopher; 20, mole rat; 21, mole; 22, naked mole rat; 23, prairie dog; 24, echidna; 25, armadillo.

## OBSERVATIONS ON THE FUR VARIABILITY AT MINK.

(Observatii asupra variabilitatii invelisului pilos la nurci).

Nicolae Pastirnac, Romulus Gruia.

In the present study we dealt with a series of aspects taking into account the implications that fur moulting has upon its quality, the endocrine and biophysical elements which act upon the respective process, as well as the fact that some aspects are rather less elucidated by the other works.

The light by visible radiations, the temperature of the medium, the dermatoptical sensitivity and their control through the central nervous and endocrine systems, representing only some elements which act upon the moulting process. Besides all this, the characteristics linked to heredity, age and feeding complete the image of the chronological and cyclical evolution, of the strictly seasonal, variability of the mink furs (fig. 1).

The variability of the fur interferes with the cyclical evolution of the sexual activity and with seasonal periodicity.

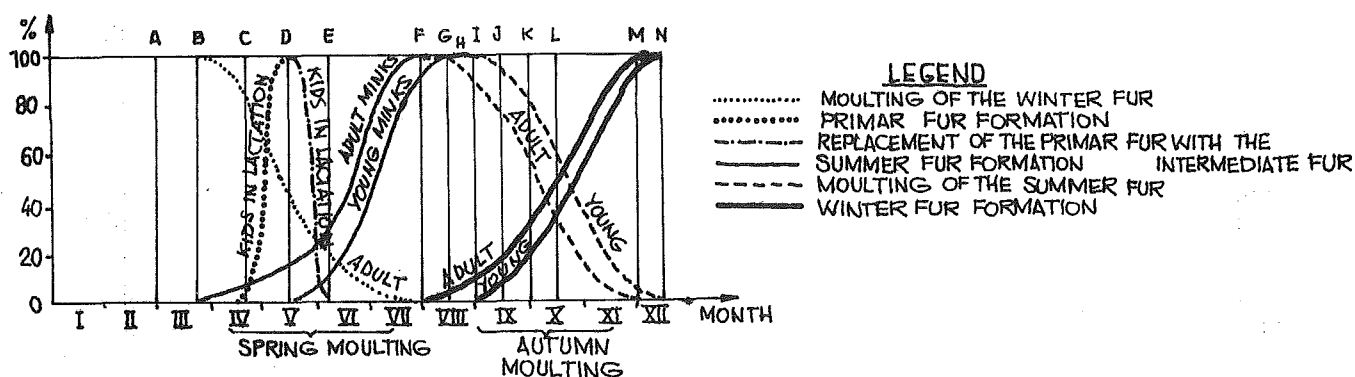


Fig. 1. The periods of evolution of the mink furs depending on the yearly physiological stages.

A - Covering; B - Beginning of pregnancy; C - Whelping; E - End of the formation of the fur follicles and the appearance of the guard hair; E - The total replacement of the primar fur with the intermediate one and the appearance of the down hair; F - Beginning of the summer fur moulting (adults); G - End of the summer fur formation at young minks (except of the tail and some isolated hairs on the body); H - Repose in the growth of the young minks' hair; I - Beginning of the summer fur moulting at young minks; J - The winter fur covers the body incompletely; K - The winter fur different periods of growth covers the body almost completely; L - End of maturation of the winter guard hair on the dorsal and lateral parts; M - Maturation of the guard and down hair on the majority of the body; N - the maturation of the fur on the last parts of the body (croupe, limbs, auricles).

Revista de cresterea animalelor, 2, 14-21, 1984. Authors' abstract.

8 figs., 6 bibl. references.  
In ROMN.

### ENERGY SAVINGS TO FOXES AND RACCOON DOGS USING A WINTER NEST.

Hannu Korhonen, Mikko Harri.

Energy costs of farmed raccoon dogs and foxes were estimated from body cooling and nest temperature measurements under farm and laboratory conditions. At thermoneutrality, heat production of the raccoon dog averaged 16 W. Winter nest and rest-shelf markedly reduced heat loss from the body to the environment. At an ambient temperature of  $-20^{\circ}\text{C}$ , when the animal was lying on an uninsulated and well-insulated surface, the heat produced averaged 34 W and 18 W, respectively. Inside the nest, raccoon dogs and foxes were able to maintain their constant body temperature without elevation of basal metabolic rate. A winter nest shifted the lower critical temperature of raccoon dogs and foxes from  $-13^{\circ}\text{C}$  and  $-17^{\circ}\text{C}$  to  $-42^{\circ}\text{C}$  and  $-50^{\circ}\text{C}$ , respectively. The results showed that foxes are better adapted to cold than raccoon dogs. Energy costs of studied canids could be significantly reduced when providing them either a winter nest or a rest-shelf in the cage.

Turkistalous, 57, 174-1975, 1985.

3 figs., 1 reference.

Authors' summary.

In FINN.

### TESTING OF FURRIER VALUE OF NUTRIA SKINS OF WHITE AND SABLELIKE VARIETIES.

**(Badania wartosci futrzarskiej skor nutrii odmiany bialej i sobolowej).**

Stanislaw Niedzwiadek, Jadwiga Kawinska, Jozefa Tuczynska.

By 20 skins of nutria of the white, nonalbinotic, and Sablelike varieties, reared in the bath system and slaughtered at the age of 8 months, were tested. The physical parameters regarded as diagnostical, such as the weight of raw and tanned skin, the weight of  $1 \text{ dm}^2$  of raw and tanned skin, the hair cover density, the thickness and density of downy and cover hairs, were estimated. The measurements of the above traits were carried out in 7 topographic parts of the skin. The test enabled to characterize in detail the furrier value of the both varieties of nutria skins. It has been proved that the skins of the Sablelike variety were

characterized by worse values of the traits analyzed, particularly of density and thickness of the hair cover.

Zeszyty Problemowe Postepow Nauk Rolniczych, 302, 177-183, 1983.

4 tables, 11 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.

### CARE OF THE YOUNG IN A FAMILY OF WILD BEAVERS, CASTOR CANADENSIS.

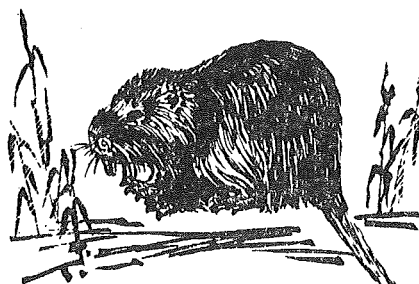
F. Patenaude.

The behaviour of a family of wild beavers was studied for 28 months in the Gatineau Park, Quebec, Canada. The family was composed of one adult pair, 2-3 juveniles and 3-4 young-of-the-year. Most observations were done inside, but occasionally outside, the lodge. Two parturitions were observed; 4 young were born in each case. The male and the juveniles help in the care of the young confined in the lodge during their first 4 or 5 weeks. With the female, they give heat and protection to the young during the first hours of life. They guard the young in the lodge, take them out of the water if they fall in and groom them. They also participate in play activities and carry vegetation to eat inside the lodge. The adults and the juveniles assume the maintenance of the lodge such as cleaning the floor, carrying herbs and stripped wood for litter and enlarging the chamber. The adults and juveniles transport or accompany the young-of-the-year for their first trips outside the lodge. During summer, they cut trees for young to eat. During autumn, they build or repair dams, the lodge and food cache without collaboration from the young.

Acta Zool. Fennica, 173, 121-122, 1983.

9 references.

Author's summary.



**INVESTIGATIONS ON THE EFFECT OF AIRCRAFT NOISE ON PERINATAL  
AND POSTNATAL LOSSES IN FARBRED MINK.**

**(Untersuchungen über den Einfluss von Fluglärm auf die peri-  
und postnatalen Verluste beim Farmnerz.)**

W. Brach.

During the last third of gestation, 48 Standard mink female were exposed to the noise from 96 flights by 2 types of aircraft. Compared with undisturbed controls, these female showed no change in the percentage of infertile female, the number of liveborn kits per litter, perinatal kit mortality and kit mortality to weaning or preweaning kit weight gains.

Deutsche Pelztierzüchter, 58, 5, 78, 1984.

In GERM.

CAB-abstract.

**BIOLOGICAL AND INDUCTION EFFECTS OF PHENOBARBITAL AND  
3-METHYLCHOLANTHRENE IN MINK (MUSTELA VISON).**

L.R. Shull, G.F. Rush, B.A. Olson, S.D. Sleight, R.J. Aulerich,  
J.A. Wisniewski.

Mink were injected (ip) daily with 20 mg/kg of 3-methylcholanthrene (MC) or 49 mg/kg of phenobarbital (PB) for 3 days and killed 48 hr after the last injection. The duration of anesthetic action of PB increased after each injection. MC-treated mink became anorexic and lost substantial body weight. PB caused enlargement of liver and lungs, whereas MC caused liver atrophy. No major treatment-related morphologic changes including amount of endoplasmic reticulum (ER) in liver were revealed by electron microscopic examination. Microsomal protein content was not increased and NADPH cytochrome P-450 reductase was not induced in liver by either PB or MC. Cytochrome P-450 (448) was increased 3.2-fold by PB and 2.5-fold by MD. Cytochrome  $b_5$  was increased 2.3-fold by MC but was not affected by PB. Aminopyrine N-demethylase was enhanced 5.1-fold in activity by PB whereas hexobarbital hydroxylase was not induced. MC-treatment moderately increased the activities of benzo(a)pyrene hydroxylase (1.7-fold) and ethoxyresorufin O-deethylase (2.1-fold) but had no effect on ethoxycoumarin O-deethylase. The most distinctive fea-

tures of the mink revealed by this study are a) lack of PB induction of the ER, microsomal protein content, NADPH-cytochrome P-450 reductase, and hexobarbital hydroxylase, and b) lack of MC induction of cytochrome P-448-associated mixed function oxidases that are known to be highly responsive to MC in other species.

Drug Metabolism and Disposition, Vol. 11, no.5, 441-445, 1983.

5 tables, 47 references.

Authors' summary

### THE EVALUATION OF POLECAT-FERRETS POPULATION EXAMPLLED OF CHOSEN COMMERCIAL FARM.

(Ocena poglowia tchorzofretek na podstawie wybranej fermy  
wielkotowarowej).

Maria Bednarz, Maria Szostek.

The body weight and lining colour of 3079 polecat-ferrets estimated in 1978-1980 years in PGR Wiartel farm were analyzed. The evaluation was made according to valid standard of license. The average body weight of males was 1797,95 g, of females - 1040,05 g. In 1980 year the 8 group of colour lining were differentiated /from light ashen to orange/. The polecat-ferrets with light yellow lining amounted to 36.57% of population, with ashen - 33.90%. with intense yellow - 16.88%. There were observed that males intense /orange. yellow/ colour of lining have reached the higher average body weight. However the average females body weights were not significantly different between several colour groups.

Zeszyty Problemowe Postepow Nauk rolniczych, 302, 113-116, 1983.

3 tables, 3 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.





**STATISTICAL ANALYSIS OF BREEDING RESULTS IN FOXES VACCINATED  
AND UNVACCINATED AGAINST SALMONELLOSIS.**

**(Analiza statystyczna wyników hodowlanych u lisów szczepionych  
i nie szczepionych przeciw salmonelozie).**

Antoni Kopczewski, Marta Stryszak, Gracjan Chylinski.

The purpose of the work was to carry out the statistical analysis of economic effects on the basis of breeding results in females of a basic flock, then taking into consideration the number of born and reared young foxes, and the rate of morbidity and mortality in foxes from weaning to slaughtering.

The examination were performed in 2300 foxes of basic flock (1550 females of Polar breed and 750 females of common breed) and 13,407 born young animals, and 11,216 reared. The number of females covered and kitted and young foxes born and reared was higher in the vaccinated group than that in unvaccinated one. The rate of morbidity and mortality among the animals of the control group was also higher than in foxes vaccinated.

Medycyna Weterynaryjna, 39, 12, 719-722, 1983.

2 tables, 3 figs., 15 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.

**THE STATE AND PROSPECTS FOR THE BREEDING OF PASTEL FOXES  
IN POLAND.**

**(Stan i perspektywy hodowli lisa pastelowego w Polsce).**

Janusz Maciejowski.

10 years ago the first mutants of common fox, called pastel fox were obtained in Poland. The paper deals with the history and genetics of the new mutative variety and also with the description of colour and methods of breeding which has been carried out systematically since 1976. The state of animals' health and reproduction results in the recent years are satisfactory. The first sale by auction of 40 pastel fox skins in London in the season 1981/82 gave 12% higher price, on the average in

comparison with silver fox skins. This gives grounds for favourable prospects for the breeding of this new variety.

Zeszyty Problemowe Postepow Nauk Rolniczych, 302, 91-97, 1983.

1 fig., 1 table, 4 references.

Author's summary.

In POLH. Summary in ENGL and RUSS.

## CHEMICAL THERMOGENESIS AND ENERGY DEMANDS IN FARMED RACCOON DOGS

H. KORHONEN, M. HARRI, J. ASIKAINEN, Dept. of Applied Zoology, University of Kuopio, POB 6, SF-70211 Kuopio 21, Finland.

This study attempted to determine the metabolizable energy (ME) requirement of young, growing raccoon dogs using a heat production (HP) technique. The results were compared with the ME fed to the animals under normal farming practice. At the beginning of July, two months after weaning, the HP of the whelps was 1100 KJ/animal/day. The HP increased gradually, reaching a steady adult level by mid-August (2000 KJ/animal/day). The average initial body weight of the test animals was 1.7 kg and by the end of November the largest animal weighed 9.0 kg. Although the recommended ME supplied to the young corresponds to their needs, it is clear that from September onwards too much feed is given to the animals. A capacity for non-shivering thermogenesis (NST), about 20 % above the basal HP, was observable in weaned pups. It was totally absent in adults.

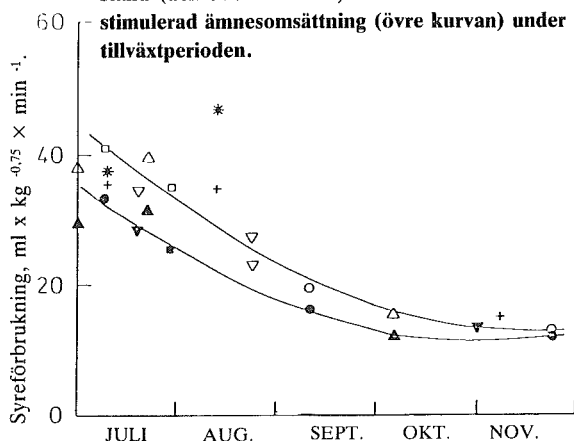
Turkistalous 54(12): 563-564, 1982.

2 figs., 2 references.

