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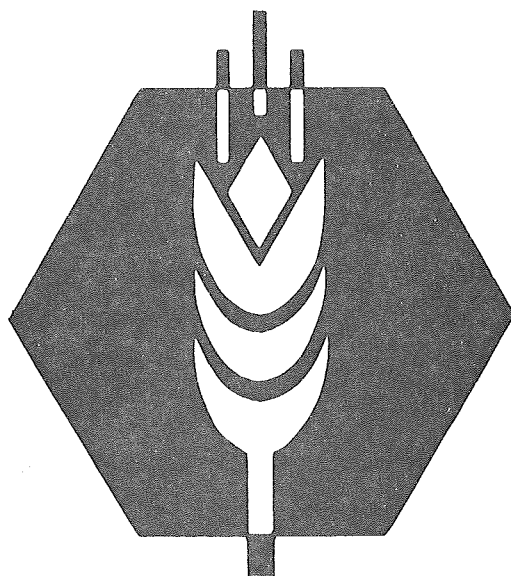
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Tracnit fra Silvio Bellis «Libro del misvar con la vista...»  
fra Venezia 1569.

N O T E S  
SCIENTIFUR, VOL. 5, NO. 3, 1981.

Dear readers

Thank you very much for all contributions received for SCIENTIFUR during the last months. It looks like the 5th Volume will be as voluminous as the former volumes, and we believe - thanks to you - that SCIENTIFUR is going to be more and more valuable for scientists, advisers, and others in the fur animal industry because abstracts and communication are going to be more regularly and up to date.

Under COMMUNICATION you can see that we have got a new Dr.Sc. Agric. among us, namely Mr. Anders Skrede from Norway, who we in this way want to congratulate with the degree.

We welcome the new contributors, Dr. Barbara Stanislawska and colleagues from The Zootechnical Institute in Bydgoszcz, Poland, and Dr. Ante Hraste from The Veterinary University in Zagreb, Yugoslavia. Thank you for your contributions.

From New Zealand we have received a letter in which Dr. M.G. Ashby ask for relevant papers and reports regarding farm production of The Australian Brush-tailed Possum (*Trichosurus vulpecula*). We hope that some of SCIENTIFUR's readers can be help-

ful to Dr. Ashby and provide him with relevant material. The address can be seen from the letter under COMMUNICATION.

A colleague from Hungary, Dr. Pèter Nagy ask a more general question about all kinds of information regarding fur animal production. (His address appears also under COMMUNICATION).

Of course, we have introduced SCIENTIFUR to both of the writers, but we believe they will be grateful to receive actual material direct from our readers.

Under COMMUNICATION in Vol. 5, No. 2, we published the preliminary program for The Annual Scandinavian Scientific Meeting about Fur Animal Production, which will go on in Finland October 7-9, this year. We also mentioned that the meeting language will be in Scandinavian, but due to the fact that many of our readers speak and understand Scandinavian languages we bring a final invitation in this issue and a formula to use for anybody who want to participate the meeting.

We know that The International Mink Breeders Conference has been held in York, England, in April this year, but we have not yet received proceedings from this conference, so people interested in these papers have to take direct contact to The Fur Breeders Association of the United Kingdom.

According to the development in the rate of exchange it would has been a very good business for SCIENTIFUR to get the subscriptions paid in US dollars instead of in Danish crowns. But we hope you will understand that the subscription price of Dkr. 200.- per volume - which price has been valid during the last 3 years - is going to be too small for running such an operation. Only the postage expenses have risen more than 100 per cent during these years. Therefore, we hope that you

all will find it okay that the subscription price will go up from January 1982 with about 25 per cent.

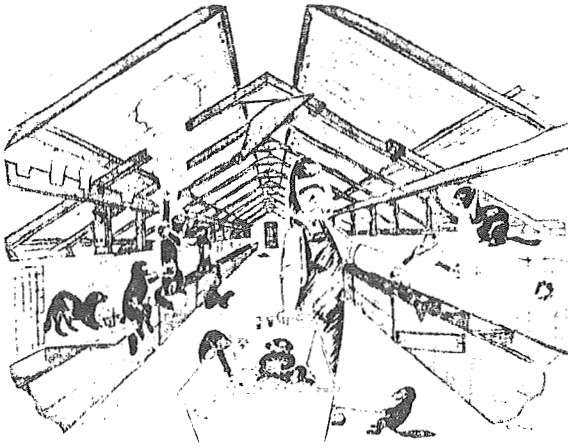
Yours sincerely

  
Gunnar Jørgensen

editor







## MULTIDISCIPLINARY

### THE CELIAC TRUNK IN MINKS.

Cezariusz Wiland, Inst. of Animal Production, Technical-Agricultural Academy Bydgoszcz, ul. Hanki Sawickiej 28, 85-084 Bydgoszcz, Poland.

Observations on the celiac trunk in 102 American minks showed that it resembles the celiac trunk in dogs, the only difference being reduction of some of the branches of the hepatic artery. The splenic and left gastric arteries in minks usually arise as a single trunk.

Variations pertain to the origin of the different arteries of the celiac trunk from the cephalic mesenteric artery.

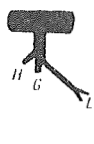


Fig. 2. Length of the celiac trunk in the mink.



Fig. 3.

Fig. 3. Variation of branches of the celiac trunk in the mink;  
Fig. 4. Varieties of the celiac trunk in the mink.

Fig. 4.

### Conclusions.

1. In minks, similarly to dogs, the celiac trunk divides into three arteries: the hepatic, splenic and left gastric.

2. The hepatic artery, after giving off slender proper hepatic arteries, continues to the pancreas as the cephalic pancreaticoduodenal artery.
3. The splenic and left gastric arteries usually arise as a common trunk from the celiac trunk.
4. Variations were observed consisting in origin of some of the arteries of the celiac trunk from the cephalic mesenteric artery.

Folia Morphologica, XXIX, 1970, 2.160-164.

3 figs., 2 tables, 12 references.

In English.

Authors abstract and  
conclusion.

#### VARIATION IN BASAL ARTERIES OF THE BRAIN IN POLECAT (*MUSTELA PUTORIUS PUTORIUS* L.)

C. Wiland, R. Jablonski, Inst. of Animal Production, Technical-Agricultural Academy Bydgoszcz, ul. Hanki Sawickiej 28, 85-084 Bydgoszcz, Poland.

Observations carried out on 106 polecat brains showed that the system of basilar arteries of the brain is similar to those in other carnivorous species. The observed variation was manifested in a differentiation connections of the vessels, in occurrence of some variations and in asymmetry. Some cases of such variations were hitherto observed only in some ruminants.

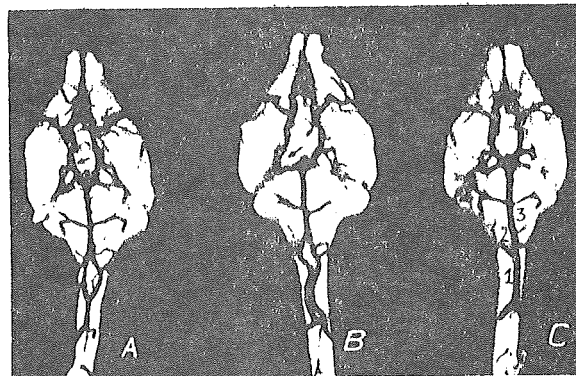


Fig. 3. Types of joining of arteries supplying the basilar artery of the brain. A - vascular loop, B - direct emptying of the IIIrd mesencephalic arteries, C - the cerebrospinal arteries emptied directly into the central mesencephalic trunk and basilar artery. 1 - central mesencephalic trunk, 2 - cerebrospinal artery, 3 - basilar artery.

Anat. Anz. Bd., 140, 498-502, 1976.

6 photos, 10 references.

In English.

Authors summary.

**MORPHOLOGICAL COMPONENTS AND BLOOD SERUM PROTEINS IN  
HYBRIDS OF THE SKUNK AND FERRET DURING THE POSTNATAL PERIOD.**

Henryk Bieguszewski, Roman Szymeczko, Zakład Fizjologii i Anatomii  
Zwierząt, Instytut Zootechniczny, Akademia Techniczno Rolnicza,  
85-084 Bydgoszcz ul. Hanki Sawickiej 28, Poland.

Examination was made of morphological indexes of blood serum proteins in hybrids of the skunk and ferret of different age. During the first few days of postnatal life the level of red blood corpuscles, haematocrit and haemoglobin in the blood of these animals was low. A change in the electrophoretic picture of their blood serum proteins was found to take place with growth.

Acta Theriologica, Vol. 23, 15, 269-276, 1978.

2 tables, 16 references.

In English with summaries in English and Polish.

Authors summary.

**AMINONITROGEN AND FREE AMINOACIDS IN POLAR FOXES PLASMA  
DIFFERENT TIMES FOLLOWING FEEDING.**

(Azot aminowy i wolne aminokwasy w osoczu krwi lisów  
polarnych w różnym czasie po pobraniu karmy).

Stanisława Stefańczyk, Henryk Bieguszewski, Zakład Fizjologii  
i Anatomii Zwierząt, Instytut Zootechniczny, Akademia Tech-  
niczno Rolnicza, 85-084 Bydgoszcz ul. Hanki Sawickiej 28,  
Poland.

Aminonitrogen content was found to be higher in the blood of adult foxes than in that of young animals in the first few hours after feeding.

The studies showed that after 24 and 48 hours of starving the aminonitrogen content in adult foxes blood was near to the content found in every time in young animals.

Eight 12, 28, 48 hours following feeding statistical significant greater decrease of aminonitrogen content in the blood of adult animals was observed.

In young animals no differences were found in aminonitrogen rate and the period in which the blood samples were taken.

Our investigations showed too, a distinct effect of feeding on free aminoacids, rate in the plasma of adult foxes blood. Simultaneously with the time increase between blood sampling and feeding, total concentration of free aminoacids decrease in blood was noted.

The decrease of free aminoacids content in blood, 12 and 24 hours following the feeding of animals did'nt cover in the same degree all the aminoacids.

The observations suggest that the polar foxes have the ability of storing and saving exogenous aminoacids, absorbed from the gastrointestinal tract to the blood or they mobilize these aminoacids during the body protein catabolism in the time of starving.

Zeszyty Naukowe, Wyższej Szkoły Rolniczej w Olsztynie, 26, 741, 1970, 65-75.

3 tables, 21 references.

In Polish with English subtitles. Summaries in English and Russian.

Authors summary.



AMINO ACID COMPOSITION OF SOME SYSTEM PROTEINS IN  
POLAR FOXES.

(Skład aminokwasowy niektórych białek ustrojowych  
u lisow polarnych).

Romual Rajs, Instytut Zootechniczny Akademii Techniczno - Rolniczej Zakład Fizjologii i Anatomii Zwierząt, 85-084 Bydgoszcz ul. Hanki Sawickiej 28, Poland.

In that paper there is presented amino acid composition of proteins; blood plasma, red blood corpuscle, liver, muscles and hair of polar foxes, 18-20 amino acids are stated to be found in particular proteins.

These amino acids are determined by means of acid protein hydrolysis, and subsequently by means of highvoltage electrophoresis and ascending paper chromatography. The results of carried out measurements show similar quality with unstable number of particular amino acids in analysed proteins of the system.

Bydgoskie Towarzystwo Naukowe, Prace Wydziału Nauk Przyrodniczych Seria B, Nr 20, 1974.

In Polish with summaries in English and Russian.

3 tables, 9 references.

Author summary.

CHANGES IN THE THYROID ACTIVITY IN POLAR FOXES AS AN  
EFFECT OF AGE AND OF VARYING TEMPERATURE OF THE ENVIRONMENT.

(Zmiany w aktywności tarczycy u lisów polarnych związane z wiekiem i różną temperaturą otoczenia.

Henryk Bieguszewski, Fryderyk Korowajczyk, ul. Okrzei 1 m 82, 85-317 Bydgoszcz, Poland.

Investigation were carried out concerning the thyroid activity in 76 adult and 15 young (2 1/2 months old) polar foxes by means

of the J131 test. The criteria for determining the thyroid activity were as follows: the rate of J131 excretion in the urine and faeces, protein-bound J131 in blood plasma (PBJ131), conversion index, and the two hours' test on the uptake of radioactive iodine by the thyroid in the animals tested.

The thyroid activity in the young foxes was found to be twice as high on the average as that in the adult animals. Significant differences in the thyroid activity were observed in animals kept under different temperature conditions. The rate of radioactive iodine uptake and of the thyroid hormone synthesis, as well as the rate of the appearance of hormone iodine in blood were higher in the animals kept at lower temperatures.

It was found that a higher level of PBJ131 and WKJ131 resulted in lower rate of J131 excretion in the urine and faeces.

Polski Archiwum Weterynaryjne 17,4, 1975.

3 tables, 18 references.

In Polish with summaries in English and Russian.

Authors summary.

## STUDY ON MORPHOLOGY AND SOME PHYSICO-CHEMICAL PROPERTIES OF BLOOD OF FERRET AND SKUNK.

(Morfologia i niektóre właściwości fizyko-chemiczne  
krwi fretki i tchórza).

J.P. Kluczek, Zakład Hygieny i Weterynarii, Instytut Zootechniczny Akademia Techniczno-Rolniczej, 85-084 Bydgoszcz, ul. Hanki Sawickiej 28, Poland.

Investigations were carried out on 40 ferrets (*Mustela furo*), 4 Skunks (*Mustela putorius*) and 60 Skunk-ferrets. These species were characterized by a high rate of metabolism, high excitability and aggressiveness. Because of qualitative and quantitative changes occurring in the hematological picture as a result of nervous excitation, blood had to be taken sub narcosi.

The results showed a characteristic interrelation between the species. The differences could be explained by differences in stock of the animals and in their hematological picture. No essential quantitative divergence was found between blood taken from the paw and from the heart, the only differences being of a qualitative nature, particularly in emotional states. The hematological indices accepted were those from samples taken from animals that were kept at rest (narcosis). Consecutive measurements blood of blood components in the same individual when in emotional state revealed strong divergences of the hematological values.

The author proposed to explain the disproportion of the changes with respect to the stimulus by the emotional state of the animal: nervous excitation, physical effort, pain, fear, anger, fatigue and the like.

Roczniki Wyższej Szkoły Rolniczej Poznaniu - XVII (1963)

7 tables, 5 figs., 41 references.

In Polish with summaries in English and Russian.

Author's summary

**SOME BLOOD INDICES AND BODY WEIGHT OF MINK RECEIVING  
A GROWTH HORMONE (CATTLE SOMATOTROPINE).**

(Niektóre wskaźniki krwi i ciężar ciała nerek  
otrzymujących hormon wzrostu (somatotropine bydleca).

Henryk Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt,  
Instytut Zootechniczny, Akademia Techniczno Rolnicza, 85-  
084 Bydgoszcz ul. Hanki Sawickiej 28, Poland.

After a repeated injection of somatotropine in 20 minks and influence of the hormone on the increase of body weight has been

observed, as well as on the increase of glucose content in the blood serum in comparison with control animals. The content of hemoglobin in blood, the level of aminic nitrogen in the serum as well as the hematocyte did not change in minks under the influence of STH.

Bydgoskie Towarzystwo Naukowe, Prace Wydziału Nauk Przyrodniczych Seria B, 1977, nr. 24.

2 tables, 15 references.

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

Author's summary

THE EFFECT OF THE GROWTH HORMONE (CATTLE SOMATOTROPINE)  
ON THE TOTAL BLOOD VOLUME, EXTRACELLULAR WATER SPACE,  
THE GLUCOSE AND HB CONTENT IN THE BLOOD OF GROWING  
ARCTIC FOXES.

(Wpływ hormonu wzrostu (somatotropiny bydlecej) na  
objętość krwi, przestrzeń wodna pozakomórkowa oraz  
zawartość glukozy i HB we krwi u rosnących lisów polarnych.)

Henryk Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt,  
Instytut Zootechniczny, Akademia Techniczno Rolnicza,  
85-084 Bydgoszcz ul. Hanki Sawickiej 28, Poland.

As the results of performed experiments there were found:

1. Statistically significant increase of total blood volume, blood cell volume and blood plasma in arctic foxes treated with the STH,
2. Extracellular water space increase in animals treated with the STH,
3. The glucose content in the blood of foxes rose after somatotropine treatment,
4. No statistically significant differences in hematocrit index and Hb content in blood.

Endokrynologia Polska, XXVI, 2, 1975.

1 table, 15 references.

Author's summary.

In Polish with English subtitles . Summaries in English and Russian.



EFFECT OF GROWTH HORMONE AND THYROXINE ON BODY WEIGHT  
GAIN, DIGESTIBILITY OF NUTRIENTS, NITROGEN BALANCE  
AND DEVELOPMENT OF HAIR COAT IN GROWING ARCTIC FOXES.

(Wpływ hormonu wzrostowego i tyroksyny na przyrosty  
ciężaru ciała, strawność składników pokarmowych dawki  
i bilans azotu oraz rozwój okrywy włosowej u rosnących  
lisów polarnych).

