SCIENTIFUR
NO.1, JANUARY 1981.

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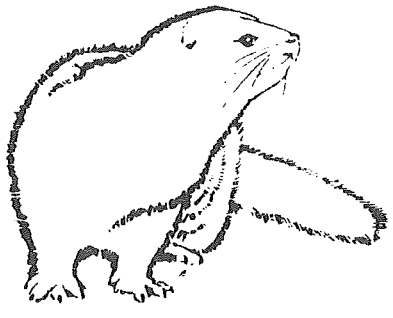

SCIENTIFUR
ISSN 0105-2403
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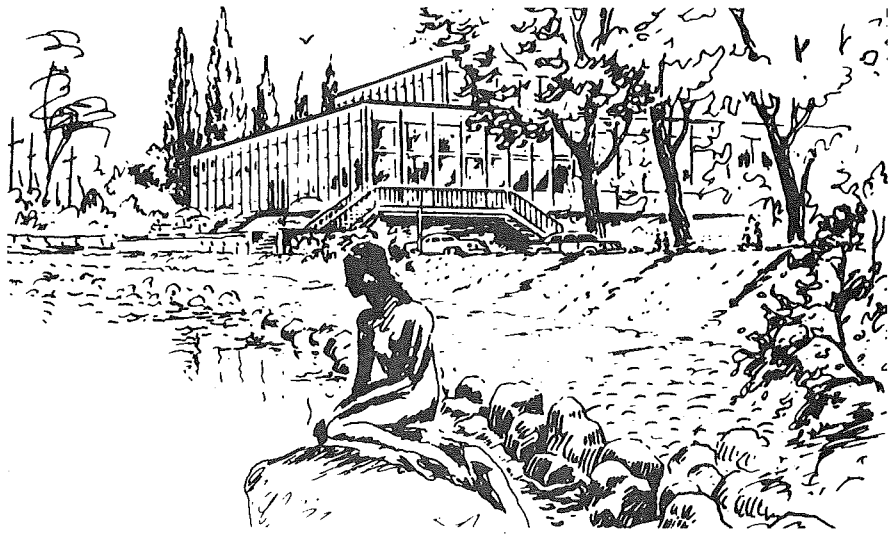
JANUARY 1981

4TH INTERNATIONAL CONGRESS ON FUR ANIMAL PRODUCTION.

EVALUATION OF THESIS CONCERNING:
BACTERIOLOGICAL QUALITY OF MINK FEED AND ITS EFFECT ON THE HEALTH OF MINK, AS MONITORED BY SOME CLINICAL AND BLOOD PARAMETERS.



"It goes on to say, 'The fault is not with the hardware. It is with you—the software!' "

N O T E S

SCIENTIFUR, VOL. 5, NO.1, 1981.

Our most heartfelt thanks for all Christmas and New Year Greetings received. Your very kind words will serve as an inspiration in our work on future issues of SCIENTIFUR. It is most gratifying to know that the outside world appreciates our efforts.

Whilst Congresses, like the 2nd Scientific Congress on Fur Animal Production held last April, are valuable for the creation of contacts, both professionally and socially, and offer participants an opportunity to become au fait with research developments in particular fields, as well as inspiring them to new work, Seminars on specific subjects will provide a far more clear indication of how far researchers have got, and what is lacking to solve problems within specialized fields of research.

In January 1981 a large number of Scandinavian researchers were given an opportunity to take stock at a course on fur animal nutrition extending over a period of a fothnight and held in Denmark under the directorship of Dr. N. Enggaard Hansen.

The course was an intensive one on theoretical, physiological, research methodological, and practical aspects of energy, protein, mineral and vitamin requirements of mink.

The conclusion from the course may be drawn that suitable standards exist in respekct of protein and energy supply; it is, however, somewhat harder to guarantee that the standards are optimal ones.

Is was rather frustrating to realize how little precise knowledge we have about minerals and vitamins. It was all too evident that our knowledge is limited in many fields, but also that it will be difficult to gain anything new from traditional feeding experiments.

Basic research in almost all spheres is lacking. This should lead to a more exact formulation of problems and, above all, utilization of well-documented and soundly based recording methods.