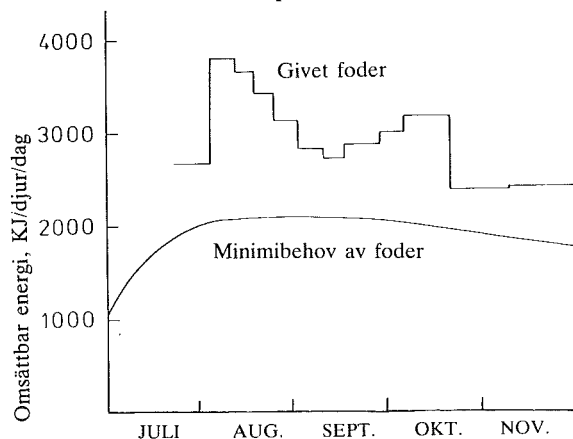
In Finnish

Authors' summary

**Figur 1. Mårdhundarnas ämnesomsättning under vilotillstånd (den undre kurvan) och med noradrenalin stimulerad ämnesomsättning (övre kurvan) under tillväxtperioden.**



**Figur 2. Mårdhundarnas minimibehov av foder och givet foder under tillväxtperioden.**



## THERMOREGULATORY CHARACTERISTICS OF THE BLUE FOX AND THE RACCOON DOG

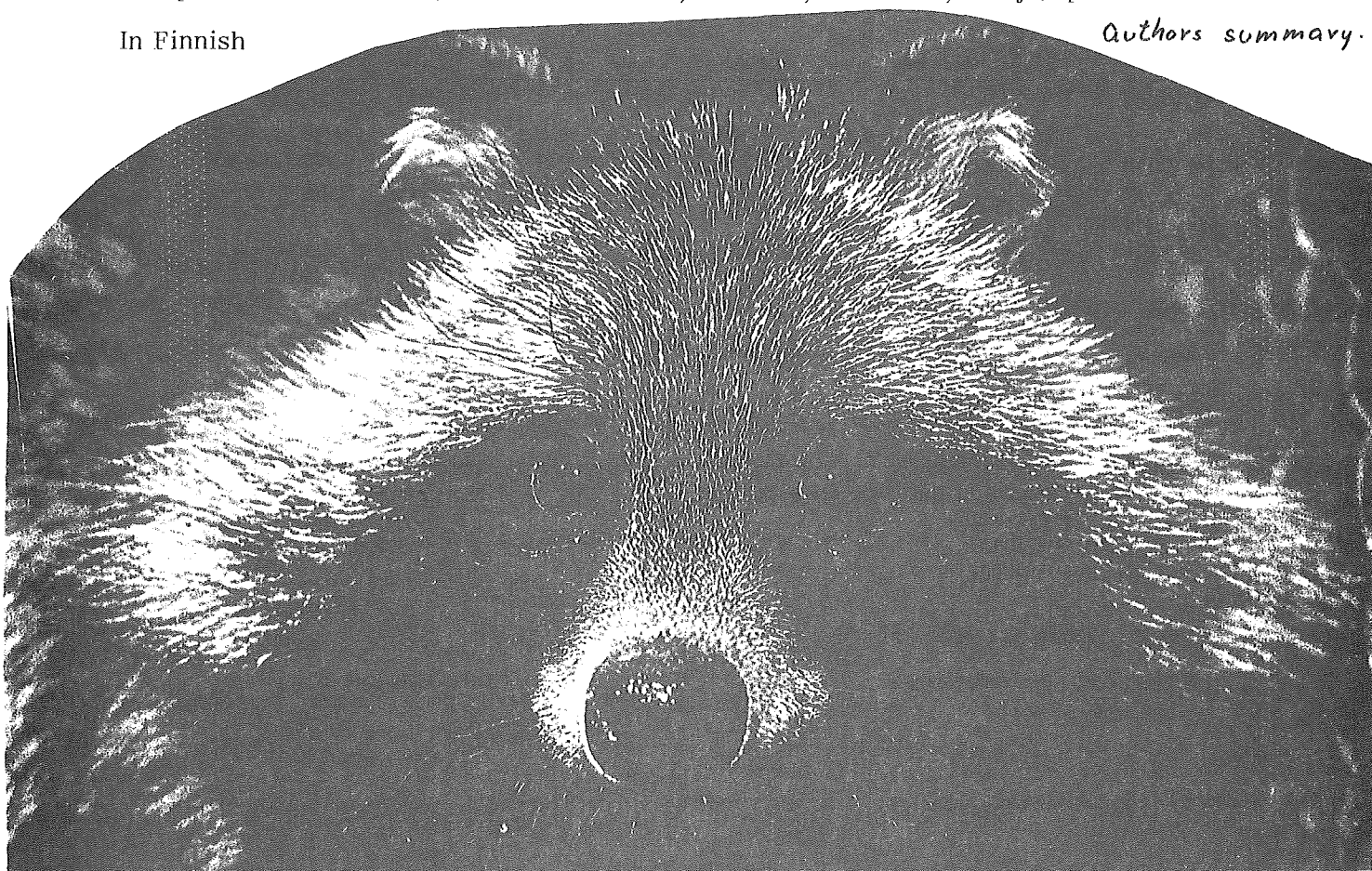
H. Korhonen, M. Harri, Department of Applied Zoology, University of Kuopio, POB 6, SF-70211 Kuopio 21, Finland.

Metabolic measurements showed that the lower critical temperature ( $T_{lc}$ ) of the raccoon dog is  $+10^{\circ}\text{C}$ , and, below thermoneutrality its oxygen consumption ( $\text{ml} \times \text{kg}^{-0.75} / \text{min}$ ) increases according to the equation  $y = 14.8 - 0.28x$ . This increased heat production cannot be explained by chemical thermogenesis which, although measured for two month old whelps, is totally absent in adults. The adults have to rely on shivering, the activity of which increases with decreasing ambient air temperature. At  $-18^{\circ}\text{C}$ , the mean rectified voltage of EMG averages  $20.3 \mu\text{V}$ , which is 4.5 times higher than the EMG activity measured at thermoneutrality. Below  $-6^{\circ}\text{C}$ , the elevation of metabolic rate ( $y$ ) in the blue fox is described by the equation  $y = 7.5 - 0.20x$ . Muscle shivering activity of this species at  $-25^{\circ}\text{C}$  is  $18.1 \mu\text{V}$  which is significantly higher than that measured at thermoneutrality. Heart rate values of the raccoon dog and the blue fox at thermoneutral zone average 124 and 140 beats per min, respectively. Elevated heart rates are observed when both species are exposed to temperatures below their  $T_{lc}$ 's. Shivering recordings as well as results from heart rate and oxygen consumption measurements are parallel, and indicate that heat production in both species is markedly increased at least at temperatures of  $-20 \dots -25^{\circ}\text{C}$ .

In: Sopeutuminen elinympäristön alhaisiin lämpötiloihin. Kylmätutkimussymposium. Tampere 26-27.3. 1985. (eds. K-M. Marnela, H. Tähti, P. Kontro, S. Oja). p.16.

In Finnish

*Authors summary.*



**THE INFLUENCE OF THE HEMOGLOBIN CONCENTRATION IN GROWING  
KITS ON CERTAIN SKIN CHARACTERISTICS.**

Anne Näveri, Jouni Kangas, Jaakko Mäkelä.

The relationship between some skin characteristics and hemoglobin values during the growth period were statistically examined in standard male minks. Significant correlations ( $P = 0.05-0.001$ ) were found between the hemoglobin concentrations determined at 3 points during the growth period (in July, August and November) and the density and colour of underfur, and skin length, respectively. According to the study even the early hemoglobin values in July and August have a significant influence on the size and quality of the pelt. Mink kits with low hemoglobin values are liable to develop a winter fur coat with defective pigmentation and hair structure of the underfur. Anemic minks develop the most extreme stage of the pigmentation defect and these so-called cotton fur skins have little value in the fur garment industry. When these abnormal hemoglobin values are recognized at an early stage, cotton fur skins may be avoided, and larger skins of better quality may be produced.

Table 2. Correlations between weights, hemoglobin concentrations, and certain skin characteristics of standard male minks ( $n = 695$ ).

	Weight in		Body growth	Hemoglobin values in			Underfur characteristics		Skin length
	July	November		July	August	November	Density	Colour	
<i>Weight in</i>									
July	1.000	0.514***	0.076	0.462***	0.216***	0.212***	0.041	0.040	0.432***
November		1.000	0.894***	0.244***	0.305***	0.384***	0.007	0.221***	0.885***
Body growth			1.000	0.043	0.241***	0.336***	-0.012	0.236***	0.806***
<i>Hemoglobin values in</i>									
July				1.000	0.556***	0.380***	0.184**	0.104*	0.237***
August					1.000	0.615***	0.219**	0.271**	0.302***
November						1.000	0.332***	0.334***	0.391***
<i>Underfur characteristics</i>									
Density							1.000	0.244***	0.022
Colour								1.000	0.233***

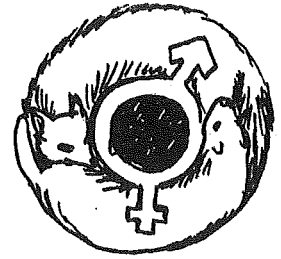
Significance of the correlation coefficients:

- \*  $P < 0.05$
- \*\*  $P < 0.01$
- \*\*\*  $P < 0.001$

Acta vet. Scand., 25, 50-56, 1984.

2 tables, 18 references.

Authors' summary.



**IMMUNOGENETICS OF THE MINK IMMUNOGLOBULIN. GENETICS**  
**IV. IDENTIFICATION AND GENETIC CONTROL OF THE L1B ALLOTYPE**  
**OF LIGHT CHAINS.**

ИММУНОГЕНЕТИКА ИММУНОГЛОБУЛИНОВ  
 АМЕРИКАНСКОЙ ПОРКИ

СООБЩЕНИЕ IV. ИДЕНТИФИКАЦИЯ И ГЕНЕТИЧЕСКИЙ КОНТРОЛЬ  
 АЛЛОТИПА L1B ЛЕГКИХ ЦЕПЕЙ

O.K. Baranov, D.K. Belyaev, O. Yu. Volkova, I.I. Fomicheva,  
 A.V. Taranin.

A new allotype of light chains of mink immunoglobulins called L1B is found. This allotype is inherited as a classical Mendelian character and has a frequency of 0.46 in mink population. It is genetically independent of allotypes of heavy immunoglobulin chains. The gene L1B is closely linked to the gene of another allotype, L1A, of light chains. The allotypes L1A and L1B are presumably markers of two subtypes of the light chains. Unlike L1A, which occurs in different mammals, the allotype L1B is species specific alloantigen of the light chains of domestic mink.

Genetica, USSR, 20, 5, 826-834, 1984.

5 figs., 5 tables, 18 references.

Authors' summary.

In RUSS. Summary in ENGL.

**GENETICS AND EVOLUTION OF THE MINK Lpm SYSTEM.**  
**III. IDENTIFICATION AND PHYLOGENETIC STUDY OF Lpm9 AND**  
**Lpm10 ALLOTYPES.**

ГЕНЕТИКА И ЭВОЛЮЦИЯ Lpm-СИСТЕМЫ  
 АМЕРИКАНСКОЙ ПОРКИ

СООБЩЕНИЕ III. ИДЕНТИФИКАЦИЯ И ФИЛОГЕНЕТИЧЕСКОЕ  
 ИССЛЕДОВАНИЕ АЛЛОТИПОВ Lpm9 И Lpm10

O.K. Baranov, V.I. Yermolaev, V.V. Filippov, M.A. Savina, D.K. Belyaev.

The new serum protein allotypes of the mink were established. Both these allotypes were present on protein molecules identical for all the physico-chemical characteristics and the antigenic isotype with those

marked by antigenic determinants of eight Lpm allotypes described earlier. Thus, it may be assumed that new allotypes called Lpm9 and Lpm10 belong to the Lpm system, and the encoding genes are included into the complex Lpm locus.

In domestic mink the antigenic specificities of Lpm9 and Lpm10 have a frequency about 1. These, similar to the Lpm6 allotype, were found in all the Mustelidae species studied and in their interspecific hybrids. The only exception is the individuals of the Martes genus, since in their serum the antigenic Lpm9 specificity is either absent or so significantly modified that it is not possible to be detected with certainty by the double immunodiffusion method. Thus, the results of the phylogenetic analysis showed that in addition to Lpm6 gene, two evolutionary conservative (during the period of divergence of Mustelidae species) genes, Lpm9 and Lpm10 are present in the Lpm family.

Genetika, USSR, 20, 6, 1016-1023, 1984.

1 table, 4 figs., 22 references.

Authors' summary.

In RUSS. Summary in ENGL.

#### GENETICS AND EVOLUTION OF THE MINK Lpm SYSTEM.

#### IV. GENETIC CONTROL OF EVOLUTIONARY "CONSERVATIVE" ALLOTYPES

#### Lpm9 AND Lpm10.

#### ГЕНЕТИКА И ЭВОЛЮЦИЯ Lpm-СИСТЕМЫ АМЕРИКАНСКОЙ ПОРЧИ

#### СООБЩЕНИЕ IV. ГЕНЕТИЧЕСКИЙ КОНТРОЛЬ ЭВОЛЮЦИОННО «КОНСЕРВАТИВНЫХ» АЛЛОТИПОВ Lpm9 и Lpm10

O.K. Baranov, D.K. Belyaev, V.I. Yermolaev, V.V. Filippov, M.A. Savina.

A genetic study of new allotypes, Lpm9 and Lpm10, showed that the absence of Lpm9 gene is a specific feature of the Lpm<sup>1,2,6,7,10</sup> haplotype, the Lpm<sup>10</sup> gene being that of the Lpm<sup>4,9</sup> and Lpm<sup>10</sup> genes are present together in other six haplotypes described earlier: Lpm<sup>1,6,8,9,10</sup>, Lpm<sup>4,6,8,9,10</sup>, Lpm<sup>4,6,8,9,10</sup>, Lpm<sup>6,8,9,10</sup>, Lpm<sup>6,8,9,10</sup>, Lpm<sup>3,4,6,8,9,10</sup> and Lpm<sup>2,4,5,7,9,10</sup>.

The individual diploid genotype combinations of these haplotypes ensure the existence in mink population of 36 genotypes and 22 phenotypes, the same number having been found earlier using Lpm1-8 markers. The presence of each of two new genes in seven out of eight haplotypes results in a high frequency (97-99%) of two individuals with the antigen Lpm9

and Lpm10 markers in the mink population.

The genetic data, together with the results of the phylogenetic study reported earlier, evidence for the genes Lpm<sup>9</sup> and Lpm<sup>10</sup> as well as Lpm<sup>6</sup> being obligate functionally active members of the supergene Lpm both in the genome of domestic mink and in closely related Mustelidae species. These three evolutionary conservative genes differ in principle for intra- and interspecific manifestation of the genes Lpm<sup>1</sup>, Lpm<sup>2</sup>, Lpm<sup>3</sup>, Lpm<sup>4</sup>, Lpm<sup>5</sup>, Lpm<sup>7</sup> and Lpm<sup>8</sup> representing the main features of the Lpm system's polymorphism in domestic mink. No such function was found in all other Mustelidae species and other mammals studied.