Henryk Bieguszewski, Roman Szymeczko, Zakład Fizjologii i  
Anatomii Zwierząt, Instytut Zootechniczny, Akademia Techn.  
Rolnicza, 85-084 Bydgoszcz ul. Hanki Sawickiej 28, Poland.

The experiment was with 36 healthy Arctic foxes in four groups  
of nine. From 15 to 140 days of life the foxes in individual  
groups were given every 2 weeks injections of: in group I physio-  
logical saline; in group II growth hormone (STH) 5 mg per kg  
body weight; in group III thyroxine 1 mg per kg body weight and  
in group IV STH and thyroxine in amounts as in groups II and  
III.

Average body weight at 140 days of age was in foxes given STH  
greater, 6810 g, than in control foxes, 5975 g. There was no  
stimulating effect thyroxine given alone or together with STH  
on live weight gain. Digestibility of nutrients was not affec-  
ted by either hormone.

Nitrogen retention was greatest, 3,8 g/day, in the group given  
STH and was rather adversely affected by injections of thyroxine  
or thyroxine and STH, 2.4 and 2.3 against 3.0 g/day in the con-  
trol group. The development of hair coat was earlier in foxes  
given hormones, earliest in those given STH thyroxine jointly.  
The skins of foxes given hormones got also better scores than  
control foxes.

Roczniki Nauk Rolniczych, 1979, Seria B, 99, 3.

3 tables, 11 references.

In Polish with English subtitles. Summaries in English and  
Russian. Authors summary.

## HISTOCHEMICAL STUDIES OF THE EXOCRINE PANCREAS OF THE MINK.

(Histochemische Studien am exokrinen Pankreas vom Nerz).

Claudio A. Ferraz de Carvalho, Dept. de Anatomia, Av. Dr. Arnaldo 455, Sao Paulo, Brasilien.

The author presents enzymhistochemical investigations on the exocrine pancreas of the mink. The distribution of enzymes is demonstrated. Cytochemical reactions for glycogen, neutral and acid mucosubstances are very slight. The activities of glycolytic oxydoreductases are remarkably high within the acinar cells. Lysosomal hydrolases, esterases and phosphatases are only to be demonstrated in very moderate degree of activity.

Anat. Anz., Jena, 149, 1981, 141-150.

10 photos, 50 references.

In German with summaries in English and German.

Author's abstract.

## CONTRIBUTION TO THE STUDIES OF THE FOX (*VULPES VULPES* L.) KIDNEY ENZYME ACTIVITIES.

A. Hraste, Ljiljana Pinter and Ana Slunjski, Vet. Fac. Univ., 41001 Zagreb, Yugoslavia.

Activities of alkaline and acid phosphatase as well as of esterase in the kidney of the 10 foxes raised at the Furrier Farm, Veterinary Station Cakovec, have been investigated. Esterase activity was significantly pronounced in the brush border of the proximal tubule cells. Epithelial cells of distal tubules contained strong activity of this enzyme, while glomeruli contained very low esterase levels.

Very strong alkaline phosphatase activity was found in proximal tubules, much more weaker in the distal tubules, and it was very weak in the glomerular cells. Proximal tubules in the region of Golgi complex expressed strong acid phosphatase activity, which was medium in glomeruli and weak in the distal tubules of the fox kidney.

Acta Biol. Med. Exp. 1980, 5, 7-10.

3 figs., 9 references.

In English.

Authors abstract.

#### PHOTOPERIODIC EFFECTS ON SERUM GLUCOCORTICOID AND FUR GROWTH IN MINK.

D.E. Weiss, L.V. Swanson, J. Adair, J.E. Oldfield, F. Stormshak,  
Dept. of Anim. Sci., Oregon State University, Corvallis 97331,  
USA.

The relationship of glucocorticoid secretion to artificial light-induced, early winter priming of pelage in ranch mink was investigated. On December 13, 1977, 16 mature female mink were exposed to natural light. On June 26 1978, the animals were assigned randomly to one of two groups. Animals in Group 1 were housed in a light-control facility and subjected to 6 hr of artificial light daily and ambient temperatures until November 27, 1978. Animals in Group 2 served as controls and were exposed to natural light. Samples of blood and measurements of the fur and vulva were taken biweekly throughout the year. Concentrations of total glucocorticoids in serum were determined by competitive protein-binding assay. The pelage of mink reared under reduced artificial light was fully prime by October 31, while that of control animals did not become prime until November 27 (time x light regimen interaction,  $P < .05$ ). A seasonal effect ( $P < .01$ ) on total glucocorticoid concentrations in serum of control mink was revealed by a pattern of three peaks over the 12-month period. The pattern of glucocorticoid secretion was not affected by exposure of mink to reduced artificial light. Maximum concentrations

of total glucocorticoids in serum occurred on the same date (September 5) in both groups, although levels were significantly higher in the light-treated mink ( $44.5 \pm 10.4$  ng/ml) than in the controls ( $26.9 \pm 5.7$  ng/ml). Fur growth was positively correlated with total glucocorticoid concentrations in serum during the period from June to December (overall  $r = .14$ ,  $P < .05$ ). Both length and width of the vulva increased ( $P < .01$ ) during February and March in animals reared under natural light. These data suggest that the increased secretion of glucocorticoids induced by exposure of mink to reduced artificial light may be involved in promoting early priming of the winter pelage of these animals.

Journ. of Animal Science, Vol. 51, No.6, 1980, 1367-1372.

2 figs., 10 references.

In English.

Authors summary.

**INVESTIGATIONS ON THE CORRELATIONS BETWEEN THE  
CHARACTERISTICS OF LENGTH AND WEIGHT OF THE FURS  
OF COYPUS, CONSIDERING THE SEXUAL DIMORPHISM.**

(Untersuchungen über die Wechselbeziehungen zwischen den  
Merkmalen Felllänge und Fellmasse beim Sumpfbiber (*Myocastor  
coypus*) unter Berücksichtigung des Geschlechtsdimorphismus).

W. Bernau, Humboldt-Universität zu Berlin, Sekt. Tierproduktion  
und Veterinärmedizin, Geflügel- und Kleintierzucht, DDR-  
1040 Berlin, Invalidenstr. 42.

Biological relations to the characteristics of the length and weight of the furs from 85 standard coloured coypus were the subject of our investigations.

The furs of male animals were about 4 cm longer ( $\bar{x} = 60$  cm) than those of the females ( $\bar{x} = 56$  cm). The greater part of the big furs (55.2%) was produced by male animals, whereas the females gave the assortment "3/4 big furs" (81%). In the assortment "big furs" the skin of the bucks were 24 p heavier than the skin of the females.

In the population we found significant correlations between length of the furs to weight of the furs ( $r = 0.483^{***}$ ), the coefficients of this characteristic were  $r = 0.427^{***}$  for males and  $r = 0.395^*$  for females. The variability of the length and weight of the furs influenced by genetic conditions. Probably the differences in the leather thickness are of the same origin.

Brühl, März/April 1981, pp 35-36.

2 tables, 3 figs.

In German.

Author's summary.

#### ASPECTS OF SKULL AND DENTITION MORPHOLOGY OF THE MINK (*MUSTELA VISON*).

A. Wallace Park, B.J.A. Nowosielski-Slepowron, Dept. of Dental Surgery, The University, Dundee, Scotland, U.K.

The skull morphology of the mink (*Mustela vison* Schreb.) based on a sample of 97 (56 male and 41 female) mink, ranch bred and aged between 7 months to 2 years has been examined to provide the characteristic features of an inbred colony whose ingress into the natural environment by escapes of releases has led to a viable feral population. Behavioural adaptation including breeding of the feral group is confirmed and the need for a cranial morphological base line is therefore paramount if cranial morphological adaptations arising from the feral group are to be compared in the future. Morphological details have been recorded by various drawings, and the characteristics which form part of the species key were noted as: postorbital constriction marked, minimum width behind postorbital processes less than width of interorbital space, tympanic bullae are flattened and broad with anterior edges merging with adjacent bones, length of tympanic bullae greater than width, maxillary molar large with inner lobe expanded lingually until much greater than the outer buccal lobe.

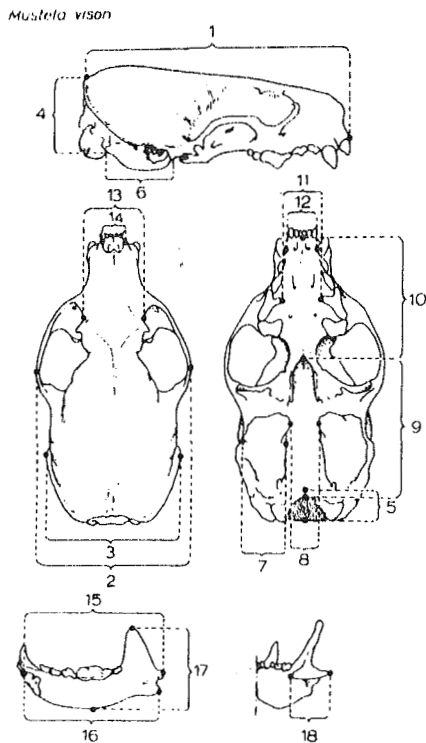


Fig 1. Sketch representing the datum parameters selected for studying the craniofacial complex

#### Skull parameters

A total of 18 measurements, based on the points illustrated in Fig. 1, were selected to demonstrate the presence or absence of sexual dimorphism within the adult group.

1. Prosthion -- inion length.
2. Maximum bizygomatic breadth.
3. Distance between the most lateral points on the occipital crests.
4. Basion -- inion.
5. Basion -- episthion.
6. Maximum length of bulla.
7. Maximum breadth of bulla.
8. Minimum interbullae distance.
9. Endobasion -- staphylion length.
10. Orale -- staphylion length.
11. Palatal breadth at fourth premolar.
12. Palatal breadth at canine.
13. Minimum distance between the orbits.
14. Piriform aperture breadth.
15. Length of mandible from symphysis to condyle.
16. Length of mandible from symphysis to the most posterior point of the angle.
17. Perpendicular distance from coronion to inferior border of ramus.
18. Maximum distance between the lateral borders of the mandibular condyles.

Sexual dimorphism was indicated from the skull measurements but was not significant due to the preponderance of immature adults present in the sample.

Acta Morphol. Neerl.-Scand. 18 (1980), 47-65.

7 figs., 1 tabel, 7 references.

In English.

Authors summary.

### CHOLERESIS AND BILE PIGMENT EXCRETION IN THE NUTRIA.

R. Preisig, C.E. Cornelius, Dept. of Clinical Pharmacology, University of Berne, CH-3020 Berne, Switzerland.

Mean excretory rates of endogenous biliverdin (BV) and bilirubin (BR) in nutria were determined to be  $6.0 \pm 1.0$  and  $0.67 \pm 0.10$   $\mu\text{l}/\text{min}/\text{kg}$ , respectively. Endogeneous bile flow was  $33 \pm 7.0$   $\mu\text{l}/\text{min}/\text{kg}$ . Infusion of sodium taurocholate at rates above  $0.1$   $\mu\text{mol}/\text{min}/\text{kg}$  resulted in cholestasis. Hepatic transport maxima for BR conjugates following the infusion of unconjugated BR were 120 and 130  $\mu\text{g}/\text{min}/\text{kg}$ . Although nutria excrete predominantly BV like

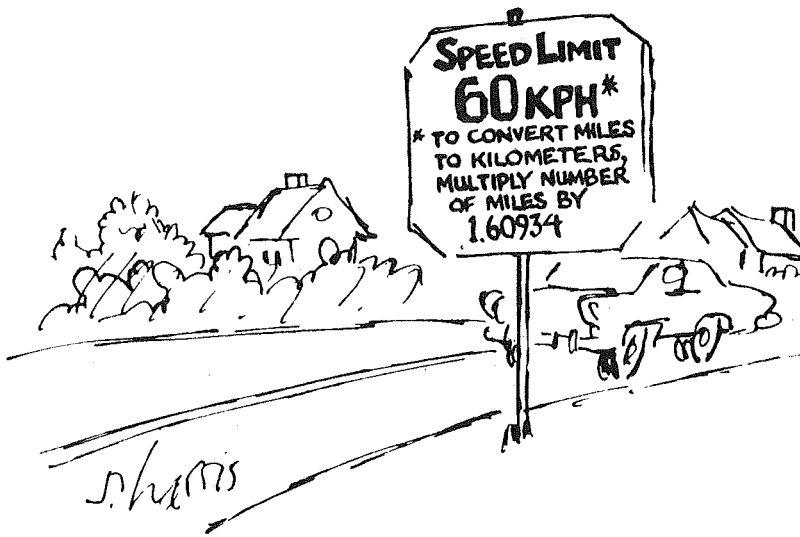
avian and reptilian species, they differ by readily excreting and exogenous load of unconjugated BR.

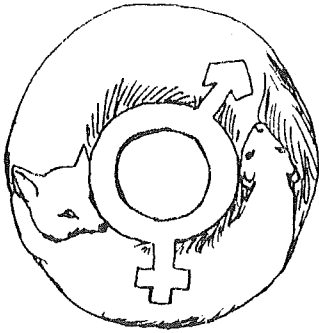
Cornell Vet. 1981, 71, 26-33.

2 figs., 1 table, 17 references.

In English.

Authors abstract.





## GENETICS

### GENETIC VARIATION IN RACCOONS, *PROCYON LOTOR*.

Roger D. Dew, Michael L. Kennedy, Ecological Research Center,  
Dept. of Biology, Memphis State University, Memphis, TN  
38152, USA.

Protein variation, levels of heterozygosity, and interlocality genic variation were studied in the raccoon, *Procyon lotor*, using starch gel electrophoresis. Specimens were examined from Tennessee, Texas, West Virginia, Georgia, and Florida. Six of 24 loci were found to be polymorphic; average heterozygosity ( $H=2.8\%$ ) was relatively low for a mammal. Analyses of data as five and 12 groups yielded genetic similarity coefficients of 0.984 and 0.946, respectively. These notable similarity values indicate *P. lotor* to be genetically similar throughout the area studied.

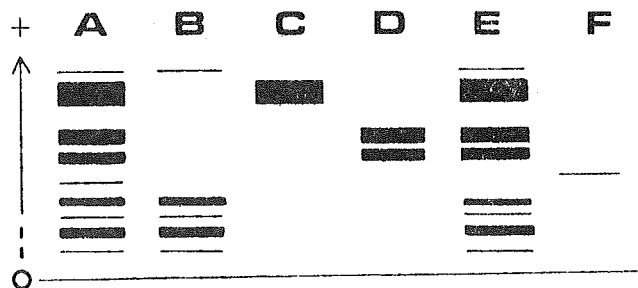


FIG. 2.—Zymogram patterns for esterases in *Procyon lotor*. A, using alpha naphthyl propionate; B, esterase-1; C, esterase-2 using NASA; D, esterase-3 using 4-methylumbelliferyl acetate-acetone mixture; E, alpha naphthyl propionate eserine mixture; F, esterase-4.

J. Mamm., 61 (4), 697-702, 1980.

2 figs., 2 tables, 30 references.

In English.

Authors abstract.



**BIOCHEMICAL GENETICS OF THE RACCOON, PROCYON LOTOR.**

M.L. Beck, M.L. Kennedy, Dept. of Biology, Memphis State Univ.,  
Memphis, Tennessee 38152, USA.

Polyacrylamide gel electrophoresis was used to examine genetic variation in *Procyon lotor* from six states in the southeastern United States. Allozymic variation of 12 genetic loci was analyzed from nine populations of *P. lotor*. Five loci were found to be polymorphic with the remaining seven loci being fixed for the same gene in all populations. Mean heterozygosity ( $H=1.4\%$ ) was found to be relatively low for a mammal. In all samples examined, one or two loci were major contributors to the observed heterozygosity. *P. lotor* was found to be genetically homogeneous over that portion of the range investigated.

Genetica 54, 127-132, 1980.

3 tables, 2 figs., 29 references.

In English.

Authors summary.

**TRANSPLANTATION OF BLASTOCYSTS OF THE SILVER-BLACK FOX.**

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

In the course of experiments lasting several years on domestication of silver-black foxes a genetic analysis is being made of domestication behavior. Reciprocal crossing of domesticated animals with aggressive forms revealed substantial early maternal effects. Cross-rearing experiments demonstrated no maternal influence on the postnatal period. To assess maternal embryonic effects, the writers have begun experiments on transplantation of embryos as early as the blastocyst stage.

Embryos were accordingly flushed out from only one uterine cornu of the donor, so that the remaining embryos developed in their own mother's uterus and she gave birth to them. All procedures concerned with flushing out the blastocysts and their transplantation were carried out on animals anesthetized with pentobarbital.

The blastocysts were flushed out of the half of the uterine cornu nearer to the ovary with nutrient medium 199 only. The blastocysts were transferred with a drop of medium in the tip of the Pasteur pipette. They were also transplanted into the end of the cornu nearer to the ovary, in which a puncture was made with an injection needle. The embryos remained in the medium outside the uterus (at room temperature, 18-20°C) not more than 5-6 min. They were collected in a Pasteur pipette and their degree of development was determined under the MBS-1 microscope.

