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8. COMMUNICATION 86-90

3rd INTERNATIONAL SCIENTIFIC CONGRESS IN FUR ANIMAL PRODUCTION.

BOOK REVIEWS:

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Chinchilla Production.(A csincsilla tenyesztese). Sandor Holdas.

Research References on Mink and Foxes. Supp. no.5. Natl. Board of Fur Farm Organizations? USA.

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N O T E S

SCIENTIFUR, VOL. 7, NO. 3, 1983.

When a nice sunday morning I am sitting at my home terace between the church and the pub trying to correct the typing of this issue of SCIENTIFUR many pictures pass by in my mind.

I do not think about how far this piece of work with SCIENTIFUR is important or not, but I only think about how privileged I am, whom is sitting in the front and is able to study the still growing number of very serious, very basal and extremely interesting reports from colleagues - and to great extent friends, from almost all parts of the world.

I am the first one to recognize the development in the sciences concerning fur bearing animals. I am the first one to see the new conquests. I am - perhaps - the first one to see in which direction more attention might be advantagous.

As the editor of SCIENTIFUR it has been a great experience to see that the development in the basal scientific side of the fur animal production has increased considerably during the years in which SCIENTIFUR has existed.

I am sure that this increase is not based on but only correlated to the age of SCIENTIFUR, and I am convinced that SCIENTIFUR's existence stimulate the - very necessary - basic side of the research work.

Not only, all scientists are able to follow the development in a very confortable way, but also people in the field of organization and administration have possibilities to follow the development and during this get

a real imagination of what direction the research money has to be spend on.

The wind os blowing fairly well for all of us - let us stimulate this fact by our attitude to our own scientific work, to SCIENTIFUR, and to the 3rd International Scientific Congress in Fur Animal Production, France, April 1984.

From the Congress letter I have noticed participants from many East Countries. It is a great wish that our friends and colleagues from these countries will be able to come to Paris. I am sure that money spend on international collaboration in the scientific side of fur animal production is the best way spending money at all.

The best holiday wishes

Your editor

Gunnar Jørgensen

Original report

SPECIES SPECIFICITY OF THE ISOENZYMATIC PROFILES OF LACTATE DEHYDROGENASE IN THE BLOOD AND ORGANS OF MINKS (MUSTELA VISON SCHR.) AND POLAR FOXES (ALOPEX LAGOPUS L.).

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Introduction

Organ and tissue profiles of lactate dehydrogenase isoenzymes (LDH) are known to have species specificity (Wilkinson, 1968). Their relative content of the first and the fifth isoenzymes responsible for the alternative glycolytic pathways varies greatly and it is closely dependent on the environmental conditions of an organism and on its oxygen supply (Shukolyukov, 1973). Thus, in semiaquatic mammals (beaver, seal) whose mode of life is closely connected with frequent diving and, consequently, with forced hypoxia conditions, LDH isoenzymatic profiles of a number of organs are characterized by higher LDH-5 content than in terrestrial animals (Blix, 1971; Messelt, Blix, 1976).

In this connection it was interesting to investigate isoenzymatic LDH spectra of blood serum and organs in fur-bearing animals differing in ecogenesis such as minks which are semiaquatic predators and polar foxes which are terrestrial representatives of the given

order. Our earlier investigations (Kozhevnikova, 1978) showed that in minks total serum LDH activity was greater than in polar foxes. This regularity retains both in the period of individual development and in seasonal metabolic adaptations.

Material and methods

Isoenzymes of lactate dehydrogenase (LDH); EC 1.1.1.27) were determined in blood serum, sceletal muscle, spleen, kidney, heart of farm-bred fur-bearing animals - 10 minks (Mustela vison Schr.) and 20 polar foxes (Alopex lagopus L.) aged 6 months.

LDH isoenzymes were estimated by agar gel electrophoresis according to Wieme's (1959) procedure. The procedure developed by I.N. Ivanov et al. (1974) was followed in preparing tissue homogenates. For enzymatic electrophoresis we used supernatant after the homogenates of the organs had been centrifuged for 30 min. at 16000 in a refrigeratory centrifuge. The quantitative ratio of LDH isoenzymes was estimated by scanning enzymograms (after their hystochemical staining) on a "Chromoscan 200-201" ("Jouce a. Loebl" Co.) microdensitometer. The results obtained were treated statistically.

Results and discussion

The analysis of the enzymograms obtained has shown LDH to be present in five molecular forms in all minks and polar fox organs studied. All the five LDH fractions were distinctly observed (Fig. 1). In the heart and kidney of fur-bearing animals, LDH-1 and LDH-2, isoenzymes rapidly migrating in electrophoresis predominated. In the heart, their relative content was 64.3% and 90% and in the kidney, 72% and 80% of total enzyme activity in minks and polar

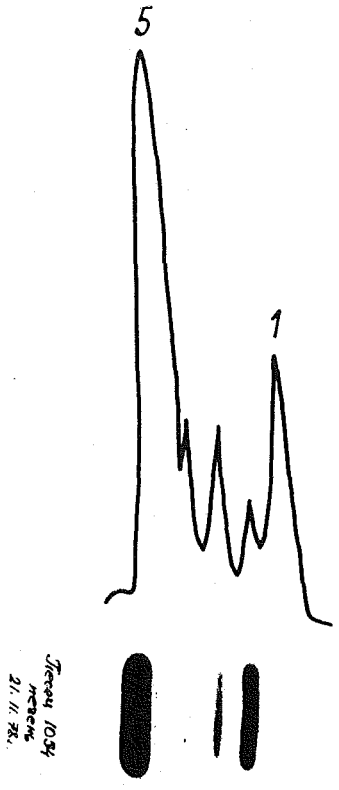

Fig. 1. Densitometry of LDH distribution of liver in polar fox.

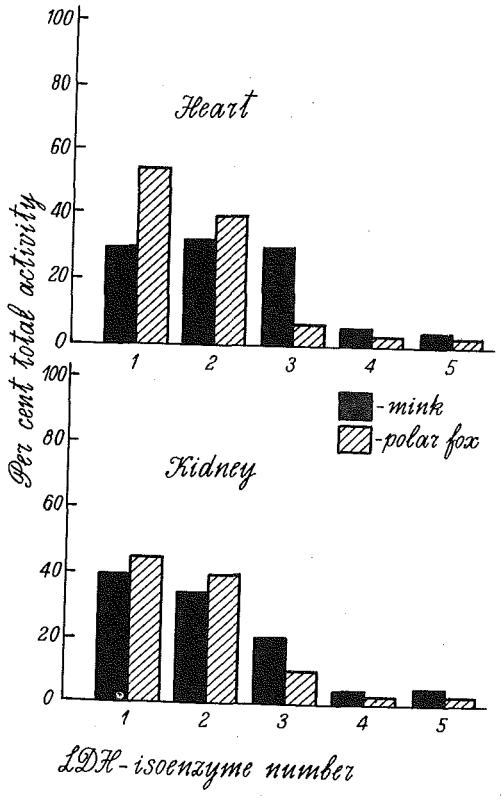

Fig. 2. Distribution of LDH isoenzymes in heart and kidney of mink and polar fox. The column expresses the means of all the experiments.

foxes, respectively (Fig. 2). The content of hybrid isoenzymes (LDH-3 and LDH-4) in mink heart and kidney varied from 22% to 34%, in polar foxes - from 10% to 25%. In the isoenzymatic spectra of these organs relative LDH-5 content was especially low: 1.7% and 1.5%.

Unlike the isoenzymatic spectra for the heart and kidney of fur-bearing animals, those for the liver and sceletal muscles were characterized by the greater content of the slowly migrating isoenzyme LDH-5 (Fig. 3). Its relative content in the liver was 72%, and 66% in minks and polar foxes, respectively; in sceletal muscles it was 57% and 52% of the total activity. In both animals, the hybrid forms of isoenzymes had approximately identical distribution. In the liver, their content varied within 6-8% of total activity and in sceletal muscles, was within 10-16%. The amount of the first LDH fraction was small - 5-10%.

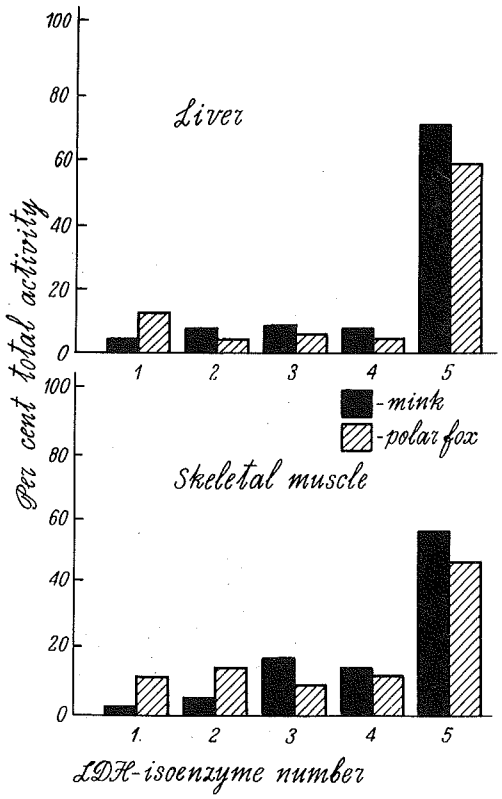

Fig. 3. Distribution of LDH isoenzymes in liver and sceletal muscles of mink and polar fox.

Spleen tissues were characterized by high saturation with hybrid forms of LDH isoenzymes (Fig. 4). In polar foxes, LDH-2, LDH-3 and LDH-4 total content was 74% in the spleen; in minks, it was 67%. The amount of anodic LDH enzyme was small. In the spleen of minks and polar foxes it was 4% and 8% of total activity, respectively.

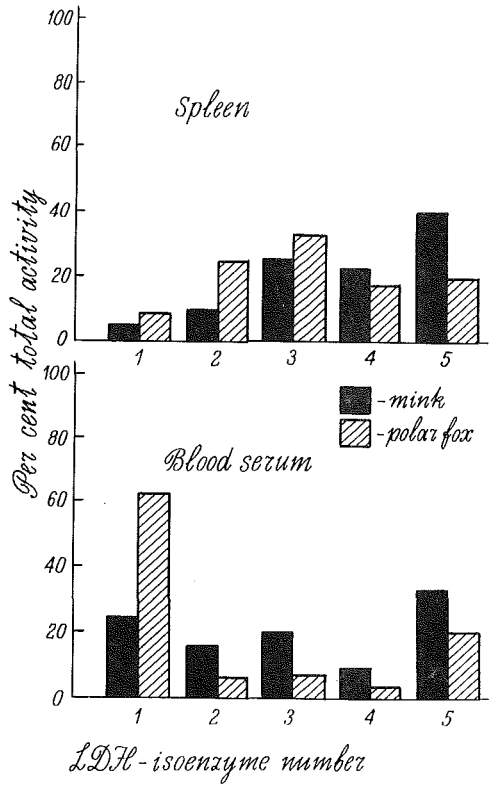

Fig. 4. Distribution of LDH isoenzymes in spleen and blood serum of mink and polar fox.

Thus, the isoenzymatic profile of LDH observed in fur-bearing animals has a certain organ specificity. The tissues of fur-bearing animals, like those of the majority of mammals (Wilkinson, 1968; Moss, Butterworth, 1978) may be divided into three groups with respect to the pattern of isoenzymatic spectra. In this case, there is a distinct correlation between the character of the isoenzyma-

tic LDH spectrum and the metabolic type of an organ. In tissues with predominating aerobic metabolism (heart, kidney) anodic fractions, i.e. H-form isoenzymes are most active. In tissues showing a pronounced ability for anaerobisis (liver, sceletal muscles) cathodic fractions, i.e. M-form isoenzymes (the second group) predominate. Other tissues (spleen, lungs etc.) generally belong to the third group, in which intermediate (hybrid) enzyme forms have the greatest relative content.

In comparing LDH spectra for organs and tissues the quantitative ratio of isoenzymes was found to be different in minks and polar foxes. In the first place, this is true of LDH-1 and LDH-5 isoenzymes (Fig. 2-4). Thus, in blood serum of minks relative LDH-5 content was 34.4%, while in polar foxes it was much lower - 23.2% (Fig. 4). At the same time in polar foxes anodic isoenzymes were more distinct and accounted for 62% of total activity, whereas in mink it was 25%. The difference in molecular LDH spectra, which lies in different distribution of isoenzymes M and H forms responsible for alternative pathways of glycolysis, in both fur-bearing animal species seemed to result from favorable mutations in genetic material associated with the adaptation of the animals to environmental conditions. The molecular profile of serum LDH seems to reflect adaptational shifts which occur at the organ and tissue level. In all the mink organs relative LDH-5 content was somewhat higher than that in polar foxes and LDH-1 content was twice as low (organ specificity of LDH isoenzyme distribution intrinsic to mammals retained as a whole). In minks, a shift towards anaerobisis observed in minks as compared to polar foxes, is well demonstrated when estimating the values of LDH-5/LDH-1 activity ratio. In mink liver, sceletal muscles, heart and lungs this ratio is twice and in spleen and blood

serum four times greater than in polar foxes. This is another evidence for a more glycolitic type of metabolism intrinsic to this representative of the marten family. In polar foxes, on the contrary, aerobic energy production pathways play a leading role. A similar regularity is observed only when analysing isoenzymatic spectra of the organs under study. Besides typical rapidly migrating LDH-1 and LDH-2 isoenzymes, Saison (1971) found LDH-5 and hybrid LDH-3 and LDH-4 forms in mink erythrocytes. This substantially differs from polar fox erythrocytes where Balbiertz et al. (1977) found only traces of LDH-5 and sometimes those of those of LDH-5 together with rapid fractions. At the same time O.L.Serov et al. (1977) did not observe slow LDH fractions in polar fox erythrocytes.

The above facts support the idea tnat the adaptation of the mink, a semiaquatic predator, to its habitat lies in the gradual improvement of the molecular profile of LDH. The energetic needs of an organism in aerobic (on the land) and anaerobic (in water) conditions might be met only in the presence of all the five fractions in the molecular profile of LDH, LDH-5 being obligatory prevalent as compared to terrestrial animals. In minks, preference for the M subunits of LDH, which is responsible for the anaerobic pathways of glycolysis, is clear-cut. It was formed because in the course of prolong evolution the animals had to maintain their vital activity when diving under forced hypoxia conditions. This is one of the examples illustrating subtle specialization of biochemical functions in conformity with environmental requirements. Biochemical adaptation of tissues to oxygen deficiency at the level of isoenzymatic systems is a particular case of the total adaptational regularity. In these representatives of semiaquatic mammals it is observed to-

gether with morphological adaptations of systems responsible for oxygen transportation and redistribution in an organism: cardiovascular, respiratory and blood (Galantzev, 1979).

This again supports the fact that the specific structure and functions of the individual systems of an organism are due to ecological factors.

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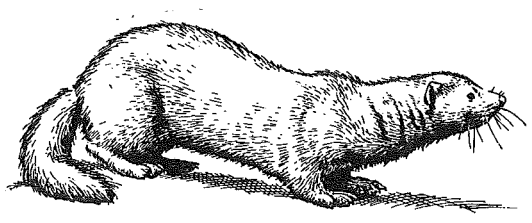

Original Report.

GROWTH OF NUTRIAS GRENLAND REARING IN DIFFERENT SYSTEMS.

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Introduction.

The breeding and rearing of nutria is included in the breeding of domestic fur-bearing animals. The accessability and ease of organizing a feeding base is of indisputable values in rearing nutria. In this respect nutria can be compared only to rabbits and sheed, while nutria fur puts it into a group of animals with highly valuable fur.

Breeding and rearing of nutria in Poland has gone through periods of both rapid development and regression. During the 1970's the situation was stabilized as a result of proper breeding and many possibilities of exporting the fur.

For further development of breeding nutria its economics must constantly be calculated systematically. This regulates the supply and creates interest in the production of nutria fur.

There is little interest in rearing and breeding nutria in scientific fields. As a results there is little to be found in both scientific and popular literature.

The purpose of this work was to compare the growth of Grenland nutria reared with and without bathing facilities.

There are controversial opinions as to the practicability of the latter system. Attempts to rear nutria without bathing facilities were carried out in Poland during the 1950's/Juny et al., 1956; Slawiński, 1957, 1960/. However, at that time breeders did not accept this method. In later years producers became interested in this method for economic reasons. Presently, some breeders use this system of rearing. At the Institute of Zootechnics evaluation of the fur obtained without bathing facilities has shown them to be valuable /Kawińska et af., 1977/.

This research deals with basic matters of growth in Grenland nutria which is the most popular breed in Poland.

Materials and Methods.

Observations on Grenland nutria growth were carried out on the Zator - Przereb Zootechnical Experimental Farm of the Institute of Zootechnics.

Experimental material included 180 young nutria from birth to 8 months of age. Ninety nutria had parents enclosed in cages without bathing facilities. The second group of 90 nutria were born of parents reared with bathing facilities. The group of young nutria included the same number of females and males. Group I - born and reared with bathing facilities. The cage had a concrete running area with running water for bathing.

Group II - nutria born and reared in cages. Cages and netting with constant access to water in a trough.

In both rearing systems the same type of buildings with nests were used.

The surface area of both the enclosed area and cage was the same for both groups. Each area contained 8 animals of the same sex. The surface area for one animal was 0.5 m^2.

The animals were fed a granulated mixture composed of the following:

wheat bran	- 18 %
Barley bran	- 20 %
Ground oat	- 23 %
Ground pea	- 14 %
Ground rape	- 6 %
Ground flax	- 8 %
Dried silage	-10.7 %
Polfamiks "D" Starter	- 0.3 %.

Throughout the entire experiment the animals were fed ad libitum. During the summer silage was added. Consumed granules and silage were recorded daily. Feed not consumed was also collected and weighed daily.

In the Chemistry Laboratory of the Zootechnical Experimental Station - Zator chemical analysis of basic nutrients was done.

Results.

Chemical analysis of the granulated feed showed the following means of basic nutrients:

Total protein	- 18.51 %
Crude protein	- 9.50 %
Crude fat	- 2.80 %

Means for the following nutrients in the silage were as follows:

Total protein	- 2.36 %
Crude protein	- 4.44 %
Crude fat	- 0.62 %.

The body weights of newborn nutria from parents reared both with and without bathing facilities were similar, 221 to 223 g /Tab. 1 and 2/. No statistically significant differences were observed in the body weights of newborn animals between sexes or between rearing methods.

Since nutrias display sexual dimorphism monthly body weights /Tab. 1 and 2/ are presented for males and females.

Table 1. Group I - Rearing in baths system - Average body weight of nutrias (g).

Sex		After birth	Age (months) 2	3	4	5	6	7	8
Males	$\bar{x}$	224	1033	1238	1900	2600	3250	3954	4190
	v%	7.14	19.74	17.52	12.36	13.46	9.5	9.6	7.6
Females	$\bar{x}$	233	1102	1414	2018	2454	2982	3613	4050
	v%	6.4	22.9	22.2	15.5	15.4	13.3	10.1	8.5
Total	$\bar{x}$	228	1066	1324	1956	2525	3108	3782	4118
	v%	7.0	20.4	20.9	14.0	14.2	11.5	10.0	8.1

Table 2. Group II - Rearing in cages system - Average body weight of nutrias (g).

Sex		After birth	Age (months) 2	3	4	5	6	7	8
Males	$\bar{x}$	221	1203	1634	2262	3141	3775	4441	4693
	v%	7.6	21.9	13.3	11.7	11.3	8.1	7.7	7.4
Females	$\bar{x}$	225	1157	1446	2285	2875	3250	3954	4373
	v%	6.6	10.6	19.6	12.2	10.0	9.3	8.7	6.8
Total	$\bar{x}$	223	1178	1538	2273	3000	3510	4196	4530
	v%	7.6	18.0	14.8	11.8	11.2	8.7	8.5	7.5

Body weights at 2 months, when the animals were weaned from their mothers were more than 1000 g for both groups. Group II had higher body weights.