Genetika, USSR, 20,6, 1024-1035, 1984.

3 tables, 15 references.

Authors' summary.

In RUSS. Summary in ENGL.

#### ELECTROPHORETIC INVESTIGATION OF BLOOD SERUM AND SEMEN PLASMA IN SILVER FOX.

(Badanie elektroforetyczne surowicy krwi oraz plazmy nasienia  
lisow srebrzystych).

Anna Madeyska-Lewandowska, Marian Brzozowski.

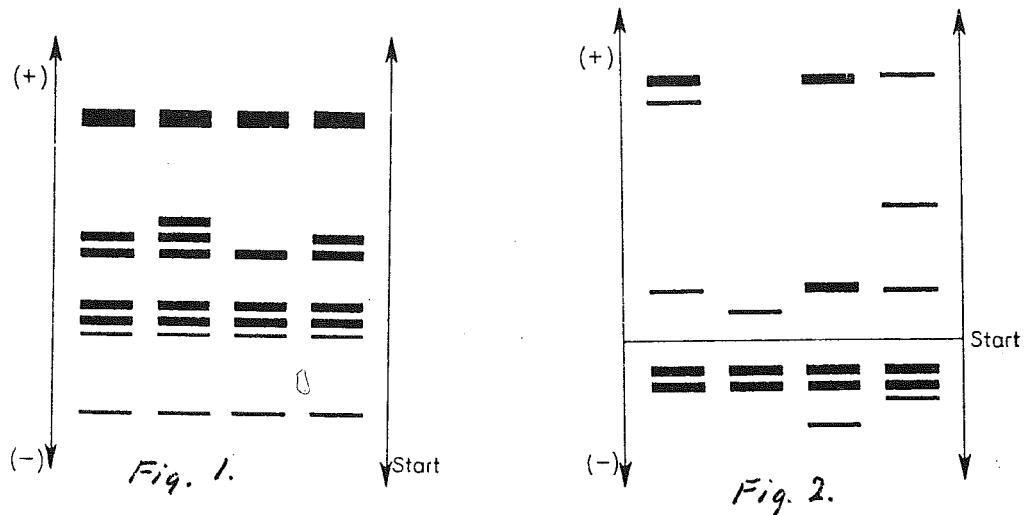
Electrophoretic investigation of blood serum was conducted on samples obtained during destroying 26 silver foxes on the common variety /*vulpes vulpes* L./.

Electrophoresis was performed on starch gel, using dual buffer system, at +4°C. Obtained was the serum proteins pattern in both transferrin /beta-globulin/ and alfa-globulin regions.

Electrophoretic investigation of semen plasma was performed on starch gel in urea medium using samples obtained from foxes of the silver variety. All animals were collected from PGR Witkowizna Farm, Siedlce district.

The semen was collected using electroejaculation at 1.5-3.0 V and 5-10 mAmps. All samples were also subject to routine examination usually

done on AI Stations /colour, density, volume, concentration and pH/. In the electrophoretic pattern, the differentiation of semen plasma proteins was observed within some regions of katodal part of the gel.



Rys. 1. Obraz elektroforetycznego rozdzielenia białek surowicy krwi lisa srebrzystego  
Fig. 1. Diagram of electrophoretic pattern the proteins of the serum blood of silver fox

Rys. 2. Obraz elektroforetycznego rozdzielenia białek plazmy nasienia lisa srebrzystego  
Fig. 2. Diagram of electrophoretic pattern the proteins of the semen plasma of the silver fox

Zeszyty Problemowe Postępów Nauk Rolniczych, 302, 41-45, 1983.

2 figs., 6 references.

Authors' summary.

In POLH. summary in ENGL and RUSS.

## SELECTION FOR FERTILITY AND BODY WEIGHT IN STANDARD MINKS.

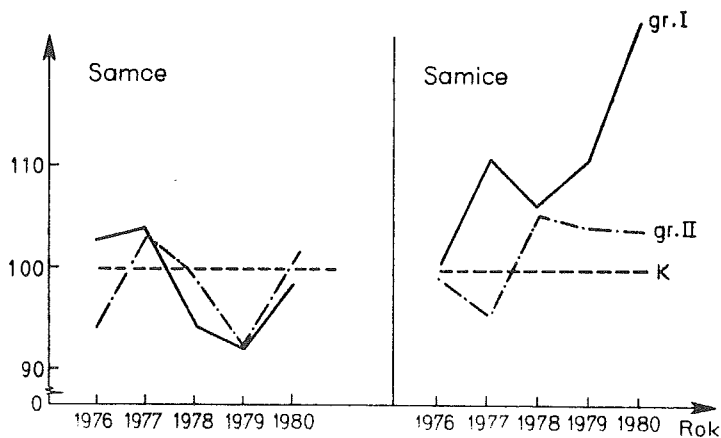
(Selekcja na plenność i masę ciała nerek standard).

Grazyna Jeżewska, Janusz Maciejowski, Jerzy Sławón.

In a group of standard minks a selective experiment was carried out which lasted 5 years to deal with the body weight and high fertility. Two experimental groups were contrasted, in one group were animals of high body weight /group I/ and in the other group /II/ animals coming from numerous letters. The control group were the animals chosen at



random /same age/ from the animals on the farm. The exchange of animals in experimental groups was 100%. Worsening food conditions on the farm in the period of 5 years do not make it possible to compare the selection results measured in absolute units between generations. Comparison of groups, however within one year points to the efficiency of the selection. It appeared to be higher in the group selected for the high body weight and considerably lower among the animals selected for fertility. A decrease in the procreation traits was observed in both experimental groups and a decrease in reproductive traits in the group of minks selected for the high body weight.



Rys. 1. Średnia masa ciała młodzi doświadczałnej w porównaniu z grupą kontrolną przyjętą za 100

Zeszyty Problemowe Postępów Nauk Rolniczych, 302, 75-81, 1983.

1 table, 2 figs., 11 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.

#### IMMUNOHISTOCHEMICAL IDENTIFICATION AND CROSSREACTIONS OF AMYLOID-A FIBRIL PROTEIN IN MAN AND ELEVEN OTHER SPECIES.

R.P. Linke, P.R. Hol, E. Gruys, O. Geisel, W.B.J. Nathrath, G. Trautwein.

Antisera were prepared in rabbits, sheep or chicken against purified amyloid fibril protein AA from man, mouse, stone marten, dog, cow, and hamster. These antisera were tested by immunodiffusion against all purified antigens and applied to tissue sections containing amyloid from man, mouse, hamster, guinea pig, rabbit, cat, dog, mink, stone marten,

pine marten, cow and horse. The binding of the antibodies to amyloid in tissue sections was assessed by the indirect immunoperoxidase method.

The strongest reactions in the immunodiffusion and immunohistochemical methods were found between amyloid deposits of members of a given species and an antibody raised against protein AA from the same species. In contrast to the lack of cross-reactivity in immunodiffusion (except in the mouse-man relationship), extensive cross reactions were observed immunohistochemically in phylogenetically related species, e.g. between stone marten, pine marten and mink, or between hamster and mouse. However, cross-reactions were also observed in combinations such as man-mouse, man-dog, man-cat, mouse-horse, and dog-cow. In addition, individual antisera showed variations in immunohistochemical reactivity with amyloid deposits of different members of one given species. Moreover, antisera prepared in rabbits reacted more restrictedly than those prepared in sheep, while rabbit antisera against any AA-protein did not reach with rabbit amyloid. Finally, the widest degree of cross-reactivity including almost all mammalian species investigated was observed with a chicken antiserum to human amyloid AA protein.

J. Comp. Path, 94, 339-356, 1984.

3 tables, 46 references.

Authors' summary.

#### **KARYOTYPIC KINSHIP BETWEEN THE BLUE FOX (*ALOPEX LAGOPUS* LINN.) AND THE SILVER FOX (*VULPES FULVA* DESM.).**

M.A. Yoshida, N. Takagi, M. Sasaki.\* \*)Reprint address.

A karyotypic comparison between the blue fox and the silver fox revealed conservation of the chromosome arm as a unit, except for large heterochromatic blocks in 10 pairs of blue fox chromosomes and the complete absence of a common metacentric autosomal pair. This findings seems to indicate that their karyotypes evolved from a common ancestral karyotype, characterized by 70-76 acrocentric autosomes, mainly through a series of independent centric fusions.

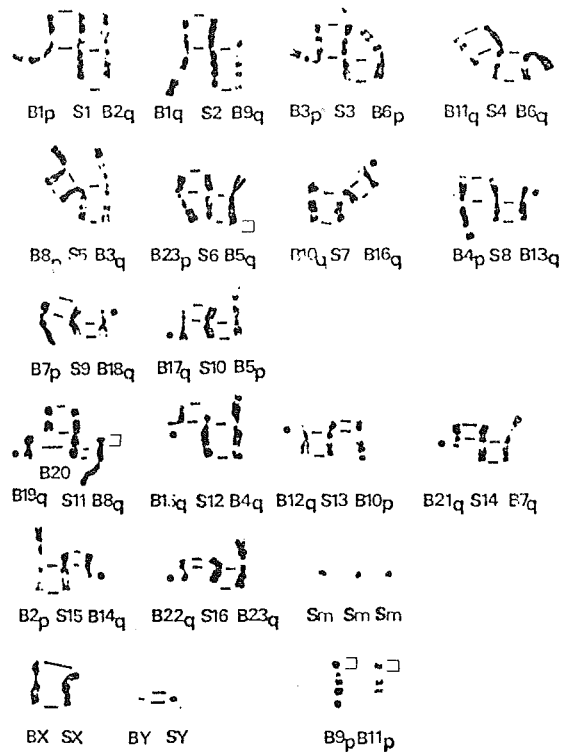


Fig. 4. A comparison of G-band pattern between the blue fox (B) and the silver fox (S) (m = microchromosome) ● = Heterochromatic short arm of the blue fox. Brackets: Euchromatic regions of the blue fox, not showing homology with the silver fox.

Cytogenet. Cell Genet. 35, 190-194, 1983.

5 figs., 2 tables, 13 references.

Authors' abstract.

In ENGL.

### THE BLOOD-TESTIS BARRIER IN STERILE BLUE FOX - SILVER FOX HYBRIDS COMPARED WITH THAT IN NORMAL FOXES OF BOTH SPECIES.

Kjell Andersen Berg.

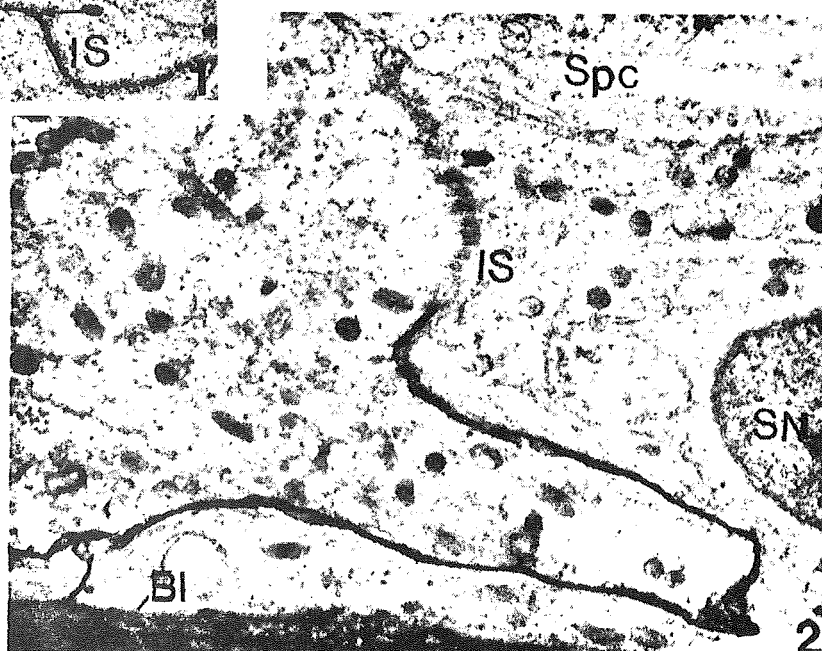
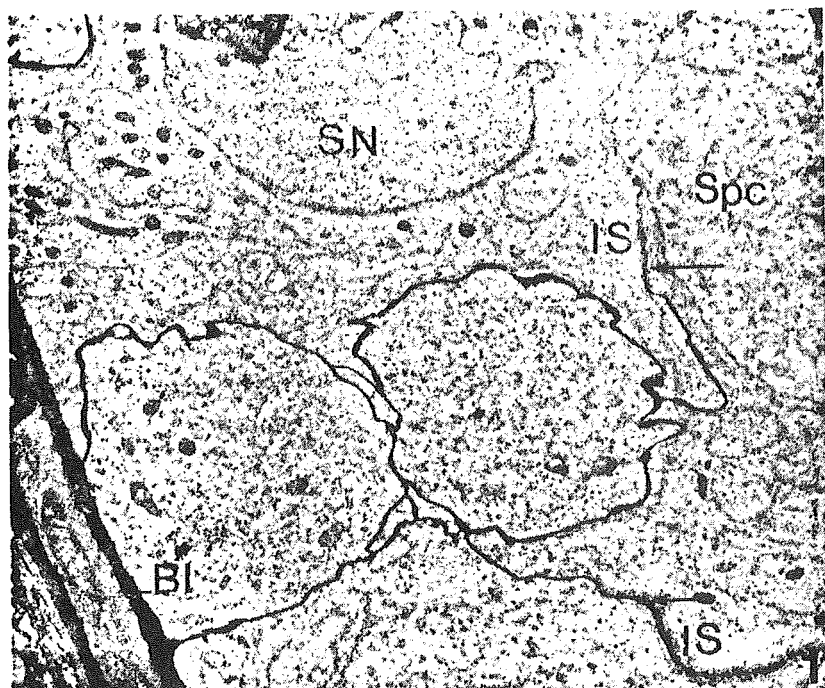
The integrity of the blood-testis barrier in the blue fox, the silver fox and hybrids of these 2 species was compared at the ultrastructural level during the breeding season by use of a lanthanum penetration technique. In the normal blue and silver fox, penetration of the tracer was blocked at the level of the inter-sertoli cell junctions, whereas these junctions were permeable in the hybrids, permitting penetration of lanthanum into the adluminal compartment of the seminiferous epithelium. Spermatogenesis in the hybrids was found to be arrested at

the early pachytene stage of meiotic prophase. The observed permeability of the inter-Sertoli cell contacts in the hybrids indicates a lack of occluding junctions, and this may be partly the cause of the sterility in these animals.

Internat.Journ. of Andrology, 7, 167-175, 1984.

5 figs., 29 references.