In the field of protein and energy it may prove difficult to produce new facts, as long as it remains difficult to record N-losses in connection with collection of faeces and urine as well as those fractions of N lost during periods of moulting. Extensive use of respiration trials in feedstuffs evaluation and recording of responses will not be topical until it has become possible to measure and possibly correct for the influence of muscular activity on the turnover rate of energy supplied.

Only a minor part of the problems associated with minerals may be described through traditional balance and deposition trials. A large share of these investigations as well as trials on optimal amounts of vitamins under different conditions may only be carried out be means of direct measurements of relevant physiological parameters in the animals, e.g. blood and organ samples.

Simultaneously with finding that basic research in the field of fur animal nutrition leaves much to be desired it should also be realised that this aspect of research makes heavy demands on resources, and that the tasks at hand cannot in any way be solved on the basis of the resources of personnel and money at present available for research on problems connected with fur animal nutrition.

The conclusion to be drawn must be that within the existing framework efforts must center rather on basic problems than on those

of "here and now" problems. The latter will often be solved anyway, and more readily so the greater the mass of basic knowledge available on which to base research.

There is no doubt that researchers lack of precise formulation of the problems as well as a list of priorities in order for them to be given the necessary resources for work within an imperative aspect of fur animal production.

In SCIENTIFUR, Vol. 4, No.4, I mentioned in the editorial notes that USA and Canada have issued an invitation to the 4th International Congress to be held in 1988. The invitation, printed under Communication, has been discussed by The Board of The Scandinavian Association of Agricultural Scientists (NJF), Fur Animal Division, who wish to call in comments from the members at a meeting fixed for October 1981. We must, therefore, ask our American and Canadian friends to await the decision of the Scandinavian researchers until the November 1981 issue of SCIENTIFUR.

Finally, I wish to thank contributors to the present issue of SCIENTIFUR. At the same time I wish to mention that we have no more "antique" material in stock. Consequently, it is my very great hope that the winter period has offered large numbers of colleagues an opportunity to write the reports which we are all waiting for - and especially the readers of SCIENTIFUR.

With all good wishes,

Yours sincerely

Gunnar Jørgensen

Editor.

USE OF ARTIFICIAL LIGHT AND DAY LENGTH TO ALTER THE LIFE CYCLES OF MINK.

Hugh F. Travis, Thomas E. Pilbeam, U.S. Dept. of Agric., U.S. Sheep and Fur Animal Exp. Stn., AR, SEA, Cornell Univ., Itacha, NY 14853, USA.

Mink (Mustela vison) that had been raised on a farm were abruptly changed from ambient light at 42° N latitude to an artificial light regimen corresponding to 45° S latitude. The study was continued for 3 years and included three generations of mink. Animals were raised in a light-controlled room with partial temperature control that kept the temperatures between -3 and 26 C. Light schedules were changed weekly to correspond with changing day length. After an initial transition period of 9 months, the mink adapted so that their furring and reproductive cycles were in phase with the altered light regimen. Normal reproductive performance was observed in some males and females. However the low percentage of both males and females that performed adequately makes the procedure economically unfeasible at this stage of our knowledge and experience. Possible causes of poor reproductive performance were: imprinting of previous light schedules on the animals, relatively high temperatures during breeding and improper light frequencies from artificial illumination.

Journal of Animal Science, Vol. 50, no.6, 1980, 1108-1112.
3 tables, 15 references.

Authors summary.

COMPARATIVE INVESTIGATIONS ON SKULLS OF SUBADULT FARM MINKS, MUSTELA VISON F. DOM. (MUSTELIDAE, CARNIVORA).

(Vergleichende Untersuchungen an den Schädeln von subadulten and adulten Farmnerzen, Mustela vison f. dom. (Mustelidae, Carnivora).

D. Kruska, Inst. für Zoologie der Tierärztlichen Hoshschule
Hannover, Bünteweg 17, D-3000 Hannover 71.

Studies were the changes in size and proportion of farm mink skulls in both sexes during late development by means of biometrical analysis. 17 characteristics skull measures of 134 (40 males, 94 females) standard farm minks of different age were taken and compared. In both sexes size decrease of the neurocranium occurs. When compared with younger individuals, mink older than six months show significantly smaller brain capacity, lesser height of the skull in the region of the neurocranium, and the width of the postorbital area is diminished. Measures of other skull areas remain unchanged in lengths, breadths, and heights during late development. On the basis of condylobasal length the same changes in size could be established. They correspond with the decrease in brain weight.