During the following months of both sexes reared without bathing facilities had higher body weights. At 8 months the highest mean body weight, 4693 g, was obtained by males reared without bathing facilities. Males reared with bathing facilities had a mean body weight of 4190 g. The difference of 503 g is statistically significant.

Females reared without bathing facilities had a mean body weight of 4373 g, while females reared with bathing facilities had a mean of 4050 g. The difference of 323 g is statistically significant.

Table 3 presents the mean increases in body weight during sequentinal

Table 3. Gain of body weight of nutrias (g).

Group	Sex	Gains periods (months)							
		0 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	0 - 8
Rearing	males	809	205	662	700	650	704	236	3966
in baths	females	869	312	604	436	528	631	437	3817
system	total	838	258	632	569	583	674	336	3890
Rearing	males	982	431	628	879	634	666	252	4472
in cages	females	952	289	839	590	375	704	419	4148
system	total	956	360	735	727	510	686	334	4308

months. The greatest increases were observed from 3 to 7 months of age.

Males in both rearing systems had higher body weight gains. The larges gains /879 g/ were seen in males reared without bathing facilities at the age of 4-5 months. After 7 months body weight gains were decidely lower for both sexes. For males it decreased from 236 to 252 g, and for females, 419 to 437 g.

Total body weight gains for the observed period was higher for nutria reared without bathing facilities and average more than 4308 g, while with bathing facilities it was 3890 g.

Calculation of daily weight gains /Tab. 4/ showed high values, even more than 20 g for the period from 3 to 7 months. From 2 to 3 months daily gains in both systems were the lowest. Mean daily weight gains for the entire experimental period was lowest in nutria reared with bathing facilities. Without bathing it was 17.9 g.

Table 4. Average daily gains from birth to 8 months of age (g).

Group	Sex	Gains periods (months)							
		0 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	0 - 8
Rearing	males	13.4	6.8	22.9	23.3	21.6	23.4	7.8	16.5
in baths	females	14.4	10.4	20.1	14.5	17.6	21.0	14.5	15.9
system	total	13.9	8.6	21.0	18.9	19.4	22.4	11.2	16.2
Rearing	males	16.3	14.3	20.3	29.3	21.1	22.2	8.4	18.6
in cages	females	15.5	9.6	27.9	19.6	12.5	23.4	13.9	17.2
system	total	15.9	12.0	24.5	24.2	17.0	22.8	11.1	17.9

Table 5 presents the total feed used for the experimental period. Feed consumption differed according to sex and rearing system. Males, with bathing facilities consumed the most granulated feed /more than 26 kg/. In cages without bathing facilities both males and females consumed less feed. Mean feed consumption for both sexes with bathing facilities was 25.34 kg, while without bathing facilities, it was 22.52 kg. The difference between groups was statistically significant.

Table 5. Feed intake (kg).

Group	Sex	Feed intake during the experimental period kg/animal		Intake per 1 kg weight gain	
		Pellets	Green forage	Pellets	Green forage
Rearing	males	26.46	34.92	6.67	8.80
in baths	females	24.23	34.12	6.34	8.93
system	total	25.34	34.51	6.51	8.87
Rearing	males	23.23	34.65	5.19	7.74
in cages	females	21.83	33.72	5.26	8.12
system	total	22.52	34.18	5.22	7.93

Silage consumption for both groups was similar and was about 34 kg.

Feed consumption for 1 kg body weight gain for nutria with bathing facilities was 6.51 kg of granulated feed, and 8.78 kg silage. For rearing without bathing facilities it was 5.22 and 7.93 kg, respectively.

Discussion.

The granulated mixture used for feeding was mixed by the author. Its value for standard nutria showed that it is suitable for feeding young nutria reared for fur /Kawińska et al., 1975/. Its protein content and other basic nutrients in the granulated feed, supplemented with silage, was sufficient to meet the needs of young nutria /Frindt, 1973; Slawiński, 1972/. The ratio between concentrate and silage, which according to Samkowa /1971/ should be 1:1.5, was maintained.

The birth weight of 220 g was high and was on the level of the birth weights of standard breeds /Ocetkiewicz et al., 1960; Slawiński, 1960/. The birth weights of both sexes and rearing systems were similar / v = 6.4 - 7.6%/. Giving all animals a similar start for the experiment.

Differences in body weight began at 2 month of age when weaning occurred. Higher body weights were obtained by nutria reared in cages without bathing facilities.

In the following months the differences increased. At 8 months of age the difference between males and females was 503 and 323 g, respectively, which is statistically significant.

Since there is little information in the literature concerning body weights in the Grenland breed data was compared with standard breeds.

Grenland nutria of both sexes, reared in cages without bathing facilities had definitely higher body weights than standard breeds also reared with this system /Juny et al., 1956; Slawiński, 1960/.

Grenland nutria also had higher body weights when reared with bathing facilities / Kopański, 1977; Ocetkiewicz et al., 1963/.

Body weight gains from birth to weaning are high and indicate a fast growth rate during this period. Between 2 and 3 months growth rates were slow which was probably due to the stress of weaning. From 3 to 7 months the growth rate increased to more than 600 g. From the 7th month on, the growth rate lowered from 236 to 252 g. The phenomenon has also been observed by WK /1971/ for standard breeds of nutria.

Higher body weight gains during the experimental period were obtained by nutria reared in cages without bathing facilities. In males the difference was 12.7% and in females 8.6%.

The calculated mean daily weight gain was high/ more than 20 g/ from 3 to 7 months. The mean daily gain for the entire experimental period was for nutria reared in cages without bathing facilities, 17,9 g andbathing facilities, 16.2 g, which is higher than that for standard breeds /Ocetkiewicz et al., 1969; Szuman and Skrzydlewski, 1963; WK, 1972/.

Feed concentrate consumption differed according to the rearing system. Total granulate consumption by nutria in cages without bathing facilities was lower for males by 3.2 kg, and for females by 2.4 kg, which is 13.9 and 10.9%, respectively. Concentrate consumption for 1 kg weight gain for nutria in cages without bathing facilities was about 5.2 kg and was lower than the data found by Cholewa /1979/ and Kowalczyk et al. /1975/. This was because the cited authors had slaughter values at 6 months and therefore lower body weights.

In summary, the development of Grenland nutria in cages without bathing facilities is normal. Body weight and daily weight gains were significantly higher than those of nutria reared with bathing facilities. Feed consumption for the entire experimental period and for 1 kg body weight gain was significantly lower in cages.

It is possible therefore to conclude that rearing in cages without bathing facilities is advantageous in Poland in producing young nutria for fur.

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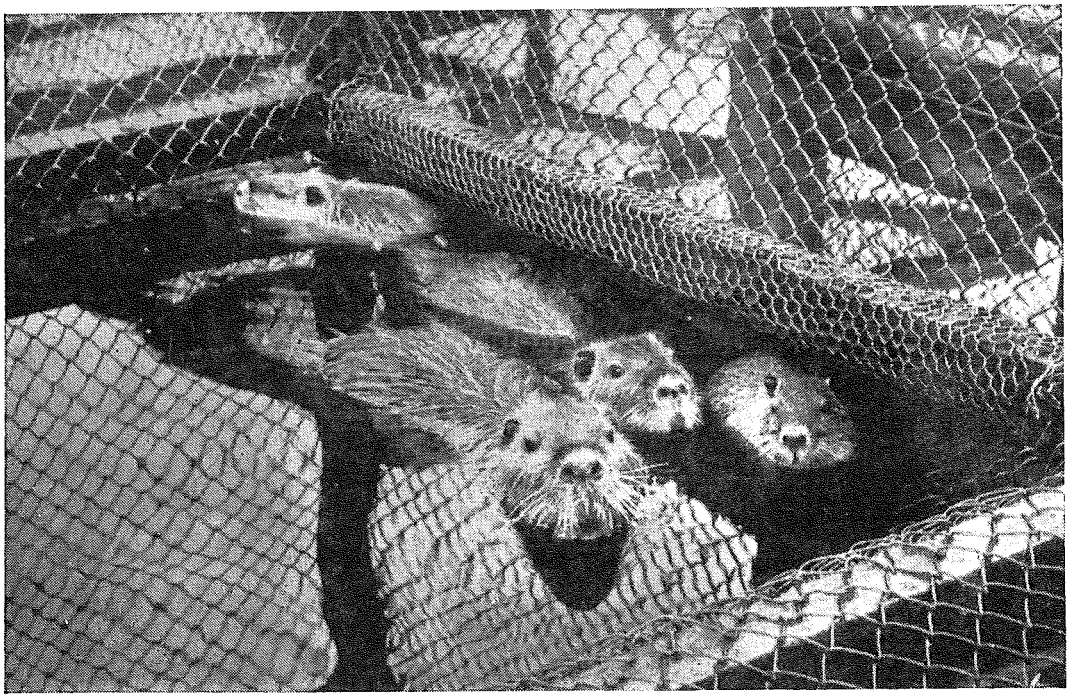


A COMPARISON OF THE HEPARIN AFFINITY OF VERY LOW DENSITY LIPOPROTEIN FRACTIONS ISOLATED FROM THE PLASMA OF FIVE MAMMALIAN SPECIES.

Mackinnon, Neil O., Cryer, Anthony *, Dept. of Biochemistry, University College, P.O. Box 78, Cardiff, CF1 1XL, Wales, U.K.
(* author for correspondence).

1. Very low density lipoproteins separated from the plasma of humans and four non-human species were subjected to affinity chromatography on a medium substituted with heparin.
2. Two distinct fractions, were separated from the VLD lipoprotein of each species, in different proportions.
3. The bound fraction in each case was richer in Apoprotein E than the corresponding unbound fraction, indicating a potential functional role for this apoprotein.

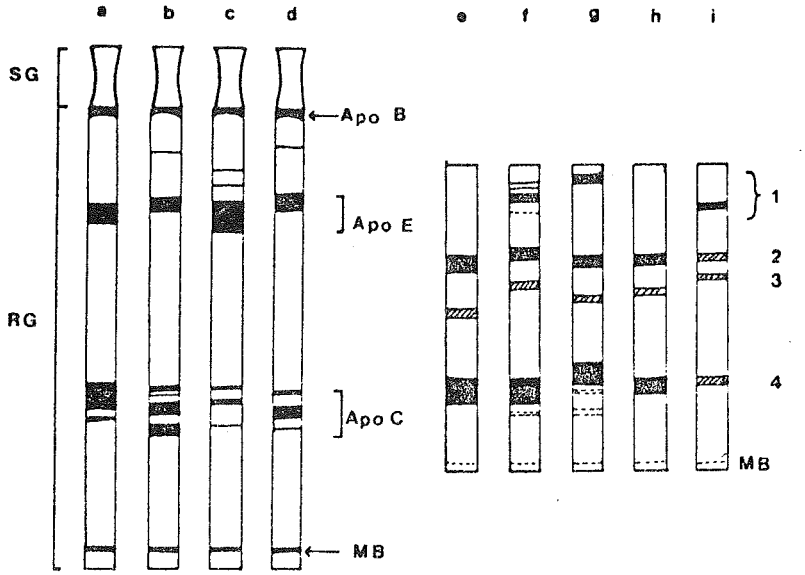


Fig. 1. Electrophoretic analysis of the apoproteins present in the very low density lipoprotein fractions isolated from pig, human, rat, ferret and mouse plasma.
The patterns of Coomasie blue staining apoproteins following electrophoresis in the presence of urea (a-d) and sodium dodecyl sulphate (e-i) are shown. The samples, derived from the very low density lipoprotein fractions of pig (a and e), human (b and f), rat (c and g), ferret (d and h) and mouse (i), were analysed as described in the materials and methods section and the identity of the bands suggested on the basis of published electrophoretic mobilities and molecular weights. MB indicates the position of the electrophoretic marker band.

Comp. Biochem Physiol., Vol. 73B, 3, 663-607, 1982.
3 figs., 40 references. Authors' summary.

ANATOMO-PATHOLOGICAL LESIONS AND CHANGES IN THE LEVEL OF Ca, P AND Mg IN THE SERA AND BONES IN COYPUS IN THE COURSE OF ENZOOTIC CALCINOSIS.

(Zmiany anatomo- i histopatologiczne oraz poziom wapnia, fosforu i magnezu w surowicy krwi i tkance kostnej w przebiegu enzootycznej kalcynozy u nutrii).

Grabarska, Adamina, Grabarski, Jan, ul. Orkana 44/7, 25-510, Kielce, Poland.

Calcinosis of the connective tissue of the blood, system, kidney, lungs and other organs was found in 40 per cent of coypus in one bevy. Histopathological lesions were associated with a decreased level of Ca and Mg. No changes were revealed in relation to P in the serum. The analysis of the bone ash did not show any differences in the concentration of Ca, P and Mg in the bone tissue of the experimental group compared with control one.

Medycyna Weterynaryjna (Poland), Vol. 38 (6), 274-277, 1982.
26 ref., 4 figs., 1 table. Authors' abstract.
In POLH with ENGL summary.

HEART RATE VALUES FOR BEAVER, MINK AND MUSKRAT.

Gilbert, Frederick F., Gofton, Norman, Wildlife Biology, Washington State University, Pullman, WA 99164, USA.

1. Implanted ECG transmitters were used to determine heart rates for several activities of beaver (Castor canadensis), mink (Mustela vison), and muskrat (Ondatra zibethicus) under free-ranging laboratory conditions within an aquatic tank.
2. All three species exhibited bradycardia when diving but mink heart rates returned to pre-dive levels if the dive lasted >30 sec.
3. Heart rates for all other behaviours were significantly ($P < 0.05$) higher than for diving and averaged about 120/min (beaver), 265/min (mink) and 240/min (muskrat).

4. Mink heart rate values were higher than would be expected based on general energetic equations if we assume heart rate to be reflective of energy costs. This was considered to be a function of this species fusiform body shape.

Comp. Biochem. Physiol. Vol. 73 A, no.1, 249-251, 1982.
23 references, 2 tables. Authors' abstract.

OCCURRENCE OF MICTURITION AND SELV-GNAWING OF HAIR IN MINKS DEPENDING ON SEX, COLOUR VARIETY AND BODY WEIGHT.

(Wystepowanie moczotoku i samoogryzania wlosów norek w zaleznośći od plci, odmiany barwnej i masy zwierzecia).

Frindt, Andrzej, Bednarz, Maria, Suski, Boleslaw, Inst. Produkcji Drobiarskiej SGGW-AR w Warszawie, Zaklad Hodowli i Uzytkowania Zwierzat Futerkowych i Drobnego Inwentarza, Poland.

The aim of the production of fur animals is to get high-quality furs. The factors affecting harmfully the value of skins are relatively frequent diseases of an insufficiently recognized etiology - micturition and self-gnawing of hair and sometimes also gnawing of different body parts. In view of a lack of any investigations in this field in Poland, an attempt to estimate the occurrence frequency of the above diseases on the material originating from 4 farms of the Warsaw prowince was undertaken. In total 5184 minks of the Standard, Royal Pastel and Finnpastel varieties were examined in the period of licence. Minks with micturition were divided into 3 groups depending on the size of the urine-wetted fur area. In estimation of self-gnawing of hair the following body parts were considered: tail end, whole tail, neck and trunk. The significance for statistical dependence between occurrence of particular diseases and the body weight of animals, their sex and colur variety was determined by the Chi2 test in the so-called independence test.

Is has been found that about 27% of the minks examined showed the symptoms of micturition or self-gnawing or these both diseases jointly. Self-gnawing occurred much more often and comprised about 20% of animals (11.4-23.8%), micturition - about 7% of animals (2.0-12.8%). The statistical analysis did not prove any significance of the dependences determined. On the other hand, somewhat greater predisposition to gnawing hairs was observed more often in females than in males, taking into consideration both the number of cases and the intensity of symptoms.

Zeszyty Problemowe Postepow Nauk rolniczych. (Warszawa, Poland, Panstwowe Wydawn. Naukowe.). 1981, 259, 137-141.
7 references, 1 table. Authors' summary.
In POLH, summaries in ENGL and RUSS.

ANALYSIS OF SOME ENVIRONMENTAL FACTORS IN FARMS IN AN INDUSTRIAL AND AGRICULTURAL REGION.

(Analiza niektórych czynników środowiskowych na fermach norek i lisów w rejonie przemyslowym i Rolniczym).

Jarosz, Stanislaw, Reszcyk, Wieslaw, Barabasz, Boguslaw, Institute of Animal Nutrition, Agricultural Academy in Krakow, 30-059 Krakow, Al. Mickiewicza 24/28, Poland.

An attempt of investigation of environmental factors, particularly atmospheric air and water, on the height, correct development and production effects of minks reared by the farm system in a typical industrial and agricultural region is undertaken in the work. The observations were carried out in the period from July 10, 1977 to February 10, 1978 at 2 farms of minks: one - in the industrial region of Upper Silesia (7090 animals), another - in the agricultural region of Poznań (5823 animals). At either farm measurements of air pollution (quantitative and qualitative determination of falling down dusts), air temperature and humidity were carried out and the nutrition of minks in the observation period, reproductibility results and health of minks were analyzed. It has been found that the air pollution, and particularly the content of heavy metals in hair (Zn, Pb, Cd and As) in the industrial region was more than

thrice higher than in the typical agricultural region. The cases of lung diseases and virus infections (plasmacytosis) prove that the air pollution favours the occurrence of respiratory tract diseases and decreases the resistance to infectious diseases. Better results attained at the farm in the industrial region prove that the most important factor affecting directly the production effects of minks is their nutrition, and particularly an appropriate balance of feed rations.

Zeszyty Problemowe Postepow Nauk Rolniczych (Warszawa, Poland, Panstwowe Wydawn. Naukowe) 1981, 259, 61-65.
10 references. Authors' summary.
In POLH, summaries in ENGL and RUSS.

INFLUENCE OF DIFFERENT BACKGROUND ON THE HAIRY COAT COLOUR ESTIMATION IN MINKS OF THE STANDARD VARIETY.

(Wplyw róznego rodzaju tla na ocene barwy okrywy wlosowej u norek odmiany standard).

Jeżewska, Grazyna, Maciejowski, Janusz, Instytyt Biologicznych Podstaw Produkcji Zwierzecej AR w Lubline, Poland.

It has been found in earlier investigations of the authors that among five supravitally estimated features in minks the greatest deviation of estimated showed the colour of hairy coat. It was decided, therefore, to verify, whether the background, against which the estimation is performed, would affect the repeatability of the results. In the first experiments 21 samples of hair taken from various animals assigned to worse or better ones were used, whereupon a collective body of 5 persons made attempt to lay them in order with their colour intensity on white, blue and black paper. This attempt was repeated twice in an identical way. The repeatability coefficients against each background were determined by the method of regression of the second result onto the first. The values of these coefficients were for the white, blue and black background accordingly 0.52, 0.89 and 0.95. The experiment has proved that the black background enables the most correct estimation of the hair colour of minks of the Standard variety, at the comparison against that background enables to assess, inasmuch the sample tested would deviate from ideal black. All samples against the white background appear to be dark, and therefore, it is very difficult to state, which of them is darker.

The second state of the experiment was carried out on animals at artificial standard lighting. Tables on which the estimation of animals was performed (in manipulation cages) were painted black and blue (the white background was not taken into account in view of negative results of the previous stage of the experiment). No significant differences in divergence of estimations (repeated twice for every animal estimated) accomplished on black and blue tables. In opinion of the authors that could be caused by the distance of the cage, in which the animal was estimated from the table top, and consequently by a weak keenness in seing the background.

Zeszyty Problemowe Postepow Nauk Rolniczych. (Warszawa, Poland, Panstwowe Wydawn. Naukowe.). 1981, 259, 129-135.
3 references, 4 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.

VARIABILITY AND REPEATABILITY OF ESTIMATES OF EXTERIOR FEATURES OF MINKS OF THE STANDARD VARIETY.

(Zmienność i powtarzalnośc ocen cech pokrojowych u norek standard).