Author's Abstract



*Figs. 1 and 2.*

Electron micrographs of the seminiferous epithelium in a normal blue fox, prepared with lanthanum added to the fixative. 1) Penetration of lanthanum is blocked at the basal level of the inter-Sertoli cell junctions (arrows). B1 = basal lamina. SN = Sertoli cell nucleus. IS = inter-Sertoli cell junction. Spc = Primary spermatocyte.  $\times 4600$ . 2) Penetration of lanthanum in relation to an inter-Sertoli cell junction (IS) which has a striated appearance. B1 = basal lamina. SN = Sertoli cell nucleus. Spc = Primary spermatocyte.  $\times 12\ 000$ .



## REPRODUCTION

### PHOTOPERIODICAL CONDITIONS AS RELATED TO MINK SPERMATOGENESE IN PREPUBERTAL PERIOD.

ВЛИЯНИЕ ФОТОПЕРИОДИЧЕСКИХ УСЛОВИЙ  
НА СПЕРМАТОГЕНЕЗ ПОРОК В ПРЕПУБЕРТАЛЬНЫЙ ПЕРИОД

D.V. Klochkov, A.A. Kim.

The influence of different day length on young mink males' spermatogenesis was studied. It is shown that the shortened 8-hour daylight from July 21 till October 10 stimulated animals' spermatogenesis. This is clearly revealed at the beginning of September. The stimulation was increased if 1-month continuous illumination preceded the shortened day. The continuous illumination during all the experiment led to the minimum activation of spermatogenesis.

Sel'skokhozyaistvennays Biologiya, 4, 31-34, 1984.

2 tables, 8 references.

Authors' summary.

In RUSS. Summary in ENGL.

### EFFECT OF Gn-RH VET. "BERLIN-CHEMIE" ON REPRODUCTIVE PERFORMANCE OF MINK.

(Die Wirkung von Gn-RH vet. "Berlin-Chemie" auf die Reproduktions-  
leistungen von Nerzen).

H. Hattenhauer.

Gn-RH vet. "Berlin Chemie" was experimentally applied to female minks to find out, if their reproductive capacity could thus be stabilised and improved. Most favourable effects have so far been recorded from one single intramuscular injection of 10 µg during the first oestric cycle, seven days before mating. Results were good in terms of litter size rather than in terms of more mated and pregnant females. Hence, mink reproduction records were improved. The results obtained from higher Gn-RH doses or from exclusive application of HCG are, usually, not as

good and in no case better.

Mh. Vet.-Med. 39. 271-273, 1984.

9 tables.

Author's abstract.

in GERM. Summary in ENGL, GERM and RUSS:

**ATTEMPTS TO SHORTEN THE LENGTH OF PREGNANCY AND TO INCREASE  
THE LITTER SIZE IN MINK USING PROGESTERONE AND MEDROXY-  
PROGESTERONE ACETATE /MPA/.**

**(Próba skrócenia diapauzy i podwyższenia plenności nerek po  
zastosowaniu progesteronu i medeoxyprogesteronu /MPA/).**

Stanislaw Jarosz, W. Richard Dukelow, Dimitrios Papateodoru.

During a 3-year experiment mink females of standard strain were given progesterone at doses of 5 mg at 15 and 20 days /in the first year/ and at 17-20 days after last mating. The respective control group were given vehicle. Medroxyprogesterone acetate was given in the first year at a dose of 4 mg at 14-19 days following the last mating and in the second year at a dose of 2 mg at 8 days after the last mating. The results of pregnancy length and litter size in the experimental and respective control groups were as follows: 52.7 days, 4.3 kits and 51.3 days, 4.3 kits; 52.1 days, 5.6 kits and 50.2 days, 4.7 kits; 44.7 days, 5.6 kits and 46.9 days 6.1 kits. A dose of 4 mg of MPA proved to be too high, resulting in the blocking of deliveries /only 7.1% of females with stated pregnancy have whelped/. After the administration of MPA at doses of 2 mg at 8 days following the last mating, the pregnancy length and litter size in experimental group were: 48.0 days and 6.1 kits and in control: 52.2 days and 4.7 kits.

Zeszyty Problemowe Postepow Nauk Rolniczych, 302, 33-39, 1983.

2 tables, 7 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.



**PROGESTERONE CONCENTRATION AND THEIR SEASONAL CHANGES  
DURING THE ESTRUS CYCLE OF CHINCHILLA.**

Joanna Gromadzka-Ostrowska, Elzbieta Szylarska-Gózdź.

According to the number of cornified cells, epithelial cells and leucocytes in vaginal smears the stages of the estrus cycle were determined. Estrus was typified by a vaginal smears which contains cornified cells and no leucocytes and is accompanied by vaginal perforation. The data were obtained during spring (May-June), summer (July-September) and autumn-winter (October-February). The progesterone concentration in plasma during different estrus cycle stages were measured by radioimmunoassay technique. During the chinchilla estrus cycle progesterone concentration varied between 0.1 to 14.0 ng/ml of plasma; at the meta-estrus period is 7.21-9.74 ng/ml and at the proestrus period is 0.4-0.8 ng/ml. Seasonal changes in progesterone concentrations at the same pattern during the estrus cycle were also determined. The lowest progesterone level (4.19 ng/ml) were found in the summer season, whereas a significantly higher progesterone concentrations were determined in the spring (6.04 ng/ml) and in the autumn-winter (5.29 ng/ml) seasons.

Acta Theriologica, 29, 20, 251-258, 1984.

1 table, 2 figs., 31 references.

Authors' summary.

In ENGL. Summary in ENGL and POLH.

**CHANGES IN PROTEIN FRACTIONS LEVEL IN BLOOD PLASMA OF  
FEMALE CHINCHILLAS DURING PREGNANCY AND LACTATION.**

Joanna Gromadzka-Ostrowska, Barbara Zalewska.

Changes in plasma protein fractions level during pregnancy, lactation and in nonpregnant, nonlactating female chinchillas were investigated. Pregnancy and lactation were divided into following periods: from first to 37th day, from 38th to 74th day, from 75th to 111th day (pregnancy) and from 7th to 20th day, from 30th to 46th day and from 54th to 62nd day (lactation). During pregnancy  $\alpha_2$ globulin level increase whereas  $\beta_2$ globulin fraction level decrease, both significantly. Changes in other protein fractions level and in total protein plasma concentration during pregnancy were non significant. Pregnant females in comparison to non-

pregnant ones have a significant higher level of  $\alpha_2$ ,  $\beta_2$ , and  $\gamma$ -globulin levels whereas albumins and  $\beta_1$ -globulin levels were significantly lower. During lactation  $\beta_1$ -globulin level decrease from period I to II, whereas  $\beta_2$ -globulin level increase in the same time. In III lactation period  $\beta_2$  and  $\gamma$ -globulin levels decreased. Lactating females in comparison to pregnant ones have a higher  $\beta_1$ -globulin level and lower  $\beta_2$ -globulin level. A small increase in total protein plasma concentration and albumins level and small decrease in  $\gamma$ -globulin level were also found in lactating females. Pregnant females comparatively to lactating (1.03) and nonpregnant, nonlactating ones (1.27) have lower A/G ratio (0.97).

Acta Theriologica, 29, 19, 243-250, 1984.

3 figs., 4 tables, 18 references.

Authors' abstract.

In ENGL. Summary in ENGL and POLH.

**JUDGING THE SPERMIOGENETIC ACTIVITY OF NUTRIA TESTICLES  
FROM HISTOLOGICAL PICTURE OF GERMINAL EPITHELIUM.**

**(Posouzení spermiogenni cinnosti varlat nutrii v prubehu roku  
na zaklade histologickeho obrazu zarodecneho epitelu).**

Pavel Jelinek, Zdenek Veznik.

Using as a basis the histological picture of testicle parenchyma from nutria males, eight stages in the cycle of germinal epithelium were set up and described together with their frequencies. These were then assessed at two-month intervals over a whole year and utilized for the judgement of spermiogenetic activity. The results suggested that, during the process of spermiogenesis in nutria males kept on farms, no conditions of subnormality or insufficiency, or even such that were of the nature of dyscoordination, occurred in dependence on the season.

Acta Univ. Agric., Ser. A, Fac. Agron. Brno, Czechoslovakia, 32, 1, 171-183, 1984.

12 fig., 2 tables, 17 references.

Authors' summary.

In CZEC. Summary in GERM, ENGL and RUSS.



**THE EFFECT OF THE DATE OF BIRTH ON THE PROCREATION  
UTILITY OF POLAR FOXES DURING THE FIRST YEAR OF THEIR USE.**

**(Wplyw terminu orodzenia na uzytkowosc rozplodowa lisow polarnych  
w pierwszym roku ich uzytkowania).**

Grazyna Jezewska, Janusz Maciejowski.

On the basis of 2 year observations on the procreation utility of young females born at different dates, no essential differences were found between the group of females born by, May 15 and the group of animals born after that date. The number of animals in one litter and the rearing results were similar. A positive correlation was found to exist between the birth date of females and the date of their first oestrus. To solve the problem completely -whether females born later than 15-20 of May are good for breeding and whether it is necessary to use selection for early kitting only data from the studies lasting many years should be considered because the changeability of procreation results each year, conditioned mainly by atmospheric factors is so great that the effect of other factors is blurred.

Zeszyty Problemowe Postepow Nauk Rolniczych, 302, 117-122, 1983.

3 tables, 6 references.

Authors' summary.

In POLH. Summary in ENGL and RUSS.

**REPRODUCTION OF THE EUROPEAN BEAVER.**

T. Doboszyńska, W. Zurowski.

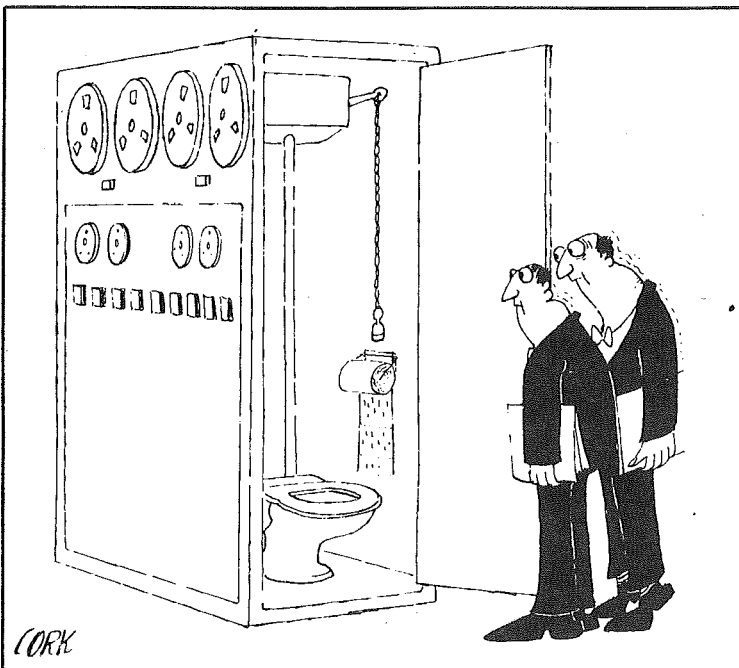
On the basis of the material obtained from the experimental breeding in European beaver (20 females and 12 males) the topography and histomorphology of various organs of reproductive system of females and males was worked out taking under account different physiological conditions and the animal age. After the observations of the beavers carried out on the farm in 1958-1981, the chosen aspects of reproductive physiology were characterised. It was stated that beavers take part in reproduction already after the development of the gonads. Only 29% of primigravida experienced parturition at the age of 2 and the rest at age of 3, 4 and 5. The nuptial season lasted from December to May with a peak in the 2nd and 3rd decade of January. The pregnancy lasted 107

days. The delivery took place from April to August with a peak in the 1st and 2nd decade of May. The fertility was 1-6 young animals in a litter (average 2.7). The young were active during the day (from 6.00 a.m. to 8.00 p.m.). The females were capable to intensive reproduction from the 3rd to the 9th years of age.

Acta Zool. Fennica, 174, 123-126, 1983.

16 references.

Authors' summary.



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# Vitamin Distribution of The Organism of Mink and Polar Fox.

## Communication 2. Deposition of Vitamin B<sub>1</sub>

G. G. Petrova, V. A. Berestov, S. P. Izotova, Institute of Biology, the Academy of Sciences of the U.S.S.R., Karelian Branch, Pushkinkaya, 11, 185610 Petrozavodsk, U.S.S.R.

### Summary

To sum up, it should be noted that, unlike fat-soluble vitamin A, water-soluble vitamin B<sub>1</sub> is concentrated more evenly in all organs and tissues of carnivora. Its highest reserves are accumulated in heart, brain, kidneys, muscles and liver.

When thiaminase-containing fish is included in the ration these supplies are involved in the metabolism, and the vitamin content decreases significantly in most organs and tissues.

The deposition of vitamin B<sub>1</sub> in the organism of marten and canine was found to show less distinct species specificity than that of vitamin A. Differences between mink and polar fox were observed when the animals were fed fish-free diets or when boiled fish was used.

One of important vitamins in carnivore feeding is water-soluble vitamin B<sub>1</sub>. Its deficit is often observed when fur-bearing animals are fed fish diets and especially fish by-products containing the enzyme thiaminase.

Regularities in thiamin deposition were studied in the liver, kidneys, heart, muscles, brain, spleen, lungs, ventricle and intestine of mink and polar fox whose diets were different. The fluorometry method was employed to determine thiamin (Berestov, 1981).

When mink rations were mostly of the meat type (Group 1) the highest concentration of thiamin was found in heart, then brain, muscles, kidneys and liver, i.e. in those organs and tissues where thiamin is essential for functional activity. Its level was lower in lungs and spleen and the lowest concentration was recorded in ventricle and intestine (Fig. 1). When for a few months minks were fed fodder fish containing thiaminase (Group 2) the content of thiamin decreased significantly: 3 times in heart and muscles, 2.5 times in lungs, 2.1 times in kidneys and 1.6 times in liver, though the vitamin was added to the ration (0.64 mg per animal). This was due to the fact that reserve supplies seemed to be involved in the metabolism. It may be assumed that these organs and tissues are a specific »storage« of thiamin. At the same time the vitamin concentration in spleen, ventricle and intestine changed negligibly.

In polar fox the distribution of the vitamin in the organism was somewhat different. When in the animal diet boiled caplin comprised 11.6% of protein in meat-fish (Group 1) and thiamin was added to the ration (0.83 mg per animal) its highest concentration was found in heart. Then it was practically the same in brain, muscles and spleen. Lower supplies were recorded for liver, ventricle, intestine and lungs (Fig. 2). When for a few months the animals were fed raw fish in small quantities containing the enzyme thiaminase (13% of protein in animal food) the vitamin level decreased significantly in the organism of polar fox: 4 and more times in kidneys, heart, muscles and spleen, 2.8 times in brain and 2 times in ventricle and intestine, though the vitamin was added to the ration.