Zeitschrift für Saugetierkunde, 44, 6, 360-375.
2 tables, 10 figs. 25 references.
In German with abstract in English.

Authors abstract.

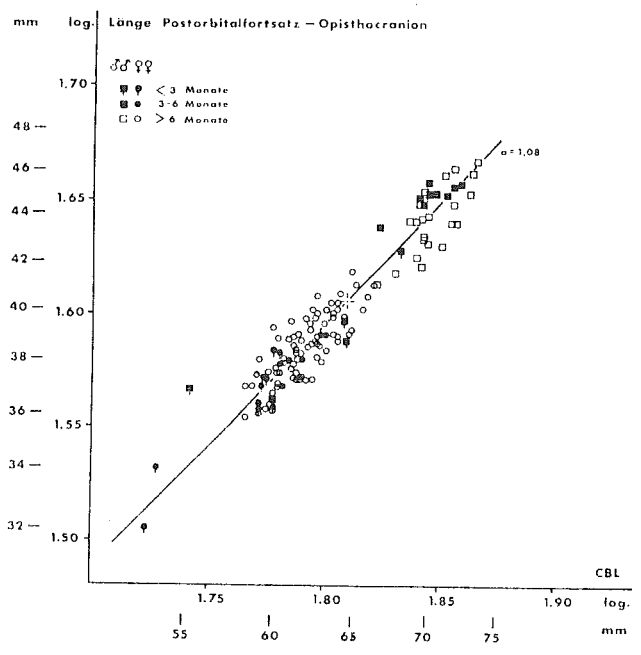


Abb. 7: Allometrische Beziehungen zwischen PL und CBL bei jüngeren und älteren Farmnerzen.

SEX IDENTIFICATION IN THE MINK (MUSTELA VISON SCHREBER) BY METRICAL MEASUREMENTS OF THE SKULL.

Øystein Wiig, Rolf W. Lie, Zoological Museum, University of Bergen, N-5014 Bergen, Norway.

The dental length and length of the first molar in the upper jaw of mink are characteristics used to estimate a discriminant function for sex identification of Norwegian populations. Reliability of the method is theoretically 93.2%.

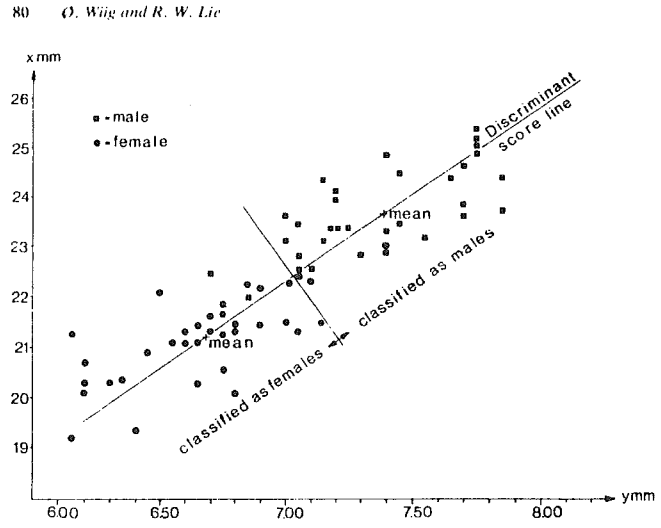


Fig. 2. Distribution of the skulls used in evaluating the discriminant function, the discriminant score line, and the dividing point between the sexes, before transformation of the standard deviation to unity.

Zoologica Scripta, Vol. 9, 79-80,1980.
2 figs., 4 references.

Authors abstract.

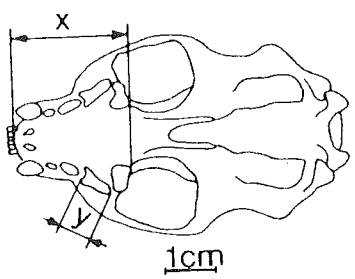


Fig. 1. Ventral view of the skull of mink and the two measurements used in sex identification.