Jeżewska, Grazyna, Maciejowski, Janusz, Slawoń, Jerzy, Instytut Biologicznych Postaw Produkcji Zwierzecej AR w Lublinie, Poland.

In earlier investigations of the authors it has been found that the estimates given by licence judges to young fur animals considerable deviated one from another. A statistically significant interaction: judge x animal proved that almost every judge had somewhat another idea of the animal with regard to all features estimated. The Central Animal Breeding Station is interested in results of the respective testing in view of the trend to unification of estimation criteria and consequently of selection.

In autumn 1978 14 zootechnicans of the Station were tested for the repeatability of estimates. The test was carried out in two series by 7 people. In every series the zootechnicians tested estimated three times 15 the same animals presented in a succession unknown to them. The estimation was carried out in accordance with the valid habitus estimation pattern.

Four habitus features - colour purity. Since the fifth feature - body weight, is determined objectively by weighing, it was assumed conventionally that all the animals would correspond in this respect with the pattern and were given for this feature the maximum score 6. Thus each feature was estimated for each animal 21 times (7 judges x 3 estimates).

The arithmetic mean was calculated basing on the sum of the above estimates, while assuming this value as approximate to the actual value of the given feature. It was assumed that deviations in estimate, both in plus and in minus, would be equally probable. These means constitute a central point in the estimation of judges, with which individual estimates can be compared. While the incompatibility of subsequent own estimates can bear evidence of a lacking experience, insatisfactory perceptivity or weak sight of the given judge, so the divergence of individual estimates from mean would prove a different idea of the estimation pattern, what suggests the need of a continous training of judges for unification of the estimation results.

The authors, basing on the materials obtained, are trying to work out numerical indices, which would constitute the minimum variability threshold of the estimates, the reaching of which would ensure the right to be a licence judge.

Zeszyty Problemowe Postepow Nauk Rolniczych. (Warszawa, Poland, Panstwowe Wydawn. Naukowe.) 1981, 259, 121-128.
3 references, 3 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.

THE SUITABILITY OF THE SGM APPARATUS FOR ESTIMATION OF THE COAT THICKNESS OF RAW NUTRIA SKINS.

(Przydatność aparatu SGM do oceny mia'zszości okrywy surowych skór nutrii).

Gedymin, Jerzy, Cholewa, Ryzard, Instytut Hodowli i Technologii Produkcji Zwierzecej AR w Poznaniu, Poland.

The cover thickness estimation of tanned rabbit and nutria skins by means

of hte SGM apparatus, carried out at the Institute of Zootechnics proved a high conformity with the coat thickness and the quality of skin. In this connection the authors decided to examine the suitability of the apparatus for estimation of raw nutria skins, for different loads of the compressing part: x = 50 g, y = 90 g, z = 180 g. The measurements were carried out on 140 skins of the sapphire variety, uncut, with the inside pattern, at two planes: on the side and the belly. As a comparison criterion organoleptic estimation of the category of coat and skin class has been assumed.

Measurement values of particular loads were closely correlated (r = 0.71-0.82). The correlations with the category of coat and skin class were low, but significant statistically. The highest values of correlation coefficients were found for the load of 180 g, somewhat higher on the belly than on the side.

The significance of differences between mean measurements within classes and categories was also more distinct for the load of 180 g. The highest difference occurred, as a rule, with the thickness of the lowest categories and classes of skins.

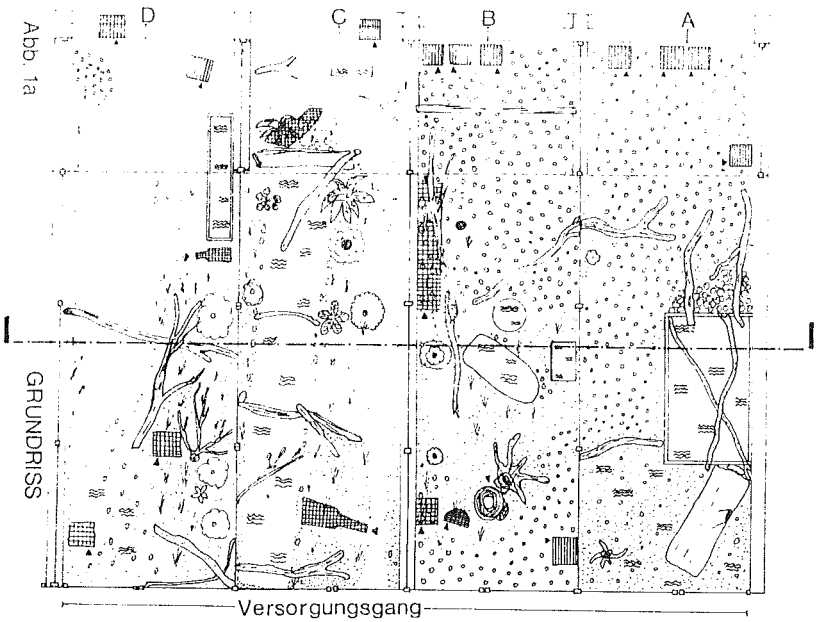
Zeszyty Problemowe Postepow Nauk Rolniczych. (Warszawa, Poland, Panstwowe Wydawn. Naukowe.) 1981, 259, 155-158.
3 references, 2 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.

BEHAVIOURAL DEVELOPMENT OF FARMED MINK IN LARGE ENCLOSURES .

(Über die Verhaltensontogenese von Farmnerzen (Mustela vison f. dom.) in Grossgehegen).

Kuby, Frank, Inst. für Zoologie der Tierärztl. Hochschule, Hannover.

Besides some remarks on the behaviour of adult farm-mink (Mustela vison f. dom.) during the breeding season, the postnatal development of young farm-mink within the first 10 weeks after birth is described. The results refer to observations of five litters with 20 cubs. Two specially designed nest-boxes with glasswalls enabled observations of two litters from their first day onward.



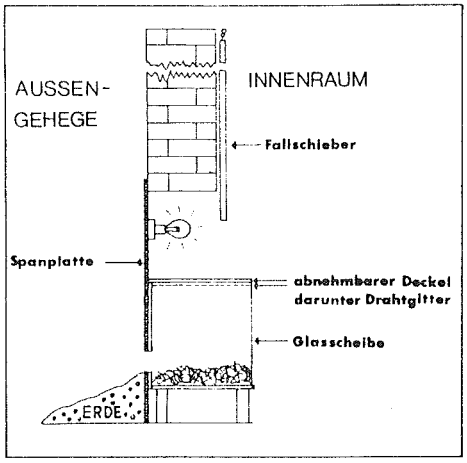


Abb. 2 Anbringung der Beobachtungsboxen

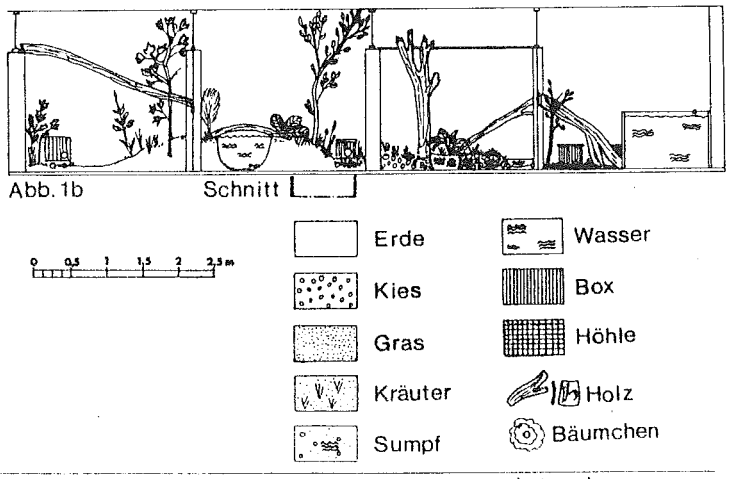


Abb.1 Grundriss und Querschnitt der Gehegeanlage (Schema)

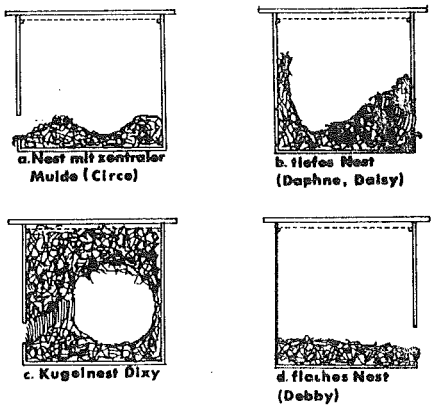


Abb. 7 Nestformen während der Aufzucht

Farm-mink are altricial mammals. Within the first three weeks the infants are very passive. At the age of five weeks they accept meat for the first time. At the same time the cubs start licking saliva from the lips of the mother. This behaviour is maintained for two weeks. The sensitive phase of the development of behaviour starts with the opening of the eyes around the 35th day of life. Shortly afterwards the cubs leave the nest-box for the first time. In the following five weeks the ethogram increases rapidly and the young farm-minks become more and more independent.

The ontogeny of the behaviour of farm-mink is discussed with that of other musteliines, but the sequence of the first appearance of behavoural aspects coincides with other Mustela-species.

Inaugural Dissertation, Tierärztliche Hochschule, Hannover. 1982, 121 pp.
80 references, 21 tables, 27 figs. Author's summary.
In GERM, summary in ENGL.

CONTRIBUTION TO THE STUDY OF BROWN FOX BIOLOGY. NOTE 2. A FEW DATA ABOUT PHYSIOLOGY AND PATHOLOGY OF THIS SPECIES.

(Contribution a l'Etude de la Biologie du Renard Roux (Vulpes vulpes). (Note 2. Quelques Donnees sur la physiologie et la pathologie de l'espece).

Blancou, J., Aubert, M.F.A., Bloch, G., Min. de l'Agric., Direction de la Qualité, Serv. Vet., Ctr. Natl. d'Etudes sur la Rage, B.P. 9, F-54220 Malzeville, France.

Blood and faecal samples taken from red foxes captures in the wild were compared with samples from comparable age and sex groups of red foxes reared in captivity. Also, biopsy specimens were examined, and PM examinations made. The physiological values of captive and wild foxes were practically identical, except that the blood mg values were lower in captive than in wild foxes. In both groups, phosphataemia was highest in males, and in summer. Proteinaemia was also higher in summer, while lipidaemia was lower. The erythrocyte count was higher in adult wild foxes than i captive foxes, while their leukocyte count was lower. In general, the fox erythrocyte count was lower than that of the dog, while the leukocyte count was higher. The absence of antibodies to infectious canine hapatitis was surprising.

Encephalomyocarditis antibodies were also lacking. There were low antibodi titres to toxoplasmosis, leptospirosis and transmissible gastroenteritis. A range of mild parasitic infections was found; only coccidiosis was severe

Refue Méd. vet. 1982, 135, 5, 315-328.
21 references, 8 tables. CAB-abstract.
In FREN, summaries in GERM, ENGL, SPAN.

THE CORRECTION OF GENETICALLY DETERMINED EMBRYONIC MORTALITY BY THE PHYSIOLOGICAL STATE OF MOTHER's ORGANISM.

Zhelezova, A.I., Belyaev, D.K., Inst. of Cytology and Genetics, Academy of Sciences of the USSR, Siberian Division, Novosibirsk, USSR.

Blastocytes from Silver-blue Shadow female mink (mated to the same males) were transplanted on days 12-14 of the development to the uteri of standard females free of the Shadow gene. It has been shown that the lethality of embryos homozygous for the Shadow gene depends on the genotype of the embryo itself but not on the female genotype. However, the genetically determined time of expression of the lethal effect may be corrected by the alteration of the physiological state of mother's organism produced by additional illumination of females - recipients during pregnancy.

Genetika, USSR, 18, 9, 1541-1543, 1982.
4 references, 1 table. Authors' summary.
In RUSS, summary in ENGL.

COLOUR VARIABILITY OF HAIR COAT IN SUCCESSIVE UNSELECTED GENERATION OF STANDARD MINK.

Maciejowski, Janusz, Jezewska, Grazyna, Agricultural Academy in 20-934 Lublin, ul. Akademicka 13, Poland.

In the herd of standard minks characterized by a sufficient level of economic traits selection for the colour of hair coating was stopped in the experimental group. During five years 1976-1980, 5 generations were obtained. The offspring of unselected animals were evaluated each year at the period of fully fur maturity and a considerably lower level of the trait was noticed in comparison with the selected group. In the last year of the experiment, due to food insufficiency the trait level in both groups decreased significantly and reach the same level.

Paper, 33rd Annual Meeting of the EAAP, No. G3.19: 9 pp, 1982.
4 ref., 1 fig., 1 table. Authors' summary.

HERITABILITY OF HAIR LENGTH IN ARCTIC FOXES.

(Odziedziczalność dlugosci wlosa u lisów polarnych).

Maciejowski, Janusz, Jeżewska, Grazyna, Agricultural Academy in 20-934 Lublin, ul. Akademicka 13, Poland.

In blue Arctic foxes, in the maturity period, the length of three basic fur layers: underfur bristle and leading hair was determined. The respective measurements were carried out on living animals at the sacral region by means of a device constructed by the authors. In total 421 animals, including 179 females and 242 males, originating from 68 litters, were examined. Since no significant differences in the hair length in females and males were found, the basic variability measures and heritability were calculated jointly for animals of either sex. A mean underfur, bristle and leading hair length amounted accordingly to 20.46, 29.84 and 41.95 mm. It has been found that the hair length in blue Arctic foxes remains under distinct genetic control and should be susceptible to selection. The estimation of heritability coefficients for underfur, bristle and leading hair amounted accordingly to 0.26 ± 0.0974, 0.46 ± 0.0975 and 0.89 ± 0.0975.

Zeszyty Problemowe Postepow Nauk Rolniczych. 1981, 259, 55-59.
6 references, 2 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.

THE SUPRAVITAL ESTIMATION OF PROGENY AND THE ESTIMATION OF VALUE OF SKINS AS A SOURCE OF INFORMATION ON BREEDING VALUE OF MOTHERS IN ARCTIC FOX.

(Przyzyciowa ocene potemstwa oraz ocena wartości skor jako zrodla informacji o wartosci hodowlanej matek u lisa polarnego).

Maciejowski, Janusz, Harasim, Maria, Agricultural Academy in 20-934 Lublin, ul. Akademicka 13, Poland.

The Arctic fox selection occurs almost exclusively on the basis of indi-

dual phenotypic estimation accomplished in autumn in the period of full fur maturity of young animals. The efficiency of such selection cannot be great, when to consider the fact that the heritability of fur features is not too high and the estimation of these features is carried out by the subjective organoleptic method. A higher litter number in this animal species renders possible to supplement the individual estimates of its next relatives (progeny, brothers and sisters). 67 litters consisting of 602 descendants were selected at random by the authors, who determined the relationship between:

1. licenced estimation of mothers and that of their progeny,
2. licenced estimation of mothers and the value of skins of their progeny,
3. licenced estimation of young foxes and of the value of their skins.

Moreover, possible effect on the supravital and post-slaughter value of such features, as body weight, trunk length and number og young in the litter was considered. It has been found that the relationship between the licenced estimation of mothers and such estimation of their progeny is not high ($r=+0.20$ at $t=1.814 < t_{0.05}=1.998$). A much higher correlation proves the licenced estimation of mothers and the value of skins classified without taking into consideration the so-called "noncommitted" faults ($r=+0.53$, at $t=4.99 > t_{0.05}=1.998$). Also a high positive correlation coefficient between the supravital licenced estimation of young foxes and the estimation of their skins accomplished at the farm without taking into consideration previously mentioned faults ($r=+0.64$ at $t=20.40 < t_{0.05}=1.965$). This relationship is much lower when to take into consideration results of the estimation of skins at purchase ($r=+0.39$ at $t=10.36 > t_{0.05}=1.965$).

Among other interesting results the fact deserves to be mentioned that the body weight of fox is a much better index of the skin size of this animal than the total height measured supravitally (suitable correlation coefficient amounted to ($r=+0.73$ and $r=+0.61$). The investigation results prove that the estimation of families could considerably improve the correctness of selection of remount animals and contribute to an improvement of the selection effectiveness.

Zeszyty Problemowe Posterpow Nauk Rolniczych, 1981, 259, 35-41.
11 references, 3 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.

REPEATABILITY OF THE HABITUS ESTIMATION RESULTS IN THE FLOCK OF FOXES AND MINKS ON THE BASIS OF RANDOM SAMPLES.

(Reprezentatywnośc wyników oceny pokroju stada lisów i norek na postawie wylosowanych prób).

Jarosz, Stanislaw, Janas, Urzula, Inst. of Animal Nutrition, Agricultural Academy in Krakow, 30-059 Krakow, Al. Mickiewicza 24/28, Poland.

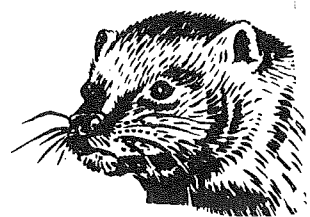
Investigations on selection of representable foxes from among population (35% from 2084 foxes) the quota, cluster, systemic and layer random sampling systems were applied.

Among mink population of different number the layer random sampling was carried out according to the guidelines of the Ministry of Agriculture.

Estimation results of minks selected for licence at random from total and non-licenced group were compared. Significant and highly significant differences (P=0.05) between the sample and population were found at application of the quota and cluster random sampling systems. The least insignificant differences (P=0.01) were observed at the layer random sampling system, at a leap appointment of individuals after sampling of the first number of an individual.

No significant differences between populations of different size and their samples at the layer random sampling system were proved. An increase of the sample size (by 5%) in relation to that recommended by the Ministry of Agriculture led to the fivefold decrease of the differences in mean between population and sample. The differences between means of the estimation of minks selected for licence and those selected at random from the total community were insignificant (P=0.05).

Zeszyty Problemowe Postepow Nauk Rolniczych. 1981, 259, 47-53.
4 references, 1 fig., 2 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.



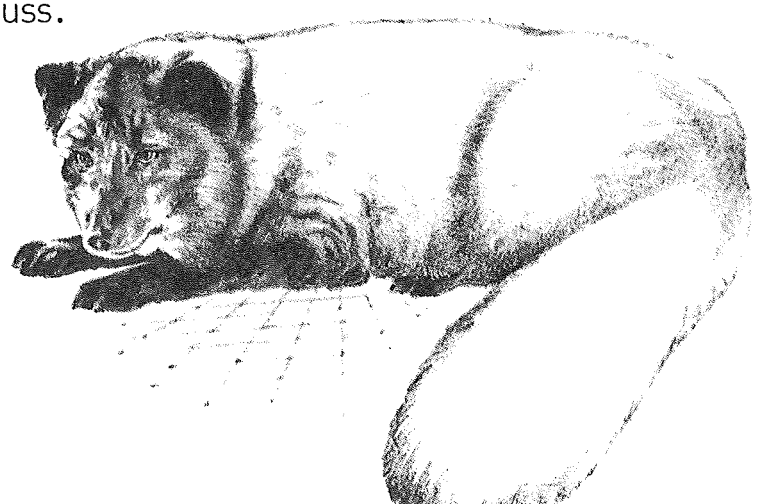
RELATIONSHIP BETWEEN THE SUPRAVITAL LICENCED ESTIMATION OF ARCTIC FOXES AND THE ESTIMATION OF THEIR SKINS.

(Wspolzaleznośc pomiedzy przyzyciowa ocena licencyjna lisów polarnych a ocena pozyskiwanych z nich skór).

Urban, Halina, Gospodarstwo Hodowlane w Zurawińcu, Lubelskiego Przedsiebiorstwa Produkcji Leśnej "Las" w Lublinie, Poland.