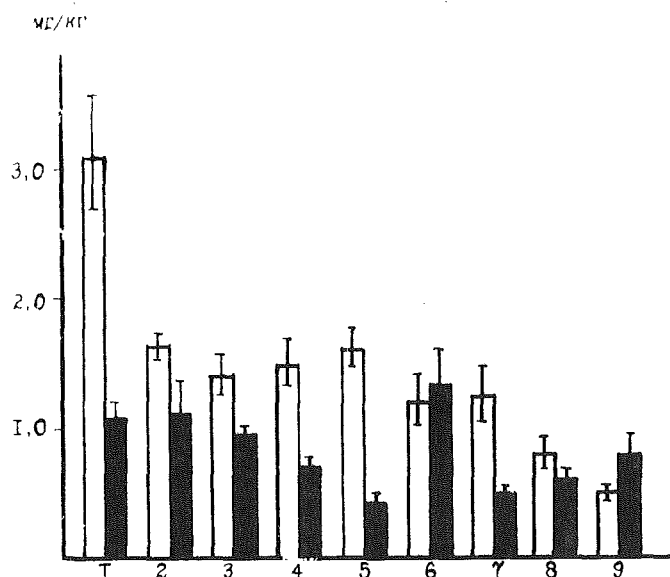


Fig. 1. Thiamin distribution in the organism of mink depending on the type of feeding. The abscissa shows the organs: 1 - heart, 2 - brain, 3 - liver, 4 - kidneys, 5 - muscles, 6 - spleen, 7 - lungs, 8 - ventricle, 9 - intestine. The ordinate - the content of thiamin in mg/kg of wet tissue. Light columns - Group 1 (meat type of feeding or boiled thiaminase fish), dark columns - Group 2 (raw thiaminase fish).

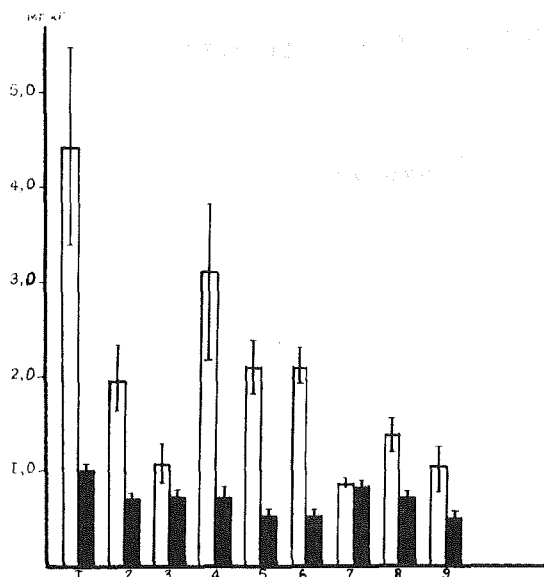


Fig. 2. Thiamin distribution in the organism of polar fox depending on the type of feeding. The same symbols as in fig. 1.

The decrease of vitamin B<sub>1</sub> reserves in mink and polar fox organisms points to highly labile vitamin B<sub>1</sub> concentration in the organism of fur-bearing animals. This depends on different factors and primarily on the presence of thiaminase-bearing fish in the ration.

At the same time the organism of carnivora and other animals seems to have special mechanisms which regulate thiamin distribution and redistribution. They also protect the animals against clinical avitaminosis up to a certain period even though the animals are inadequately provided with the vitamin.

Liver is most active in thiamin distribution. The vitamin is rapidly accumulated and consumed there, and its discharge is especially fast under extreme conditions (Totsky and Rover, 1972), particularly when its content is insufficient (Ostrovsky, 1974). Phosphorylation of thiamin absorbed into blood from small intestines occurs in liver. Part of it as free vitamin is involved in total bloodcirculation and the other portion is excreted with gall and the excreted of digestive glands into the alimentary canal, thereby providing constant recycling of thiamin and its gradual uniform assimilation by tissues (Ostrovsky, 1974, 1979).

Kidneys also take part in the mechanism of thiamin distribution in the organism because they are an excretory organ. The vitamin is most actively

excreted with urine when its amount in food is high (Ostrovsky, 1974).

Whenever lack of thiamin is felt, the brain tissue can retain it much longer than other tissues. Therefore, the brain reserves protect the animals against neurological disturbances (McCandless, Schenker, 1968; Ferrari et al., 1947). That is possible and has been observed in our experiments with the addition of thiaminase-containing fish in the ration. Though thiamin supply decreased significantly in the organism, there were no clinical symptoms of avitaminosis and no negative effect on fur formation was observed. The sale prices were fairly high. Regular addition of the vitamin to thiaminase fish used as food seems to sustain the endogenous thiamin pool in the organism sufficient for normal growth and fur formation. It is known (Ostrovsky, 1974) that the amount of the vitamin in the tissues is much higher than the level necessary for the functioning of specific enzymatic systems.

Comparative analysis of two predatory mammals, mink and polar fox, for their thiamin-depositing ability revealed some differences in the process. When the provision is high, the thiamin level is much higher in the digestive organs of polar fox than in those of mink. However, when the provision is low, no differences are practically observed.

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**LIPOGENIC HEPATIC ENZYME ACTIVITY OF RACCOON DOGS  
(NYCTEREUTES PROCYONOIDES) FED VARIOUS DIET.**

Hannu Korhonen, Ilpo Jääskeläinen.

1. Body weight, obesity and liver weights of male raccoon dogs fed diets of various energy content were higher than those of females.
2. With increasing body weight and obesity the liver weight and glucose-6-phosphate dehydrogenase (G-6-PD) decreased significantly in both sexes.
3. The liver weight correlated very positively with the G-6-PD activity.
4. The alpha-glycerophosphate dehydrogenase (alpha-GPD) correlated with the liver weight only in females.

Comp. Biochem. Physiol., 80B, 1, 41-43, 1985.

4 tables, 14 references.

Authors' summary.

**INFLUENCE OF AN ADDITION OF PRESERVED FEED TO THE RATION  
ON SOME USEFUL AND PHYSIOLOGICAL INDICES OF POLAR FOXES.**

**(Wpływ dodatku karmy konserwowanej do dawki pokarmowej  
na niektóre wskaźniki użytkowe i fizjologiczne lisow polarnych).**

Oskar Lorek.

The observations carried out within the 1st and 2nd series of the respective investigations have proved that a long-term feeding of polar fox females, designed for reproduction, the rations with an addition of blood preserved with sodium benzoate and sulphuric acid as well as post-slaughter wastes preserved with formaline does not affect negatively the reproduction utilization indices of the females. The application in the ration of feeds preserved with chemicals did not lead, either, to any decrease of the bodyweight gains of foxes during their growth and development. An important index of the performance of foxes from the economic viewpoint is the markedable estimation of skins. The quality of skins of experimental animals did not deviate from the mean quality of skins of the remaining animals subjected to slaughter at the farm.

Zeszyty Problemowe Postepow Nauk Rolniczych, 302, 123-130, 1983.

5 tables, 11 references.

Author's summary.

In POLH. Summary in ENGL and RUSS.

## A CASE OF ACUTE POISONING IN THE COYPU BY Pb COMPOUNDS.

(Przypadek ostrego zatrucia nutrii związkami ołowiu).

Tadeusz Gorka, Jerzy Kulczycki, Arnold Wasniewski.

A case of acute Pb poisoning took place following feeding grass from a field air-port to the coypu. Within 12 hours out of 800 animals forty died. Toxicological analysis of internal organs (kidney, liver, spleen, brain), muscles, and samples of the grass revealed a high level of Pb. On the basis of anatomo-pathological lesions and toxicological analysis of the samples of the dead animals the authors concluded that Pb was the cause of the poisoning.

Medycyna Weterynaryjna, 39, 9, 535-536, 1983.

1 table, 7 references.

Authors' summary.

In POLH. Summary in RUSS and ENGL.

## PLACENTAL AND MAMMARY TRANSFER OF A POLYCHLORINATED BIPHENYL MIXTURES (AROCLOR 1254) IN THE EUROPEAN FERRET (MUSTELA PUTORIUS FURO).

Michael R. Bleavins, William J. Breslin, Richard J. Aulerich\*, Robert K. Ringer. (\* reprint address).

Adult female ferrets were found to absorb 85.4% of a single dietary dose of the polychlorinated biphenyl (PCB) mixture Aroclor 1254. Excretion in the days immediately following dosing yielded the greatest quantity of PCBs eliminated in a given time period. In general, urinary excretion represented one-tenth or less of the PCBs excreted via the feces. Placental transfer to the ferret kits was 0.01% (per kit) of the female's absorbed dose when exposure occurred during the first trimester of pregnancy and 0.04% (per kit) when the PCBs were administered during the third trimester. Transplacental exposure to PCBs was considerably less than that reaching the kits through the dam's milk. The ratio of placental to mammary transfer, following 1 week of lactation, was calculated to be approximately 1:15 for the offspring of first-trimester-dosed females and 1:7 for the offspring produced by females treated during the third trimester.

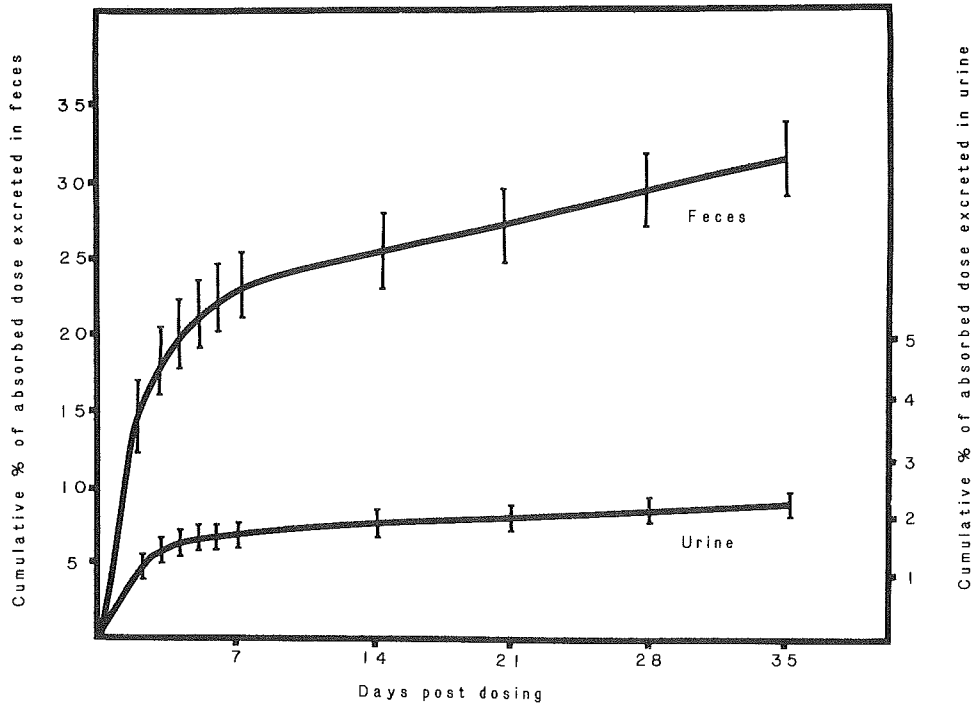


Fig. 1. Cumulative percentage of absorbed dose of  $^{14}\text{C}$ -labeled Aroclor 1254 excreted (mean  $\pm$  95% confidence intervals) by female ferrets via the feces or urine. (Values for the fourth and fifth weeks represent data only from animals in groups I and II.)

Environmental Toxicology and Chemistry, 3, 637-644, 1984.

1 table, 1 fig., 42 references.

Authors' summary.

### EFFECTS OF DIETARY HEXACHLOROBENZENE EXPOSURE ON REGIONAL BRAIN BIOGENIC AMINE CONCENTRATIONS IN MINK AND EUROPEAN FERRETS.

M.R. Bleavins, S.J. Bursian,\* J.S. Brewster, R.J. Aulerich. (\* reprint address)

In the initial trial, adult mink and ferrets were administered hexachlorobenzene (HCB) via the feed at concentration of 1, 5, or 25 ppm for 47 wk. Animals receiving 125 and 625 ppm HCB in the diet died before termination of the experiment, with female ferrets at the 125 ppm level displaying abnormal aggressiveness and hyperexcitability just prior to death. Hypothalamic serotonin (5-HT) was significantly elevated at all dose levels in mink, and cerebellar 5-HT was significantly elevated at 1 ppm in the ferret. Regional brain biogenic amine concentrations were also determined in the offspring of the female mink that were administered 1 and 5 ppm HCB. Hypothalamic dopamine (DA) concentrations were significantly depressed by 1 and 5 ppm in these kits. In a second study, adult male and female ferrets were administered 250 or 500 ppm HCB via the diet for 7 wk. Two animals at the 250-ppm level and 3 animal at the 500-ppm level died before termination of the experiment without show-

ing behavioral changes. Of the remaining animals, 3 ferrets at 250 ppm and 1 ferret at 500 ppm showed slight aggressiveness and hyperexcitability during the last week of the experiment. Concentrations of 5-HT were significantly elevated at 500 ppm in the cerebral hemispheres and at 250 ppm in the midbrain of male ferrets, while in the females, 5-HT was elevated in the cerebral hemispheres at 250 ppm and in the hypothalamus at both 250 and 500 ppm. Norepinephrine (NE) concentrations were significantly elevated in the cerebellum of males exposed to 250 and 500 ppm, as were NE concentrations in the midbrain. HCB at 500 ppm caused a significant increase in medullary NE, while 250 ppm caused an increase in hypothalamic NE in males. The only change in regional brain dopamine (DA) concentrations occurred at 500 ppm HCB in the midbrain of male, where there was a significant elevation of this neurotransmitter.

Journ. of Toxicology and Environmental Health, 14, 363-377, 1984.

7 tables, 34 references.

Authors' summary.

**TOXICOLOGICAL MANIFESTATIONS OF 2,4,5,2',4',5'-, 2,3,6,2',3',6'-, AND 3,4,5,3',4',5'- HEXACHLOROBIPHENYL AND AROCLOR 1254 IN MINK.**

Richard J. Aulerich, Steven J. Bursian, William J. Breslin, Barbara A. Olson, Robert K. Ringer.