The best results were obtained when the donor was used on the 9th day and the recipient on the 6th day of pregnancy. Six recipients were used at the stage of pregnancy. From the six donors, 24 embryos were transplanted into them. All six recipients gave birth to transplanted cubs, of which the total number was 16; i.e., the survival rate of 9-day embryos transplanted into recipients on the 6th day of pregnancy was 66.7. At these stages of pregnancy of the donor and recipient conditions are evidently optimal for adaptation and subsequent survival of the transplanted embryos.

To sum up the results of operations on transplantation of embryos of the silver-black fox it can thus be concluded that the most successful transplantations are those in which 9-day embryos are transplanted into recipients on the 6th day of pregnancy.

Translated from Doklady Akademii Nauk SSSR, Vol. 249, No.2, 471-473.

0012-4966/79/1112-1228\$7.50 1980 Plenum Publishing Corporation.

1 fig., 1 table, 5 references. Abstract: G. Jørgensen

In English.

THE EFFECT OF DOSE OF ALLOTYPES OF THE LPM SYSTEM IN  
THE MINK. QUANTITATIVE ANALYSIS OF LPM1, LPM2, AND LPM4  
MARKERS.

O.K. Baranov, T.V. Zykova, V.I. Ermolaev, Inst. of Cytology and Genetics, Academy of Sciences of the USSR, Siberian Branch, Novosibirsk.

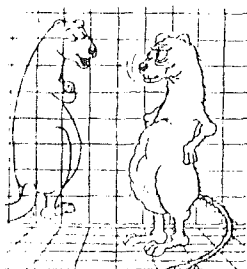
Results are presented of a quantitative investigation of Lpm1, Lpm2, and Lpm4 allotypes of the Lpm system of mink lipoprotein with very high density, using radial immunodiffusion. A dependency was established of the serum concentration of the protein (allotypical) product on the number of copies of the gene coding it: mink with two doses of any Lpm gene contain twice or almost twice as many molecules of Lpm lipoprotein of the corresponding allotypical specificity in serum as mink with one dose. Because of the gene - dose dependency, it was shown that use of the quantitative technique permits direct differentiation of different Lpm genotypes with similar phenotypes indistinguishable using the usual quantitative method of testing serum alloantigens. A dose of one of the genes of the complex Lpm locus does not exert a substantial influence on the concentration in serum of total Lpm lipoprotein, which includes molecules of different allotypes. No dependency was found of the quantity of Lpm allotypes and total Lpm lipoprotein on sex of the mink.

Translated from Genetika, Vol. 16, No.5, 874-883, May, 1980.

3 tables, 3 figs., 21 references.

In English

Authors summary.



Do you really think  
that your LPM system  
is normal?

PRODUCTION AND CHROMOSOMAL ANALYSIS OF A NEW CELL  
CULTURE OF THE AMERICAN MINK (MUSTELA VISON).

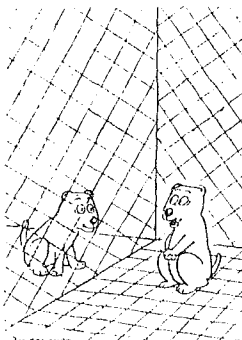
L.G. Reznik, G.F. Reshetnikova, S.I. Radzhabli, Inst. of Cytology and Genetics, Siberian Branch, Academy of Sciences of the USSR, Novosibirsk.

A transplantable culture of embryonic fibroblasts of the American mink (*Mustela vison*,  $2n = 30$ ) (MV) was obtained. The culture is characterized by rapid growth, comparatively good effectiveness of inoculation (for the 100th passage the effectiveness of inoculation was 50%), and clear identification not only of normal, but also of changed chromosomes in staining according to the G-method. Clones of independent origin were obtained and investigated. The results of karyoptic analysis showed that the MV line retains a deploid karyotype up to the 70th passage. By the 100th passage the culture underwent a number of changes: the modal class became the 29-chromosome class of cells on account of monosomy of the X-chromosome. Changes in one of the homologs of the eighth and ninth chromosome pairs were also observed. These chromosomal changes can be associated both with the conditions of culturing and with the ability of the cells for prolonged culturing in vitro.

Translated from *Genetika*, Vol. 16, No.6, pp 1020-1025, June 1980.  
1 table, 2 figs., 14 references.

In English.

Authors Summary.



Do you know the difference  
between clon and clan ?



## REPRODUCTION

### ORIGINAL PAPER.

#### APPLICABILITY OF LAPAROSCOPE TO THE RESEARCH ON THE REPRODUCTIVE PHYSIOLOGY IN POLAR FOXES.

S. Jarosz, Institute of Animal Nutrition, Agricultural Academy  
in Krakow, Poland.

Since the time of improving the laparoscope with the use of fiber optic light transmission it has become more useful and popular in diagnosing and surgery of internal reproductive organs. Semm (1969) pointed out the possibilities of laparoscopy implementation in human for ovarian biopsy, cyst removal and sterilization. Jarosz et al. (1971, 1977), Dukelow et al. (1971, 1976), Jewett et al. (1973), Harrison et al. (1974), Ariga et al. (1977) carried out laparoscopic examination of ovaries in goats and primates, Fujimoto et al. (1974) in pig, Snyder et al. (1974) in sheep, Heinze (1972) in horse, Wildt et al. (1973, 1977) in the pig, cat and dog. Superiority of laparoscopy contrary to laparotomy consist in a possibility of performing it without the opening of the abdominal cavity and trauma associated with this procedure. In addition, laparoscopy allows to examine subsequent ovarian processes during the phases of sexual cycle or experimentally after hormonal treatment. In the goat, sheep, swine, cow, horse, cat, rabbit, and primates the laparoscopic examination of ovaries is not complicated as the ovaries are not encapsulated in the bursa ovari and it is possible to uncover them from mesovarium and mesosalpings folds by means of tactile probe. Unlike the former species the ovaries of dogs and foxes are com-

pletely encapsulated in a peritoneal pouch, the bursa ovari, so their direct laparoscopic examination is impossible. Wildt et al. (1977) to uncover the ovaries for laparoscopic inspection in the dog have made an incision of the bursa ovari by means of electrocautery.

The aim of this study was to elaborate a method exposing the ovaries from bursa ovari as well as long-term observation of the ovarian changes after hormonal induction of estrus and ovulation in polar vixens.

#### Material and Methods.

Thirty polar vixens, 5 two-year-old and 25 one-year-old, were used for experiment. The females designed for laparoscopic examination during copulation period, in March 1981, had been subjected to laparotomy in December 1980 to expose the ovaries from bursa ovari. Laparotomy was carried out under anaesthesia induced by an intraperitoneal injection of pentobarbital solution (Vetbutal-Biowed) 0.25 ml/kg body mass. The time of anaesthesia was about 30-40 min. An incision 8-10 cm long was made along the abdominal white line. After opening the abdominal cavity the procedure was as follows: on feeling uterine horns and their delicate pulling backward, fingers were moved towards the ovaries which were seized and driven up to the opening. Two methods of incisions and enucleations of ovaries were used. In 10 females very small incisions (ca. 0.8 cm long) were made on the ventral part of bursa ovari and then the ovaries were enucleated in a way preventing their return to bursa ovari. In the remaining vixens the incisions of bursa ovari were longer allowing a full exposition of the ovaries from bursa ovari. The bursa ovari was separated from ovaries by binding or suturing.

After 3 months (in March during proestrus and estrus phases the laparoscopic examinations of ovaries were performed to investigate the growth of Graafian follicles and ovulation processes.

The Frangenheim 135° laparoscope, SL-telescope Richard Wolf Co., Knitlingen, 7 mm in diameter was used. This instrument was attached to a Wolf Model 5006 Generator Prox. light source by means of a fiber optic cable. In addition the light generator was equipped with electronic flash for endophotography.

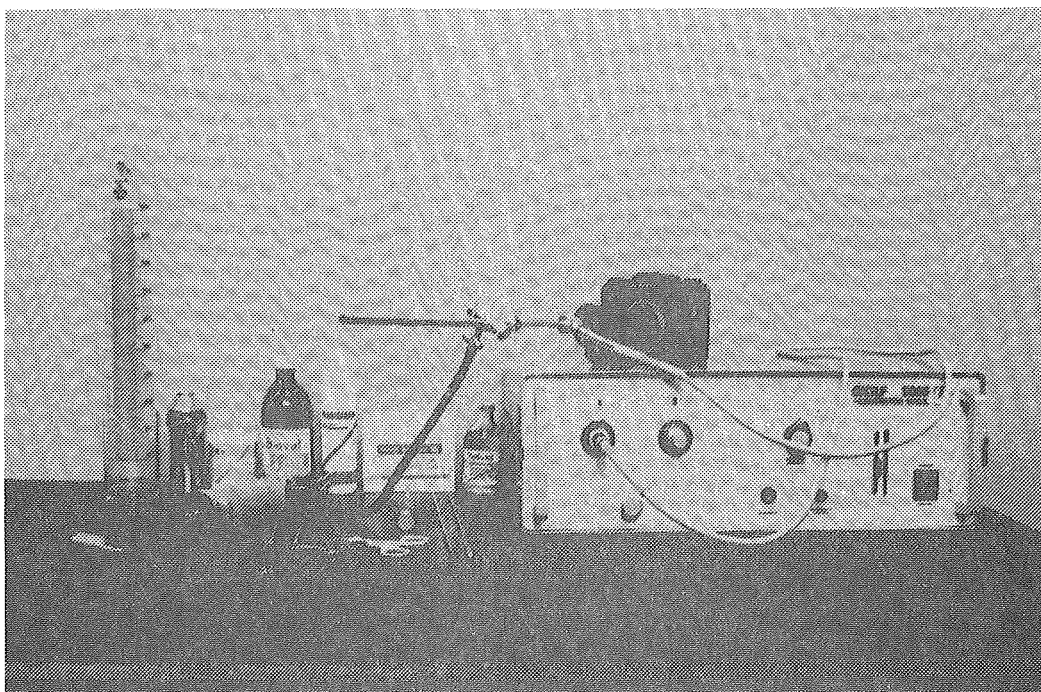


Fig. 1. Laparoscope and ancillary equipment.

Laparoscopic examinations of ovaries were performed under anaesthesia like in the former laparotomy interventions. After surgical preparation a small incision was made (0.7 cm long) on the ventral mid-line posterior to the navel, and the trocar cannula was inserted through the abdominal wall into the abdominal cavity.

The trocar was withdrawn and the laparoscope inserted through the cannula.

The fiber cable and the air supply hose with syringe were attached to the laparoscope and cannula.

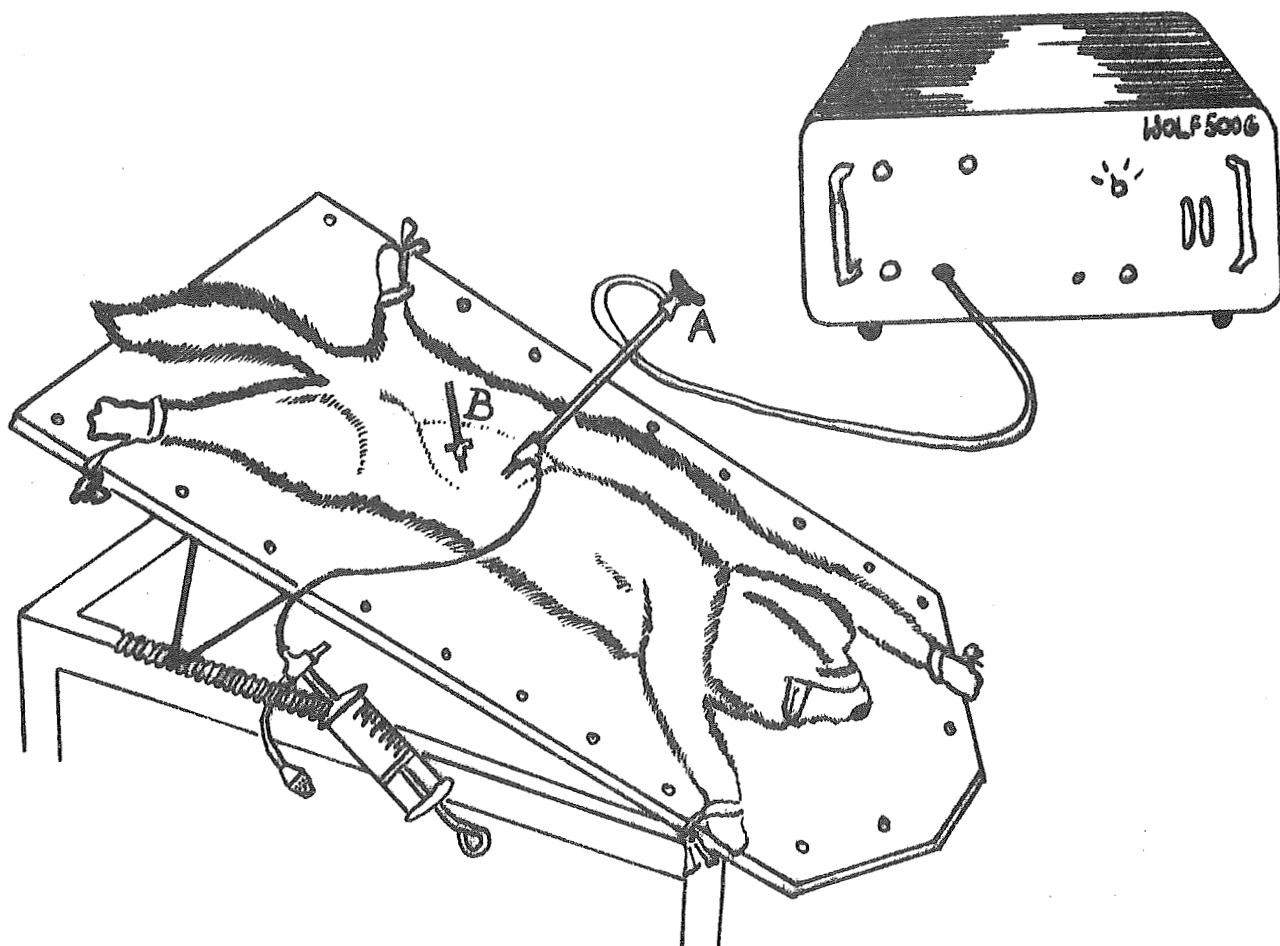


Fig. 2. Sites of introduction of the laparoscope (a) and tactile probe (b).

A tactile probe or small troca-cannula for manipulating with their internal organs were inserted at the point about 7 cm lateral to the mid-line of incision.

A vixen was placed on its back on 30-45° sloped table with the rear legs tied down. To facilitate observation of the ovaries, the abdominal cavity was insufflated with the air by means of 150 cu cm Janett syringe equipped with non return valve. By means of a graded tactile probe it was possible to measure the size of ovaries.

After placing the laparoscope in the abdominal cavity the bladder was located and the tip of the laparoscope directed downward under the bladder to cornua uterina and along them headwards to ovaries. A manipulation with the oviduct and ligamentum ovarium



with the use of a tactile probe allowed a complete ovarian examination only in cases if there was not adhesion after earlier performed enucleation from bursa ovari during laparotomy. In the cases of adhesion it was not possible to establish a number of Graafian follicles or postovulatory blood points on the ovaries.

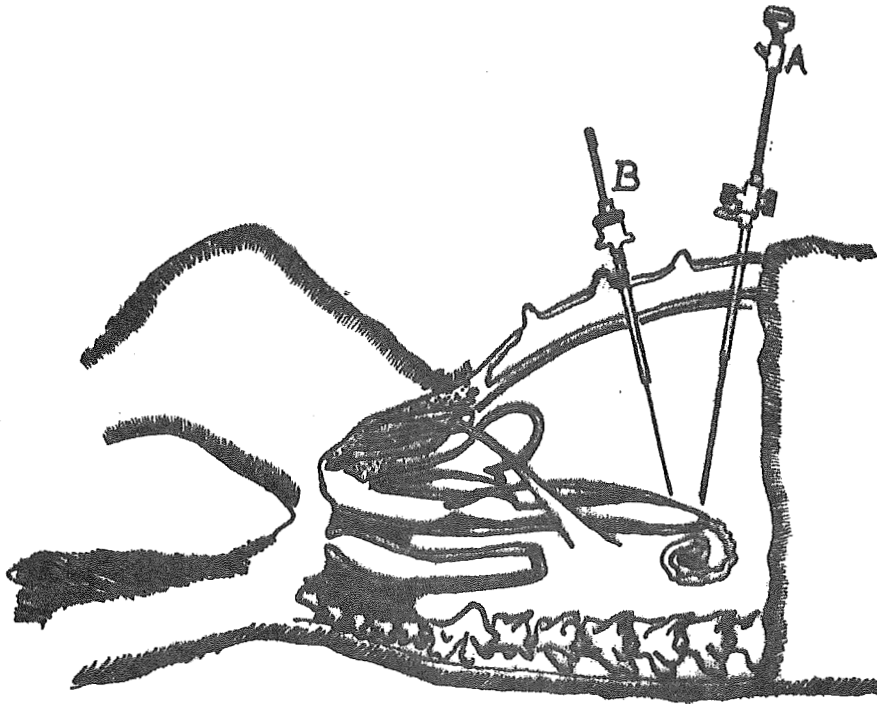


Fig. 3. Position of the laparoscope (a) and tactile probe (b) in the abdominal cavity during visualization of ovaries.