The breeding work at farms is aimed at production of animals with a high breeding value and high quality of skins. One of the most important breeding work is selection preceded by the licence carried out by the licence judge. The licenced estimation comprises 5 features. Foxes which got a high number of scores are designated for breeding, the remaining animals are slaughtered. The furrier value of skins is estimated by the purchase staff in accordance with the Polish standard of the estimation of raw skins of fur animals, comprising 5 quality classes. Licenced estimations carried out on foxes as well as the classification of skins take into consideration the same features. Thus it seems that a conformity should exist between the estimation of a living animal with skin produced by it (at the assumption that the given skin should not be damaged at its taking off carcass or during storage). To verify the relationship between the supravital licenced estimation and the estimation of the skins obtained, 1000 living foxes were subjected to the licenced estimation, 695 of which were slaughtered and their skins estimated. The correlation coefficient assumed the value of +0.605 and differed significantly from zero, what would prove an existence of moderate relationship.

Zeszyty Problemowe Postepow Nauk Rolniczych, 1981, 259, 43-46.
4 references, 1 table. Author's summary.
In POLH, with summaries in ENGL and RUSS.



REPRODUCTION

CULTURING IN VITRO AND TRANSPLANTING EMBRYOS OF THE MINK MUSTELA VISON.

Zhelezova, A.I., Sekirina, G.G., Institute of Cytology and Genetics, Siberian Branch, Academy of Sciences of the USSR, Novosibirsk.

This paper presents the results of culturing later mink embryos (7-12 days) that were next transplanted into female recipients where development of the transplanted embryos resulted in the birth of normal pups.

For transplantation we used only those blastocysts that retained normal structure through 24 h of culturing, and it is possible that it is just this selection of the more viable embryos that was responsible for the success of the third series which resulted in the birth of 14 silver-blue pups or 41.2% of the transplanted embryos. This indicates that we selected adequate conditions for culturing the mink embryos and preserved in these conditions the capability for further normal development after transplantation into female recipients. The degree of synchronization between the age of the embryo and the duration of pregnancy of the female recipient is also very significant for success in transplantation because the best results were obtained when these points in time were in best agreement.

TABLE 1. Results of Transplantation of Mink Embryos after 24-h Culturing

Number of experiment	Age of blastocyst	Number of explanted embryos	Number of transplanted embryos	Number of female recipients	Stage of pregnancy of female recipients after mating, days	Results of whelping
1	7-8-day	43	31	7	10-15	Of seven females only two gave birth to "their own" standard pups
2	9-day	11	9	2	11	Six silver-blue pups were born; two deviated 24 h after birth
3	11-12-day	46	34	6	12	Fourteen silver-blue pups were born
	Total	100	74	15		Twenty silver-blue pups were born

The results obtained indicate the real possibility of culturing mink embryos in vitro before implantation and obtaining normal progeny after transplanting the embryos into female recipients. This approach may be used to resolve a number of problems in developmental genetics and experiment embryology.

Translated from Doklady Akademii Nauk SSSR, Vol. 264, no.3, pp 715-717, May 1982.
0012-4966/82/0506 - 0259$07.50-1982-Plenum Publishing Corporation.
4 references, 2 figs., 1 table.

Abstract by
G. Jørgensen

REPETITIVE TREATMENT WITH GONADOTROPHIN RELEASING FACTOR OR A LONG-ACTING ANALOGUE UPON GONADOTROPHIN SECRETION IN THE FERRET.

Gledhill, B., Donovan, B.T.,Dept. of Physiology, Institute of Psychiatry, De Crespigny Park, Denmark Hill, London SE5 8AF.

The changes in plasma levels of LH and FSH were examined after treatment of intact and ovariectomized female ferrets with a long-acting analogue of gonadotropin releasing factor (Gn-RF) (D-Ser(But)^6-LH-releasing hormone(1-9-nonapeptide ethylaminde; Hoe 766) either as a single intravenous injection or daily for 6 days. The responses were compared with those induced by daily injections of Gn-RF or 0.9% NaCl (w/v). Treatment with Gn-RF consistently induced rises in both LH anf FSH release with peak levels of both hormones being reached 20 min after injection and being of similar size from day to day in individual animals. Thereafter, the gonadotrophin levels declined rapidly to approach basal values by the end of each sampling period. Treatment with Hoe 866, however, produced very high values on day 1 of treatment, with LH being raised for 10-12 h and FSH for up to 24 h. Subsequent injections, on the other hand, produced an abbreviated LH response of similar size to that induced by Gn-RF and little, if any, FSH response. In ovariectomized ferrets, Hoe 766 induced a variable LH response and little FSH response at any time. In addition, basal FSH levels in the first three samples taken on each day from day 2 onwards tended to decline markedly in all of the Hoe 766-treated animals, an effect not seen in Gn-RF or 0.9% NaCl-treated controls.

J. Endocr. 1981, 90, 275-283.
22 references, 3 figs.

Authors' summary.

A STEREOLOGICAL STUDY ON THE TESTICULAR COMPONENTS OF THE MINK IN THE PRE- (4-MONTH-OLD) AND POST (13-MONTH-OLD) BREEDING SEASON.

Yoshida, Mitsutoshi, Dept. of Veterinary Obstetrics, Fact. of Vet. Med., Hokkadio University, Sapporo 060, Japan.

The testicular components were analyzed stereologically in the testes of five 4-month-old (pre-breeding season) and five 13-month-old (post-breeding season) Pastel minks. Linear correlation between the spermatogenetic index and the stereological parameters were studied in these two generations.

4-month-old minks: The spermatogenetic index was positively correlated with the volume of the following: the testis ($r=0.73^{*}$), the intratubular area ($r=0.79^{**}$), the blood vessels ($r=0.74^{*}$) and the remaining interstitial tissue ($r=0.72^{*}$). Furthermore, there were positive correlations with the spermatogenetic index both in the total number of type-A spermatogonia including a gonocyte ($r=0.89^{**}$) and that of supporting cells ($r=0.67^{*}$) per testis.

13-month-old minks: The spermatogenetic index was positively correlated with the volume of the testis ($r=0.87^{**}$) and the intratubular area ($r=0.97^{**}$). There was a negative correlation between the spermatogenetic index and the volume of the interstitial cells ($r=-0.83^{**}$), which corresponded to that observed in the remaining interstitial tissue ($r=-0.96^{**}$). A negative correlation was also observed between the spermatogenetic index and the total number of supporting cells ($r=-0.74^{*}$), which corresponded to that observed in the interstitial cells ($r=-0.89^{**}$) per testis.

The results indicated that the spermatogenesis estimated by the spermatogenetic index was closely correlated with the volume of the testis and the intra-tubular area in both generations.

Japanese Journ. of Vet. Res. 30 (1/2) 42, 1982.
Summary of thesis, Fac. Vet. Med., Hokkaido University.

Author's summary.

IS ESTROGEN REQUIRED FOR IMPLANTATION IN THE FERRET?

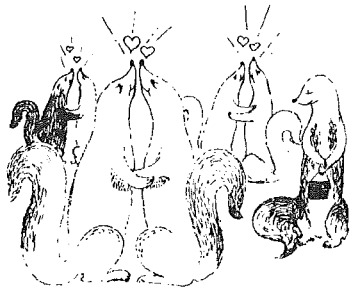
Mead, Rodney A., McRae, Martha, Dept. of Biological Sciences, University of Idaho, Moscow, Idaho 83843, USA.

A series of experiments was designed to further test the hypothesis that ferret corpora lutea synthesize and secrete estrogen between Days 6 and 8 of pregnancy, and that this estrogen is required to initiate implantation of blastocysts on Day 12.

Corpora lutea, removed on Day 8 of pregnancy contained significant quantities of testosterone. Incubation of aliquots of the same luteal tissue for 4 h significantly elevated estrogen levels above those of nonincubated controls. Peripheral plasma estrogen levels exhibited a slight increase on Day 8 over those observed on Day 6 of pregnany (7.9 ± 3.4 vs. 4.1 ± 1.1 pg/ml). However, continuous release of estradiol from Days 6-8 from two different sizes of Silastic capsules failed to induce implantation in ovariectomized-progesterone treated ferrets, whereas this same treatment was compatible with nidation in intact ferrets. Administration of the aromatase inhibitor, androsta- 1,4,6-triene-3,17-dione (ATD) on Days 5-8 of pregnancy prevented implantation of blastocysts on Day 13. Simultaneous administration of estradiol and ATD failed to reverse the inhibitory effect of ATD.

Results of this study confirm that luteal tissue of ferrets prossesses at least one aromatizable androgen which is converted to estrogen under physiological conditions. However the data do not support the hypothesis that estrogen is required for implantation in the ferret.

Biology of Reproduction, 27, 540-547, 1982.
14 references, 5 tables. Authors' abstract.



EFFECT OF MEDROXYPROGESTERONE ACETATE ON GESTATION IN MINK.

Murphy, B.D., Concannon, P.W., Travis, H.F., Dept. of Biology, Univ. of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N OWO.

Mink ovariectomized 14 days after the first of two matings received injections of 2 mg MPA, the same MPA treatment + an oestradiol-17 β implant or no replacement therapy. Some mink were ovariectomized after implantation and given a single dose of 2 mg MPA or no replacement therapy. MPA persisted in the serum at detectable levels for 13 or more days in all mink treated. MPA and MPA + oestradiol induced uterine growth but neither treatment was capable of inducing embryo implantation. More embryos were retained in mink treated with MPA alone and these appeared to be viable. Implanted embryos persisted for a longer period in animals that were ovariectomized and treated with MPA. MPA neither supported pregnancy nor permitted parturition. Serum LH was elevated by 1 week after ovariectomy and elevations persisted for a further 20 or more days. While MPA alone had no apparent negative feedback effects on LH, animals that received MPA + oestradiol did not display any elevation of LH, suggesting that oestradiol or a combination of MPA and oestradiol has a potent negative feedback in mink.

J. Reprod. Fert. 1982, 66, 491-497.
19 references, 2 figs., 1 table. Authors' summary.

REPRODUCTION RESULTS OF ARCTIC FOXES KEPT IN FREE-STANDING CAGES AND PAVILLIONS.

(Wyniki rozrodu lisów polarnych utrzymywanych w klatkach wolnostojacych i w pawilonach).

Maciejowski, Janusz, Slawoń, Jerzy, Inst. Biologicznych Podstaw Produkcji Zwierzecej AR w Lublinie, Poland.

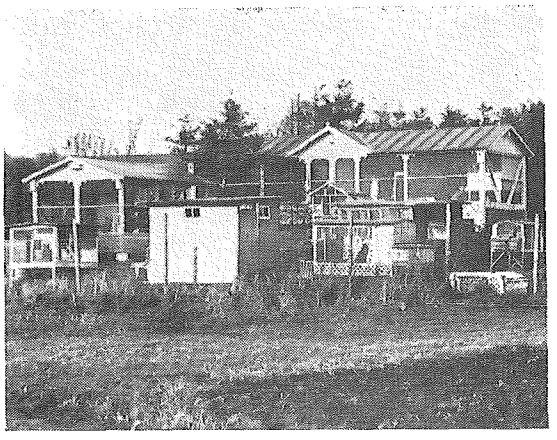
A quick increase of the number of foxes in breeding farms at an unchanged attendance technology creates serious organizational problems

and leads to a considerable growth of the labour expenditures. One of important factors improving the labour organization at farms is the pavillion system of rearing. However, the view is widespread among breeders that the reproduction results of animals kept in pavillions would be worse than those of animals kept in free-standing cages.

Results of the reproduction of Arctic fox females kept in accordance with either system at 6 farms in two subsequent years were compared with the respective calculations, of which 2162 females were kept in free-standing cages and 3820 - in pavillions. The age of females was taken into consideration as well. It has been found that the females from pavillions showed the oestrus symptoms by 5-7 days later than those kept in cages. These differences were more distinct in older females, in which the oestrus occurrence is affected, beside light, by many other factors. The differences between number of steril females kept in accordance with either system were statistically insignificant.

Keeping females in cages or pavillions did not exert any differentiating influence on other reproduction features (mean size of litter per bearing and covered female, mean number of reared young). The results obtained allow to draw the general practical conclusion on groundlessness of maintaining that the pavillion system of rearing animals of the basic flock would affect negatively the reproduction results of Arctic foxes.

Zeszyty Problemowe Postepow Nauk rolniczych 1981, 259, 93-99.
6 references, 5 tables. Authors' summary
In POLH, summaries in ENGL and RUSS.



One of the first fox farms in Denmark.

THE LITTER SIZE FORMATION DEPENDING ON THE AGE OF FEMALES AND ON THE EFFECT OF BOTH FEATURES ON THE PROGENY PROPORTIONS OF BLUE ARCTIC FOX (ALOPEX LAGOPUS L.) AT THE FARM LOCHOWO.

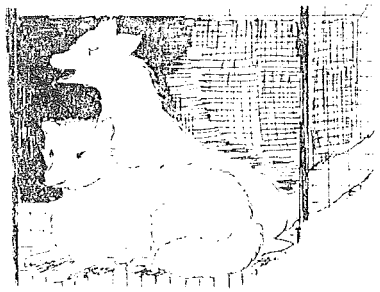
(Ksztaltowanie sie wielkości miotów w zalezności od wieku samic oraz wplyw obu tych cech na proporcje plci potomstwa lisow polarnych niebieskich (Alopex lagopus L.) z fermy Lachowo).

Bernacka, Henryka, Zaluska, Janusz, Kubacki, Stanislaw, Akademia Techniczno-Rolnicza w Bydgoszczy, Instytut Zootechniczny, Zaklad Hodowli Owiec i Koni, Poland.

In testings carried out on numerical material collected from pedigree books comprising the period 1970-1977, age of females, number of whelping (502), size of litters and number of whelps born (4786) and reared (4123) at consideration of sexes (on the average 54.45% of males) were determined.

The most numerous litters bore 2-year old females (10.07 whelps), while the most numerous reared litters originated from 2- and 3-year old females (8.65 and 8.85 whelps). The litter were characterized also by the highest index of rearing (90.86%). The 1-3-year old females bore significantly or highly significantly more males than remaining ones. The maximum number of males (4.82) was in the litters of 2-year females and their greatest percentage (54.40%) in the litters of 1-year old females. The proportion of males and females in the progeny of 1-3-year old females showed the index of 1.25-1.12:1.00, while in the progeny of older females the index was 0.89-0.80:1.00. In litters amounting to 4-6, 7-9, and 10-12 whelps a significant or highly significant shifting of the proportion of sexes i favour of males was found. The removal of females older than 3 years off the flock can favour the occurrence of higher number of males in the reared progeny.

Zeszyty Problemowe Postepow Nauk rolniczych 1981, 259, 87-92.
5 references, 3 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.



OBSERVATIONS AND INVESTIGATIONS CONCERNING THE REPRODUCTION OF SILVER FOXES (VULPES VULPES L.).

(Obserwacje i badania dotyczace rozrodu lisów srebrzystych (Vulpes vulpes L.).

Kaleta, Tadeusz, Instytut Produkcji Drobiarskiej SGGW-AR w Warszawie, Zaklad Hodowli i Użytkowania Zwierzat Futerkowych i Drobnego Inwentarza, Poland.

Silver fox (Vulpes vulpes) being a colour variety of the common fox, is a valuable species, reared under farm conditions. Poland is one of the main producers of skins of these animals. Dependence of production results on the fecundity of foxes justifies the purpusefulness of investigations on this problem.

Since the time of reaching sexual maturity by common fox at the age of 10 months, every-year cyclic occurrence of physiologic changes in sexual organs of individuals of either sex begins. In the course of these changes the oestrus occurs once (monoestric species) and lasts 1-3 days. The spontanic ovulation occurs on the second or third day of the oestrus. In practical breeding of foxes polygamic mating (1 male, 3-4 females) is applied. The pregnancy period is 48-57 days and the number of young in the litter varies within 1-14.

An attempt of the fecundity analysis of foxes at one of the best farms of silver foxes in Poland was undertaken by the author on the basis of the flock structure and the fecundity coefficients. As far as the flock structure is concerned,it distingguished itself in the investigation years with a high share of primaparae in the flock (25-45%). The fecundity coefficients estimated were higher than or equal to country means and amounted: of covered females - to 94%, of fertilized ones - to 87%, of whelped ones - to 85%. The average number of whelps from 1 female: born - 4.3, reared - 3.4; the ratio of whelps reared to born - 0.8. Mean pregnancy duration - 53 days; the oestrus repeatability - in primaparae at later time than in females utilized for a longer time. While confronting the above results with the literature data, it can that the percentual values concerning covered, fertilized and whelped females

did not deviate from other investigations.

The litter vitality coefficient derived for the first time by the author, was high, what bears evidence of a good care on the part of mother-foxes. Also the presumption concerning the belated oestrus of primaparae in relation to other females was confirmed. The purposefulness of keeping older animals (6-7 years of age) in the farm was proved as well, at a simultanous statement that the flock remount accelerating the breeding program can decrease the fecundity indices of females in the flock.

Zeszyty Problemowe Postepów Nauk Rolniczych 1981, 259, 75-80.
19 references. Author's summary.
In POLH, summaries in ENGL and RUSS.

COMPUTOR PLANNING OF THE PROGRAM OF MATING ARCTIC FOX IN LARGE FARMS.

(Konstrukcja planu kojarzen przy uzyciu emc dla wielkostadnych ferm lisów polarnych).

Narucka, Irena, Zuk, Boleslaw, Gedymin, Jerzy, Instytut Hodowli i Technologii Produkcji Zwierzecej Akademii Rolniczej w Poznaniu i Wroclawiu, Poland.

The authors developed a method of using a computer i planning the matings of Arctic fox in large farms. The program comprises two variants: 1) line mating, and 2) mating of unrelated individuals.

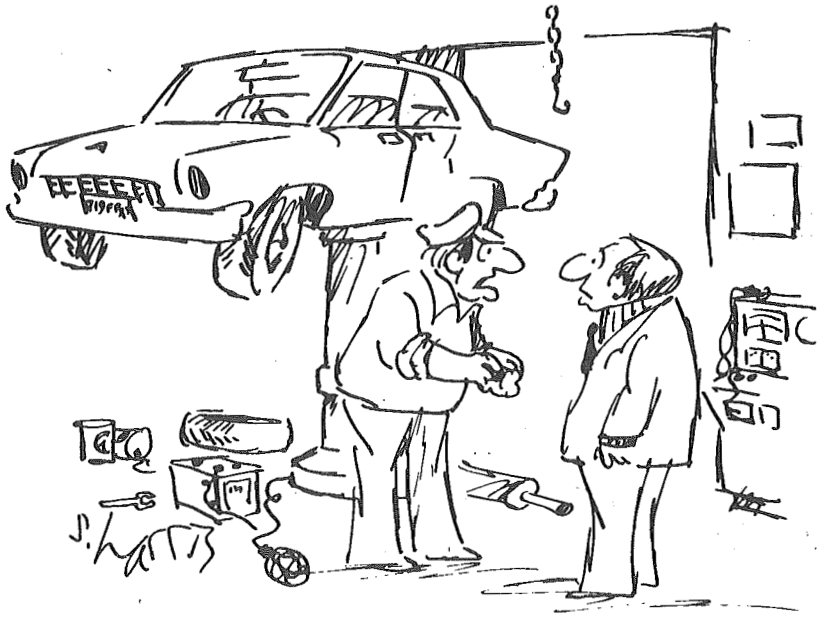
1. The program concists in finding in the population the males which have higher estimated of their coat and the indices of their progeny exceeding the mean values of the population. In line mating the females of high value, related with the same ancestor are mated with the males of the same line.

2. The other males are mated with unrelated females followeing the program, where animals of each sex are enlisted according to their evaluation and suitable animals are chosen for mating ($R < 0.0625$).

For each male 5 optimal and 3 reserve females are designed and each can be served by 3 males.

The farm should have a mating program on a perforated tape. Every year before the breeding season a program of matings should be planned by ad computer basing on the data and names of the individuals sent for the computer calculations.

Zeszyty Problemowe Postepów Nauk rolniczych 1981, 259, 81-85.
6 references, 1 table. Authors' summary.
In POLH, summaries in ENGL and RUSS.