Adult female mink were fed diets that contained 2.5 ppm Aroclor 1254, 0,1 or 0.5 ppm 3,4,5,3',4',5'-hexachlorobiphenyl (345 HCB), 2.5 or 5.0 ppm 2,4,5,2',4',5'-hexachlorobiphenyl (245 HCB) or 2,3,6,2',3',6'-hexachlorobiphenyl (236 HCB), or a control diet from 1 mo prior to breeding through parturition. All mink fed 0.5 ppm 345 HCB died within 60 d, while those fed 0.1 ppm showed 50% mortality after 3 mo exposure. Only one stillborn kit was whelped in the Aroclor 1254 group. No adverse reproductive effects were observed in the animals fed 236 HCB or 245 HCB. Plasma progesterone concentrations were significantly depressed by Aroclor 1254 and significantly elevated by 0.1 ppm 345 HCB. 17 $\beta$ -Estradiol concentrations were not significantly altered by any of the dietary treatments. Hepatic microsomal cytochrome P-450 concentra-

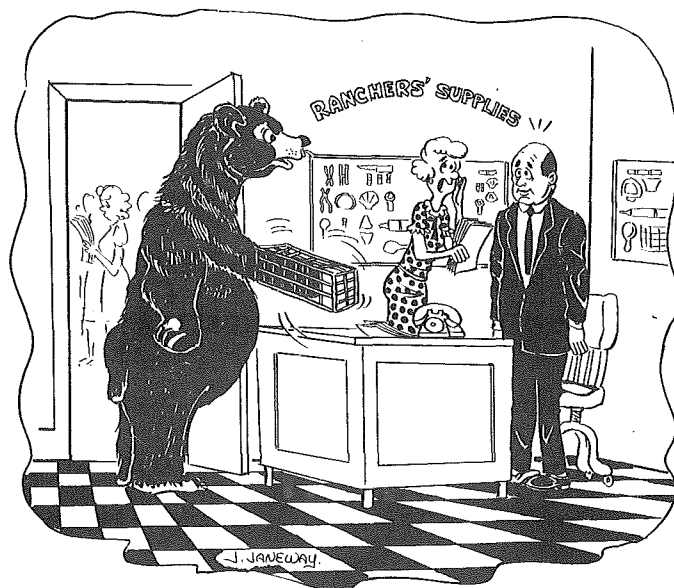


tions were significantly elevated by all treatments except 236 HCB, with the largest increases occurring in mink exposed to Aroclor 1254 and 345 HCB. Aminopyrine N-demethylase activity was elevated by 5.0 ppm 245 HCB. Aroclor 1254 caused significant elevations in both benzo(a)pyrene hydroxylase and ethoxyresorufin O-deethylase activities. Benzo(a)pyrene hydroxylase activities were also significantly elevated in mink fed 245 HCB and 345 HCB. Aroclor 1254 caused a significant elevation in cerebellar and hypothalamic norepinephrine concentrations and a significant elevation in hypothalamic dopamine concentrations. Cerebral dopamine was elevated by 0.1 ppm 345 HCB, while midbrain dopamine levels were depressed. Norepinephrine concentrations were significantly elevated by 5.0 ppm 236 HCB in the midbrain and by 5.0 ppm 245 HCB in the medulla.

Journ. of Toxicology and Environmental Health, 15, 63-79, 1985.

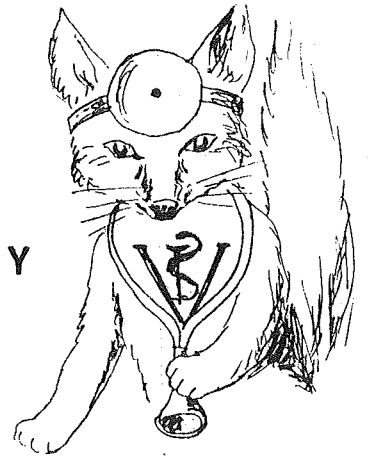
8 tables, 51 references.

Authors' summary.



"I'm afraid we have a complaint about your trigger trap!"

## VETERINARY



### ACUTE INTERSTITIAL PNEUMONITIS CAUSED BY ALEUTIAN DISEASE VIRUS IN MINK KITS.

S. Larsen, S. Alexandersen, E. Lund, P. Have, M. Hansen.

In four Danish mink ranches acute interstitial pneumonitis caused excessive mortality among kits within the first 2 1/2 months after parturition. The disease was found to be due to an Aleutian disease virus (ADV) and could be reproduced experimentally in neonatal kits by inoculation with material from spontaneous cases, as well as with other strains of ADV. Experimental reproduction was only possible in kits from dams free of Aleutian disease (AD) whereas kits from dams experimentally or naturally infected with ADV developed no lung changes. Presently available evidence indicates that the initial lung lesions result from primary viral injury to type II alveolar cells, and that immune mechanisms, essential for the development of traditional AD, are not involved in the pathogenesis.

Acta Path. microbiol. immunol. Scand., Sect. A, 92, 391-393, 1984.

14 references.

Authors' summary.

### AN OUTBREAK OF EXCESSIVE NEONATAL MORTALITY IN FOUR DANISH MINK FARMS.

#### II. ANALYTIC EPIDEMIOLOGICAL INVESTIGATIONS.

Anette G. Bøtner, Poul H. Jørgensen.

Data collected from an outbreak of excessive mortality of mink kits in 4 Danish mink farms in 1982 were analyzed. The mortality of the mink kits was found to be highest for the kits from Aleutian Disease (AD)-positive females, and the Scanblack mink was found to be the most frequently affected mink type. Furthermore the mortality was found to depend on the farm of origin and to be highest for the latest born kits. The age of the females and their location in sheds were found not to influence the mortality of the kits. However, the mortality for the Pastel mink decreased with increasing distance from the Scanblack mink. The



# Mink Vaccines

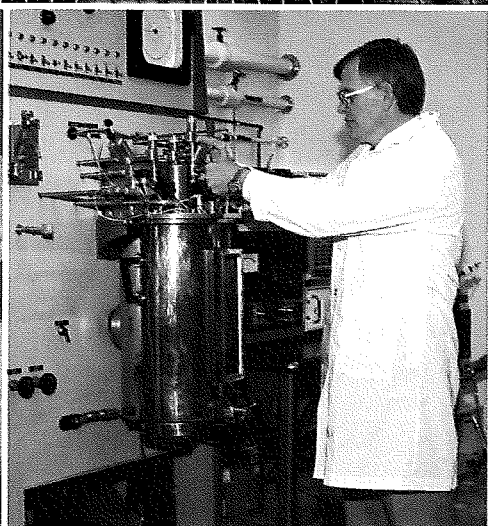
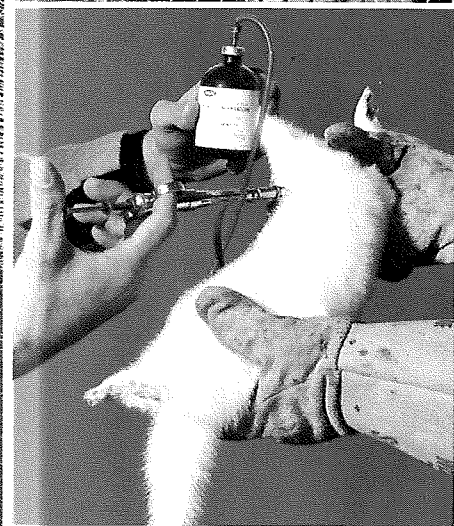
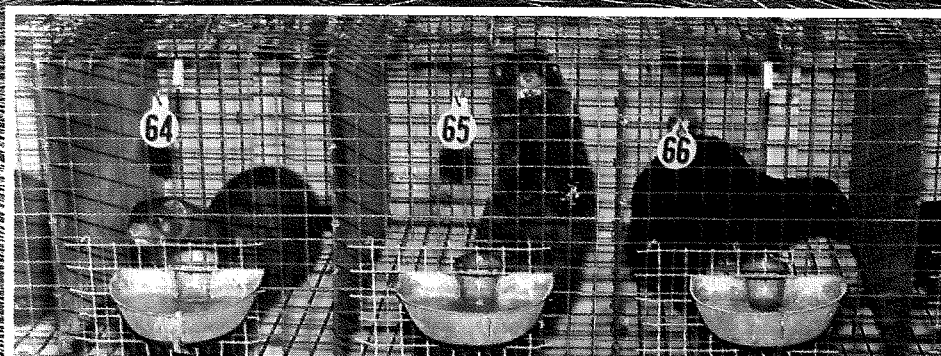
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possibility that the excess mortality of the kits might be due to an ADV-virus infection is discussed.

Acta Vet. Scand., 24, 499-511, 1983.

7 figs., 10 tables, 3 references.

Authors' summary.

#### **ALEUTIAN DISEASE VIRUS, A PARVOVIRUS, IS PROTEOLYTICALLY DEGRADED DURING IN VIVO INFECTION IN MINK.**

Bent Aasted, Richard E. Race, Marshall E. Bloom.

The polypeptides of the highly virulent mink-passaged Utah I and the nonvirulent cell culture-adapted ADV-G strain of Aleutian disease virus (ADV) were compared. When CRFK cells infected with either Utah I or ADV-G were analyzed by immunoprecipitation, both viruses induced proteins with molecular weights characteristic of the ADV-G 85,000 (85k)- and 75k-dalton structural proteins (p85 and p75) as well as the 71k-dalton nonvirion protein p71. However, when Utah I, Pullman ADV, and DK ADV (a Danish isolate of ADV) were purified from infected mink, only polypeptides with molecular weights between 27k and 30k could be identified. In addition, trypsin treatment of ADV-G degraded p85 and p75 to smaller antigenic proteins with molecular weights of 24k and 27k, similar to those found for the virulent in vivo viruses. The effect of proteolytic treatment of ADV was then studied in detail. Purification of Utah I ADV from mink organs in the presence of protease inhibitor did not prevent the appearance of the low-molecular-weight proteins and ADV-G proteins were not degraded upon purification from a homogenate of normal mink organs, suggesting that artifactual proteolysis was not occurring. When a serum pool from terminally diseased mink was analyzed by radioimmunoassay for antibody reactivity against trypsinized and non-trypsinized ADV-G, five times higher reactivity was found for the trypsinized ADV-G than for the nontrypsinized ADV-G, an effect which could not be elicited by chymotrypsin or V8 protease treatment, implying that in vivo-produced ADV was being modulated in vivo by trypsin or a trypsin-like enzyme. Trypsinization was shown not to cause a change in ADV virion density, but to decrease the in vitro infectivity of ADV-G for CRFK cells. These studies suggested that during infection of mink ADV proteins are degraded to highly antigenic smaller polypeptides.

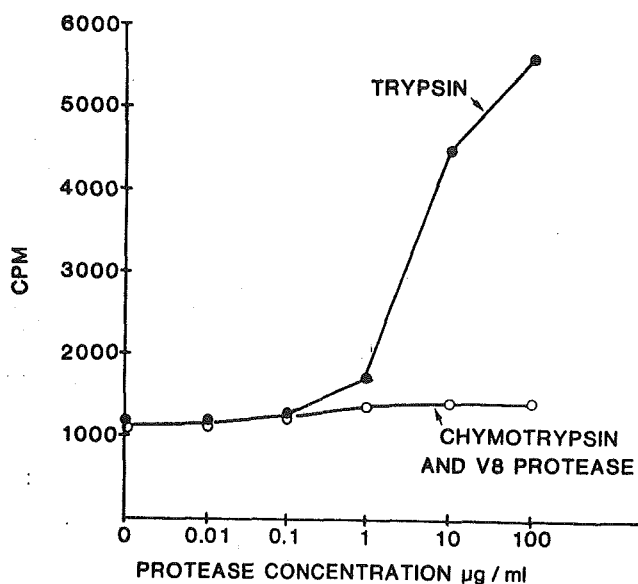


FIG. 5. Influence of protease treatment on ADV-G reactivity in RIA. Samples of ADV-G were treated with protease (trypsin, chymotrypsin, or V8 protease) for 1 h at 37°C in Dulbecco phosphate-buffered saline (pH 7.3). After incubation, soybean trypsin inhibitor was added in molar excess over the enzymes, and the samples were assayed by RIA with mink antibodies against ADV as both solid-phase antibody and  $^{125}$ I-radiolabeled antibody (4).

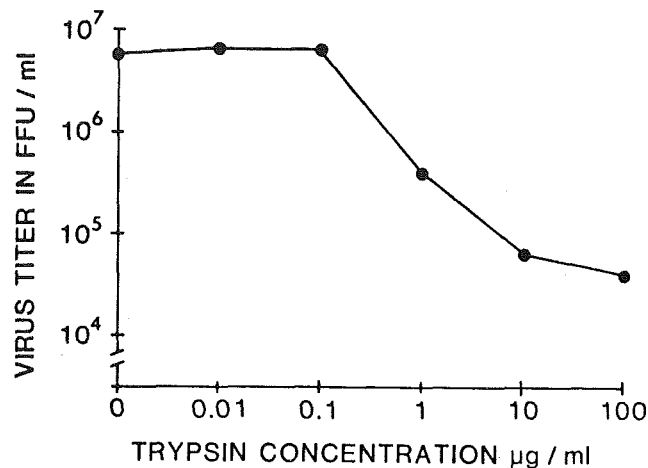


FIG. 6. Effect of trypsin treatment on ADV-G infectivity. A culture of ADV-G-infected CRFK cells was harvested into Dulbecco phosphate-buffered saline, freeze-thawed, and sonicated. Portions were incubated with the indicated concentrations of trypsin for 1 h, and the residual ADV-G infectivity was assayed as described previously (8) after addition of a molar excess of soybean trypsin inhibitor.

Journ. of Virology, 51, 1, 7-13, 1984.

7 figs., 25 references.

Authors' summary.

#### CHARACTERIZATION OF ANTIGENIC VARIATION AMONG MINK ENTERITIS VIRUS ISOLATES.

C.R. Parrish, J.R. Gorham, T.M. Schwartz, L.E. Carmichael.

Three antigenic forms of natural field isolates of mink enteritis virus were revealed with a panel of monoclonal antibodies generated against the closely studied feline panleukopenia virus and canine parvovirus-2 virus. Two types (types 2 and 3) were shown to be closely related by agar-gel precipitin tests and by restriction enzyme mapping. However, types 2 and 3 differed from the type 1 isolates in the same tests. In cross-protection studies, inactivated viral vaccines made from any one of the 3 variant types of mink enteritis virus protected mink against challenge exposure by the homologous, as well as the heterologous, antigenic types.

Am.J.Vet.Res., 45, 12, 2591-2599, 1984.

5 tables, 5 figs.

Authors' summary.

**ROTAVIRUS-ASSOCIATED DIARRHEA IN YOUNG RACCOONS (PROCYON LOTOR),  
STRIPED SKUNKS (MEPHITIS MEPHITIS) AND RED FOXES (VULPES VULPES).**

R.H. Evans.

Electron microscopy and a commercial ELISA test for rotavirus antigen were used to diagnose rotavirus infection in diarrheic raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*) and red foxes (*Vulpes vulpes*). Gross and histopathological changes in two raccoons and two red foxes were found to be very similar to those described previously in rotavirus mediated diarrhea in other animals. While an etiology for the diarrhea is not definitively established, it would appear to involve rotavirus alone or possibly in concert with enterpathogenic coliform bacteria, overfeeding of a commercial kitten milk replacer and the stresses of captivity.

Journ. of Wildlife Diseases, 20, 2, 79-85, 1984.

2 tables, 2 figs., 18 references.

Author's summary.