During laparoscopic visualization as well as during later post-mortem dissections it appeared that in all females in which during laparotomy a small incision was made on the wall of bursa ovari and the ovaries were enucleated by force without ligating or sewing up, an adhesion took place which resulted in many cases in covering almost all surface of the ovary.

Similar adhesions after electrocautery of the bursa ovari in dogs were stated by Wildt et al. (1977).

On the other hand in all cases where a longer incision was made on the bursa ovari and it was separated by ligating or sewing

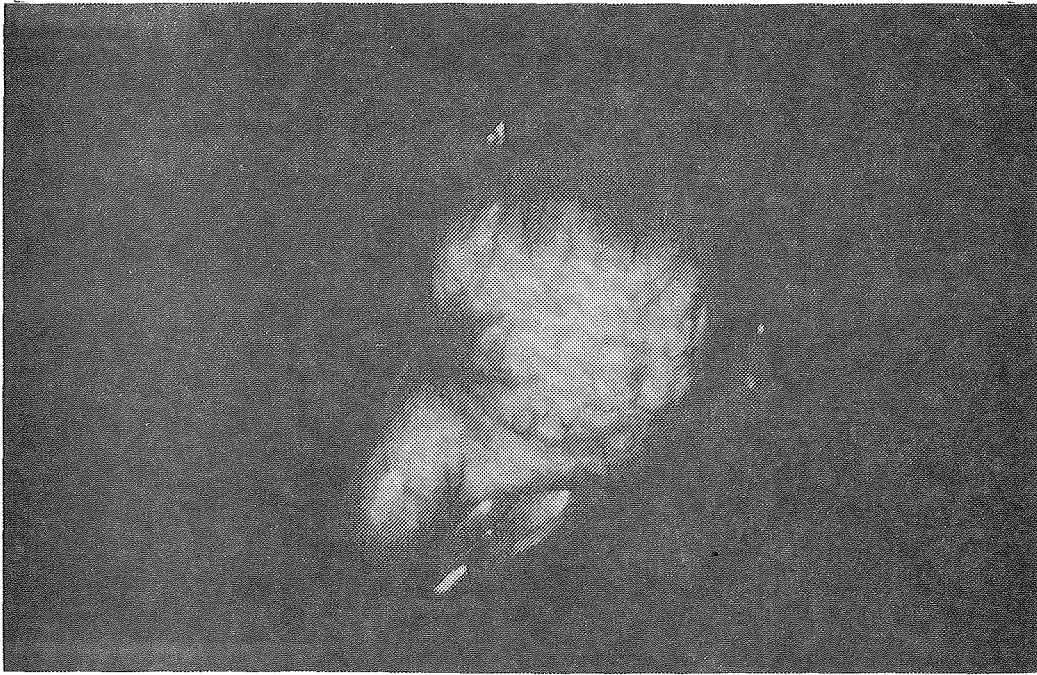


Fig.4

Fig. 4. The ovary with the adhesion of the bursa ovarii. up the adhesion did not occur and the examination of the surface of the ovary as well as endophotography could be performed. Morphological observations were documented with the endophotographs taken with a Rolleiflex SL 35 M camera attached to the telescope for laparoscopy by means of a 95 mm adapter and high speed, 24 din., film was used.

The photographs, fig. 5, 6, 7, present the surface of the ovaries with Graafian follicles in different stages of growth during estrus phase after hormonal induction.

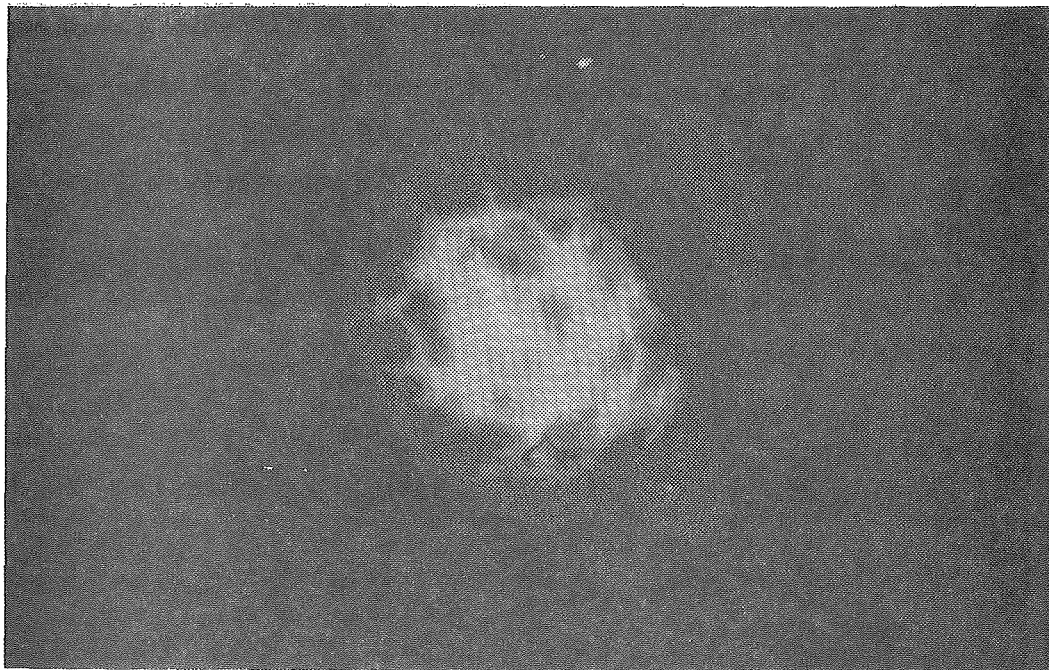


Fig.5



Fig.6

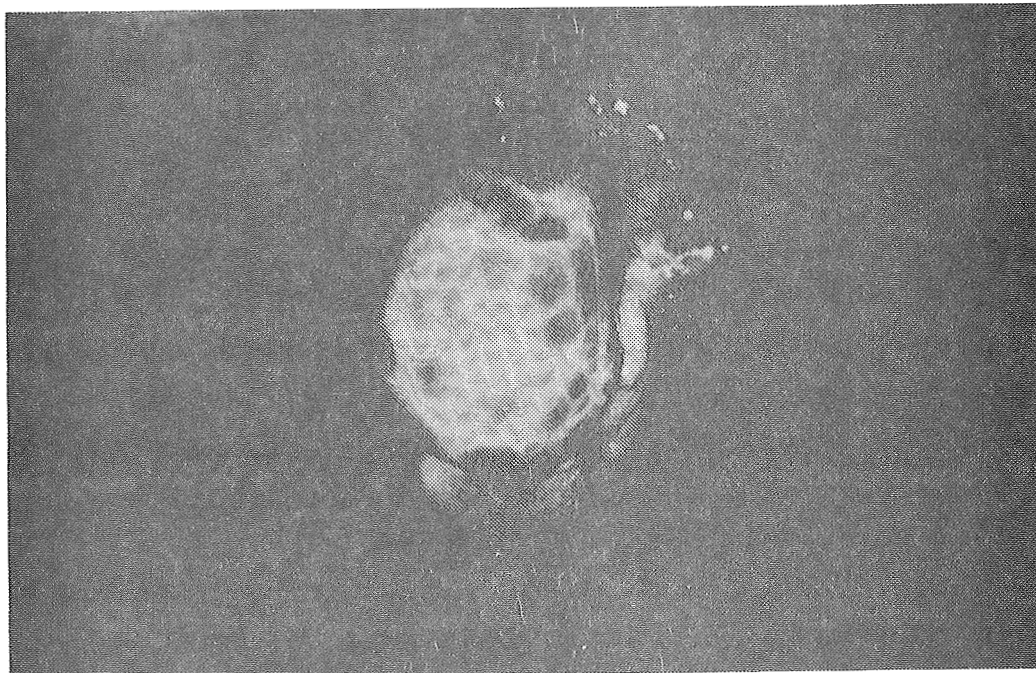


Fig.7

Figs.: 5, 6, 7. Ovaries with Graafian follicles during estrus phase induced by gonadotropins.

The problems concerning hormonal stimulation of estrus and ovulation in polar foxes will be the subject of a separate study.

#### Conclusions.

1. The method of laparoscopic examination of the ovaries in polar foxes gives good results under condition that after the surgical exposure of the ovaries from the bursa ovari are protected against adhesion.
2. The Frangenhein's laparoscope 7 mm in diameter is rather too large to examine the ovaries in so small animals as vixens. A more useful one for such animals would be a Semm 135° pediatric laparoscope, 5 mm in diameter.

#### Acknowledgement.

The author wish to express hos appreciation to B. Barabasz M.Sc. and D. Papateodoru M.Sc. as well as to Mr. A. Suder for their assistance.

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CHANGES OF PLASMATIC PROTEIN FRACTIONS, TOTAL PROTEIN  
AND SEDIMENTATION RATE IN THE COURSE OF PREGNANCY IN  
POLAR VIXENS.

(Zmiany osoczowych frakcji białkowych, białka całkowitego  
i opadu krwinek czerwonych w przebiegu ciąży u lisic  
polarnych).

Barbara Stanisławska, Instytut Zootechniczny Akademii Techniczno  
- Rolniczej, ul. Hanki Sawichiej 28, 85-084 Bydgoszcz,  
Poland.

The examination of the plasma of 17 polar vixens resulted in finding that in the course of pregnancy total protein increases initially to the value of  $8.60 \pm 0.64$  g/100 ml of plasma and then it decreases to the value of  $7.52 \pm 0.43$  g/100 ml. In pregnant vixens a decrease of albumins and increase of  $\beta_2$  and gamma globulins occurred on the 28th day of pregnancy. Sedimentation rate of red blood cells was accelerated in the second half of pregnancy, whereas the level of fibrinogen increased insignificantly.  $\alpha_1$  globulins showed a small variation and increased only 10 days before delivery. Globulins  $\beta_1$  decreased with the development of the pregnancy. Sedimentation of red blood cells is suggested to be used as auxiliary test in diagnosing 3-4 week pregnancy in polar vixens.

Medycyna Weterynaryjna, 35/11, 1979.

1 table, 20 references.

In Polish with summaries in English and Russian.

Author's summary.



CHANGES IN THE CONTENT OF Ca, INORGANIC P, Mg, Na, K,  
AND AP ACTIVITY IN THE COURSE OF PREGNANCY AND LACTATION  
IN POLAR VIXENS.

(Zmiany zawartości Ca, P nieorganicznego, Mg, Na, K i  
aktywność AP w przebiegu ciąży i laktacji u lisic polarnych).

Barbara Stanisławska, Ewa Dryżalowska, Henryk Bieguszewski,  
Instytut Zootechniczny Akademii Techniczno - Rolniczej,  
ul. Hanki Sawichiej 28, 85-084 Bydgoszcz, Poland.

Concentration of Ca, inorganic P, Mg, Na, K and AP activity was studied. The authors found a high Ca concentration in the initial phase of pregnancy and its decrease during lactation. The level of inorganic P was low in the first weeks of pregnancy. During lactation the concentration of this element was increasing, reaching its highest value in the peak stage. The concentration of magnesium was high during pregnancy and decreased during lactation: its lowest value was recorded on weaning cubs from mothers. Sodium level varied greatly. The lowest content of this element in blood plasma was recorded in four-week pregnancy and the highest after delivery. Potassium concentration was lower in the lactation period and in the later phase in pregnancy. AP activity oscillated within wide ranges. A distinct increase was observed on 1-2nd day after copulation and on 3-10th day after delivery.

Medycina Weterynaryjna, 35 (12) 1979.

1 table, 16 references.

In Polish with summaries in English and Russian.

Authors summary.





THE CHANGES IN TOTAL PROTEIN AND PROTEINIC FRACTIONS  
OF PLASMA AND ERYTHROCYTE SEDIMENTATION IN THE COURSE OF  
LACTATION IN ARCTIC FOXES.

(Zmiany białka całkowitego i frakcji białkowych osocza  
oraz opadu krwinek czerwonych w przebiegu laktacji u  
lisic polarnych).

Barbara Stanisławska, Instytut Zootechniczny Akademii Techniczno  
- Rolniczej, ul. Hanki Sawichiej 28, 85-084 Bydgoszcz,  
Poland.

High concentration of total protein, albumins and fibrinogen,  
and lower level of gamma-globulins in the first period and high  
at the end of lactation was found out in foxes. In addition,  
variable content of  $\beta_1$ -globulins and  $\alpha_2$ -globulins, and  
little changeability of  $\beta_2$ -globulins, were noticed. During  
lactation period there were ascertained foster erythrocyte sedi-  
mentation and large variability of this parameter.

Medycyna Weterynaryjna, 36 (1), 1980.

1 table, 14 references.

In Polish with summaries in English and Russian.

Author's summary.

SEPARATIONS OF PLASMA PROTEINS AND PLASMA ESTERASES  
ON STARCH GEL IN FEMALES OF POLAR FOXES IN PREGNANCY  
AND LACTATION.

(Rozdziały na zelu skrobiowym białek osocza i esteraz  
osoczowych u lisic polarnych w czasie ciąży i laktacji).

Barbara Stanisławska, Instytut Zootechniczny Akademii Techniczno  
- Rolniczej, ul. Hanki Sawichiej 28, 85-084 Bydgoszcz,  
Poland.

Separations of plasma esterases and plasma proteins performed



by the method of horizontal starch gel electrophoresis revealed that the activity of carboxylic esterase alters the most regularly. This fraction in female foxes in the first-half of pregnancy was non evident or slightly evident (period I, II, III), and it manifested well at about 10 days before parturition (period IV) and in the course of lactation (period V, VI, VII, VIII). After one month after weaning (period IX) it was better visualized than in the first-half of pregnancy and worse than in the period of lactation. Plasma proteins and esterases were separated in Lith and Serov's buffers. Proteinic fractions and other esterases did not reveal regular alterations. In a female which did not give birth a line of mobility of carboxylic esterase appeared only in IXth period of examinations, and in a female of which progeny died after birth this fraction was present only in IVth and IXth periods of the examination. The best substrate appeared to be alpha naphthyl butyrate (Serova). The activity of this fractions may be influenced by steroid hormones, prolactin and the level of inorganic P. Physiological and pathological changes of the activity of caroxylic esterase should be taken in mind in genetical studies.

Medycina Weterynaryjna, 37 (4), 246-250, 1981.

10 figs., 19 references,

In Polish with summaries in English and Russian.

Author's summary.

**THE LEVEL OF HEMOGLOBIN, VALUE OF HEMATOCRIT, NUMBER OF  
LEUKOCYTES AND WHITE BLOOD PICTURE IN PREGNANT AND  
LACTATING FEMALE POLAR FOXES.**

(Poziom hemoglobiny, wartość hematokrytu, liczba leukocytów i obraz białokrwinkowy u ciężarnych i laktujących lisic polarnych).

Barbara Stanisławska, Instytut Zootechniczny Akademii Techniczno  
- Rolniczej, ul. Hanki Sawichiej 28, 85-084 Bydgoszcz,  
Poland.

The performed hematological examinations point to a possibility of the appearance of hypochromic anemia towards the end of pregnancy, preparturient leukocytosis, post parturient leukopenia, lactation limphopenia, tendencies to eozynophilia towards the end of pregnancy and lactation, increase of the number of band neutrocytes at a half of pregnancy and at a peak of lactation, and increase of monocytes at the beginning and at a half of lactation.

Medycyna Weterynaryjna, 37 (5), 1981.

2 tables, 27 references.

In Polish with summaries in English and Russian.

Author's summary.

**INITIAL INVESTIGATION ON THE DETERMINE SOME BLOOD FACTORS  
IN OESTRUS, PREGNANCY AND LACTATION PERIODS IN POLAR  
FEMALE FOXES.**

(Wstępne badania nad określeniem niektórych wskaźników  
krwi w okresie rui, ciąży i laktacji u lisic polarnych).

Barbara Stanislawska, Instytut Zootechniczny Akademii Techniczno  
- Rolniczej, ul. Hanki Sawichiej 28, 85-084 Bydgoszcz,  
Poland.

The blood plasma total protein level increases in the oestrus  
cycle of polar females foxes.

In pregnant females the total protein and the albumin fraction  
decreases. The beta and gamma globulins increased.

The protein fractions changes dynamic was similar to those in  
pregnant women.

Akademia Techniczno-Rolnicza im. J.J. Śniadeckich w Bydgoszczy  
Zeszyty Naukowe Nr. 77 - Zootechnika 4 - 1980.

2 figs., 1 table, 23 references. Author's summary.

In Polish with English subtitles. Summaries in English and Russian.



UTILIZATION OF FISH AND ANIMALS BYPRODUCTS IN MINK NUTRITION.  
IV. THE DIGESTIBILITY OF AMINO ACIDS IN FISH VISCERA  
PRODUCTS AND THE EFFECTS OF FEEDING ON GROWTH, FUR  
CHARACTERISTICS AND REPRODUCTION.