"It's your computer. I'll have to call in a systems analyst."

Original Report.

VITAMIN-E AND SELENIUM PROBLEMS IN DANISH MINK ?

Asbjørn Brandt, Natl. Inst. of Animal Science, Fur Bearing Animals, Trollesminde, 48 H Roskildevej, DK-3400 Hillerød, Denmark.

Introduction.

Yellow-fat disease has been recognized as the classical manifestation of the ill interaction of nutritional factors such as PUFA, their oxidative products and vitamin-E deficiency.

The prevailance of yellow-fat disease in Danish mink has diminished drastically the last decade. The fact seems to be correlated to the following development, especially inside the feed production:

a) The feed production has been centralized. Thus 35 feed kitchens supply nearly all 2,700 Danish minkfarms with fresh feed daily.
2) There has been established a comparatively effective voluntary feed-quality-programme, including determination of the fat quality (FFA, peroxide- and anisidine-values).
c) The stabilization of especially PUFA-containing feeds with antioxydants (etoxyquin).
d) Fortification of the feed with minerals and vitamins, including vitamin- as a-tocopherolacetate.

In contrast to these rather radical alterations in the Danish feed production, there has been diagnosed an increasing number of cases with close resemblance to vitamin-E/selenium deficiency described in swine and chickens.

Disease outbreaks with resemblance to vitamin-E/selenium deficiency, can in principle be divided into three categories:

1) Acute. Typical the symptoms are seen in thriving, fast growing mink kits. After the condition is observed, death occurs within 2 days, with a lethality rate close to 100%. The mortality rate close to 100%. The mortality rate varies much between farms (0-

10%). Paresis/paralysis of the posterior musculature is usually observed, following by severe dyspnoea - at this stage the condition may be complicated by exsuffication of transudate and blood terminating in coma and death.

Postmortem reveals pericardial and pleural transudation. Myocardial discolouration in plaques and striations. In some cases petecial bleedings in themyocardium are seen, in general light (anemic) musculature, most discernible in the thigh and shoulder. The lungs are often haemorrhagic and edemic. Liver and kidneys are at times fat-metamorphic. Culturing for phatogenic microorganisms is usually negative.

2) Peracute. This category varies principally from the acute by having a very sudden and fast development. The transudations are more profound and voluminous, and are also seen in the abdomen and in the alimentary channel. In some cases peteccial bleedings are seen in the cerebellum (resembles botulismus or vitamin-B1 deficiency). In both the acute and peracute cases an increased tendency of cannibalism is observed among the mink kits.

3) Cronic. It has been postulated that the cronic nutritional deficiency syndrome "tynde mink" eqv. "lean mink" may be a facet of vitamin-E (selenium) deficiency.

Haematological and clinical-chemical studies has been scarce but a prevailing tendency has been low hemoglobin: $\bar{x}$ = 10 mg% and hematocrit: $\bar{x}$ = 40%. High serum values for ASAT and ALAT: more than 160 iu/l. A few tests for the plasma a-tocopherol level showed low values: $\bar{x}$ = 8 µg/ml compared to $\bar{x}$ = 30 µl/ml for normal mink kits of same age. Whole blood GSH-Px-activity resulted in an ununiform pattern with some low values: 300-500 mkat/l eryt. and some "normal": $\bar{x}$ = 650 mkat/l eryt.

Histological examinations has not yeat shown anything specific besides the mentioned fat metamorphosis of liver and kidney cells.

Recent studies of Nordstoga show muscular degeneration of the hyalin type in the heart musculature of typical acute cases.

Discussion.

Vitamin-E (selenium) deficiency is not only a question of vitamin being present in the feed or not. In general terms it must be considered more a question of the total amount of oxidative stress on e.g. cell and organel membranes by factors such as PUFA, peroxides, radicals and ions, that will determine the symptoms of vitamin-E/selenium deficiency.

As mentioned the feed production has changed radically and although there has been taken certain preventive measures concering the quality, the feed apparently has a constellation which nevertheless gives deficiency symptoms in the mink.

In light of this the following factors in the Danish mink feed should be mentioned as having a possible correlation to the induction of the mentioned deficiency symptoms:

a) Vitamin-E determinations on the feed has shown that supplemented vitamin-E (a-tocopherolacetate) undergoes deterioration by function of time.
b) Brisling (Sprattus sprattus) is used as both fish silage and chilled/frozen feed. It has been established that the fat content (PUFA) increases significantly during summer-autumn. Furthermore, the thiaminasis content varies considerably.
c) The amount of iron has at times been high in conjunction with high cobber:zinc ratio.
d) The amount of SO_4^{--} ion has been high owing to the H_2SO_4 preserved fish silage and added iron-, copper- and zinc-sulphate.
e) The amount of added vitamin-A has been high.
f) The bacteriological standard has varied.
g) The feed concentration (joule/g) has been fairly high.
h) The amount of energy derived from protein has been high (50-60%).

There is evidence that the symptoms can be aggreviated by feeding high rations or feeding with big daily variations in quantity. Reciprocally the symptoms can be eliminated in many cases by mere fasting.

Therapy, if introduced in due time, as injection of a-tocopherolacetate: 30 mg/kg s.c. or sodium selenite: 0.1 mg/kg s.c., has a theratpeutic effect.

It is not possible at this stage to differentiate between vitamin-E and a possible selenium deficiency in mink. Physiologists have traditionally considered it impossible for e.g. mink to develop selenium deficiency, as the main source of their feed is fish with a high content of selenium. But today there has been aroused uncertainty of the availability of organic complex bound selenium compounds to animals, and whether or not these compounds are utilized as readily as inorganic compounds. Besides this comes the question of the significance of the competitive absorption of various compounds in the alimentary channel.

Clinical-chemical studies concerning selenium status in mink are complicated by the lack of experience and the uncertainty of how much of the glutationsperoxidase is selenium dependent. The significant decline in in GSH-Px activity in mink fed selenium deprived feed is not as significant as that observed in other animal species.

Lack of experience is also the case concerning vitamin-E status evaluation in mink.

Besides a-tocopherol and glutationperoxydase, the mink may be dependent on concomitant antioxidative systems, which might be mal-functioning giving the problem a new dimension and complexity.

At this point it seems clear that there are a number of conditions in the feed that may cause the hazard, but basal and significant knowledge is missing, therefore investigations in the future should emphasize on the following:

a) Is selenium deficiency in mink possible in practice.

b) Can selenium deficiency in mink be diagnosed via GSH-Px activity determinations, or should other methods be implimented such as GSH-Px separation in non- and selenium-dependent fractions or by plasma/organ selenium values.

c) Can vitamin-E/selenium deficiency be provoked by known factors in the feed (experimentally). Which are important, and how can they be eliminated (compensated).

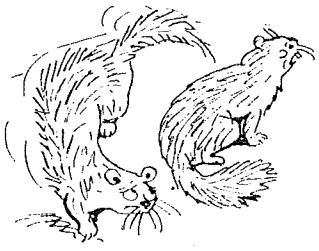
d) Can clinical-chemical diagnostics, besides those mentioned be used.

e) Can histological examinations e.g. of muscles (liver) be used as a diagnostic tool in vitamin-E and selenium deficiency in mink.

f) Are vitamin-E (selenium) deficient mink more suceptible to endotoxin toxicosis than non deficient mink.

g) What is the significances of vitamin-E on the general immuno-competence in mink.

This article is largely based on an article by Asbjörn Brandt in Dansk Veterinær Tidsskrift, 1982, 65, 4. 15/12. 33 references.



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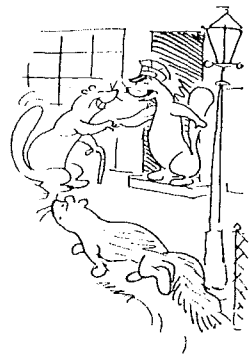

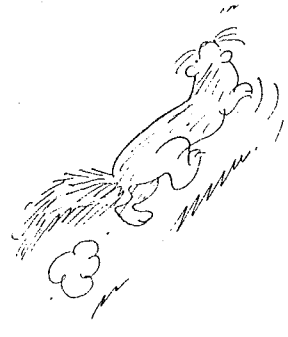

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LECITHINE-ENRICHED VEGETABLE OIL IN THE NUTRITION OF THE MINK.

(Lecithinangereicherte pflanzenfette in der ernährung des farmnerzes).

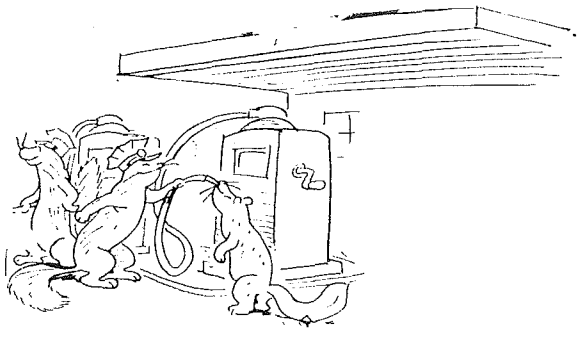
Sandø Lund, R., Forsögsfarmen West, 112 Herningvej, DK 7500 Holstebro, Denmark.

Fats can be utilized by the mink rather good. The quality of the fat used in mink feeds is very influential on the health of the mink and the quality of the fur. If considered that the mink is very sensitive to liver diseases the fat quality fed is of high importance for tis health. In mink feeding, therefore, the properties of lecithine in respect to the fat metabolism has a number of advantages.

Digestibility tests with lecithine-enriched vegetable oil have shown positive responses. In a feeding trieal with pregnant females and its youngsters lecithine-enriched vegetable oil has been equivalent to other aniaml/marine fats (lard and herring oil). The best responses were recorded by the parameter number of raised youngsters at the age of 42 days and the colour and the gloss of the Standard mink's fur.

Under practical conditions, therefore, the use of 30% lecithine-enriched vegetable oil of the total fat quantity added to mink feeds can be recommended, especially for the period from weaning to killing.

Kraftfutter, Vol. 63 (5), 232-234, 236, 1980.
1 fig., 5 tables. Author's summary.
In GERM, summary in ENGL.



COMPOSITION OF FATTY ACIDS IN THE MINK FEED.

(Forskellige fedtstoffer til mink).

Hillemann, Georg, Mejborn, Heddie, Nordjysk Pelsdyrforsøgsfarm A.m.b.A.,
DK 9800 Hjörring, Denmark.

It is recognized that the pelt qualities differ with the content of fatty acids in the feed. Many types of fat ingredients may be used in the mink feed, and it is therefore relevant to establish more precisely the effect of each fat component on the pelt quality as well as on other factors.

We have made two runs of experiments. One in the growth period of 1981 to decide on the effect on the certain fatty acids on the pelt quality and to decide the fatty acid composition of the internal fat deposits. The second in the breeding season of 1982 to establish the effect of the feed fat composition on the composition of fatty acids in the mink milk.

Growth period.

7 groups of 200 mink kits each were given an addition of their feed of 4.5% of either lard, poultry fat, ox tallow, soya bean oil, rapeseed oil, palm seed oil or a vegetable fat composition made to match poultry fat.

Breeding period.

3 groups of 80 first year females each received an addition of 1.5% of either lard, rapeseed oil or fish oils.

Results.

The quality of the pelts was negatively affected when the content of linolene acid was below 12%.

Results of analysis of the feed as well as of scraped off pelt fat were coherent from group to group.

The fatty acid composition of the pelt fat was almost the same whether is was scraped from male or female dark mink. This was also the case when pelt fat from dark males was compared to that of pastel males.

Scraped off pelt fat and intestinal fat were different in respect of fatty acid composition.

The fatty acid composition of the mink milk differed very much in accordance with the fatty acid composition of the feed.

A change of the fat addition from the 5th of May for the rapeseed oil and the fish oil groups to received the lard enriched feed caused the fatty acid composition of the mink milk to change in the course of 3 weeks to become completely as that of the females receiving lard all the time.

NJF-Meeting, Ålesund, Norway, 1982.
10 pages, 8 tables, 1 fig. Authors' summary.
In DANH.

KRILL MEAL IN DIETS FOR MINK.

В РАЦИОНЕ КРИЛЕВАЯ МУКА И ШРОТ

Perel'dik, N. Sh., Besedina, G.G., USSR.

Young mink were in 5 groups and were fed on a basal diet of Korean cod, heads of slaughtered cattle, milk, cottage cheese, cereals, fodder yeast and mixed fat (control); or that diet containing 50 percent krill meal and without Korean cod; or with 50 percent krill meal, Korean cod and vitamin A, riboflavin and thiamin; or with 50 percent krill meal and additional fat; or with 35 percent krill meal. The respective sizes of pelts were 1000.6, 917.4, 893.9, 941.1 and 1009.5 cm^2. Percentage yield of normal skins was 62.5, 69.2, 75.7, 78.6 and 35.5. In another experiment, mink were in 6 groups and ate a normal diet without krill meal (diet 1); or with 40 percent krill meal (diet 2); or diet 2 in July to August, but a diet with 20 percent krill meal in September (diet 3);

or diet 1 with krill meal treated with 2 percent HCl (diet 4); or diet 1 with 25 percent krillmeal, 25 percent zooplankton and supplemented with vitamins A and D (diet 5); or diet 1 with krill meal to provide 40 percent of animal protein (diet 6). The results showed that krill meal providing 35 to 40 percent of the animal protein gave skins of good quality which were not inferior to those from mink raised entirely on feeds of animal origin. Increasing the amount of krill meal to provide 50 percent of animal protein in the diet caused a deterioration in skin quality.

Krolikovodstvo i Zverovodstvo, No.5, 10-11, 1982.
3 tables. CAB-abstract.
In RUSS.

SUNFLOWER OILMEAL IN DIETS FOR MINK.

Perel'dik, N.S., Gubskii, V.V., USSR.

A control group of mink received for 14 days a basal diet of cattle rumen, Korean cod, rolled barley, fodder yeast, mixed fat and sunflower oilmeal. Groups 2, 3 and 4 ate the basal diet in which 25 percent of the DM was replaced with more sunflower oilmeal; the sunflower oilmeal was steamed, boiled for 30 min and autoclaved for 1 h, respectively. In the above order, digestibility of organic matter was 71.2, 65.8, 67.7 and 68.1 percent, of protein 77.2, 75.0, 75.8 and 77.8, of fat 88.4, 84.8, 89.7 and 90.7, and of fibre 39.6, 38.1, 40.7 and 37.1 percent. Boiling of the sunflower oilmeal for 1 h instead of 30 min significantly increased the digestibility of its crude protein.

Krolikovodstvo i Zverovodstvo, no.5, 11-13, 1982.
5 tables. CAB-abstract.
In RUSS.

AN ADDITION OF SYNTHETIC LYSINE AND METHIONINE TO THE FEED OF YOUNG MINKS.

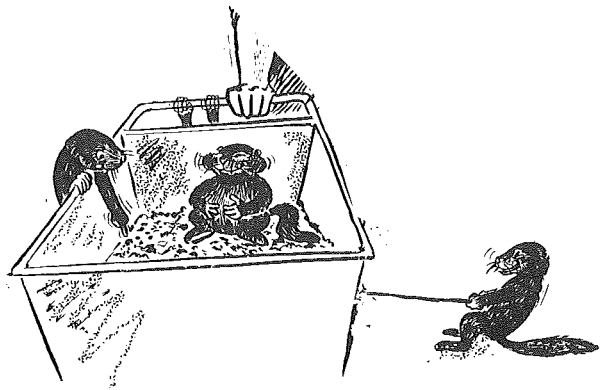
(Dodatek syntetycznej lizyny i metioniny do dawki pokarmowej dla mlodych norek).

Barabasz, Boguslaw, Jarosz, Stanislaw, Instytut Zywienia Zwierzat i Gospodarki Paszowej AR w Krakowie, Poland.

At the farm at Klodnica in the flock of 289 minks of the Standard variety synthetic lysine and methionine was added in the period from July to December to the normal ration of the poultry-fish type.

The growth of animals in the experiment period digestibility of rations and nitrogen utilization (retention) as well as anatomopathologic changes in internal organs, licence estimates and quality and length of skins were analyzed in detail. Worse results both in licence estimation and in classification of skins showed the group fed rations with highest methionine addition (0.4%). It was caused probably by an inappropriate balance between particular amino acids. In the group fed rations with addition of 2% methionine + 0.2% of lysine, the latter smoothed the consequence of an inappropriate balance of the ration. The results obtained suggest that synthetic amino acids can be added to feed at a strict control of the content in it of other amino acids. At application of the ration with synthetic methionine a particular attention should be paid to the mutual relation of tryptophane and sulphuric amino acids (methionine + cystine) in the ration.

Zeszyty Problemowe Postepow Nauk Rolniczych 1981, 259, 115-119.
6 references, 1 table. Authors' summary.
In POLH, summaries in ENGL and RUSS.



OBSERVATIONS ON THE FEEDING FREQUENCY OF YOUNG MINKS AT THE TIME OF FORMING THE FIRST WINTER COVER.

(Obserwacje nad czestościa karmienia mlodych norek w czasie pierwszego formowania okrywy zimowej).

Ocetkiewicz, Jadwiga, Wojtacha, Henryk, Zaklad Hodowli Drobnego Inwentarza IZ w Krakowie, Poland.

The observations on feeding minks, once, twice and thrice throughout two subsequent years at the time of forming the full winter cover were carried out. The experimental material constituted young minks of the Standard variety in the period from September 1 to November 30. The analysis of the mean body weight grains proved a certain tendency to a favourable effect of the twofold feeding. The animals fed twice a day were constantly in a good condition, distinguished themselves with high vitality and showed no changes in the consumption of feed. Quality, lustre and elasticity of the hair coating are positively estimated at the licence. Individuals of that group, designated for the basic flock, gave good breeding results. However, in view of the fact that the body weight gains did not prove any significant differences between two- and threefold feeding as well as of higher labour consumption at threefold feeding - the twofold feeding would be more purposeful.

Zeszyty Problemowe Postepow Nauk Rolniczych, 1981, 259, 111-114.
4 references. Authors' summary.
In POLH, summaries in ENGL and RUSS.

FERTILITY OF MINKS FED POULTRY REFUSE.

(Ksztaltowanie sie plodności norek zywionych odpadami drobiowymi).

Barteczko, Jan, Instytut Zywienia Zwierzat i Gospodarki Paszowej AR, Kraków.

The aim of the respective experiment was to determine the results of feeding minks rations of participation of poultry refuse (raw poultry heads), i.e. feed containing biologically active substances. The experi-

mental feeding was applied in the preparatory period of their reproduction, pregnancy and lactation. The effect of the above feeding on the reproductory activity of females and males as well as on weight gains of young animals aging 3 and 6 weeks was investigated. The experiment was carried out under farm conditions and comprised the basic flock of 120 minks of the Standard variety.

The results obtained have proved that at 25%-tual content of raw poultry heads in the ration of minks in the reproduction period worse indices of the reproductory activity of females are obtained. Particularly significantly lower fecundity of females and less weight of their progeny at the age of 3 weeks was observed. On this basis it may be concluded that the above feed can be applied outside the reproduction period only.

Zeszyty Problemowe Postepow Nauk Rolniczych 1981, 259, 143-148.
10 references, 2 tables. Author's summary.
In POLH, summaries in ENGL and RUSS.

INVESTIGATIONS ON WORKING OUT COMPOSITION OF DRY FULL-VALUE MIXTURES FOR ARCTIC FOXES.

(Badanie nad opracowaniem skladu suchych mieszanek pelnoskladnikowych dla lisów polarnych).

Slawón, Jerzy, Ośrodek Badawczo-Rozwojowy Produkcji Leśnej "Las" w Skolimowie, Poland.

The basic components of feed of Arctic foxes are fresh or frozen meat-and-fish feeds. Considerable fluctuations in seasonal supply of these feeds in connection with a different area of refrigerators necessary for their preparation, result in periodical feed deficiencies, what consequently is negatively reflected in the quality of skins and limited the breeding development possibilities.