**A NON-HAEMAGGLUTINATING ISOLATE OF MINK ENTERITIS VIRUS.**

Esteban Rivera, Bo Sundquist.

A virus was isolated from mink showing clinical and pathological signs of mink enteritis. This virus was identified as mink enteritis virus (MEV) from results of serological tests, determination of its density in CsCl ( $1.415 \text{ g cm}^{-3}$ ), and morphology, including size (20 nm in diameter). The isolate was designated MEV-S. In contrast to other known MEV strains, the MEV-S isolate has no haemagglutinating (HA) activity with swine red blood cells (RBCs) at 4°C and pH 6.8.

Neither was there any HA at other pH values and temperatures, or when horse, bovine and rhesus monkey RBC's were used.

Vet. Microbiology, 9, 345-353, 1984.

1 fig., 2 tables, 18 references.

Authors' summary.

**SEPTICAEMIC FORM OF LISTRIOSIS IN A COYPU.****(Vérfertőzéses listeriosis nutriában).**

István Hajtós, Galal Malik.

*Listeria monocytogenes* septicaemia was diagnosed in an adult coypu (*Myocastor coypus*) originating from a small private farm in May, 1982, approx. 3 to 4 weeks after the delivery of viable offsprings.

The pathological changes were characterized by an acute septicaemic, hyperplastic splenitis and by numerous greyish-white minute foci in the liver. The histological examination revealed inflammatory-necrotic foci of various sizes, so-called listeriomies, consisting mainly of lymphocytes, histiocytes and - in a smaller number - also of neutrophilic granulocytes. Proliferation of reticulum cells and an expressed diminution of lymphocytes in number were found in the spleen. Bacterial emboli were also found in the kidneys, in the capillaries of glomeruli and in the interlobular blood vessels. The Gram-staining revealed numerous Gram-positive, fine, rod-shaped bacteria in the liver and kidneys. The brain showed no histological alterations.

The bacterial strain isolated from the liver, spleen and brain of the coypu proved to be characteristic, virulent *L. monocytogenes* serotype 1/2 according to the morphological, cultural and serological characteristics, as well as mouse and chicken pathogenicity.

Magyar Állatorvosok Lapja, 38, 6, 359-361, 1983.

2 figs., 1 table, 7 references.

Authors' summary.

In HUNG. Summary in ENGL, GERM and RUSS.





**EFFICACY OF IVERMECTIN AGAINST SARCOPTES SCABIEI VAR CANIS  
INFESTATIONS OF FOXES.**

**(Klinisk effekt av ivermectin ved behandling av *Sarcoptes scabiei*  
var canis på farmrev).**

Gunnar N. Berge, Erik Smeds.

The efficacy of ivermectin against natural infection of the mange mite *Sarcoptes scabiei* var canis in foxes was evaluated.

The investigations consisted of two field studies and one controlled study.

In experiment 1, ivermectin was given as a single subcutaneous dose at 200 µg/kg in six foxes.

In experiment 2, was one group, consisting of five animals, administered 200 µg ivermectin/kg s.c. twice with an interval of 35 days. Group two, consisting of four animals, was given one subcutaneous injection of 400 µg ivermectin/kg.

In experiment 3, ten foxes were given 1 ml 0.2% Eqvalen s.c. (i.e. 340-440 µg ivermectin/kg). A control group of ten animals was not medicated.

Before and after treatment a clinical evaluation and skin scraping for microscopic examination was carried out in all three experiments.

The results indicated that ivermectin was a good alternative in the therapy of the *Sarcoptes* mange in foxes by moderate mite infection. A progressive clinical improvement of the mange lesions was evident in the treated foxes. Mites were not detected in skinscraping, except in one animal in experiment 3.

It was concluded that ivermectin should be administered in an initial dose of 400 µg/kg 2-3 weeks after the first treatment.

Nord. Vet.Med. 36, 5/6, 156-161, 1984.

1 table, 9 references.

Authors' summary.

In NORG. Summary in ENGL.

EFFECTS OF AEROSOL AND PARENTERAL VACCINATIONS AGAINST DISTEMPER IN POLECAT AND MINK FARMS.

Czesława Górską, Jerzy Górski.

The studies have demonstrated that 21 days after aerosol or subcutaneous vaccinations of polecats with Canivac F they were resistant to experimental infection with virulent distemper virus. Four months after aerosol vaccination, over 70 per cent of minks had antibodies under field conditions. The parenteral vaccination gave better results because in the same time the specific antibodies were found in all examined sera.

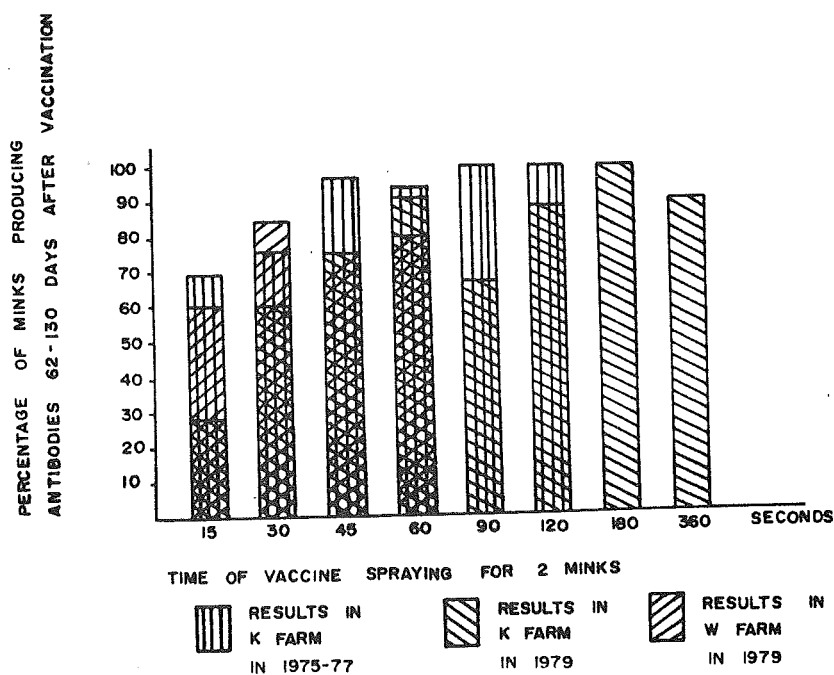
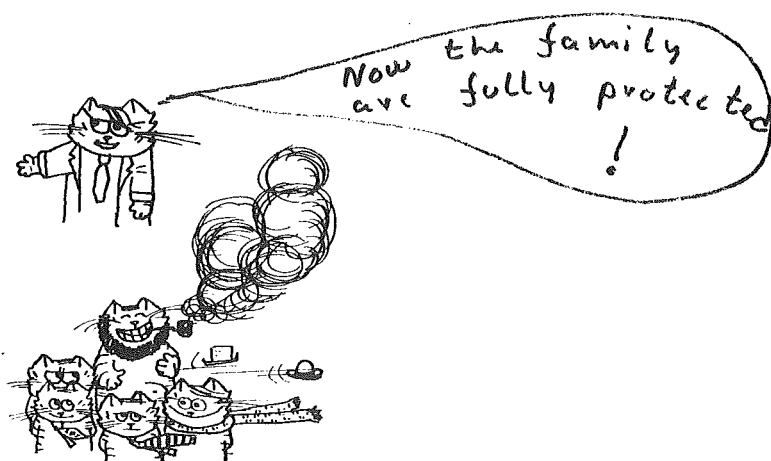


Fig. 1. Development of antibodies against distemper in minks following aerosol vaccination with Canivac F

Bull. vet. Inst. Pulawy, 26, 1-4, 1983.

3 tables, 1 fig., 12 references.

Authors' Summary.



**IMMUNITY IN FOXES VACCINATED WITH LEPTOSPIRA INTERROGANS  
SEROVAR. ICTEROHAEMORRHAGIAE.**

**(Odporność lisów szczepionych na doświadczalne zakażenie  
Leptospira interrogans serowariant icterohaemorrhagiae).**

Janusz Nowakowski, Jerzy Motz.

Five foxes vaccinated and three control ones were infected interaperitoneally with *L. icterohaemorrhagiae*, pathogenic for hamsters and dogs. There was not observed in the both groups under study any clinical signs of disease, however the differences were noted at necropsy. In control foxes there were observed large infarcta and haemorrhages in the lungs while in the vaccinated ones - only some petechiae. Bacteriological examinations confirmed the immunity of vaccinated foxes since no leptospira were found in their kidneys, whereas the pathogens were isolated from two out of three control foxes.

Medycyna Weterynaryjna, 39, 8, 457-459, 1983.

1 table, 7 references.

Authors' summary.

In POLH. Summary in RUSS and ENGL.

**ATTEMPTS OF VACCINATION OF FOXES AGAINST DISTEMPER AND  
RUBARTH'S DISEASE BY AN AEROSOL ROUTE.**

Czesława Górńska, Jerzy Górski.

After aerosol immunisation of farm foxes with a monovalent distemper vaccine and with a bivalent distemper and Rubarth's disease vaccine specific antibodies were demonstrated by the serum neutralization test.

Bull.vet. Inst. Puławy, 26, 1-4, 1983. pp 35-39.

2 figs., 2 references.

Authors' summary.



**OUR EXPERIENCE IN TREATING COYPU SUFFERING FROM DEMODECOSIS.**

**(Nase iskustvo lecenja nutrija obolelih od demodikoze).**

M. Teofanović, I. Boroš, A. Dudaš.

A case of demodecosis in coypu which was diagnosed and described for the first time in this country in the province of Voivodina, was the reason for us to attempt to cure diseased animals. In our case it was decided to use the preparation Vetiol (Galenika) for therapy. The active principle in this acaricide and insecticide is malathion, a thiophosphoric ester. The animals were dipped in a 1% solution of Vetiol a total of four times at ten day intervals. Besides dipping, the building were disinfected once a week with 2% NaOH solution and sprayed with a 1% solution of Vetiol. After the last dipping on the fortieth day, bare places were no longer visible on the bodies of the coypu. Using this treatment and procedure, no harmful side effect and consequences were observed in any of the coypu.

Veterinarski Glasnik. 37, 12, 975-978, 1983.

5 references.

Authors' summary.

In SRCR. Summary in ENGL and RUSS.

**ANAESTHESIA OF UNUSUAL SPECIES IN COMMON VETERINARY PRACTICE.**

**NOTE 3. RABBIT AND RODENTS ANAESTHESIA.**

**L'Anesthésie des espèces insolites en pratique vétérinaire courante.**

**Note 3. L'Anesthésie du lapin et des rongeurs).**

J.P. Genevois, A. Autefage, P. Fayolle, A. Cazieux, P. Bonnemaïson.

Concerning a series of papers dealing with species they call "unusual" the authors study in this third note the special case of rabbit and rodents, the latter includes 10 species: agouty, chinchilla, guinea-pig, squirrel, jerboa, hamster, lemming, marmot, rat and mouse.

Revue Méd. Vét., 135, 5, 273-279, 1984.

27 references.

Authors' abstract.

In FREN. Summary in GERM, FREN, ENGL and SPAN.

**ANAESTHESIA OF UNUSUAL SPECIES IN COMMON VETERINARY PRACTICE.**

**NOTE 4. WILD CARNIVORA ANAESTHESIA.**

**(L'Anesthésie des espèces insolites en pratique vétérinaire courante.**

**Note 4. L'Anesthésie des carnivores sauvages).**

J.P. Genevois, P. Fayolle, A. Autefage, P. Bonnemaïson, A. Cazieux.

In the context of a series of notes dealing with anesthesia of species which they call "unusual" the authors study the particular case of wild carnivora: mink, ferret, other mustelidae, ursidae, hyenidae, viverridae, procyonidae, canidae and felidae.

Revue Méd. Vét., 135, 6, 379-384, 1984.

1 fig., 1 table, 11 references.

Authors' summary.

In FREN. Summary in FREN, ENGL, SPAN and GERM.

**DEMODECOSIS IN THE REARING OF FUR-BEARING COYPU.**

**(Demodikoza u uzgoju krznasica nutrija).**

M. Teofanović, A. Dudas, I. Boros, Veslina Komnenov.

The authors give a review and description of the first case of demodecosis in fur-bearing coypu in Yugoslavia. Namely, an owner of coypu in the province of Volvodina noticed a bare patch about 3 cm in diameter in the area of the mammary gland of one purchased animal in March 1982. In July the same year he observed bare places (without fur) on different parts of the body of many young coypu. In January 1983 it was apparent that this syndrome was widespread among breeding stock of both sexes and especially in growing stock and female offspring. Practically all the pens in which the coypu were kept were affected. In addition to the changes on the skin, i.e. on the fur, the owner notices many islands of hair floating on the surface of the water in the bathing pools. The symptoms were most often observed on the head, particularly on the eyelids, followed by the paws and the inner sides of the back legs. The owner did not see the diseased coypu scratching themselves. Up to the beginning of March 1983 about 90% of the coypu of all ages were affected, especially the young stock. With the aim of solving this problem and making a correct diagnosis

two animals were killed and the carcasses brought to a specialist veterinary institute. On the basis of the clinical picture, namely, the alterations found on the skin, their appearance and position together with the findings after examination of skin scrapings under the microscope, the diagnosis of demodecosis was made. In this particular case it was concluded from the appearance of the efflorescence on the skin and its localization, that the squamous form of demodecosis was concerned. Such a massive outbreak of demodecosis points to special caution and care when ordering and purchasing coypu from stock which is not guaranteed to be free from all diseases and particularly from infections.

Veterinarski Glasnik, 37,7, 525-529, 1983.

10 references.

Authors' summary.

In YUGO. Summari in ENGL and RUSS.

#### **EPIDEMIOLOGY OF AUJESZKY'S DISEASE IN DENMARK.**

**(Om Aujeszky-virusinfektionens epidemiologi i Danmark).**

Viggo Bitsch, Jørgen Bent Andersen.

Studies of Aujeszky's disease in cows suggested the existence of two main types of infection, respiratory, affecting the forequarters, and genital or alimentary, affecting the hindquarters. It was further found that AD virus isolated from affected forequarters of cows frequently formed syncytia in tissue culture, while virus from hindquarters rarely did. The respiratory syncytium-forming virus was the more pathogenic for cattle, and thought to be most often transmitted to them by pigs. Numbers of outbreaks in pigs, cattle, dogs, cats, furbearing and red foxes are tabulated for the years 1964-1981. In 1981 there were 68 outbreaks in swine, 19 outbreaks in cattle, 3 in dogs, 3 in cats and 5 in red foxes. Modes of transmission of the virus are discussed, including airborne infection, rats and mice, and personnel.

Proc. from 14th Nordic Vet. Congress, 6-9 July 1982, 92-95, 1982.

1 table, 5 references.

CAB-abstract.

In DANH.