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

Fish viscera products were studied as protein sources in mink diets. Main emphasis was given to fish viscera silage (FVS) prepared by formic acid (0.75%)/propionic acid (0.75%) preservation, autolysis, heating to 95°C and fat separation. Four batches of FVS were investigated, two of which were concentrated by vacuum drying. The study also considered frozen-stored, unprocessed fish viscera (FSV) with differing contents of liver fat and acid-preserved non-defatted fish viscera (AV). The latter product was preserved with formic acid/propionic acid (AV-FP) or formic acid/sorbic acid (AV-FS) and ethoxyquin as antioxidant.

The fish viscera products revealed great differences in fat content, depending on the amounts of liver and whether or not defatting was carried out. Different fish viscera products showed similar amino acid composition, except that production and storage of FVS caused partial loss of tryptophan. The microbiological quality of fish viscera products was judged to be satisfactory for use in mink diets.

Digestibility and performance upon prolonged feeding was studied using dark mink. During the period of July-November, experiments were conducted to study the effects of fish viscera products and supplementation with DL-methionine and L-tryptophan on growth and fur characteristics. These studies involved 27 diets and 864 animals. Experiments in the period January-June, to study female reproduction and kit viability and growth comprised 240 breeding females with progeny.

True digestibility of N in fish viscera products averaged 92%. The digestibilities of individual amino acids in FVS were slightly below those of other fish viscera products. This was especially pronounced for cystine, tryptophan and aspartic acid, indicating an effect of the heat treatment imposed or perhaps the high level of free amino acids in FVS.

Experiments in the growing/furring period showed a distinct reduction in body weight gain and skin size by feeding non-concentrated FVS at levels of 20-40% of apparently digestible protein (ADP). Concentrated FVS was fed at 15% of ADP without reduced growth. Higher levels of concentrated FVS (30-45% of ADP) caused impaired growth, but less severe than with non-concentrated FVS. The effect of FVS on growth parameters could not be alleviated by supplementation with methionine and tryptophan or by increasing the level of protein. It appeared that the sensitivity of the mink to the preservative acids at least partly could explain the lower weight gain when feeding FVS. Concentration of FVS caused partial loss of propionic acid and improved acceptability. FVS and acid-preserved fish viscera containing formic acid and propionic acid (AV-FP) caused a similar reduction in growth parameter values relative to content of preservative acids. Frozen-stored fish viscera (15-30% of ADP) had no significant effect on body growth.

There was no indication of reduced fur quality by feeding fish viscera products. One of the experiments revealed an improvement of fur quality when feeding FVS and AV-FP, perhaps because the mink were in more suitable condition at the time of fur

development. In most cases amino acid supplementation had no effect on fur quality. When feeding high levels of non-concentrated FVS at a protein level of about 7 g ADP per 100 kcal ME, it appeared that methionine supplementation could be beneficial to fur quality. The level of methionine + cystine should apparently be kept above 3 g per Mcal ME, especially when values of feed intake and digestibility are relatively low.

Reproduction was very satisfactory with all diets - on average 5.5 kits per mated female at weaning. Fish viscera products in amounts of about 15 or 30% of ADP had no adverse effects on reproduction, kit viability, or growth before 3 weeks post partum. Kit growth between 3 and 6 weeks post partum was reduced by 15 and 30% of ADP from concentrated FVS, while the same levels of FSV had no effect, regardless content of liver fat. Both types of AV were fed at 15% of ADP without noticeable effects on preweaning kit growth.

When properly handled and processed fish viscera are potentially a useful feed resource for mink. However, acid preservation would set a limit to its inclusion level in mink diets. No adverse effects of fish viscera ascribable to the fat content were found.

Acta Agric. Scandinavica, Vol. XXXI:2, 1981.

33 tables, 3 figs., 48 references.

In English.

Author's summary.



If all factors are optimal  
it should be useful according  
to Dr. Skrede's experiences!

PROTEIN METABOLISM IN FUR-BEARING CARNIVORE ANIMALS.  
1. PROTEINS OF BLOOD PLASMA IN FOXES, MINKS AND POLECATS.

(Przemiana białek u zwierząt futerkowych miesozernych.

1. Białka surowicy krwi u lisów, norek i tchórzofretek).

H. Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt, Inst. Zootechniczny, Akademia Techn. Rolnicza, 85-084 Bydgoszcz, ul. Hanki Sawickiej 28, Poland.

The electrophoretic blood plasma investigations in 18 silver foxes, 18 polar foxes, 28 standard minks and 4 polecats, fed and raised in average farm conditions, have been carried out.

Both in silver and in polar foxes six fractions at the blood plasma distribution have been distinguished, viz. albumins  $\alpha_1$ -,  $\alpha_2$ -,  $\beta_1$ -,  $\beta_2$  and  $\gamma$ -globulins.

In silver foxes the total protein level amounted, on the average, to 7.27 g per cent, albumins - to 44.71 per cent,  $\alpha_1$ -globulins to 5.69 per cent,  $\alpha_2$ -globulins to 5.77 per cent,  $\beta_1$ -globulins to 6.13 per cent,  $\beta_2$ -globulins to 19.76 per cent and  $\gamma$ -globulins to 17.95 per cent.

In polar foxes the respective values have been as follows: total protein 6.98 g-percent, albumin 46.32 per cent,  $\alpha_1$ -globulins 6.27 per cent,  $\alpha_2$ -globulins 6.17 per cent,  $\beta_1$ -globulins 6.08 percent,  $\beta_2$ -globulins 18.12 per cent and  $\gamma$ -globulins 17.07 per cent. On the basis of the data obtained the conclusion has been drawn that the protein picture of the blood plasma both in silver and polar foxes is very alike.

On the electrophorograms of the mink and polecat blood plasma five (in some cases six) fractions have been distinguished, which have been reckoned to albumins and  $\alpha$ -,  $\beta$ -,  $\gamma_1$ - and  $\gamma_2$ -globulins.

The mean values of total protein in the blood plasma amounted to 6.88 g-per cent for minks and 7.19 g-per cent for polecats.

In the blood plasma of minks albumins participated in 49.7 per cent,  $\alpha$ -globulins in 14.99 per cent,  $\beta$ -globulins in 14.93 per cent,  $\gamma_1$ -globulins in 5.97 per cent and  $\gamma_2$ -globulins in 14.33 per cent.

The comparison of the male group with the female group in minks showed no significant statistical differences between mean total protein values and mean values of all protein fractions.

In the blood plasma of minks albumins participated in 49.78 per cent,  $\alpha$ -globulins in 14.64 per cent,  $\beta$ -globulins in 18.21 per cent,  $\gamma_1$ -globulins in 7.18 per cent and  $\gamma_2$ -globulins in 15.46 per cent.

Roczniki Nauk Rolniczych, 88-B-3, 1966.

3 photos, 3 tables, 11 references.

In Polish with summaries in English and Russian.

Author's summary.

#### PROTEIN METABOLISM IN CARNIVOROUS FUR ANIMALS.

### II. BLOOD SERUM PROTEINS AND HEMOGLOBIN IN FOXES DURING GROWTH OF FUR COAT.

(Przemiana białek u zwierząt futerkowych miesozernych.

II. Białka surowicy krwi i hemoglobina u lisów w okresie wzrostu okrywy włosowej).

Henryk Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt,  
Inst. Zootechniczny, Akademia Techn. Rolnicza,  
Bydgoszcz ul. Hanki Sawickiej 28, Poland.

There were examined 40 adult arctic foxes. The examinations

included: an estimation of the total protein contents in the blood serum, an electrophoretic separation of blood serum proteins, determination of the erythrocyte count in 1 cu. mm. of blood, an estimation of the amount of hemoglobin in 100 ml of blood, and a determination of the hematocrite index in the blood of foxes during the growth of the winter fur coat and after the termination of that process.

There were found a statistically significant decrease in the total protein contents of the blood serum, a decrease in the number of red blood cells, and in the hematocrite index of blood of foxes in the period of an intensive fur coat growth. No considerable changes, however, were observed in the protein picture of the blood serum of foxes during that period, apart from a significant drop in  $\alpha_1$ -globulins, as compared with period II i.e. after the growth of the fur coat had been entirely accomplished.

It may be assumed that the growth of the fur coat of foxes limits to a certain extent the hematopoietic processes in these animals.

Zeszyty Naukowe, Wyższej Szkoły Rolniczej w Olsztynie, 19,415, 1965.

2 tables, 11 references.

In Polish with subtitles in English. Summaries in English and Russian.  
Author's summary.





PROTEIN METABOLISM IN FUR-BEARING CARNIVORE ANIMALS.  
III. THE INFLUENCE OF THE DIFFERENT ANIMAL PROTEIN CONTENTS  
IN DAILY RATION OF GROWING POLAR FOXES ON THEIR SERUM PROTE-  
INS LEVEL, SOME HAEMATOLOGICAL INDICES AND LIVER FUNCTION.

(Przemiana białek u zwierząt futerkowych mięsożernych.

III. Wpływ różnej zawartości białka pochodzenia zwierzecego  
w dawce pokarmowej na białka surowicy krwi, niektóre wskaźniki  
morfologiczne krwi oraz czynność wątroby u rosnących lisów  
Polarnych.)

Henryk Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt,  
Inst. Zootechniczny, Akademia Techn. Rolnicza, Bydgoszcz,  
ul. Hanki Sawickiej 28, Poland.

The influence of different amount of meat in the daily ration of 32 young polar foxes on some of their haematological indices and liver function was analyzed. The feeding ad libitum with food containing different amount of meat: I group - 80% of meat, II group - 40%, III group - 20% and IV group - 20% of meat and 20% of silage.

No statistically significant differences in the level of total protein content in serum, Hb and RBC amount, Ht level was found in animals of I, II and III group.

In foxes fed with 20% of meat with 20% of fish silage in daily ration (group IV) the growth rate and haematopoietic activity were depressed.

The different feeding of foxes under experiment did not produce any characteristic changes in the electrophoretical picture of the serum proteins.

No statistically significant differences in the liver activity as measured with the level of carbohydrates metabolism in foxes fed with different amount of animal protein were found.

It was stated that significant shifts in the haematological indices depend upon age.

Roczniki Nauk Rolniczych, 91-B-1, 1969.

4 tables, 15 references.

In Polish with subtitles in English. Summaries in English and Russian.

Author's summary.

PROTEIN METABOLISM IN FUR-BEARING CARNIVORE ANIMALS.  
IV. THE INFLUENCE OF THE DIFFERENT COMPOSITION OF DAILY  
RATION AND DIFFERENTIAL PROTEIN LEVEL IN IT, ON THE DIGEST-  
IBILITY, NITROGEN BALANCE AND SOME HAEMATOLOGICAL INDICES  
IN POLAR FOXES.

(Przemiana białek u zwierząt futerkowych mięsożernych.

IV. Wpływ różnego zestawu dawki pokarmowej i zmiennego poziomu białka w diecie na strawność i bilans azotu oraz niektóre wskaźniki krwi u lisów polarnych.)

Henryk Bieguszewski, Czesław Lewicki, Zakład Fizjologii i Anatomii Zwierząt, Inst. Zootechniczny, Akademia Techn. Rolnicza, Bydgoszcz, ul. Hanki Sawickiej 28, Poland.

The influence of the substitution of animal protein with the protein of plant origin such as protein of peanut meal with pea meal or soybean meal after extration in the ration of polar foxes were examined. The digestibility of crude protein in diet, nitrogen retention, serum protein, Ht, and Hb content were determined. The exchange of 16.3% or 32.0% of animal protein with the protein of plant origin diminished the digestibility of crude protein in the diet.

The replacement of that quantity of animal protein with the protein of peanut meal with pea meal or soybean meal did not decrease the nitrogen retention in foxes under experiment.

The reduction of total protein in the foxes daily ration from 68 g to 53 g made the nitrogen balance negative.

The introduction in the diet of more food of plant origin did not cause distinct changes in the total serum protein contents, electrophoretic serum protein fractions in the Ht index and Hb-level for experiment foxes.

The distinctly decreased Ht-level in foxes with negative nitrogen balance was due to the reduced protein level of the diet.

Roczniki Nauk Rolniczych, 91-B-4, 1969.

3 tables, 9 references.

In Polish with subtitles in English.

Summaries in English and Russian. Authors summary.

Protein metabolism in fur-bearing carnivorous animals.

V. Blood serum albumin turnover of arctic foxes fed on different diets.

Henryk Bieguszewski, Akademia Techn. Rolnicza, Bydgoszcz, Poland.

Abstract from this report has been printed in SCIENTIFUR, Vol. 4, No.4, pp. 45.

PROTEIN METABOLISM IN FUR-BEARING CARNIVOROUS ANIMALS.  
VI. REGENERATION OF BLOOD SERUM PROTEIN AND ABSORPTION OF J131-ALBUMIN FROM THE INTESTINAL TRACT INTO THE BLOOD OF ARCTIC FOXES FED ON DIFFERENT DIETS.

(Przemiana białek u zwierząt futerkowych mięsożernych.

VI. Regeneracja białek surowicy krwi oraz wchłanianie albuminy-J131 z przewodu pokarmowego do krwi u lisów polarnych żywionych różnymi dawkami polarmowymi.

Henryk Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt,

Inst. Zootechniczny, Akademia Techn. Rolnicza, Bydgoszcz,  
ul. Hanki Sawickiej 28, Poland.

Following experimental bleeding a disproteinemia of protein fractions of blood serum was observed in all animals with a significant increase of the proportion of albumin. A reduction of the amount of protein in the diet of foxes affected adversely the regeneration rate of blood serum protein.

The rate of the recovery of haemoglobin to the normal value, following experimental bleeding, was much slower in protein deficient than in control animals. When replacing a part of animal protein in the diet with plant protein no significant influence on the recovery rate of blood serum protein was observed. Replacement of a part of animal protein with the protein of peanut oilmeal and soyabean oilmeal did not affect the regeneration rate of blood haemoglobin in foxes.

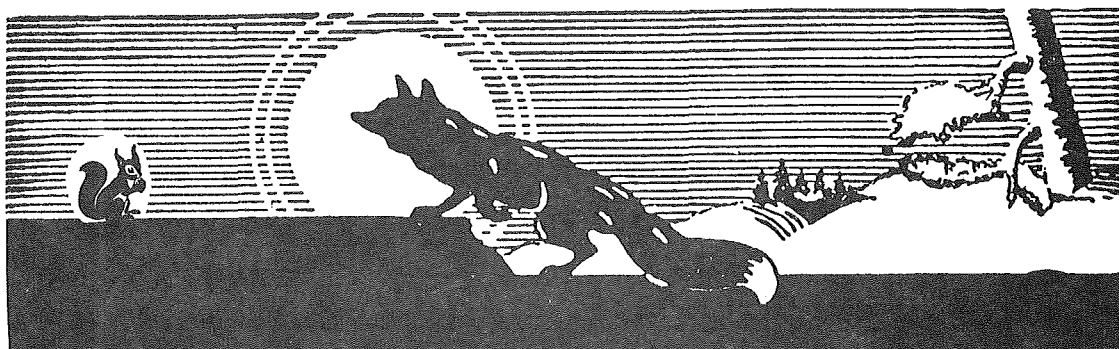
The absorption curve of labelled albumin from the intestinal tract into the blood of foxes fed on a diet with a low protein content was similar to that obtained with control animals. However in foxes fed on diets with high content of plant protein the peak of the activity curve of plasma occurred much later after the administration of labelled albumin.

Roczniki Nauk Rolniczych 1971, B-93-4.

4 tables, 3 figs., 12 references.

In Polish with subtitles in English. Summaries in English and Russian.

Author's summary.



PROTEIN METABOLISM IN FUR-BEARING CARNIVOROUS ANIMALS.  
PART 7. EFFECT OF GROWTH HORMONE (BOVINE SOMATOTROPIN)  
ON WEIGHT GAIN, NITROGEN RETENTION AND PROTEIN AND AMINO  
ACIDS IN THE BLOOD SERUM OF GROWING ARCTIC FOXES.

(Przemiana białek u zwierząt futerkowych miesozernych.

Cz. 7. Wpływ hormonu wzrostowego (somatotropiny bydlecej)  
na przyrosty ciężaru ciała, retencje azotu, białka i amino-  
kwasy surowicy krwi u rosnących lisów polarnych).

Henryk Bieguszewski, Zakład Fizjologii i Anatomii Zwierząt,  
Inst. Zootechniczny, Akademia Techn. Rolnicza, Bydgoszcz,  
ul. Hanki Sawickiej 28, Poland.

The effect of exogenous (bovine) somatotropin was studied on protein metabolism in growing Arctic foxes 18 to 60 days old. Somatotropin increased body weight gain, digestibility of nitrogenous compounds and nitrogen retention.

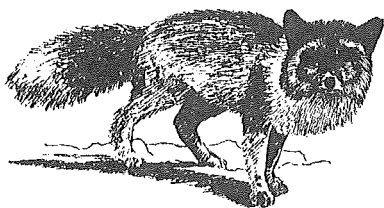
There was a significant fall in the  $\alpha$ -amino nitrogen in the blood serum of foxes given somatotropin as compared to untreated animals. The proportion of free amino acids in the blood serum were not affected but total free amino acids were less. Total protein content in the blood serum increased but no significant changes were observed in the electrophoretic fraction of serum proteins.