In such situation investigations on working out prescription for dry mixture as a substitute of fresh meat feed components or full-value

mixture as a counterpart of the ready feed seemed to be necessary.

The investigations were carried out in four breeding seasons while setting up and testing various components of the mixture.

The suitability of mixtures was estimated on the basis of body weight gains of experimental animals and quality of their fur developed on the basis of licence evaluation and classification of raw skins at simultaneous considerable drop of the feeding costs. The experimental animals were fed throughout the whole rearing period rations, in which the full-value mixture participated in 50% in the group I and in 75% in the group II in relation to the metabolic energy of the feeds.

Animals of either group reached the body weight and fur quality at the level of control animals. Purchasing costs of feeds utilized in the rearing period were higher in experimental groups that in the control group, whereas the total cost of the purchase and storage of feeds was similar in all groups.

Zeszyty Problemowe Postepow Nauk Rolniczych 1981, 259, 23-27.
3 references, 2 tables. Author's summary.
In POLH, summaries in ENGL and RUSS.

UTILIZATION OF TECHNICAL BLOOD IN FEEDING ARCTIC FOXES.

(Zastosowanie krwi technicznej w żywieniu lisów polarnych).

Slawoń, Jerzy, Kulikowski, Janusz, Mańkowski, Piotr, Ośrodek Badawczo-Rozwojowy Produkcji Leśnej "Las" w Skolimowie, Poland.

The technical blood is a valuable animal protein source utilized only to an insignificant degree by the feed production industry. A deficiency of meat-and-fish feeds comples to seek for utilization ways of this raw material in breeding of carnivorous fur animals. It is assumed in the hitherto breeding practice that the blood protein could constitute 10-15% of daily protein ration in the feeding of foxes. For better utilization of this raw material it is necessary to carry out investigations on:

- working out feeding technology enabling to introduce higher blood per cent into feed,
- working out the blood conservation technology for its protection in the period of transport and storage as well as the chemical or thermic sterilization of fresh blood.

The investigations carried out in the Research and Development Centre at Skolimów were aimed at working out principles of feeding young Arctic foxes reations with high percentage of the technical blood. Increased technical blood doses were given jointly with the dry mixture containing 15.6% of digestible protein, 10% of digestible fat and 29.1% of digestible carbohydrates.

Animals of the experimental group were given thorughout the whole period of rearing the feed consisting in 50% of technical blood and in 50% of supplementing mixture. The blood protein amounted thus to 50% of the total protein. The control group was fed traditional feed. Foxes of the experimental group reached higher body weight and formed the fur cover at the level of control animals. The costs of feed consisting of technical blood and dry mixture appeared to be by about 20% lower than of the traditional feed.

Zeszyty Problemowe Postepów Nauk Rolniczych 1981, 259, 29-34.
2 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.

THE FERRODEX INJECTION EFFECT ON THE BLOOD HEMATOGRAMS OF POLECAT-FERRETS AND FERRETS.

(Wplyw iniekcji ferrodexu na hemogramy krwi tchórzofretek i fretek).

Bednarz, Maria, Frindt, Andrzej, Tomicki, Zenon, Instytut Produkcji Drobiarskiej SGGW-AR w Warszawie, Poland.

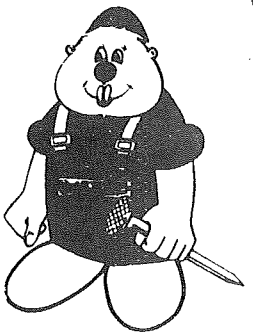
Hematologic examinations, beside cognintive aspects, are also of a great practical usefulness, since they enable to diagnose different anaemia

kinds or morbid states in animals. Twenty polecat-ferrets (8 males and 12 females) and ten ferrets (4 males and 6 females) at the age of 8 months, with levelled body weight, were used in the respective examinations. The animals were divided into two groups. The experimental animals were administered 4 fold every 21st day 1 ml Ferrodex, whereas to individuals of the control group by 1 ml of the physiologic salt solution were injected. Some of the results obtained are presented in Tables 1 and 2.

The Ferrodex administration did not affect distinctly the hematologic indices and hematogram of blood, what could be in consequence of starting the preparation administration to 4 month old individuals.

The results obtained approximate hematologic indices of minks.

Zeszyty Problemowe Postepów Nauk rolniczych 1981, 259, 101-105.
8 references, 2 tables. Authors' summary.
In POLH, summaries in ENGL and RUSS.



RESEARCHES CONCERNING COYPU NUTRITION WITH GRANULATED COMBINED FORAGE.

(Cercetari privind alimentatia nutriilor cu nutret combinat granulat).

Balasescu, M., Ionita, Elena, Zavoi, I., Inculet, Elena, Visan, I., Sava, Speranta, Rumania.

In order to improve the technology of intensive breeding of the coypu, in houses with ranged batteries, as well as for the semiintensive system of breeding, recipes of granulated combined forage have been made. The test for different ages and physiological states of animals suggests a feeding technology in correspondence with the present development of the branch.

Using these diets a simplification of the breeding technology, a reduction

of labour volume, an important feed and energy economy in feed preparation is obtained.

Lucrari stiintifice I.A.N.B., Seria D, Vol. XXIV, 1981. 97-101. (Bucuresti Ministerul Educatiei si Invatamintului, Inst. Agronomic "Nicolae Balcescu").
5 references, 2 tables. Authors' summary.
In ROMN, summary in ENGL.

PRINCIPLES AND TECHNIQUE OF FEEDING OF COYPU.

Принципы и техника кормления

Kladovshchikov, V.F., USSR.

Optimum level of digestible protein in the diets given to coypu kept under different physiological conditions is 12 to 15 percent of dietary Dm; that of fat 3 to 4 percent of DM. For the young up to 5 months old, the crude fibre content of the diet should be 5 to 8 percent DM; for older animals 10 to 12 percent. Pelleted feed mixture for coypu should contain sodium chloride 0.4 to 0.5, calcium 0.8 to 1.0 and phosphorus 0.6 to 0.7 g/100 g. Additional trace elements are not required unless the feeds were obtained from soils deficient in those elements. Fat-soluble vitamins are essential, including vitamin B12; and the diet should contain vitamin A 250 to 300 IU/100 kcal metabolizable energy (ME) or 750 IU/100 g DM of diet; vitamin D 50 IU and tocopherol 2.5 IU/100 kcal ME. During mating, pregnancy and lactation it is necessary to supplement the diet with minerals up to 0.5 percent by weight of DM. ME requirement of coypu kept indoors is 125 kcal/day up to 30 days old; 250 at 2 months; 350 at 3 months; 400 at 4 months; 500 at 5 months, and 550 at 6 months. During the first half of pregnancy, ME requirement is 500 to 550 kcal/day and during the 2nd half 600 to 625; during lactation, with litter size 5 to 6 up to 30 days old the requirement is 750 to 900, and at more than 1 month old 1000 to 1250 kcal/day. When animals are kept indoors their diet should be pelleted and the diet should be based on grass and legume meal, barley and maize, wheat and oats, wheat bran, linseed oilmeal, sunflower oilmeal, pea meal, fish meal, krill meal, fodder yeast, bone meal, CaCO3,

NaCl and a vitamin A, D and E mixture. Before pelleting the feeds should be disinfected. The pellets should be 6 mm in diameter and 10 to 12 mm in length. Adults should be given feed at 35 to 45 g/kg bodyweight, those 1 to 2 months old 75 g, 3 to 4 months old 55 g, and 5 to 6 months 90 g. The reach slaughter weight within 6 to 7 months of age, each coypu ate 45 to 57 kg pellets.

Krolikovodstvo i Zverovodstvo, no.4, 17-19, 1982.
3 tables. CAB-abstract.
In RUSS.

FREE MAGNESIUM IN SHEEP, FERRET AND FROG STRIATED MUSCLE AT REST MEASURED WITH ION-SELECTIVE MICRO-ELECTRODES.

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University of Bern, Bühlplatz 5, CH-3012 Bern, Switzerland.

1. Neutral carrier-based liquid membrane micro-electrodes were constructed which are suitable for continuous measurements of $(Mg^{2+})_i$ in cardiac and skeletal muscle preparations.
2. The electrodes show a Nernstian behaviour in pure $MgCl_2$ solutions. In the presence of a constant ionic baskground chosen to simulate the cytoplasmic composition, the calibration function flattens progressively with lower (Mg^{2+}), due to the interference of K^+ and Na^+. The response to changes in (Mg^{2+}) is less than 0.5 sec.
3. In quiescent preparations at room temperature (23° C), the following basal $(Mg^{2+})_i$ were determined: 3.5 mM (sheep Purkinje fibres), 3.1 mM (sheep ventricular muscle), 3.0 mM (ferret ventricular muscle) and 3.3 mM (frog skeletal muscle).
4. In cardiac tissue, electrical stimulation does not measurably affect the basal $(Mg^{2+})_i$.
5. In the presence of 0.5 mM-Mg^{2+}_o, the calculated Mg^{2+} equilibrium potentials E_{Mg}, are in the range of -23 to -25 mV, suggesting that Mg^{2+} is not passively distributed across the sarcolemma in striated muscle.
6. Further studies were performed on sheep Purkinje fibres to investigate the effect of various experimental interventions onf $(Mg^{2+})_i$.

7. Elevating $(Mg^{2+})_o$ from 0.5 to 10 mM resulted in a reversible increase of $(Mg^{2+})_i$. The initial rate of increase corresponds to a Mg^{2+} influx of 0.42 p-mole/cm^2.sec, or a magnesium permeability P_{Mg}, of 1.6×10^{-8} cm /sec.
8. Increasing P_{CO^2} from nominally 0 to 100 mm Hg (Tris-buffered vs. bicarbonate-buffered Tyrode solution) produced a reversible decrease in $(Mg^{2+})_i$ by roughtly 0.45 mM, probably due to Mg^{2+} binding the newly formed intracellular HCO_3^-.
9. The effect of metabolic poisoning on $(Mg^{2+})_i$ was assessed by exposure to cyanide iodoacetic acid and 2-4-dinitrophenol. No significant increase in $(Mg^{2+})_i$ indicative of a liberation of Mg^{2+} from ATP was observed.

J. Physiol. 1981, 333, 173-188.
1 table, 7 figs., 53 references. Author's summary.

LIVER, ADIPOSE TISSUE AND PLASMA LEVELS OF TOCOPHEROLS IN MINKS: RESPONSES TO GRADED LEVELS OF VITAMIN E.

Työppönen, Jouko, Hakkarainen, Juhani, Juokslahti, T., Lindberg, P., Dept. of Animal Hygiene, College of Vet. Medicine, Uppsala, Sweden.

The fate of the four different tocopherols found in the basic diet and the effect of additional DL-α-tocopheryl acetate on tissue tocopherol levels were studied in minks.

The basic diet without supplemental vitamin E contained α, β, γ and δ-topocherol in ratios 1:0.07:0.55:0.10. The corresponding relative occurrences in the tissues were: liver 1:0.04:0.12:0, plasma 1:0.13:0, and adipose tissue 1:0.0.19:0. The addition of α-tocopheryl acetate decreased the γ-tocopherol levels in all the three tissues studied. The β-tocopherol level in the liver remained unchanged irrespective of the addition of α-tocopheryl acetate. No tocotrienoles were found either in the feed or in the tissues.

Quantitatively, plasma α-tocopherol showed a linear relationship to log dietary dose while the liver and adipose tissue had good capacities

for storage of α-tocopherol. There were no differencies in the tocopherol contents between renal and subcutaneous fats. The liver content of α-tocopherol was in correlation to total lipids in liver ($P<0.05$). The correlation between plasma total lipids and plasma α-tocopherol was significant ($P<0.001$) only at the lowest dietary α-tocopherol level, i.e. in the unsupplemented group.

Twelfth Linderström-Lang Conference, Laugarvatn, Iceland, June 1982.
Part of collective document, page 102.
Only summary. Authors' summary.

Original Report.

VETERINARY

PREPARATION AND OPTIMIZATION OF IN VIVO PRODUCED ALEUTIAN DISEASE VIRUS (ADV) ANTIGEN

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Aleutian disease (AD) causes substantial economic losses to the fur industry. However, herds can be freed from AD if seropositive animals are removed. Consequently, eradication programs in which mink reacting to ADV antigen in counter-current immunoelectrophoresis (CIE) are culled have been developed and are highly successful. Although it is now possible to produce ADV in cell culture in acceptable yields (4), we have in this report decided to concentrate on production and optimization of 5 different in vivo produced isolates of ADV.

Much attention has been focused on possible ADV strain differences between isolates of ADV. In vivo infectivity studies have grouped the Pullman and Montana strain of ADV as low virulent ADV strains and the Utah, DK and Ontario (ON) strains as high virulent strains (1, 6-8). The high virulent strains normally have peak virus titers on day 10 after experimental infection (8) and relatively high virus quantities can be achieved. These virus strains would be the ones of choice for CIE antigens. For scientific studies, however, the production of the low virulent ADV strains is important and normally much lower yields than found for the high virulent strains are achieved.

It is our impression that in the present literature there are several unanswered questions with regard to ADV antigen production. We wish in this study to report on experiments focusing at some of these questions like 1) virus yields from mink with high vs. low serum antibody titers, 2) the yield increase by Freon reextractions of the organ materials, 3) the procedure that should be used in dissociating antibody from virus (activation of virus), and 4) total virus yield from low vs. high virulent ADV infection.

MATERIALS AND METHODS

Only ADV negative sapphire mink (Aleutian genotype) were used. They were kept in isolated cages. Intraperitoneal inoculation doses were 10^7 ID_{50} for Utah I,

$10^{6.5}$ for Pullman, 10^5 for Montana (MT), 10^5 for Ontario (ON) and 0.1 ml of Danish (DK) counter current antigen. All of these ADV isolates have been described in the literature (1, 6-8). Blood samples for antibody quantitation were taken by the nail method and on the day of organ collection by heart puncture. Antibody testing was done by radioimmune assay (RIA) and counter-current immunoelectrophoresis (CIE) as previously described (2). The strength of the CIE precipitin line was recorded according to the following scale: + reaction, weak precipitate only visible by staining, ++ weak precipitate visible without staining, +++ strong precipitate, ++++ strong precipitate, where the antigen could be diluted 10 times and still give a ++ reaction. The strength of a ++++ antigen is similar to the ones used for CIE routine analyses.

Ten mink were infected with the Utah or DK isolate of ADV and killed on day 10. All sera were tested in RIA and the mink were grouped in a low antibody and high antibody group. Ten mink were infected with Pullman and MT strain of ADV and 3 mink with the ON strain. These mink were tested 2 times a week in RIA for antibody quantitation and sacrificed when the antibody titers were in the order of 1000 and significantly enhanced when compared to the previous antibody testing (an indication of viral replication).

On the day of organ collection, spleen, liver, kidneys and the mesenteric lymph node were collected from each mink. The Utah and DK mink organs were pooled into two groups (low vs. high titered animals).

The virus purification procedure was the one published by Cho and Ingram (5) with some modifications. A 25% organ suspension was made in PBSA (0.02 M phosphate, 0.13 M NaCl, 0.1% NaN_3, pH 7.3) by homogenization for 3 min in a Waring blendor. The organ suspension was freeze-thawed 4 times. This preparation is referred to as crude in Table 1. One-half volume of Freon 113 was blended with the homogenate for 3 min followed by centrifugation at 4000 X g for 1/2 h. The supernatant from this centrifugation is referred to as F in Table 1. A volume of PBSA similar to the original organ weight was added to the organ/Freon phases and a new homogenization was performed for 3 min (note: no new Freon was added at this step) followed by a centrifugation as above. The supernatant from this centrifugation is referred to as Fre in Table 1. For ON, Pullman and Mt ADV purifications, Fre and the original F fraction were pooled and referred to as F in Table 1. Ultracentrifugation for 90 min at 180,000 X g was performed for all F and Fre fractions. The supernatants were

Table 1. Preparation and optimization of in vivo produced Aleutian disease virus (ADV)

ADV strain	# mink organ wt o.w./mink	Mean serum ab RIA titer	Day after infect	Purif. steps	Vol. in ml	Protein determination OD_{280}[a] units	Protein determination Total OD_{280} units	RIA determination of ADV CPM	RIA determination of ADV Total CPM	Spec.[b] activity	CIE reaction
DK	4	2408	10	crude	768	90	69,120	112	86,016	1	-
				F	480	69	33,120	201	96,480	3	-
	192g	±1438		FU	96	21	2016	1476	141,696	70	-
				FUF	92	17	1564	1307	120,244	77	-
	48g			FU2F	92	13	1196	47	4324	4	-
				Fre	200	27	5400	65	13,000	2	-
				FreU	45	14	630	616	27,720	44	-
				FreUF	45	9	405	433	19,485	48	-
				FreU2F	45	7	315	291	13,095	42	+
	6	11,533	10	crude	1333	100	133,300	215	286,595	2	-
				F	736	78	57,408	244	179,584	3	-
	333g	±4437		FU	147	35	5145	1263	185,661	36	-
				FUF	143	21	3003	1149	164,307	55	-
	56g			FU2F	140	18	2520	454	63,560	25	+
				FU3F	140	13	1820	286	40,040	22	+
				Fre	290	34	9860	81	23,490	2	-
				FreU	60	22	1320	890	53,400	40	-
				FreUF	60	17	1020	688	41,280	40	-
				FreU2F	60	16	960	923	55,380	58	++
				FreU3F	60	12	720	143	8580	12	-
	10	7883	10	FU1½F[c]	337	17	5729	1269	427,653	75	++
				FU2½F	337	15	5055	691	232,867	46	++
	525g	±5817		FU1½FU	34	53	1802	11,442	389,028	216	++++
				FU1½FUA	34	14	476	10,005	340,170	715	++++
	53g			FU1½FUD	34	52	1768	12,800	435,200	246	++++

Table 1 continued

ADV strain	# mink organ wt o.w./mink	Mean serum ab RIA titer	Day after infect	Purif. steps	Vol. in ml	Protein determination OD_{280}[a] units	Protein determination Total OD_{280} units	RIA determination of ADV CPM	RIA determination of ADV Total CPM	Spec.[b] activity	CIE reaction
Utah	5	6340	10	crude	948	135	127,980	137	129,876	1	-
				F	561	135	75,735	135	75,735	1	-
	237g	±2229		FU	140	31	4340	665	91,700	21	-
				FUF	137	20	2740	996	136,452	50	-
	47g			FU2F	137	15	2055	404	55,348	27	-
				FUFU	14	90	1260	8809	123,326	98	++++
				FUFUA	14	71	994	9329	130,606	131	++++
				FUFUD	14	86	1204	7859	110,026	91	+++
				Fre	216	36	7776	70	15,120	2	-
				FreU	44	19	836	261	11,484	14	-
				FreUF	43	10	430	203	8729	20	-
				FreU2F	43	5	215	141	6063	28	-
				FreUFU	4	48	192	4210	16,840	88	-
				FreUFUA	4	40	160	4312	17,248	108	++
				FreUFUD	4	50	200	3202	12,808	64	-
	5	30,600	10	crude	1079	198	213,642	209	225,511	1	-
				F	636	100	63,600	350	222,600	4	-
	269g	±17,757		FU	135	51	6885	267	36,045	5	-
				FUF	132	18	2376	1286	169,752	71	-
	54g			FU2F	132	18	2376	351	46,332	20	-
				FUFU	13	120	1560	9049	117,637	75	+
				FUFUA	13	82	1066	8258	107,354	101	++++
				FUFUD	13	100	1300	9445	122,785	94	-
				Fre	383	57	21,831	110	42,130	3	-
				FreU	77	36	2772	21	1617	1	-
				FreUF	71	12	852	278	19,738	23	-
				FreU2F	71	10	710	80	5680	8	-
				FreUFU	7	57	399	5284	36,988	93	+
				FreUFUA	7	41	287	7116	49,812	174	+++
				FreUFUD	7	53	371	5107	35,749	96	+

Table 1 continued

ADV strain	# mink organ wt o.w./mink	Mean serum ab RIA titer	Day after infect	Purif. steps	Vol. in ml	Protein determination OD_{280}[a] units	Protein determination Total OD_{280} units	RIA determination of ADV CPM	RIA determination of ADV Total CPM	Spec.[b] activity	CIE reaction
ON	3	1445	17	crude	552	N.D.		80	44,160		-
	(-spleens)	± 632		F	500	58	29,000	166	83,000	3	-
	138g			FU	75	95	7125	1072	80,400	11	-
	46g			FUF	70	34	2380	1665	116,550	49	-
				FU2F	63	27	1701	1610	101,430	60	+++
				FU2FU	6	58	348	14,839	89,034	256	++++
				FU2FUA	6	22	132	16,900	101,400	768	++++
				FU2FUD	6	49	294	16,800	100,800	343	++++
Pullman	5	1312	3 on	F	1260	68	86,580	31	39,060	0.5	-
			day 20	FU	252	20	5040	330	83,160	17	-
	311g	± 498		FUF	241	23	5543	570	137,370	25	-
			2 on	FU2F	162[d]	19	3078	866	140,292	46	++
	66		day 28	FU3F	162	10	1620	131	21,222	13	-
				FU2FU	16	79	1264	8648	138,368	109	++++
				FU2FUA	16	33	528	10,200	163,200	464	++++
				FU2FUD	16	78	1248	8000	128,000	103	++++
Mt	10	2220	2 on	F	2040	81	165,240	22	44,880	0.3	-
			day 14	FU	408	51	20,808	31	12,648	0.6	-
	510g	±2211	7 on	FUF	380	23	8740	71	26,980	3	-
			day 20	FU2F	375	21	7875	54	20,250	3	-
	51g		1 on	FUFU	38	72	2736	171	6498	2	-
			day 28	FUFUF	38	67	2546	504	19,152	8	-
				FUFUFF	38	60	2280	28	1064	0.5	-
				FUFUFA	38	20	760	1735	65,930	87	+
				FUFUFD	38	60	2280	298	11,324	5	-

[a] Measured by UV absorption in a spectrophotometer. One unit is roughly equivalent to 1 mg/ml of protein.