EXPERIMENTAL DIAGNOSIS OF SEX IN THE FOX, (VULPES VULPES), COMPARATIVE TESTING OF THREE METHODS FOR THE EPIDEMIOLOGICAL STUDY OF RABIES BY D. SALMON AND J. BLANCOU.

(Diagnose expérimentale du sexe du renard (Vulpes vulpes) essais comparés de trois méthodes en vue de l'étude épidémiologique de la rage.)

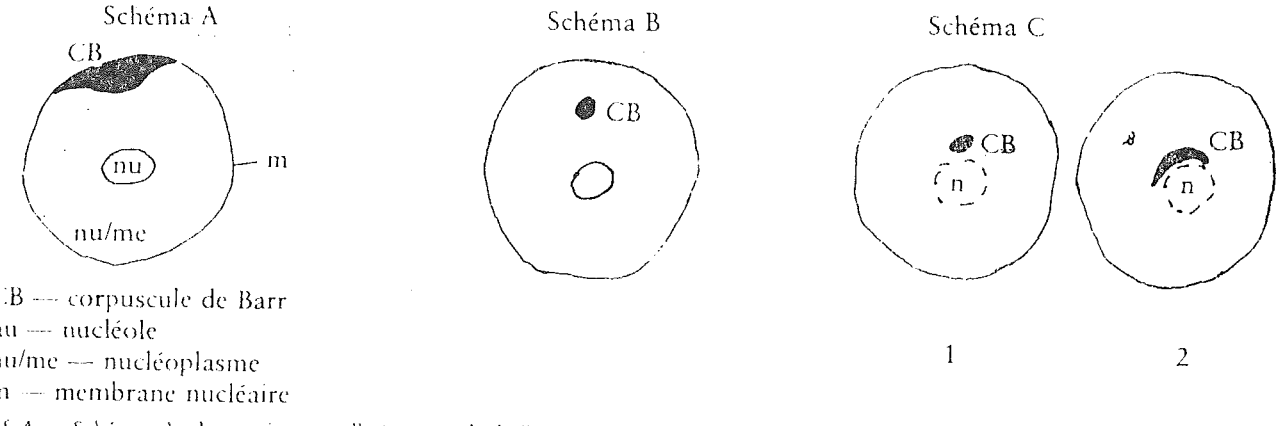
D. Salmon, J. Blancou, Ministère de l'agriculture, Direction de la qualité, Services vétérinaires, Centre national d'etudes sur la rage, B.P. 54220 Malzeville, France.

Three methods for experimental recognition of the sex in foxes only from heads sent to laboratories for rabies diagnosis have been tested: measurement of the size of the canine teeth, demonstration of sexual chromatin (Barr corpuscule) and of chromosome Y in fluorescence.

The demonstration of Barr corpuscule proves the most accurate method (97 times out of 100 cases), the method of chromosome Y demonstration having failed and the measurement of the diameter of canine teeth allowing for at least 25 per cent mistake.

Rec. Méd. vét. 156, 1, 121-128.
5 tables, 3 figs, 20 references.
In French with summaries in French, English, and Spanish.

Authors summary.



CB — corpuscule de Barr
nu — nucléole
nu/me — nucléoplasme
m — membrane nucléaire

Fif. 4. — Schémas de chromatine sexuelle (corpuscule de Barr).

PATTERNS OF VARIATION AND CORRELATION IN THE DENTITION OF THE RED FOX, VULPES VULPES.

Philip D. Gingerich, Dale A. Winkler, Museum of Paleontology, The University of Michigan, Ann Arbor, MI 48109, USA.

The teeth of 51 individuals of the red fox, Vulpes vulpes, from the Upper Peninsula of Michigan were measured to quantify dental variation and correlation in this species. Upper and lower first molars tend to be the least variable in the toothrow; the canines incisors, and posteriormost molars tend to be more variable. Variability of the cheek teeth is uncorrelated with sequence of tooth eruption, but rather appears to be inversely related to occlusal complexity, with teeth in the carnassial region being the least variable. Correlations and partial correlations of tooth length were calculated for all pairs of upper and lower teeth. Surprisingly, the tooth pairs that are most highly correlated are in the premolar series where no tooth-to tooth occlusion is possible. Reduces variability near occluding carnassials in each toothrow is presumably related to the functional importance of precise occlusion, but this is not reflected in the pattern of correlations and partial correlations.