Roczniki Nauk Rolniczych 1975, B-96-4.

3 tables, 22 references.

In Polish with subtitles in English.  
Summaries in English and Russian.

Author's summary.



PROTEIN METABOLISM IN CARNIVOROUS FUR-BEARING ANIMALS.  
VIII. NITROGEN DIGESTIBILITY, NITROGEN BALANCE AND SERUM  
FREE AMINO ACID LEVELS IN POLAR FOXES FED FOOD DIFFERING  
IN ANIMAL PROTEIN CONTENT.

(Przemiana białek u zwierząt futerkowych miesozernych.  
VIII. Strawność i bilans azotu oraz wolne aminokwasy w  
surowicy krwi u lisów polarnych, żywionych dawkami  
pokarmowymi o różnej zawartości białka pochodzenia.  
zwierzecego).

Henryk Bieguszewski, Stanisława Stefańczyk, Zakład Fizjologii  
i Anatomii Zwierząt, Inst. Zootechniczny, Akademia Techn.  
Rolnicza, Bydgoszcz, ul. Hanki Sawickiej 28, Poland.

Nitrogen digestibility and balance, as well as the serum free amino acid content were determined in polar foxes fed diets differing in meat content. Animals were divided into groups I, II and III, fed ad libitum diets containing 60, 40 and 20% of meat, respectively.

Animals of the three groups did not differ significantly in nitrogen retention. In foxes fed the diet containing 60% of animal protein sources, the nitrogen digestibility was higher. The nutritional differences exerted no characteristic effect on the aminogram of serum free amino acids as well as caused no significant differences in serum amino nitrogen content. The same amino acids were found in serum of animals and in protein hydrolysate of feed.

Zesz. Nauk. ART Olszt. Zootechnika Nr. 11, Rok. 1976.

4 tables, 15 references.

In Polish with subtitles in English.  
Summaries in English and Russian.

Authors summary.

INFLUENCE OF LYSINE AND METHIONINE TO NUTRIENTS WITH  
DECREASED CONTENTS OF PROTEIN ON BODY WEIGHT, DIGESTIBILITY  
OF NUTRITIVE COMPONENTS AS WELL AS CHOSEN BLOOD INDEXES AT  
ARCTIC FOXES.

(Wpływ dodatku lizyny i metioniny do karmy z obniżoną zawartością białka zwierzecego na ciężar ciała, strawność składników pokarmowych i wybrane wska'zniki krwi u lisów polarnych).

Henryk Bieguszewski, Mirosława Gruda-Smigiel, Aleksander Wielopolski, Zakład Fizjologii i Anatomii Zwierząt, Inst. Zootechn., Akademia Techn. Rolnicza, Bydgoszcz, ul. Hanki Sawickiej 28, Poland.

The experiment I dealt with was to investigate digestibility of nutrients and nitrogen retention in 8 foxes, which, during the first period were fed with ration composed of 60% feed-stuff of animal origin. In the second period the quantity of feed-stuffs of animal origin was reduced to 30% and 1% of lysine and 0.5% of methionine were added to the ration. Reducing the level of animal protein in the ratio and addition of synthetic amino acids did not influence the digestibility of nutrients and nitrogen retention.

Experiment II was carried out on 30 arctic foxes from July 5th till November 15th, 1976. The animals were divided into two groups. Group I (control) was fed with the ratio composed of about 60% feed-stuffs of animal origin. The quantity of feed-stuffs of animal origin in the ration of the second (experimental) group was only half as large as in the ratio of the first group but it contained the addition of 1% lysine and 0.5% methionine. The weight gained of the foxes from control group were approximately the same as of the foxes from the experimental group.

Morphological indexes of blood and electrophoretic picture of plasma proteins of animals fed with the diet with reduced level of feed-stuffs of animal origin and addition of synthetic amino acids did not differ significantly from the same blood parameters of animals from the control group.

Reducing by 50% the level of feed-stuffs of animal origin in the ration and addition of lysine and methionine did not have unfavourable effect on commercial skin value.

Akademia Techniczn-Rolnicza im. J.J. Śniadeckich w Bydgoszczy  
Zeszyty Naukowe Nr. 77 - Zootechnika 4, 1980.

8 tables, 9 references.

In Polish with subtitles in English. Summaries in English and Russian.

Authors summary.

**DIGESTIBILITY OF NUTRIENTS AND NITROGEN RETENTION IN  
POLECATS FED WITH NUTRITIVE RATIO WITHOUT MUSCULAR  
PROTEIN PARTICIPATION.**

(Strawność składników pokarmowych i retencja azotu u  
tchórzofretek żywionych dawka pokarmowa bez udziału  
białka mięśniowego).

Henryk Bieguszewski, Oskar Lorek, Romuald Rajs, Roman Szymeczko,  
Zakład Fizjologii i Anatomii Zwierząt, Inst. Zootechniczny,  
Akademia Techn. - Rolnicza, Bydgoszcz, ul. Hanki Sawickiej  
28, Poland.

The digestibility of nutrients and nitrogen retention were investigated in 16 polecats fed with the use of two different diets. The first (control) group received the standard ratio used in feeding arctic foxes. The second (experimental) group was fed with ration in which muscular protein was entirely replaced by blood and vegetable feed-stuffs protein.



Replacing meat with after slaughter blood, cooked pearl barley and wheat bran in the polecats ratio did not have any unfavourable effect in digestibility of most nutrients and nitrogen retention. It was established that polecats digest crude fibre better than arctic foxes. The digestibility of crude protein and crude fat is approximately the same as for arctic foxes.

Akademia Techniczno-Rolnicza im J.J. Śniadeckich w Bydgoszczy, Zeszyty Naukowe Nr. 77 - Zootechnika 4, 1980.

4 tables, 10 references.

In Polish with subtitles in English. Summaries in English and Russian.

Authors summary.

**NITROGEN RETENTION, THE DIGESTIBILITY OF THE NUTRIENTS  
AND SOME HAEMATOLOGICAL INDICES IN POLECATS FED ON DIETS  
CONTAINING SUPPLEMENT OF SLAUGHTERHOUSE BLOOD CONSERVED  
WITH SODIUM BENZOATE AND SULPHURIC ACID.**

(Strawność składników pokarmowych, retencja azotu oraz niektóre wskaźniki krwi u tchórzofretek żywionych karmą z dodatkiem krwi konserwowanej).

Henryk Bieguszewski, Jolanta Zólkoś, Zakład Fizjologii i Anatomii Zwierząt, Inst. Zootechniczny, Akademia Techn. - Rolnicza, Bydgoszcz, ul. Hanki Sawickiej 28, Poland.

The influence of the substitution of 50% animal's feed with blood conserved with sodium benzoate and sulphuric acid in the ration of polecats was examined.

The digestibility of the nutrients, nitrogen balance and physiological indices of blood were determined. Negative influence on digestibility of the nutrients of ration containing conserved blood wasn't confirmed.

The amount of nitrogen retained in the organism and haemoglobin contents were higher in polecats fed with the food containing conserved blood than animals in the control group.

Addition of blood into the ration had not any influence of the number of red blood cells and leucocytes counted in 1 mm<sup>3</sup> of blood, the haematocrit value and blood serum proteins in polecats.

Akademia Techniczno-Rolnicza im. J.J. Śniadeckich w Bydgoszczy, Zeszyty Naukowe Nr. 77 - Zootechnika 4 - 1980.

5 tables, 12 references.

In Polish with subtitles in English. Summaries in English and Russian.

Authors summary,

#### FEEDING SPRAY-DRIED EGGS TO MINK AND ITS EFFECT ON REPRODUCTION AND FUR QUALITY.

Richard J. Aulerich, Michael R. Bleavins, Angelo C. Napolitano, Robert K. Ringer, Dean D. Hughson, Animal Science Department, Michigan State University - East Lansing, Michigan 48824, USA.

Commercial mink operations have had various results in using spray-dried eggs as a feed ingredient. Eggs are a high-protein and economically attractive feed ingredient, but they can sometimes cause a biotin deficiency, which in turn hampers reproduction and diminishes fur quality. These authors found that spraydried eggs may successfully be used in mink diets, provided there is adequate biotin supplementation.

Feedstuffs, 53 (27), 24, 26-28, 1981.

7 tables, 3 photos, 18 references.

In English.

Authors abstract.

**FEED CONSUMPTION AND FOOD PASSAGE TIME IN MINK (MUSTELA  
VISON) AND EUROPEAN FERRETS (MUSTELA PUTORIUS FURO).**

Michael R. Bleavins, Richard J. Aulerich, Dept. of Animal Sci.,  
Michigan State University, East Lansing, MI 48824, USA.

The amount of feed consumed per day and the rate of food passage was measured in mink and European ferrets. Daily feed consumption averaged 40 and 42 g dry matter per kg body weight for male mink and ferrets and 53 and 49 g dry matter per kg body weight for female mink and ferrets, respectively. Using ferric oxide as a feed marker, no differences were observed in food passage time between mink and ferrets or between males and females within each species. The mean time of food passage was 187 minutes for mink and 182 minutes for European ferrets.

Laboratory Animal Science, Vol. 31, No.3, June 1981.

4 tables, 6 references.

In English.

Authors summary.

**EMPLOYMENT SLAUGHTERHOUSE BLOOD CONSERVED WITH SODIUM  
BENZOATE AND SULPHURIC ACID IN FEEDING OF ARCTIC FOXES.**

(Zastosowanie krwi poubojowej konserwowanej benzoesanem  
sodowym i kwasem siarkowym w żywieniu lisów polarnych).

Witold Podkówka, Henryk Bieguszewski, Józef Staśkiewicz,  
Zakład Fizjologii i Anatomii Zwierząt, Inst. Zootechn.,  
Akad. Techn. - Rolnicza, Bydgoszcz, ul. Hanki Sawickiej  
28, Poland.

Studies were carried out on the application of slaughterhouse blood, conserved with sodium benzoate and sulphuric acid, for feeding polar foxes. Blood was conserved by the following method: 0.75 kg sodium benzoate and 0.61 kg concentrated sulphuric acid were added to 100 kg of fresh blood. Prior to mixing blood with sulphuric acid, the latter was diluted with water in the

proportion 1:1.84 (ml).

In the first experiment, 20 per cent of muscle protein was replaced with conserved blood protein. Nitrogen balance and digestibility of the nutrients were determined. In the control group, the digestibility coefficients were as follows: 75% organic substance, 79% crude protein, 88% crude fat, 73% nitrogen-free extract; for the experimental group, the respective values were: 76, 79, 91 and 77%. The amount of nitrogen retained in the organism was higher in animals which were given feeds containing conserved blood.

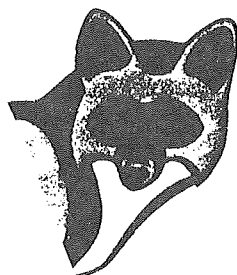
The objective of the second experiment was to study the influence of replacing 10 and 20 per cent of muscle protein with conserved blood protein on the growth and on some physiological blood indices. The experiment was started on August 6th, and finished on November 18th. No correlation was found between the body weight and the feeding groups, but there were observed differences with regard to the sex: in all groups, males were heavier than females. No changes were found in the haemoglobin content, haematocrit value or in the content of total protein in blood plasma of foxes fed with rations containing slaughterhouse blood conserved with sodium benzoate and sulphuric acid. It was also demonstrated that sodium benzoate is not cumulated in the liver of foxes.

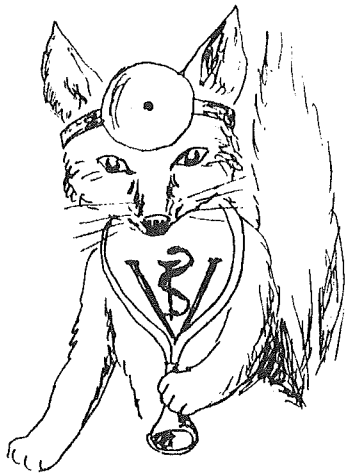
Bydgoskie Towarzystwo Naukowe, B-20-1974.

6 tables, 1 figs., 9 references.

In Polish with subtitles in English. Summaries in English and Russian.

Authors summary.





**VETERINARY**

**ACCIDENTS LINKED TO SMALL CARNIVORES ANAESTHESIA.  
NOTE 1. CARDIAC ARREST.**

(Accidents liés à L'anesthésie de petits carnivores.  
Note 1: L'arret cardiaque).

J.-P. Genevois, A. Cazieus, A. Autefage, Path. Chirurgicale  
Ecole, Natl. Vétérinaire de Toulouse, 23, chemin des  
Capelles, F-31076 Toulouse Cedex, France.

After listing the factors leading to cardiac arrest, the authors  
enumerate precautions to take to prevent its sudden occurrence  
and detail the procedure to treat it.

They insist on the necessity of very early action.

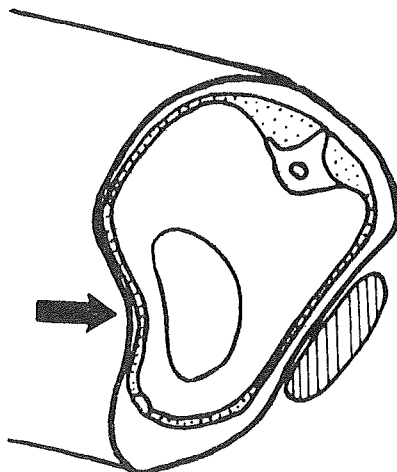


FIGURE 1 - Principe du massage cardiaque externe.

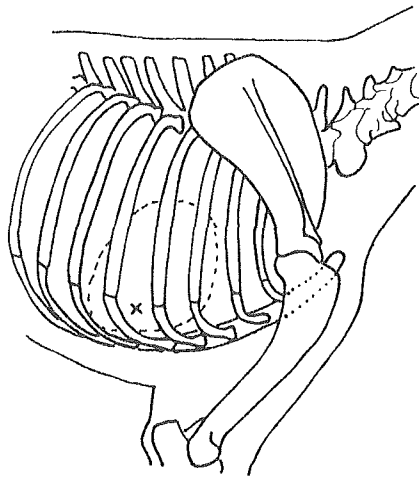


FIGURE 2: Zone de projection cardiaque chez le chien.  
x : Lieu d'élection de l'injection.

Revue Méd. vét., 1980, 131, 12, 853-855.

2 figs., 5 references.

In French with summaries in French, English, German and Spanish.

Authors summary.

#### COCCIDIAL INFECTIONS IN RANCH MINK.

G.H. Myers, W.J. Foreyt, G.R. Hartsough, A.C. Todd, Dept. of  
Vet. Sci., Univ. of Wisconsin, Madison, WI 53706, USA.

A field study was conducted from April through June of 1976 to determine whether coccidial infections adversely affect the growth and survivability of young mink. Two anticoccidials, lasalocid (62 mg/kg of feed) and an antibiotic-sulfoamide preparation (220 mg/kg of feed), were incorporated into a standard pelleted ration. Comparisons of weight gains, mortality, and oocyst numbers were made between control and treated groups. Treatment reduced mortality ( $P < 0.001$ ) but did not significantly affect weight gains. The antibiotic-sulfonamide preparation and, to a lesser extent lasalocid, reduced oocyst discharge. Increased oocyst shedding was detected among adult female mink from parturition to weaning of their kits.

J. Amer. Vet. Med. Ass., 177,9, 849-851. 1980.

3 tables, 8 references.

Authors summary.

In English.

**PARVOVIRUS INFECTION IN TRANSLOCATED RACCOONS.**

Victor F. Nettles, James E. Pearson, Gary A. Gustafson, Jack L. Blue, Southeastern Cooperative Wildlife Disease Study, Dept. of Parasitology, College of Vet. Med., Univ. of Georgia, Athens, GA 30602, USA.

Severe enteritis attributed to parvovirus infection was diagnosed in raccoons (*Procyon lotor*) purchased from a commercial animal dealer for interstate translocation. Intestinal lesions included edema, hyperemia, and focal mucosal necrosis. Microscopically, intestinal villi were reduced markedly, and there was necrosis of the glandular crypts. Intranuclear inclusions were seen in many crypt cells. A parvovirus that was infective for Crandell feline kidney cells and primary canine kidney cells was isolated from the spleen of a sick raccoon. The raccoon virus was distinguished from feline panleukopenia virus by the former's ability to hemagglutinate swine erythrocytes at a pH of 7.2. Serum neutralization testing of infected raccoons indicated that the raccoon isolate differed from feline panleukopenia virus and may have been canine parvovirus.

J. of Amer. Vet. Med. Ass., 177, 9, 787-789, 1980.

1 table, 2 figs., 11 references.

In English.

Authors summary.



**CEREBRAL NEMATODIASIS IN NUTRIA, ATTRIBUTED TO INFECTION  
WITH LARVAE OF BAYLISASCARIS.**

(Zerebrale Nematodiasis bei Sumpfbibern (*Myocastor coypus*)  
- verursacht durch Larven von *Baylisascaris* (Nematoda)).