[b] Specific activity was defined as CPM/OD_{280} units.

[c] FUF preparations from low antibody titered animals and FU2F preparations from high antibody titered animals were pooled.

[d] Tube broke during centrifugation.

discarded and the pellets solubilized in 5 times less volume. This fraction is referred to as FU in Table 1. Not all of the pellets will solubilize even after sonication or shaking for several days, but an additional Freon treatment [again 33% (v/v) of Freon] clarifies the aqueous phase. This purification step is referred to as FUF in Table 1. From this step on the main purpose of the following treatments were to remove antibody from virus, also called activation procedures. All activation procedures were carried out on 3 ml pilot samples and analyzed in RIA together with a preactivation sample. If the treatment increased antigen titer, the total batch was exposed to the treatment, and a new pilot activation performed. The activation treatment choices were the following: 1) An additional Freon treatment (FU2F and FU3F for 2 additional Freon treatments in Table 1), 2) An additional ultracentrifugation with a concentration factor of 10. This treatment is referred to with an additional U in Table 1. These ultracentrifugations were carried out in a SW 50.1 Beckmann rotor at 50,000 rpm for 1 h (234,000 X g). The pellet solubilizes readily after this centrifugation, 3) DNAase treatment. The samples were made 10 mM with $MgCl_2$ and 250 µg/ml of DNAase added (250 µg/ml, P/L Biochemicals, Milwaukee, Wisconsin). Incubations were at 37°C for 1 h, 4) Acid treatment (referred to as A in Table 1).

After an additional ultracentrifugation (as in 2), acid treatment of the pellet was carried out by resolubilizing the pellet in 0.1 M glycine/HCl buffer, pH 3.0, incubation for 15 min and ultracentrifugation at 234,000 X g for 1 h as in 2. The pellets were resolubilized in the original volume of PBSA, 5) In some experiments, the acid treatment was followed by DNAase treatment. In no instances did this treatment give higher RIA values than without DNAase treatment. These experiments are therefore not included in Table 1. 6) Trypsinization. Treatment with 25 μg/ml of trypsin (TRL, Worthington Biochemical Corp., Freehold, New Jersey) for 1 h at 37°C. Although activation of antigenicity of ADV was observed in some instances (and never any decrease in antigenicity), in no instance did this treatment give additional activation that could not be achieved with the other activation methods. The trypsinization values are therefore not included in Table 1.

RESULTS AND DISCUSSION

The total purification and activation data for organ materials from mink infected with 5 different ADV isolates are presented in Table 1. The mink infected with the DK and Utah isolate of ADV were grouped into groups with low vs. high serum antibody titers. The total virus yields from these groups turned out to be very similar, indicating that relative high antibody content of the initial organ material can be removed without losing too much virus. However, care must be taken not to overtreat with Freon. In all purification experiments, examples of overtreatment with Freon are given (pilot experiments). This proves that Freon can denature the virus if too many treatments are carried out. Another conclusion from the low vs. high antibody grouping experiment is that although the organ material from the high antibody groups gave a higher organ weight per mink, the additional Freon treatment (or other activation treatments) of these preparations and consequently greater loss of virus brought the total virus yield to the same as found in the low antibody groups (which required less Freon activations). These experiments also showed that reextraction of the crude organ material yielded on the average 25% more virus.

Repeated Freon activation used as the only activation method did not seem to remove all antibody bound to the virus. This has only been documented indirectly by the present study (acid activations, see later) but direct evidence has been given elsewhere (3). Such preparations also induce an antibody production against mink immunoglobulin in mice (R. Race, unpublished results).

Four virus activation methods (Freon, acid, DNAase, trypsin) were used in this report. We have recently shown that Freon activated virus preparations contain DNA (1, 2). Whether the DNA actually coats the virus to a certain extent and

thus hides antigenic determinants on the virus is not known, but the fact that DNAase treatment actually increased the antigenicity of some of the preparations points toward such a mechanism. Acid treatment also had a beneficial effect for most of the preparations (but not all). For example, the MT virus preparation was only active in CIE when it was acid treated and one Utah antigen preparation went from a + to a ++++ CIE reaction. In other instances, the acid treatment increased the virus titer in RIA. In no instances did the acid treatment seem to spoil ADV antigenic activity.

Trypsin activation increased in some instances the RIA titer (data not shown), but the same effect was found with either acid or DNAase treatment. DNAse treatment of acid treated virus did not further increase the virus antigenicity. The reason for this could be that the ultracentrifugation in the presence of acid eliminates most DNA.

In general, it was found that the optimal virus titer in RIA did not correlate with the CIE quality of the virus. Table 1 gives several examples on declines in RIA titer when the preparations became optimal in CIE. This probably means that the requirement for antigen purity is higher for CIE than RIA (e.g., antigen works in RIA even when it is not fully activated, for example, two virus particles coupled together will work in RIA but not in CIE).

CONCLUSION

The purification procedure we will recommend from the studies is freon treatment, ultracentrifugation, freon treatment, ultracentrifugation followed by acid activation (FUFUA). It is, in our opinion, the easiest purification procedure which also happens to give the cleanest antigen (highest specific activity).

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EXPERIMENTAL ENCEPHALITOZOONOSIS IN THE BLUE FOX. TRANSPLACENTAL TRANSMISSION OF THE PARASITE.

Mohn, S.F., Nordstoga, K., Møller, O.M., Natl. Vet. Institute, P.O. Box 8156, Dep., Oslo 1, Norway.

Spores of Encephalitozoon cuniculi were recovered from foetal and placental tissues from blue fox females orally inoculated with the parasite. The results provided evidence for transplacental transmission of the causative agent of fox encephalitozoonosis.

Acta Vet. Scand. 1982, 23, 211-220.
3 figs., 1 table, 16 references. Authors' abstract.
In ENGL, summary in NORG.

EXPERIMENTAL ENCEPHALITOZOONOSIS IN THE BLUE FOX. NEONATAL EXPOSURE TO THE PARASITE.

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Newborn and young pups up to the age of 15 days were exposed to E. cuniculi, either by keeping the pups in cages together with orally inoculated foster-mothers and their offspring, or by oral inoculation with E. cuniculi spores. A majority of pups appeared sero-positive to E. cuniculi with the india-ink immunoreaction from 35 to 87 days post exposure; spores of E. cuniculi were detected in organs of some of the animals. The non-inoculated pups kept together with the orally inoculated pups became sero-positive from 49 to 129 days after the oral inoculations. However, the exposure of newborn and young pups failed to induce clinical encephalitozoonosis, and when killed at the time of pelting the body weights and fur quality appeared to be within the normal range in all exposed foxes. No macroscopic lesions were detected in the various organs. Histologically focal interstitial nephritis occurred in the great majority of the seropositive animals. Meningo-encephalitis was seen in some of the foxes, whereas slightly thickened walls of some arteries, mainly in the myocardium, were found in a few animals.

The lesions of the brain and kidneys seem to be very similar to those seen in chronic cases of rabbit encephalitozoonosis. Polyarteritis nodosa and severe encephalitis and interstitial nephritis with extensive proliferations of plasma cells, which are almost constant findings in cases of clinically diseased foxes, were not detected in any of the subclinically infected animals. Various factors that might be of significance in the pathogenesis of the disease are discussed, and it is concluded that intrauterine infection of the pups via the transplacental route appears to be an essential supposition for the establishment of clinical fox encephalitozoonosis.

Acta vet. Scand. 1982, 23, 344-360.
1 table, 7 figs., 17 references. Authors' summary.
In ENGL, summary in NORG.

STUDIES ON THE PATHOGENESIS OF ALEUTIAN DISEASE OF MINKS.

(Untersuchungen zur pathogenese der aleutenkrankheit der nerze).

Collatz, Anna Bianca, Sao Paulo, Brasilien.

In the present study it was attempted to propagate the virus of Aleutian disease (AD) in a suitable cell culture system. In the experiments, different cell lines (FeEC, Mv_1Lu, $MiCl_1$, and CRFK) as well as primary cell cultures of fetal mink organs were used. In infections with the moderately virulent AD virus strain SK-66/Hannover these cell culture systems proved to be unsuitable for the propagation of the AD virus. In one experiment parvovirus-like particles were demonstrated by electron microscopy of a cell culture of fetal mink organs. However, it was not possible to identify AD viral antigen in tissue culture cells by immunofluorescence.

In three experiments the infectivity and pathogenicity of the two AD virus strains "Guelph" and "Utah 1" was tested in mink. In two of the experiments only one mink showed hypergammaglobulinemia as evidence of clinically manifest AD, whilst in all other animals only histological organ changes were noted. The possibility is discussed that a higher resistance of the experimental mink may be the cause

of the clinically inapparent course of experimental AD.

To further elucidate the immunopathogenesis of AD, experiments were carried out to demonstrate in glomeruli of mink kidney a receptor for the third complement factor (C3). With two different systems of indicator cells it was shown that this type of receptor is present on mink B lymphocytes; however, in all trials there was no evidence for the presence of a C3 receptor in glomeruli of the mink kidney. Thus, it is concluded that in AD of mink other pathomechanisms may be responsible for the deposition of circulating immune complexes in the kidney.

Inaugural-dissertaion, Hannover Tierarztliche Hochschule, Inst. f. Path and Virologie, 1982.
99 pages, 7 tables, 10 figs. 109 references. Author's summary.
In GERM, summaries in ENGL and PORT.

ISOLATION OF VIRUS AND ANTIBODY CONTAINING IMMUNE COMPLEXES FROM MINK WITH ALEUTIAN DISEASE BY AFFINITY CHROMATOGRAPHY OF EQUINE COMPLEMENT Clq.

Burger, Dieter, Sriranganathan, Nammalwar, McDonald, Thomas, Gorham, John R., Washington State University, Pullman, WA 99164, USA.

Affinity chromatography on immobilized equine complement Clq was used for the isolation of complement-binding immune complexes in sera of mink infected with Aleutian disease virus. Immune complexes were isolated and quantitated from 4 of 5 mink, as early as 2 weeks after infection and before hypergammaglobulinea had appeared. The quantity of immunoglobulin G in these immune complexes ranged from 180 to 370 µg/ml serum. There were no Clq-binding immune complexes found in mink which were negative for Aleutian disease antibody. Using ^{125}I-labeled BSA-anti-BSA complexes, we demonstrated that the affinity columns bound selectively immune complexes which had formed in antibody excess, whereas immune complexes in antigen excess were not bound. By neutralization of sensitized virus with anti-mink IgG serum, non-Clq-binding immune complexes were also detected, which indicates

that circulating immune complexes in persistently infected mink are heterogeneous as far as their reactivity with equine Clq is concerned.

Am.J.Vet. Res., Vol. 44, no.1, 86-90.
24 references, 5 figs., 2 tables. Authors' summary.

ESTROGEN-INDUCED BONE MARROW DEPRESSION IN FERRETS.

Bernard, Susan L., Leathers, Charles W., Brobst, Duane F., Gorham, John R., The Animal Disease Research Unit., Agricultural Research Service, US, Dept. of Vet. Microbiology and Pathology, College of Veterinary Medicine, Washington State University, Pullman, WA 99164-7040.

The administration of estrogen-induced severe bone marrow depression in 9 of 12 ferrets, independent of sex (male, female) or ovariohysterectomy. Resultant pancytopenia was manifested by subcutaneous petechiae, melena, hematomyelia, pale mucous membranes, pale bone marrow, centrilobular hepatic degeneration, hydrometra, and pyometra. These findings are compatible with the naturally occurring estrus-associated anemia seen in female ferrets.

Am. Journ. of Vet. Res., Vol. 44, no.4, 657-661, 1983.
3 tables, 6 figs., 12 references. Authors' summary.

SEROLOGICAL SURVEY OF INFLUENZA A VIRUS INFECTION IN MINK.

Yagyu, Kazuhiro, Yanagawa, Ryo, Matsuura, Yoshiharu, Fukushi, Hideto, Kida, Hiroshi, Noda, Hiroshi, Dept. of Hygiene and Microbiology, Faculty of Vet. Medicine, Hokkaido University, Sapporo-shi, Hokkaido 060, Japan.

Serum samples were collected from 1278 mink 3-9 Months old, on five farms in Central and North-West Hokkaido during the period August 1978 to December 1980. The haemagglutination inhibiton test was carried out

using antigens of 20 strains of influenza A virus. Titres of 1:32 or more were considered positive. Of 175 serum samples from one farm tested in November 1980, 31 were positive for Hokkaido/80 (H3), 28 for Kumamoto/76 and 5 for Aichi/68. Of 110 samples from the same farm tested during December 1980 44 were positive for Hokkaido/80 (H3), 38 for Kamamoto (76) and 1 for Aichi/68. In Three of the other farms small numbers were positive for Kumamoto/76 (7 of 90, 9 of 147, 4 of 100), Hswinj/76 (6 of 90) and Hopr/8/34 (3 of 147) strains during November or December 1979.

Jpn. J. Vet. Sci., 44 (4), 691-693, 1982.
6 references, 2 tables. CAB-abstract.
In ENGL, summary in JAPN.

THE EFFECTIVENESS OF PROPHYLACTIC VACCINATION AGAINST SALMONELLOSIS BY THE USE OF POLITYPHOVAC.

(Ocena skuteczności szczepień profilaktycznych przeciw salmonelozie lisów przy uzyciu szczepionki Polityphovac).

Kopczewski, Antoni, Stryszak, Marta, Chylinski, Gracjan, Inst. Weterynarii w Pulawach z siedziba w Gdansku, Zaklad Higieny Weterynaryjnej, ul. Kaprów 10, 80-316 Gdansk, Poland.

The examinations were carried out on three farms of polar foxes containing 100, 90 and 70 females of basic drove. During winter and summer half of the droves was vaccinated and the second half served as control. The vaccinations were performed twice at an interval of 10 days using a dose of 3 ml and 4 ml in adult foxes, and 1 ml and 2 ml in young on the first and second injection, respectively. The percentage of foxes suffering from salmonellosis was lower in the group of animals vaccinated at about 5 per cent. The disease in young foxes occurred in the both groups though an increased intensity was noticed in the control one.

Medycyna Weterynaryjna, Vol. 38, 6, 283-284, 1982.
14 references. Authors' summary.
In POLH, summaries in ENGL and RUSS.

STUDIES ON THE USEFULNESS OF DRONCIT (BAYER) IN THE CONTROL OF TAPEWORMS INVASION IN CARNIVORES.

(Badania nad przydatnością preparatu Droncit (Bayer) do zwalczania inwazji tasiemców u zwierzat miesozernych).

Ramisz, Alojzy, Piechocki, Bogdan, Serwin, Jan, Zaklad Higieny Weterynaryjnej, ul. Brodowicza 13a, 31-518 Kraków, Poland

Forty two dogs, twenty seven cats, and thirty three foxes were dehelminthized in 1980-1981. The extensiveness and intensity of invasion, and besides the genus and species of tapeworm were assessed on the basis of gross and microscopic examinations of feces (Willis-Schlaaf's method). The invasion of Dipylidium caninum and Taenia spp. was found in79 and 23 cases, respectively. The results of treatment were checked by means of coproscopic method (twice between the 7th and the 8th day, and between the 25th and the 30th day) and at necropsies (between the 10th and the 14th Day). Droncit was given orally in a dose of 5 mg/kg of body weight, i.e. one tablet per kg. The drug proved to be very effective against the tapeworm invasion in carnivores: all the dogs and foxes were free from tapeworm invasion of Taenia and Dipylidium caninum spp. The segments of D. caninum were found only in one cat reexamined after 25 days.

Medycyna Weterynaryjna, Vol. 38, 10, 527-529, 1982.
12 references, 1 table. Authors' summary.
In POLH, summaries in ENGL and RUSS.

THE FERRET (MUSTELA PUTORIUS FURO) AS AN EXPERIMENTAL HOST FOR BRUGIA MALAYI AND BRUGIA PAHANGI.

Crandall, R.B., McGreevy, P.B., Connor, D.H., Crandall, C.A., Neilson, J.T., McCall, J.W., Dept. of Immunology and Medical Microbiology, College of Medicine, Box J266, University of Florida, Gainesville, Florida 32610.

Ferret inoculated subcutaneously with 150-200 infective larvae of Brugia malayi (subperiodic strain) usually developed patent infection during the 3rd month post inoculation. Microfilaremia was transient, and most

animal became amicrofilaremic after the 6th month of infection. Ferrets developed a persistent eosinophilia at the time of patency. At necropsy, 5-8 months post infection, adult worms were recovered principally from lymphatic vessels and recovery ranged from 0.5-13% of the inoculated larvae. The inflammatory response of ferrets to microfilariae was characterized by nodules 1-5 mm in diameter in the liver, lung, spleen, and submucosa of the gastrointestinal tract. The center of these lesions contained a degenerated microfilaria or the cast of a microfilaria embedded in Splendore-Hoeppli substance. The Splendore-Hoeppli substance was surrounded by eosinophils and/or foreign body giant cells. Identical lesions were observed in ferrets experimentally infected with Brugia pahangi. Sera from ferrets infected with B. malayi demonstrated a 3- to 5-fold increase in IgG by the 4th Month of infection and these sera produced 2-3 precipitin bands in double gel diffusion assays with an extract of B. malayi microfilarial antigen. Skin tests with B. malayi microfilarial antigen showed that the majority of the infected ferrets had immediate hypersensitivity responses, but none had Arthus or delayed hypersensitivity responses.

Am.J.Trop. Med.Hyg. 31 (4), 1982, 752-759.
6 figs., 25 references. Authors' summary.

POLECAT'S PARASITISM (MUSTELA PUTORIUS) BY TROGLOTREMA ACUTUM. BIBLIOGRAPHICAL STUDY AND PRELIMINARY RESEARCH IN EASTERN FRANCE.