**INFECTION WITH AUJESZKY'S DISEASE VIRUS IN  
NYCTEREUTES PROCYNOIDES GRAY.**

**(Zakazenie wirusem choroby Aujeszkyego u jenotów (Nyctereutes  
procyonoides Gray) w fermach zwierząt futerkowych).**

Jan Zwierzchowski, Artur Sambor, Tadeusz Koziol, Tomasz Jarmolowicz.

The authors describe the first case in Poland and the second one in the world the focus of infection in raccoon dogs caused by pseudorabies virus. The clinical course of the disease (hyperacute and acute forms) was similar to that observed in foxes. It was found a much higher morbidity in raccoon dogs than in common and polar foxes.

Medycyna Weterynaryjna, 39, 8, 455-457, 1983.

1 table, 1 fig., 25 references.

Authors' abstract.

In POLH. Summary in ENGL and RUSS.

**THE APPLICATION OF IMMUNOFLUORESCENCE TEST FOR ROUTINE  
DIAGNOSIS OF AUJESZKY DISEASE.**

**(Zastosowanie odczynu immunofluorescencji w rutynowej diagnostyce  
choroby Aujeszky).**

Tomasz Peryt.

Samples derived from 26 animals of various species, suspected of natural infection of Aujeszky disease were laboratory examined in biological test on young rabbits according to the instruction. The obtained results were compared with those performed on white mice intracerebrally infected with the suspected material. Furthermore, it was performed after 18 and 24 h since the infection the isolation of the virus on a primary cell culture of chicken embryo with the use of immunofluorescence test. Preparates for the test were also prepared from brains, spinal cords, lungs and spleens of animals sent for diagnostic purposes, and from brains of died and slaughtered mice after 24, 48 and 72 h since the artificial infection. Aujeszky disease virus was found in 12 animals (1 pig, 1 dog, 10 foxes) from 6 farms. It was found a full agreement of the results of biological test performed on rabbits and mice. Examination in the immunofluorescence test the sample from animals naturally infected has not a practical value. Using immuno-

fluorescence test and brain samples of infected mice it is possible to detect Aujeszky disease virus when the signs of neurological disorders appeared. However, in tissue culture of chick embryo the virus is detected next day since the infection.

Medycyna Weterynaryjna, 39, 9, 546-548, 1983.

1 table, 3 figs., 7 references.

Author's summary.

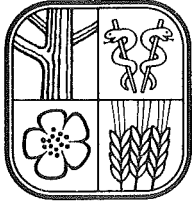
In POLH. Summary in ENGL and RUSS.





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## EFFECT OF NUTRITION ON REPRODUCTIVE PERFORMANCE AND KIT GROWTH IN MINK

Anne-Helene Tauson



*name:* Tauson, Anne-Helene

*title:* ~~Agronomist~~ *Dr. agric.*

*country:* Sweden

*institute & address:* Department of Animal Husbandry  
Funbo-Lövsta  
S-755 90 Uppsala, Sweden

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*Dear Anne-Helene.*

*Congratulations from all your friends  
in the mink producing world.*

*Jenni.*

# EFFECT OF NUTRITION ON REPRODUCTIVE PERFORMANCE AND KIT GROWTH IN MINK

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## LIST OF PUBLICATIONS INCLUDED IN THE THESIS

The present thesis is based on the six papers listed below:

- A) Tauson, A.-H. & Aldén, E. 1984. Pre-mating body weight changes and reproductive performance in female mink. *Acta Agric. Scand.* 34, 177-187.
- B) Tauson, A.-H. 1985. Different feeding intensity levels to mink. 1. Effects on male reproductive performance. *Swedish J. agric. Res.* 15 (in press).

- C) Tauson, A.-H. 1985. Different feeding intensity levels to mink. 2. Effects on female reproductive performance, pre-weaning kit growth and longevity of females. *Swedish J. agric. Res.* 15 (in press).
- D) Tauson, A.-H. 1985. Different feeding intensity levels to mink. 3. Effects on post-weaning kit growth performance and fur quality characteristics. *Swedish J. agric. Res.* 15 (in press).
- E) Tauson, A.-H. 1985. Effects of flushing on reproductive performance, ovulation rate, implantation rate and plasma progesterone levels in mink. *Acta Agric. Scand.* 35 (in press).
- F) Tauson, A.-H. 1984. Effects of lactic acid bacteria as feed additive on reproductive performance and early kit growth rate in mink and blue foxes. *Acta Agric. Scand.* 34, 485-506.

References to these papers will be made with the capital letters used above. Detailed reports have earlier been given on the work reported in papers A-D by Aldén et al. (1977; A), Johansson & Aldén (1975; B-D), Aldén & Johansson (1976; B-D), Tauson & Aldén (1979; C) and Aldén & Johansson (1977; D).

## ABSTRACT

Effects of pre-mating weight change in yearling females, effects of different feeding intensity levels, effects of flushing and effects of dietary lactic acid bacteria (LAB) on reproductive performance, pre- and post-weaning kit growth rate and fur quality characteristics were investigated in mink.

In yearling females, severe weight reduction from November to March gave inferior reproductive results compared with females kept in moderate condition.

For males on high feeding intensity (*ad lib.*) or in a high condition, litter size, barren frequency and rate of stillborn kits were non-significantly increased compared with animals on a low intensity (20% restriction). Similarly, in females litter size, barren frequency, rate of stillborn kits and kit losses during lactation tended to increase for females on high intensity. Yearling females strongly reduced in weight from November to March had poor performance, but in adults conditioning had little effect. On low intensity a tendency for improved longevity was recorded, but at an age of 5 years all females had very poor results.

Kit birth weights were unaffected by intensity level of the dams, but pre-weaning growth was superior on high intensity. Post-weaning growth, final body length and skin length were more affected by intensity during July-August than by intensity from September to pelting, but the feeding level in the nursing period was still more important. Fur quality tended to be improved by a high intensity prior to pelting.

Flushing by *ad lib.* feeding of formerly restricted yearling females commenced 4-5 days before the start of the mating season tended to increase litter size. Similarly, a tendency for increased number of corpora lutea was recorded but plasma progesterone levels were not conclusively affected.

Dietary LAB in late gestation and during lactation, with one exception, did not improve kit growth performance. Some positive effects on reproductive results could not be excluded, but field data showed a considerable variation between farms.

List of addresses.

- Aasted, Bent Dept. of Vet. Virology and Immunology, Royal Vet. and Agric. University, 13, Bülowsvej, DK 1870 Copenhagen V.
- Aulerich, Richard J. 132 Anthony Hall, Dept. of Animal Science, Michigan State University, East Lansing, MI 48824-1225, USA.
- Baranov, O.K. Inst. of Cytology and Genetics of the USSR Academy of Science, Siberian Branch, Novosibirsk, 630090, USSR.
- Bollinger, K.S. Dept. of Forestry & Wildlife Management, Univ. of Massachusetts, Amherst, MA 01003, USA.
- Bednarz, Maria Inst. Produkcji Drobiarskiej, Zaklad Hodowli i Uzytkowania Zwierzat Futerkowych i Drobneho Inwentarza, SGGW-AR, Warszawa, Poland.
- Berg, Kjell Andersen Institute of Reproductive Physiology and Pathology, The Norwegian College of Veterinary Medicine, P.O. Box 8146 Dep., Oslo 1, Norway.
- Berge, Gunnar N. Norges Veterinærhøgskole, Inst. for farmakologi og toksikologi, Postboks 8146, Oslo Dep., Oslo 1, Norge.
- Bitsch, V. Statens veterinære Serumlaboratorium, København, Danmark.
- Bötner, Anette G. Dept. of Vet. Virology and Immunology, Royal Vet. and Agric. University, 13 Bülowsvej, DK 1870 Copenhagen V.
- Brach, W. Hannover, Germany.
- Bursian, S.J. Dept. of Animal Science, Michigan State University, East Lansing, Michigan 48824-1225, USA.
- Busher, P.E. Coll. of Basic Studies, Boston Univ., 871 Commonwealth Ave. Boston MA 02215, USA.
- Chizhov, V.A. USSR
- Cholewa, Ryszard Akademia Rolnicza w Poznaniu, ul. Dozynkowa 9 bl. H., Poland.
- Danilov, P.I. Pushkinskaya II, 185610 Petrozavodsk, USSR.
- Dibble, Eric D. Dept. of Biology, Univ. of Wisconsin-Eau Claire, Eau Claire Wisconsin 54701, USA.
- Doboszyńska, T. Res. Stn. of Polish Academy of Sciences Popielno, 12-222 Wejsuny, Popielno, Poland.
- Erbslöh, J. Aulenford, West Germany.
- Erlinge, S. Dept. of Animal Ecology, Univ. of Lund, S-223 62 Lund, Sweden.
- Evans, R.H. Treehouse Wildlif Ctr., Inc., RR 1, Box 125E, Brighton, Illinois 62012, USA.
- Frindt, Andrzej Instytut Hodowli Zwierzat i Technologii Produkcji Zwierzecej, SGGW-AR, Warszawa, Poland.
- Genevois, J.P. Path. Chirurgicale, Ecole Natl. Vet. de Toulouse, 23 chemin des Capelles, F-31076 Toulouse Cedex, France.
- Gorka, Tadeusz Zaklad Higieny Weterynaryjnej, ul. Powstańców Wielkopolskich 10, 85-090 Bydgoszcz, Poland.
- Gorska, Czeslawa Vet. Res. Inst., Pulawy, Poland.
- Gromadzka-Ostrowska, Joanna. Physiological Laboratory, Warsaw Zoological Garden, Ratuszowa 1/3, 03-461 Warszawa, Poland.
- Haferbeck, Edmund Universität Göttingen, West Germany.
- Hajtós, István Hungary.
- Hattenhauer, H. Helenenstrasse 24, 7030 Leipzig, DDR.
- Haupt, Rolf Idstein-Oberrod, West Germany.
- Heran, Ivan Zoologické oddeleni Národního muzea, Praha, Czechoslovakia
- Hodgdon, H.E. The Wildlife Society, 5410 Growvenor Lane, Bethesda, MD 20814, USA.
- Hoszowski, Andrzej Vet. Res. Inst., Pulawy, Dept. of Microbiology, Poland.

- Jelinik, Pavel Katedra chovu skotu, koní a ovcí Vysoké školy zemědělské v Brně, Zemědělská 1, 662 65 Brno, CSSR.
- Jones, Donald M. Dept. of Biology, Univ. of Waterloo, Waterloo, Ontario N2L 3G1, Canada.
- Klochkov, D.V. Inst. of Cytology and Genetics, Acad. of Science of USSR, Siberian Branch, Novosibirsk 630090, USSR.
- Kopczewski, Antoni Inst. Weterynarii w Puławach z siedziba w Gdańsku, ul. Kaprów 10, 80-316, Gdańsk, Poland.
- Korhonen, Hannu Dept. of Applied Zoology, Univ. of Kuopio, POB 6, 70211 Kuopio 21, Finland.
- Lancia, R.A. Forestry Dept., North Carolina State Univ., Raleigh, NC, USA 27650, USA.
- Larsen, S. Dept. of Pathology, Royal Vet. and Agric. University, 13 Bülowsvej, DK 1870 Copenhagen V.
- Linke, R.P. Inst. of Immunology, Univ. of Munich, Schillerstrasse 42, 8000 Munich 2, West Germany.
- Lorek, Oskar Ferma Hodowli Zwierząt Futerkowych - Wiartel, Poland.
- MacArthur, Robert A. Dept. of Zoology, Univ. of Manitoba, Winnipeg, Man., Canada R3T 2N2.
- Maciejowski, Janusz Zakład Genetyki i Hodowli Zwierząt Drobnych, Inst. Biologicznych Podstaw Produkcji Zwierzęcej, AR Lublin Poland.
- Madeyska-Lewandowska, Anna. Inst. Genetyki i Hodowli Zwierząt PAN w Jastrzebcu Poland.
- Mead, R.A. Dept. of Biological Sciences, University of Idaho, Moscow 83843, USA.
- Muller-Schwarze, D. State University of New York, Coll. of Environmental Science and Forestry, Syracuse, New York, 13210, USA.
- Müller, Wolfgang Fachgebiet Tierhaltungs- und Tropenhygiene im Inst. für Tiermedizin und Tierhygiene der Universität Hohenheim, West Germany.
- Niedzwiadek, Stanislaw Zakład Hodowli Drobnych Inwentarza Instytutu Zootechniki, Balice koło Krakowa, Poland.
- Nowakowski, Janusz Zakład Technologiczno-Badawczy Puławskich Zakładów Przemysłu Bloweterynaryjnego, 24-100 Puławy-Michalowska, Poland.
- Näveri, Anne the Finnish Fur Breeders Association, P.O.Box 5, SF-01601 Vantaa, Finland.
- Paradiznik, Vesna VTOZD za veterinarstvo BF, 61000 Ljubljana, Gerbiceva 60, Yugoslavia.
- Parrish, C.R. James A. Baker Inst. for Animal Health, New York State Coll. of Vet. Med., Cornell University, Ithaca, New York 14853, USA.
- Pastirnac, Nicolae Dept. of Agric. of State, I.A.S. Prejmer, judetul Brasov R.S. Romania.
- Patenaude, F. Dept. of Biologie, Université Laval, Quebec, Quebec G1K 7P4, Canada.
- Peryt, Tomasz ul. Belwederska 19 m. 29, 00-761 Warszawa.
- Petrova, G.G. Inst. of Biology, The Academy of Science of the USSR, Karelian Branch, Pushkinskaya 11, 185610 Petrozavodsk, USSR
- Powell, R.A. Dept. of Zoology and Forestry, North Carolina State Univ., Raleigh, North Carolina, 27650, USA.
- Richard, P.B. Laboratoire CNRS, Mouli 09200 Saint-Girons, France.
- Rivera, Esteban Natl. Vet. Institute, S-750 07 Uppsala, Sweden.
- Sacher, Bernhard Neustadt, West Germany.
- Sandell, M. Dept. of Animal Ecology, Univ. of Lund, Ecology Building, S-223 62 Lund, Sweden.

- Sasaki, M. Chromosome Research Unit, Faculty of Science, Hokkaido University, North 10, West 8, Kita-ku, Sapporo 060 (Japan).
- Sava, O. Romania
- Schult, Gert Hannover, West Germany.
- Shull, L.R. Dept. of Environmental Toxicology, Univ. of California, Davis, CA 95616, USA.
- Stiny, Volker H. Vet. Inst., Novi Sad, Yugoslavia.
- Teofanović, M. Inst. of Terrestrial Ecology, Penrhos Road, Bangor, Gwynedd LL57 2LQ Wales.
- Valton, K.C.
- Vidmontas, Anthony All Union Research Institute of Game Management and Fur Farming, Kirov, U.S.S.R.
- Yazan, Olga
- Zwierzchowski, J. Instytut Chorob Zakaznych i Inwazyjnych Wydzialu Weterynaryjnego AR we Wroclawiu, pl. Grunwaldzki 45, 50-366 Wroclaw.