F. Koch, J. Rapp, Staatliches Tierärztliches Untersuchungsamt,  
D-7960 Aulendorf.

An outbreak of cerebral nematodiasis in nutria on a breeding farm is described in the course of which a total of 65 young animals died or had to be destroyed. All sick nutria were at first temporarily kept in a pen, in which racoons had been previously accommodated. On the basis of histopathological results and larval findings, which were obtained by the pepsin digestive method, the disease outbreak was attributed to infestation with larvae of *Baylisascaris*. It is pointed out that racoons, which are the final hosts for *B. procyonis*, represent a potential danger for nutria.

Berl. Münch. Tierärztl. Wschr. 94, 111-114, 1981.

6 photos, 2 references.

Authors summary.

In German with summary in English.

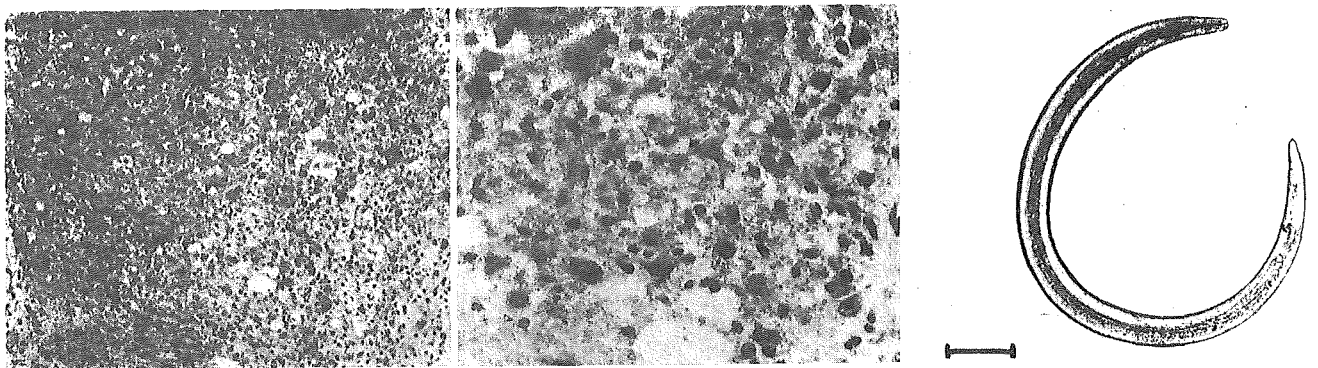


Abb. 2 (links). Malazieherd mit entzündlicher Reaktion, im Kleinhirnmark, HE, Obj. 6. Abb. 3 (Mitte). Ausschnitt aus Abb. 2, Obj. 20. Abb. 4 (rechts). Gesamtansicht der isolierten Nematodenlarve (Teilstrich 100  $\mu$ m)



CAPILLARIA PARANALIS SP. N. (NEMATODA: TRICHURIDAE)  
 A NEW TYPE OF TRICHURID NEMATODE FROM THE ANAL SACS OF  
 THE STONE MARTEN (MARTES FOINA ERXLEBEN, 1777).

(*Capillaria paranalis* sp.n. (Nematoda: Trichuridae),  
 eine neue Haarwurmart aus den Analbeuteln des Steinmarders  
 (*Martes fiona* ERXLEBEN, 1777)).

M.J. Forstner, O. Geisel, Inst. für Vergleichende Tropenmedizin  
 und Parasitologie der Tierärztlichen Fakultät der Univer-  
 sität München, Veterinärstr.13, D-8000 München 22.

A new type of trichurid nematode situated in the anal sacs of  
 the stone marten is described and the name *Capillaria paranalis*  
 sp.n. is suggested. This nematode can be distinguished from  
 all presently known mustelid types of capillaria on the basis  
 of size, morphology and its specific locality of the host.

Berl. Münch. Tierärztl. Wschr. 93, 312-316, 1980.

9 figs., 1 table, 6 references.

In German with summaries in German and English.

Authors summary.

HELMINTHS OF THE COMMON FOX (*VULPES VULPES* L.) FROM  
 THE MASSIF CENTRAL (FRANCE).

(*Helminthes du Renard commun (Vulpes vulpes L.) dans*  
*la région du Massif Central (France).*)

A.-F. Petavy, S. Deblock, C.H.U. de Clermont-Ferrand Service  
 de Parasitologie (P<sup>r</sup> Coutet), B.P. 69, F 63003, Clermont-  
 Ferrand.

Sixty nine wild foxes originating from Auvergne for the period  
 January 1977 to January 1978 have shown intestinal parasites

in the proportion of 76.8 per cent. 59.4 per cent are invaded with Cestodes; 72.4 per cent with Nematodes and none with Trematodes. The list of the identified species is following: 1° Cestodes. A) Adults and fertile forms of: *Mesocestoides litteratus* in 27.5 per cent of the hosts; *Taenia crassiceps* in 15.9 p.c.; *T. polycantha* in 27.5 p.c.; *Echinococcus multilocularis* in 7.2 p.c.; *Amoebotaenia paradoxa* in 4.3 p.c. B) Immature forms of: *Taenia pisiformis* in 2.89 p.c.; *T. ovis* in 1.44 p.c. 2° Nematodes. *Uncinaria stenocephala* in 68.1 per cent of the hosts; *Ancylostoma caninum* in 1.4 p.c.; *Molineus patens* in 1.4 p.c.; Oxyurid sp. in 1.4 p.c.; *Toxocara canis* in 27.5 p.c. and *Toxacaris leonina* in 33.3 p.c. The composition of the helminth fauna of the foxes in the center countries of France is not different of the European species from the same host, except *Amoebotaenia paradoxa*, Dilepidid cestode of birds, quite unusual from a carnivorous mammal.

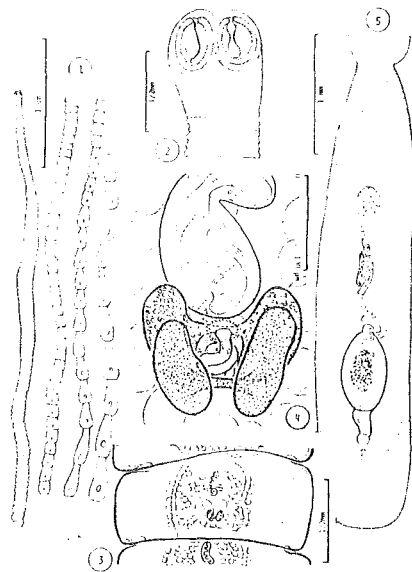


Fig. 2. *Mesocestoides litteratus*. 1. Strobile complet. 2. Scolex. 3. Anneau mûr. 4. Appareil reproducteur femelle. Vitellogène supère (en pointillés). Ovaire dessous, avec l'oviducte contourné passant en position infère, où se situe la glande de Mehlis. Le fin canal vaginal et l'utérus sinuent sous l'organe parutérin ovoïde (figuré en clair). Testicules périphériques. 5. Anneau grvide terminal.

Annales de Parasitologie (Paris) 1980, 55,4,379-391.

7 figs. 1 table, 2 references.

In French with summaries in French and English.

Authors summary.

INCIDENCE OF CAPILLARIA IN THE ANAL SACS OF MUSTELIDS,  
HISTOPATHOLOGICAL FINDINGS.

(Haarwürmer in den Analbeuteln von Musteliden.  
Vorkommen und histopathologische Befunde).

O. Geisel, Veterinärstrasse 13, D-8000 München 22.

Histologically the occurrence of capillaria in the anal sacs of different mustelids, e.g. stone martens, pine martens, pole-cats, one ermine, and one ferret, was detected. The helminths are to be found in young and adult animals of both sexes. In numerous cases the parasites cause hyperkeratosis or akantthosis in the mucosa of the anal sacs, mostly combined with purulent and non purulent inflammation. The lesions are limited to the anal region as an accessory findings.



Abb. 1. Parasitenanschnitt mit Eiern in der Leibeshöhle und in der Schleimhaut; Eier im Analbeutel-lumen; Hyperkeratose und Ansammlung von Granulozyten in den abgeschlifferten Hornmassen. Steinharder, Tgb. Nr. 1491/78, Haemalun-Eosin, 100 X

After printing this paper additionally the first case of anal-sac-capillariasis in an ermine (in 1 out of 11 animals) has been found.

Berl. Munch. Tierarztl. Wschr. 93, 411-413, 1980.

2 photos, 1 reference.

In German with summaries in German and English.

Author's summary.

**CELL-MEDIATED IMMUNITY IN FERRETS DELAYED DERMAL HYPER-  
SENSITIVITY, LYMPHOCYTE TRANSFORMATION, AND MACROPHAGE  
MIGRATION INHIBITORY FACTOR PRODUCTION.**

Carol A. Kauffman, Div. of Infectious Diseases, Veterans Administration Medical Center and the University of Michigan Medical School, Ann Arbor, Michigan 48105, USA.

Cell-mediated immune reactions - delayed dermal hypersensitivity, lymphocyte transformation, and macrophage migration inhibitory factor production - were investigated in the ferret.

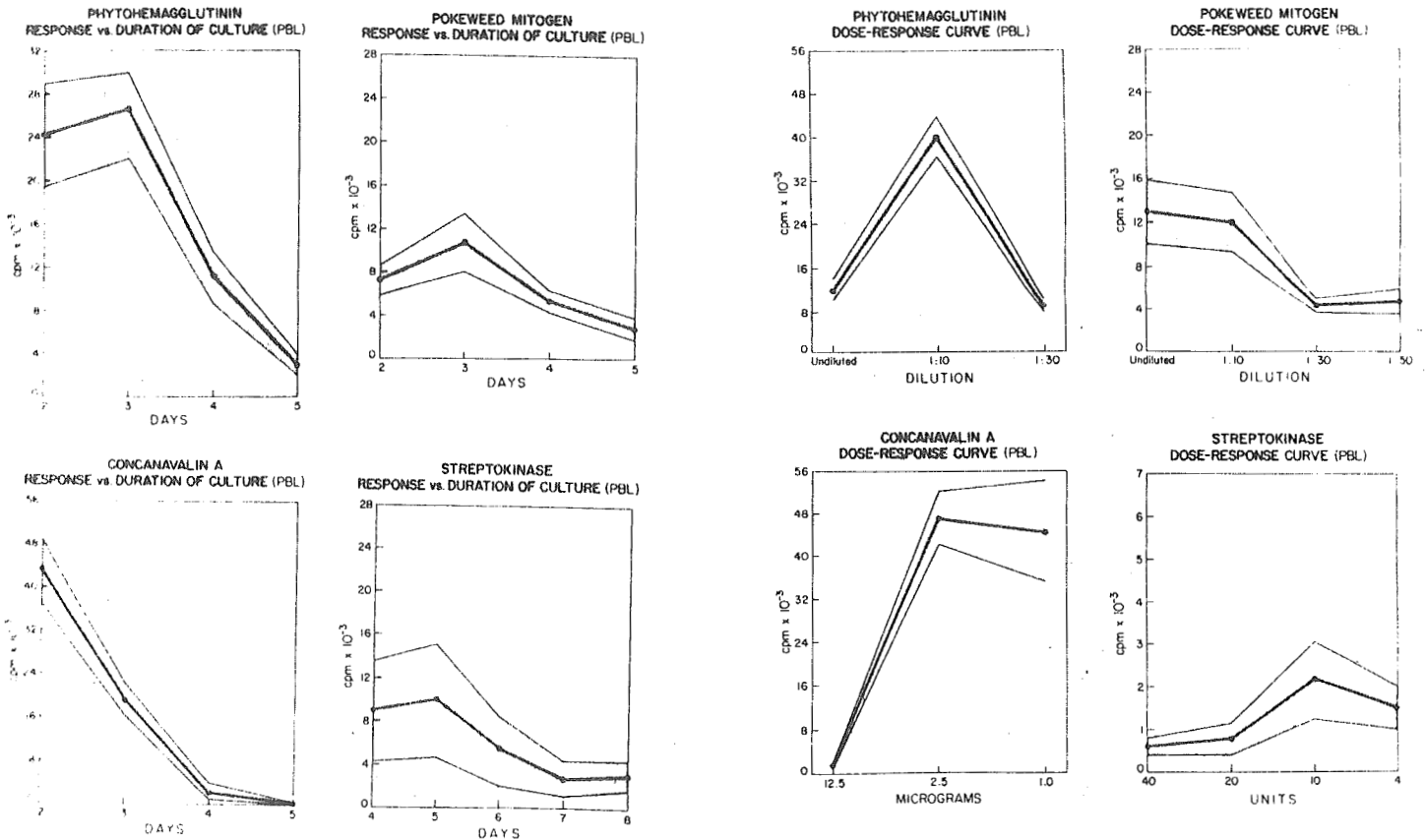


FIG. 3

The effect of incubation time on the proliferative response of peripheral blood lymphocytes to three mitogens, PHA, PWM, and CON A, and the antigen SK. Mean CPM  $\pm$  standard error of the mean (shaded area) for 10 ferrets.

FIG. 4

The effect of concentration on the proliferative response of peripheral blood lymphocytes to three mitogens, PHA, PWM, and CON A, and the antigen SK. Mean CPM  $\pm$  standard error of the mean (shaded area) for 15 ferrets.

Ferrets immunized with streptokinase in complete Freund's ad-

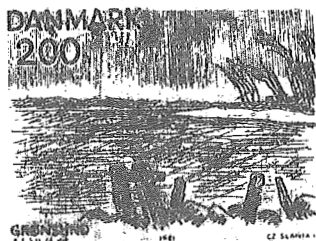
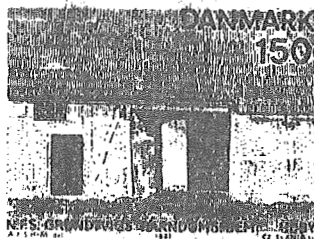
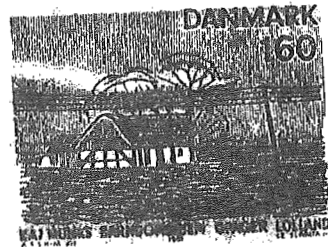
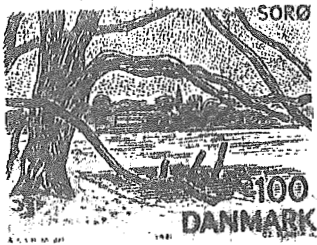
juvant had skin test responses characterized by induration with little erythema; skin test biopsies showed mononuclear cell infiltration. In vitro transformation of peripheral blood or splenic lymphocytes was elicited by phytohemagglutinin, concanavalin A, pokeweed mitogen, and streptokinase; macrophage migration inhibitory factor was produced by spleen cells from immunized ferrets. These studies confirm the usefulness of certain tests of cell mediated immunity in ferrets.

Developmental and Comparative Immunology, Vol.5, 125-134, 1981.

4 figs., 2 tables, 17 references.

In English.

Author's abstract.



COMMUNICATION.

Dr. Sc. Agric.  
Anders Skrede  
Dept. of Poultry and  
Fur Animal Science  
Agricultural University  
of Norway  
Box 17, 1432 Ås-NLH  
Norway

June 11 and 12, 1981, Anders Skrede, Department of Poultry and Fur Animal Science, Agricultural University of Norway, qualified for the Dr. Sc. in agriculture by giving two lectures and defending the thesis "Utilization of Fish and Animal Byproducts in Mink Nutrition."

The work consists of six detailed articles with the major objective being to obtain information on aspects of the importance of utilization of fish by-products as protein sources in mink diets.

The work is extremely comprehensive and gives much detailed information on the applicability of these products in various phases of mink production. The protein balance studies are extended with determination of metabolic nitrogen and true amino acid digestibility. This is considered as a very valuable contribution in the study of protein metabolism in mink. Based on this information the actual protein value of fish and animal byproducts can be determined with high precision and thus be very valuable criteria when composing mink diets. As a whole, the author demonstrates wide knowledge of basal nutrition, and the work will be of utmost importance for anyone working in mink nutrition. We therefore take this opportunity to congratulate Dr. Anders Skrede with his comprehensive work.

Bjørn O. Eggum.



**Scientifur**

Department of Poultry and Fur Animal Science  
Agricultural University of Norway  
Ås-NLH, Norway

## UTILIZATION OF FISH AND ANIMAL BYPRODUCTS IN MINK NUTRITION

By  
Anders Skrede

### PREFACE

The present work consists of six articles published in Acta Agriculturae Scandinavica under the common heading «Utilization of fish and animal byproducts in mink nutrition»:

I. Effect of source and level of protein on nitrogen balance, postweaning growth and characteristics of winter fur quality.  
Vol. 28, 105-129. *Abstr. SCIENTIFUR*  
Vol. 2, No. 2.

II. Effect of source and level of protein on female reproductive performance, and preweaning growth and mortality of the progeny.  
Vol. 28, 130-140. *Abstr. SCIENTIFUR*  
Vol. 2, No. 2.

III. Digestibility of diets based on different cod (*Gadus morrhua*) fractions in mink of different ages.  
Vol. 28, 141-147. *Abstr. SCIENTIFUR*  
Vol. 2, No. 2.

IV. Fecal excretion and digestibility of nitrogen and amino acids by mink fed cod (*Gadus morrhua*) fillet or meat-and-bone meal.  
Vol. 29, 241-257. *Abstr. SCIENTIFUR*  
Vol. 4, No. 2.