Artois, M., Blancou, J., Gerard, Y., Min.de l'Agriculture, Direction de la Qualité, Serv. Vet., Ctr. Natl. d'Etudes sur la Rage et la Pathologie des Animaux Sauvages, B.P. 9, F-54220 Malzeville. France.

The authors present a bibliographical review of our present knowledge about polecat troglotremosis.

Then, they give an account of systematic research of this disease on 14 polecats, 28 stone martens, 4 martens, 4 badgers, 1 wessel and 1 stoat.

ARASITISME DU PUTOIS PAR *TROGLOTREMA ACUTUM*

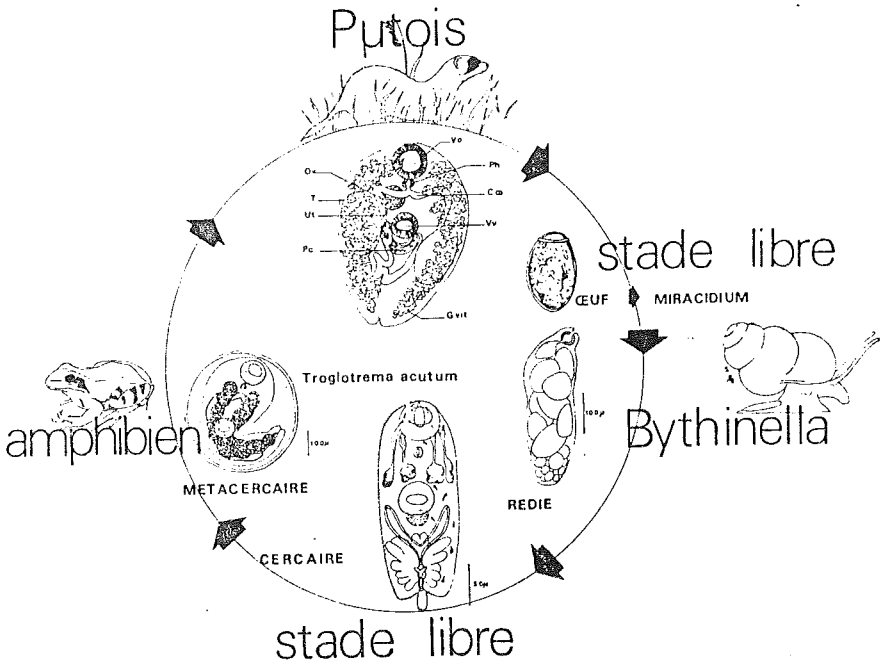

FIGURE 2 : Cycle évolutif à trois hôtes de *Troglotrema acutum*.
Adulte, d'après J. G. BAER [1]. Vo : Ventouse orale - Ph : Pharynx - Cœ : Cœcum intestinal - Vv : Ventouse ventrale - G.vit : Glandes vitellogènes - P.c. : Poche du cirre - Ut : Utérus - T : Testicule - Ov : Ovaire.
Oeuf, rédie et cercaire d'après H. VOGEL et J. VOELKER [20] - Métacercaire d'après B. GRABDA-KAZUBSKA [5].

Only the polecats proved to be infested at a 50 p. 100 rate.

Revue Méd. vét. 1982, 133, 12, 771-777.
3 figs., 1 table, 23 references. Authors' summary.
In FREN, summaries in GERM, ENGL., SPAN.

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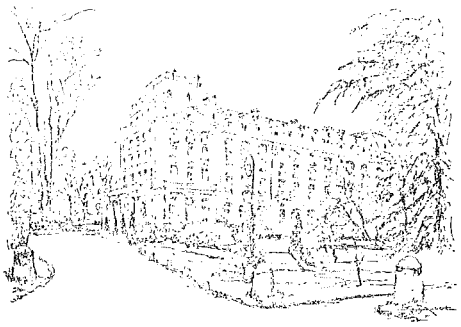

Dr Gunnar JØRGENSEN
National Institute of Animal Science
Fur Bearing Animals
Trollesminde
48 H Roskildevej
DK-3400 HILLERØD
DANEMARK

We are very pleased that you will present a paper at the 3rd International Scientific Congress on Fur Animal Production to be held in Versailles.

Instructions for typing your abstracts and papers are enclosed with the forms on which they should be typed. Abstracts should be returned to the Secretary before November 1, 1983 so that they can be distributed to participants before the Congress. Papers should be sent in before December 15, 1983 and will be given to participants at the opening of the Congress.

We have received 45 papers and 2 posters proposals from the following countries : Argentina, Canada, Czechoslovakia, Denmark, Finland, Federal Republic of Germany, France, Great Britain, Iceland, the Netherlands, New Zealand (opossum !), Norway, Poland, Romania, USA, USSR, Yugoslovia.

As usual, most of the papers concern reproduction, nutrition and pathology, but all the themes are well-treated and several species (mink, fox, blue-fox, nutria, racoon-dog, opossum) studied.

We will probably be about 100 participants, and our serious scientific thoughts will be tempered (I don't say distracted !) be the agreeable presence of quite a few wives.

Other news will follow.

With kind regards, Thank you very much for your help

T. Rougeot

J. ROUGEOT

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Book reviews.

THE COCCIDIAN PARASITES (PROTOZOA, APICOMPLEXA OF CARNIVORES.

by Norman D. Levine and Virginia Ivens.

A comprehensive monograph of carnivore parasites of the family Eimeriidae Minchin and Sarcocystidae Poche. Of special interest are parasites of host families Canidae and Mustelidae, comprising of the majority of known Coccidian parasites, also of lesser known host Geni.

For each parasite the paragraph is divided into: Type host, other host, location, geographic distribution, oocyst structure, sporulation, merogony, gametogony, prepatent period, pathogenity etc. For extra clarification a number of plates are presented of some parasites by using clear and stylized drawings.

The Coccidian Parasites of Carnivores

Plate 2

7. *Isospora canis* Nemeséri, 1959 from *Canis familiaris* (from Lepp and Todd, 1974). 1300X.

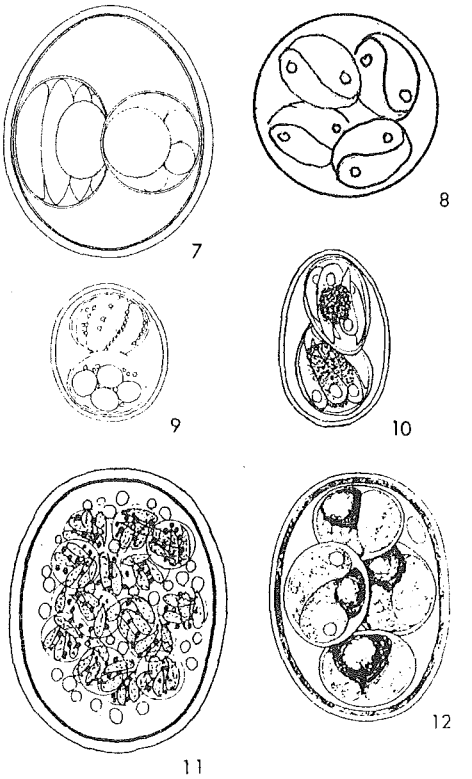
8. *Eimeria adleri* Yakimoff and Gousseff, 1936 from *Vulpes vulpes* (from Yakimoff and Gousseff, 1936).

9. *Isospora babiensis* de Moura Costa, 1956 from *Canis familiaris* (from Levine and Ivens, 1965b--cited as *I. bigemina*). 2200X.

10. *Isospora fennechi* Prasad, 1965 from *Fennecus zerda* (from Prasad, 1961). 1100X.

11. *Klossia* sp. Golemansky, 1975 from *Vulpes vulpes* (from Golemansky, 1975). 1000X.

12. *Eimeria vison* Kingscote, 1935 from *Mustela vison* (from Levine, 1948). 2000X.



Ref. Asbjørn Brandt.

249 pp, 1981 (36 pp of ref.) 16 pl.
Champaign, Illinois 61820, USA, University of Illinois Press, Box 5081, Station A. ISBN 0-252-00856-1, Price: Dol. 15.95.

HOLDAS, S.

CHINCHILLA PRODUCTION
[A CSINCSILLA TENYESZTESE] = (HU)
BUDAPEST (HUNGARY), MEZOGAZDASAGI KIADO, 19[illegible]
P. (1982)
MONOGRAPH
NUMERICAL DATA
NOTES : 42 TABLES , 7 GRAPHS , 22 ILL.
ISBN : 963 231 1[illegible]

A CSINCSILLA TENYÉSZTÉSE

Mezőgazdasági Kiadó · Budapest, 1981

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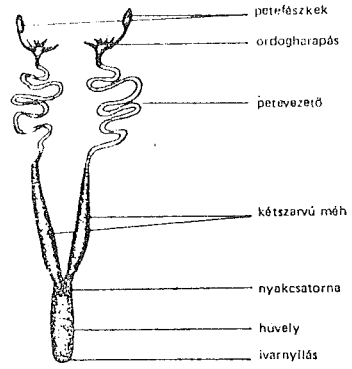
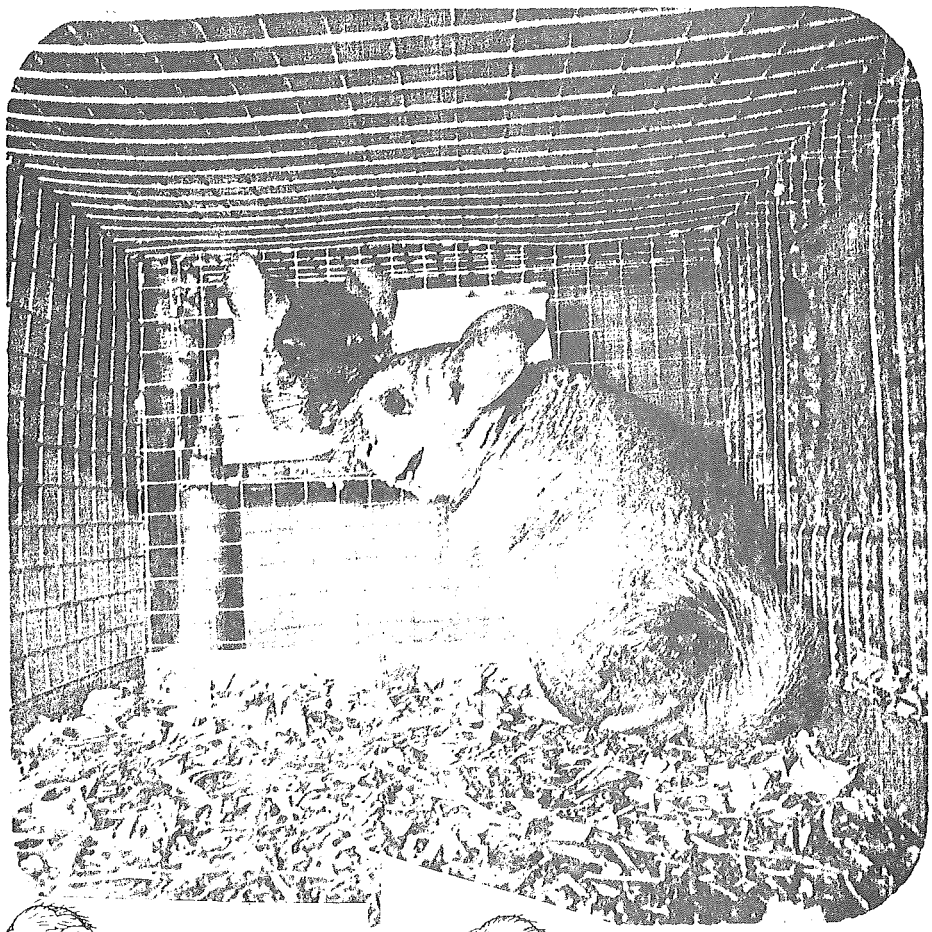
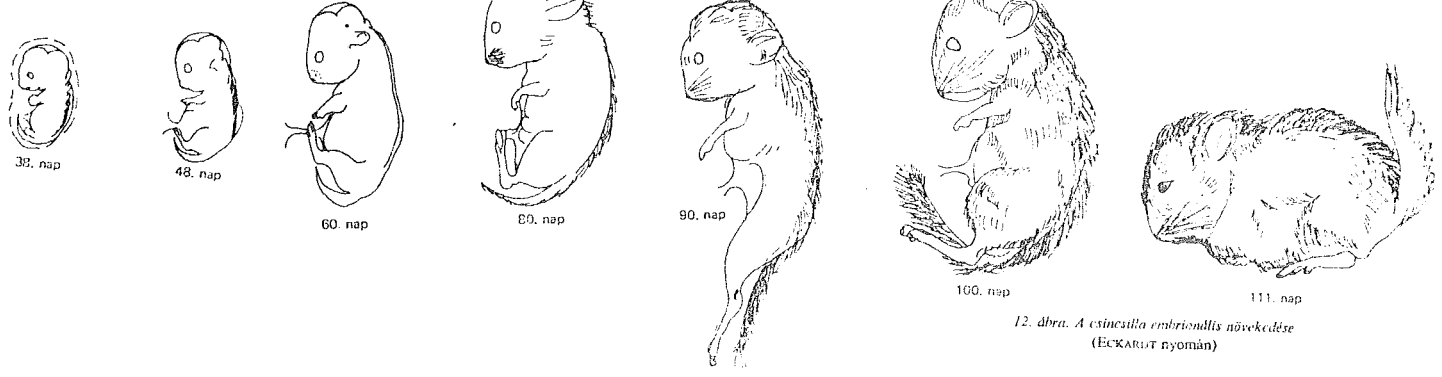
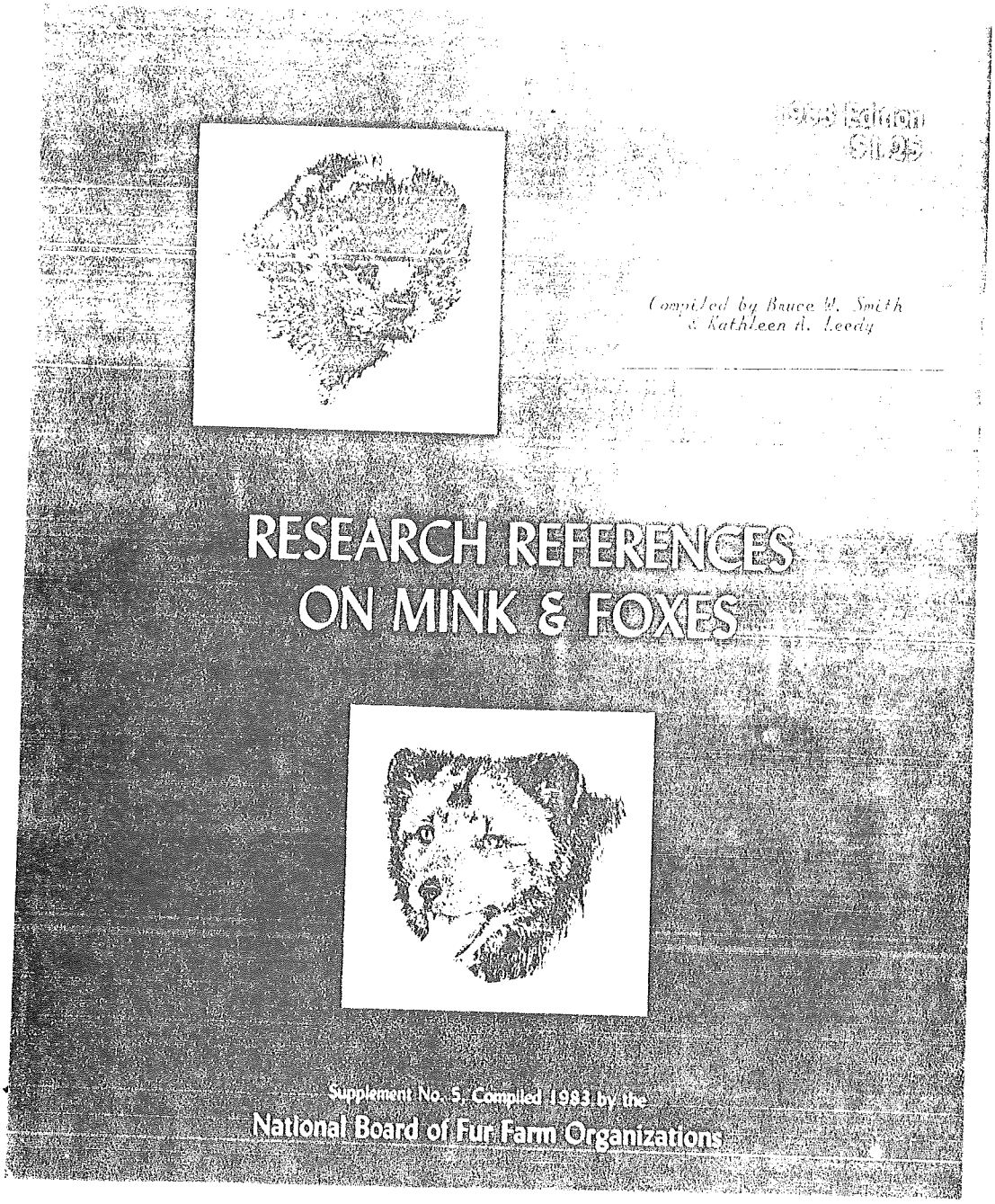
11. ábra. A nőstény csincsilla ivarszervének vázlatos rajza







12. ábra. A csincsilla embrionális növekedése
(ECKARDT nyomán)



For the convenience of fur farmers, the references herein to fur farming publications show the month, year, and page number of the publication where the article appeared. For technical publications, the volume and issue numbers and page numbers are shown.

The National Board does not have copies of any of the reports cited herein for distribution. Professional and scientific journals can be located in any major library; libraries of land-grant universities and colleges also can be consulted.

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Publications from Finland.

In Finland all activities in fur animal research is promoted by Yrjö Helves Foundation. Some of the activities are financed by government funds, but the main financial support comes from Finnish Fur Breeders Association.

Yrjö Helves Foundation (Yrjö Helves Stiftelse) publish a report serial under ISSN 0358-3759. The address is: Helves Stiftelse, PB 5, 01601, Vanda 60, Finland.

Following publications are available:

1. Juokslahti, T. Bacteriological quality of mink feed and its effect on the health of mink as monitored by some blood parameters. 1980.
2. Mäkelä, J. et al. Vassbuk och mört som pälsdjursfoder. (Vassbuk (clupea sprattus) and roach (rutilus dutilus L.) as fur animal feed) 1981.
3. Finlands Pälsdjuruppfödares Förbunds frivilliga foderkontrolls analyseresultat 1980. (Feed analysis from the feed control 1980). 1981.
4. Berg, H. Användning av alternativa proteinfodermedel i minkens utfodring. (Use of alternative protein feedstuffs in the mink feed). 1981.
5 Kangas, J. et al. Tillvaratagande av pälsdjurskroppar, deres behandling och användning i fodret. (Treatment and utilization of fur animal bodies in the feed). 1982.
6. Kangas, J. Sjukdomar hos räv och märdhund. (Diseases in fox and finn raccoon). 1982.
7. Finlands Pälsdjuruppfödares Förbunds frivilliga foderkontrolls analyseresultat 1981. (Feed analysis from the feed control 1981). 1982.
8. Sundqvist, C. Förbattring av minkens valpresultat medelst spermaundersøkning och testosteronhaltbestämning. En serologisk analys av testikelvävnaden. (Increasing the breeding result in mink during spermacontrol and testosterone measurement. A serological analysis of testis). Vanda 1982.
9. Fodermedelstabell för pälsdjur. (Nourishment content of feeds for fur bearing animals). Pälsdjurslaboratoriet 1982.
10. Kangas, J., Smeds, E. Plasmacytos hos mink - sjukdomsförlopp och bekämpning. (Plasmacytosis in mink - disease and erradication).

The language used in the report is Swedish (except in cases where the title is stated in English).

Some of the publications will be presented in future issues of SCIENTIFUR (in English).