J. Mamm. 60, 4, 691-704, 1979.
6 tables, 4 figs., 28 references.

Authors abstract.

MORPHOLOGY AND MORPHOMETRY OF THE APPENDICULAR SKELETON OF THE RED FOX (VULPES VULPES).

André Bisaillon, Laszlo DeRoth, Dept. d'Anatomie et Physiologie animales, Faculté de Mèdicine vétérinaire, Univ.de Montreal, C.P.5000, Saint-Hyacinthe, (Que), Canada J2S 7C6.

Themorphological and morphometrical characteristics of the limb bones are studied in 8 adult male and 17 adult female red foxes (Vulpes vulpes). Although the appendicular skeleton is similar

in strukture in both sexes, it is possible to distinguish between male and female animals using some measurements to the pelvic limb bones.

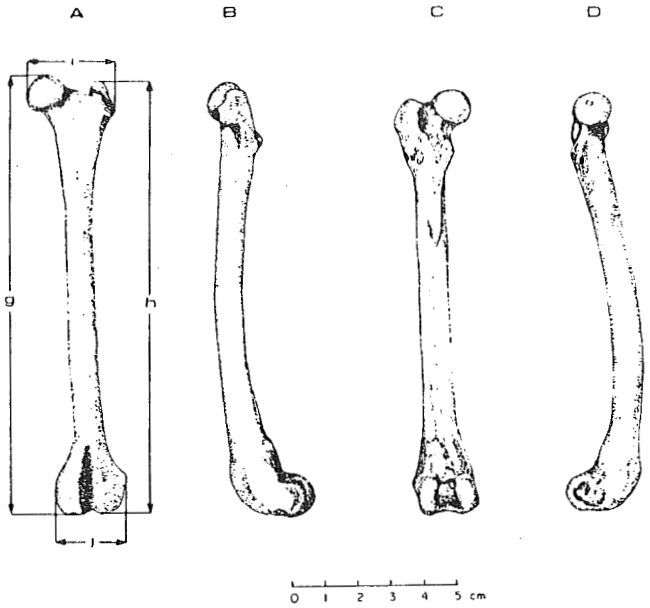


FIG. 5. Left femur. (A and B) Cranial and lateral view of male; (C and D) caudal and medial view of female. (A) Representation of measurements taken.

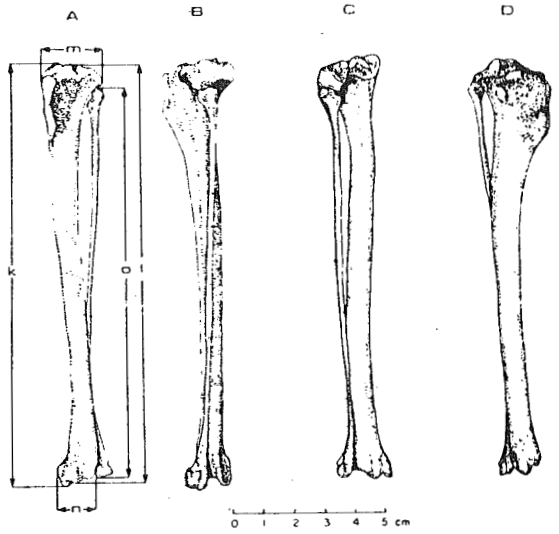


FIG. 6. Left tibia and fibula. (A and B) Cranial and lateral view of male; (C and D) caudal and medial view of female. (A) Representation of measurements taken.

Canadian Journal of Zoology, Vol. 57, 11, 1979.
2089-2099.

6 figs., 4 tables, 10 references.

In English with abstracts in English and French.

Authors abstract.

RESPONSE OF CAPTIVE MALE RED FOXES (VULPES VULPES L.) TO SOME CONSPECIFIC ODORS.

R.A. Blizard, G.C. Perry, Dept. of Animal Husbandry, Univ. of Bristol, Langford, Bristol, BS18 7DU, U.K.

Captive male red foxes were allowed access to urine and anal sac secretions collected from both familiar and unfamiliar foxes of both sexes. Conspecific odors commonly elicited higher visiting and marking frequencies than did their distilled water controls. Unfamiliar odors generally attracted a higher frequency of urinations than familiar odors, und unfamiliar male urine elicited a longer investigation time and was urine-marked more frequently than other stimulus odors.