V. Content and digestibility of amino acids in cod (*Gadus morrhua*) byproducts.  
Vol. 29, 353-362. *Abstr. SCIENTIFUR*  
Vol. 4, No. 2.

VI. The digestibility of amino acids in fish viscera products and the effects of feeding on growth, fur characteristics and reproduction.  
Vol. 31. *Abstr. SCIENTIFUR*  
Vol. 5, No. 3.

The mink (*Mustela vison*) is by nature a carnivorous animal species with a short and simple digestive tract. Mink thus depend on a concentrated diet, preferentially with high levels of animal protein. In the Scandinavian countries, common practical mink diets are largely based on raw byproducts from fish industry and slaughterhouses. Marginal feed resources are in this manner converted into a valuable product. However, the available byproducts reveal greatly variable composition and feed value. The major objective of the present study was to obtain information on aspects of importance for utilization of fish byproducts as protein sources in mink diets.

The experiments reported in Articles I and II aimed at studying the properties of raw byproducts from the Norwegian cod and haddock fisheries in terms of chemical composition, and digestibility, N balance and performance achieved when fed to mink. Each byproduct was fed at graded levels of protein to establish whether or not the optimal protein levels were influenced by source of protein. These studies thus provided information about the adequacy of present protein standards when the diets are based mainly on fish byproducts.

During the early growth phase (4-10 weeks of age), mink kits are very responsive to minor changes in factors as palatability, protein quality and digestibility. The experiments described in Article III were undertaken to study the efficiency of digestion in mink of different ages. The protein sources applied were raw or cooked fractions of cod, varying in their contents of skeletal and skin protein.

It is recognized that optimal utilization of the protein sources would require knowledge of the contents of available amino acids. Since indigestibility seems to be an important reason for unavailability, it was considered relevant to extend the digestibility studies with mink to include individual amino acid digestibility. Determination of «true digestibility» requires information about metabolic fecal excretion. A study of the experimental technique, involving a protein-free diet as well as highly (raw cod fillet) and poorly (meat-and-bone meal) digestible protein at graded levels, was therefore carried out (Article IV). To study the potential effect of the intestinal microflora, this study included experiments on dietary supplementation with neomycin sulphate. The results reported in Article IV are subjected to general discussion, also considering results obtained with other species.

Article V concerns mainly with the composition and digestibility of amino acids in different cod fractions, and the effects of autoclaving, drying and homogenization. Main emphasis was given to clarification of the effect of skeletal protein on digestibility, and the different response in digestibility when heating cod fractions with different contents of skeletal protein.

Fish viscera is currently a greatly underutilized feed resource. The investigation presented in Article VI was conducted to study the potentiality of using fish viscera as an ingredient in mink diets. The study involved determination of chemical composition as well as digestibility trials and feeding experiments in all phases of production. A number of different fish viscera products, varying in raw material, preservation or processing method, was studied. Special efforts were made to study the capability of fish viscera products in supporting the amino acid requirements of the mink.

The present work was part of a project financed by the Norwegian Agricultural Research Council. Financial aid was also contributed by the Norwegian Fur Breeders Association. The research was carried out at Department of Poultry and Fur Animal Science.

The author wishes to express sincere appreciation to Docent Hans Rimeslätten and to Professor Dr. Harald Hvidsten for valuable discussions and advice during the course of the study. Acknowledgement is expressed to Mr. Aasmund Aam, Mr. Henrik Ovrebo and Mrs. Ashild Longva Eldegard for their assistance in conducting the digestibility trials. Thanks are due to the staff at the fur farm of the Department for technical assistance and skilful management of the animals, and to the secretaries for typing the manuscripts. Appreciation is also extended to other members of the Department for their contribution to this work, and to Dr. Bjørn O. Eggum, Mr. Gunnar Jørgensen and Mr. Niels Glem Hansen for reading some of the manuscripts.

Ås-NLH, November 1980

Anders Skrede

Dear Dr. agric. Anders Skrede.  
Congratulations to your thesis and your new title.  
We hope the best for you, your family and our cooperation in the future.  
Kind regards  
Gunnar J.



72

*Northwood Fur Farms, Inc.*

P.O. BOX 40

CARY, ILLINOIS 60013

Phones: (312) 639-3801 • (312) 639-3802

TRADEMARKS

Northwood  
Black Sapphire  
Black Velvet  
Blue Horizon  
Blue Indigo  
Pewter  
Umber Dusk  
Umber Glo

June 8, 1981

Mr. Gunnar Jorgensen  
National Institute of Animal Science  
Roskildevej 48 H  
3400 Hillerod  
Denmark

Dear Gunnar,

I think we have something that might be of interest to your readers of *Scientifur*, and it confirms the ideas that Dr. Rafael Garcia-Mata developed in Vedbaek last year.

This season was the earliest possible opportunity we could try what he has been doing for the last number of years, namely lighting females, after most of the matings have been accomplished.

We used to start lighting our mutation females the 5th of March and our darks the 17th.

This year we lighted all our female mink on the 14th of March, on that day 85% of our mink are double bred, and as compared to previous seasons our whelping was highly condensed, and our results were the best ever, with a conception rate of slightly over 96%.

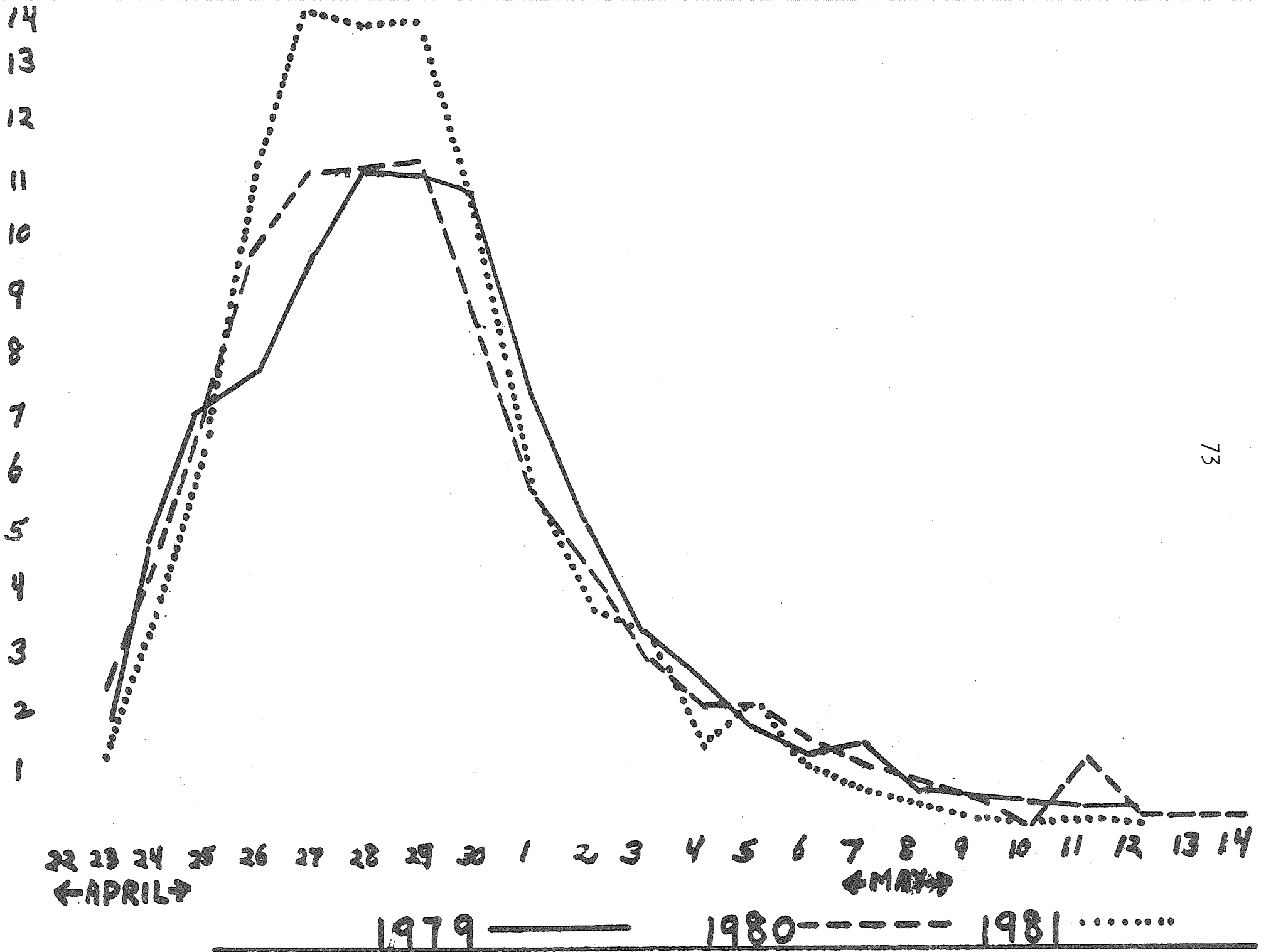
Yours truly,

A. A. Rietveld

AAR/dls



Percentage of Total



73

Dear Gunnar,

Here is the new National Board Research References for 1981.

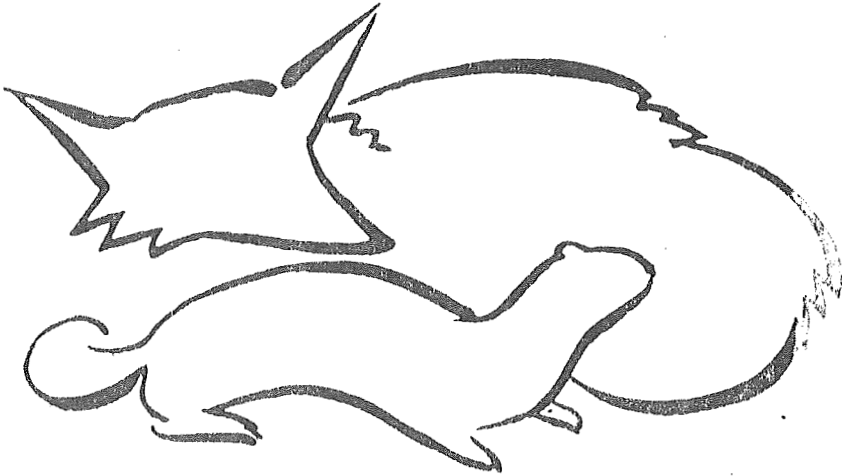
Copies sent outside North America should include \$1 US additional for air mail postage.

I am planning to bring a group of about 40 US mink farmers and wives to Scandinavia, including Denmark, in April, 1982. Will be writing you more about this.

*Regards, Bruce*

26 JUNE

# RESEARCH REFERENCES ON MINK & FOXES



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85-084 BYDGOSZCZ



Telefony: centrala 22-12-41, Dziekan 22-37-31, Teleks 562528 izatrpl

Bydgoszcz, dnia 16 th of July, 1981

Gunnar Jørgensen

NJF's Fur Animal Division

Scientifur

48H Roskildevej

DK - 3400 Hilleroed

Denmark

Dear Editor.

I am very satisfied that you have publicated the summary of my paper from "Medycyna Weterynaryjna". Now I am sending some copies of my works and other authors which I collected. If they appear useful for "Scientifur." you can take advantage them.

August 14, 1981.

Dear Dr. Barbara Stanisławska

Thank you very much for your letter of July 16th, and for the more than 25 scientific reports from your and related institutes in Bydgoszcz, Poland.

All the reports, of which many are very valuable, are abstracted in this issue of SCIENTIFUR.

Both I and undoubtly the readers of SCIENTIFUR will be very obliged to receive reports or abstracts from our colleagues in Bydgoszcz in future.

We wish you good luck both personal and with your scientific work concerning fur animal production in future, and we are looking forward to further cooperation.

Your sincerely

Barbara Stanisławska

Your sincerely

Gunnar Jørgensen

editor

Doc. dr Ante Hraste

76

ZAVOD ZA ANATOMIJU, HISTOLOGIJU I EMBRIOLOGIJU  
VETERINARSKOG FAKULTETA SVEUČILIŠTA

Zagreb, Heinzelova 55, pp 190

tel. 219-333

Zagreb, 8. VII 1981.

Beoj .....

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

Dear colleague!

Thank you ver much for the periodical "Scientifur"  
with the abstract of one of my reports. I am sending you two of  
my next reports and abstracts of them and I hope we shell coope-  
rate in the near future.

Sincerely yours

Doc. dr Ante Hraste

August 14, 1981.



Dear Dr. Ante Hraste

Thank you very much for your kind letter of July 8, 1981, and  
thank you for the enclosed reports.

Also we are looking forward to further cooperation with you  
and your colleagues in Yugoslavia.

Your sincerely



Gunnar Jørgensen

editor

Our Ref:

Your Ref:

Ruakura Agricultural Research Centre,  
Private Bag, Hamilton, N.Z.  
Telephone: 62 839.  
Telegraph "Agfarm, Hamilton"

June 26 1981



The Director  
National Institute of Animal Science  
Fur Bearing Animals  
Trollesminde 48H Roskildevej  
DK-3400 Hilleroed  
DENMARK

Dear Sir

With the present interest being shown in N.Z of farm rearing possums for fur production, Ruakura Agricultural Research Centre has become involved with a research program.

Although the Australian Brush-tailed possum Trichosurus vulpecula has been the subject of intense study in a variety of disciplines, little is known of the nutritional requirements to produce top quality fur.

Since about 1840 when the animal was introduced from Australia, there has been a fluctuating fur trade to 1980 when around three million pelts were exported. Of these, all from feral specimens, only five per cent appear to be selected into the top grade.

The feral possum breeds on average once, or in some locations twice a year, with only one young born at each partuition, so investigation in this area will be advantageous, too.

At Ruakura, we have begun to set up facilities to study all aspects pertinent to economical raising of these arboreal herbivores. The colony we have at present is being nourished on commercial rat pellets with a daily allowance of Dock (Rumex spp).

With these points in mind, I request copies of any papers produced from your institute with particular reference to early weaning, fur promoting or other factors relating to the initiation of a fur rearing colony of mammals.

Yours sincerely

M.G. Ashby  
TECHNICAL OFFICER

We are sure that help and information from any of SCIENTIFUR's readers will be appreciated. Please, take direct contact to the writer.

The Editor

Kupeczky J.u.11.  
Budapest  
Hungary  
H-1185

Det Kongelige Danske Landhusholdningselskab  
København

Modt.
20 JULI 1981
Kopi

Dear Sirs,

Please excuse my disturbing you. First let me introduce myself: my name is Péter Nagy, I am a librarian by profession. My problem is the following: since fur farming in Hungary is only of recent date, it is very important for it to have a sound information base and that is what I am going to organize. Since the results of Danish fur farmers are well known even here, I am very much interested in literature /books and articles/ published on this subject in your country. I wonder whether you could direct me to a special organ or body that could send me information - a list of titles - on the basis of which I could start.

Thanking you ever so much for this favour in advance,

I remain yours respectfully,

We are sure that help and information from any of SCIENTIFUR's readers will be appreciated. Please, take direct contact to the writer.

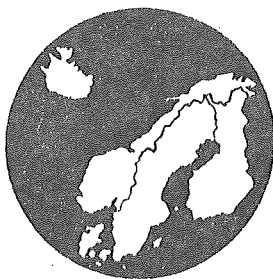
*Péter Nagy*  
Péter Nagy

The Editor

*Grimmer!*

*Scientifur mit bestemms hjælp.*  
*HL*

*Danke Pékelymunka*  
*de vilde granulat*  
*for Gyt.*  
*Mellem det Kongelige*  
*Landhusholdningselskab*



NORDISKA JORDBRUKSFORSKARES FÖRENING

Scandinavian Association of Agricultural Scientists

hold their annual meeting October 7-9, 1981, at Hotel Cumulus,  
Forssa, Finland.

The program for the meeting was announced in the latest issue  
of SCIENTIFUR.

Subscribers who want to participate may use the application  
formula below.

The Scandinavian languages will be the official languages during  
the meeting.

.....cut here .....

Send to: Finlands Pälldjuruppfödarens Förbund R.F.  
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Finland

A N M Ä L N I N G

till NJF:s seminarium no 20 PÄLSDJURSPRODUKTION  
7 - 9 oktober 1981  
på hotell Cumulus i Forssa, Finland.

Namn \_\_\_\_\_  
Titel/Yrke \_\_\_\_\_  
Firma/Inst. \_\_\_\_\_  
Adress \_\_\_\_\_  
Land \_\_\_\_\_

Jag reserverar enkelrum    
dubbelrum \_\_\_\_\_  
på hotell Cumulus från \_\_\_/\_\_\_ till \_\_\_/\_\_\_

Jag deltar/deltar inte i exkursionen till  
Jockis den 9.10.1.1981.

Jag anländer till Helsingfors flygfält den  
\_\_\_/\_\_\_ kl \_\_\_\_\_.

Jag avreser från Helsingfors flygfält den  
\_\_\_/\_\_\_ kl \_\_\_\_\_.

Mötesavgiften FIM 650,- har inbetalts på FPF:s  
postgirokonto nr 6370-4/bifogas med check.