Journ.of Chemical Ecology, Vol.5, No.5, 1979. 869-880.
4 tables, 30 references.

Authors abstract.

FOOD-CACHING BEHAVIOUR OF CAPTIVE-REARED RED FOXES.

D.L. Jeselnik, I.L. Brisbin, Savannah River Ecology Laboratory, P.O. Drawer E, Aiken, SC 29801, USA.

Two juvenile male red foxes exhibited stereotypic patterns of food-caching behaviour when moved into a dirt-floored pen from a concrete-floored run in which they had been raised since being removed from their natal den. The dominant animal did not prevent the subordinate fox from unearthing and/or reburying food which id had buried. Of a total of 44 unearthings of buried food items, 56.8% were made by the subordinate fox. Urinemarking behaviour was not noted in connection with the burying of food and may suggest that this is either learned behaviour or simply related to the lack of maturity of the foxes studied.

Appl. Animal Ethology, 6, 1980, 363-367.
1 table, 8 references.

Authors abstract.

THE USE OF FISH VERTEBRAE IN SCATS FOR ESTIMATING PREY SIZE OF OTTERS AND MINK.

M.H. Wise, Dept.of Biological Sciences, The University, Exeter.

A method of using fish vertebrae in scats of otters and mink in order to estimate prey size is described. Significant positive correlations between fish fork length and length of abdominal and caudal vertebrae respectively were demonstrated and described for a series of reference fish of different species. Comparison of direct length measurements of fish fed to captive mink with length estimated obtained from vertebrate recovered in their scats and derived using the appropriate regression lines determined from the reference fish revealed a close measure of agreement and indicated that the method achieves a high level of accuracy. Use of vertebrae from scats for estimating fish length is considered to have several advantages over use of scales, and the method greatly extends the range, accuracy and value of the information that can be obtained from scat analysis.

J. Zool., London, 1980, 192,25-31.
2 tables, 13 references.

Authors abstract.

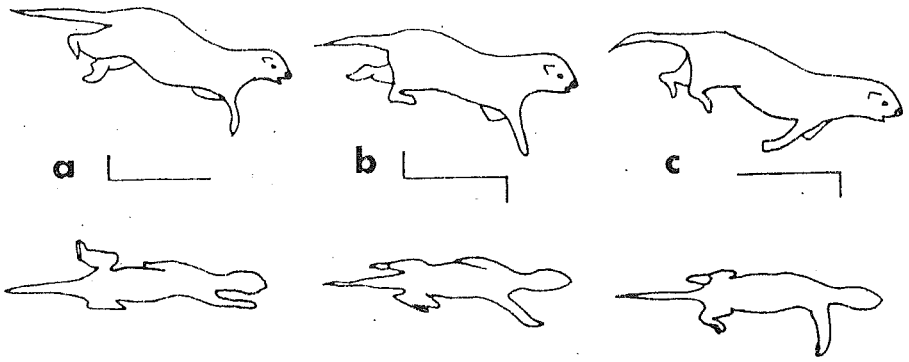
SWIMMING AND DIVING BEHAVIOR OF THE MINK. (MUSTELA VISON SCHREBER).

Nigel Dunstone, Dept. of Zoology, University of Durham, Science Laboratories, South Road, Durham DH1 3LE, U.K.

Underwater swimming and diving behaviour of the American mink (Mustela vison) was investigated in the laboratory using cine film. The locomotor patterns involved in aquatic movement are described and compared with terrestrial locomotion in the mink and aquatic and terrestrial locomotion in the ferret (Mustela furo). Two forms of aquatic locomotion are described for the mink, midstream swimming and surface swimming both of which

are slower than the terrestrial modes.

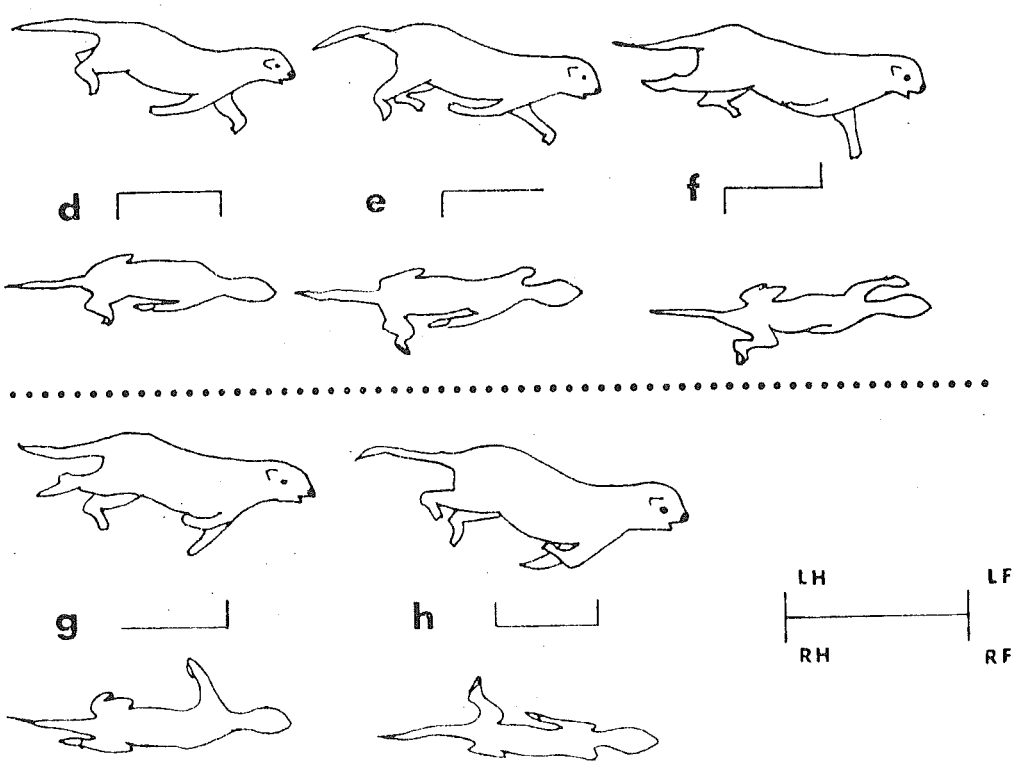
FIGURE 1. Limb sequence diagrams for midstream swimming in the mink giving lateral and dorsal views with support diagrams. LH, left hind; RH, right hind; LF, left fore; RF, right fore.

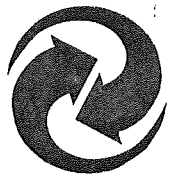


During midstream swimming the mink used a power and recovery method of locomotion involving alternate use of all four limbs whereas when surface swimming only the fore limbs were used.

Carnivore, Vol. II, part. 4, November 1979.
1 table, 1 fig., 15 references.

Authors abstract.





BIOLOGY OF THE FEMALE REPRODUCTIVE TRACT OF THE MINK, MUSTELA VISON SCHREBER, 1777.

I. MORPHOLOGY OF THE ENDOMETRIUM DURING ANESTROUS.

(Zur biologie der weiblichen Reproduktionsorgane des Nerzes, Mustela vison Schreber, 1777.
I. Morphologie des Endometriums im Anoestrus).

Lüder C. Busch, Abt. Anatomie der Medizinischen Fakultät,
der Rheinisch-Westfälischen Technischen Hochschule,
Melatener Strasse 211, D-5100 Aachen.

The mink uterus (corpus uteri and cornua uteri) during anestrous was examined by SEM and TEM.

The endometrium of the uterine horn forms 5 longitudinal mounds and a sequence of circularly arranged mucosal pillows on the antimesometrial side of the horn. Up to 8 longitudinal mounds, however, may appear in the corpus uteri.

The epithelial cells of the endometrium are characterized by extended depots of glycogen, sometimes disintegrated by electron-opaque areas. Numerous elongated mitochondria are located particularly in the supranuclear region. Cisternae of the rough endoplasmatic reticulum are rare. Golgi bodies are not very prominent. Small secretory granules of different structure are located particularly in the supranuclear region. During late anestrous, however, these granules occur in the apical cell region. Other characteristic organelles of the endometrial epithelium are lamellar bodies of varying size, shape and structure. Possibly they are lysosomelike deposits of phospholipids. Up to now development and function of these lamellar bodies are unknown. Ciliated celles are rarely seen during anestrous. Light cells with dendritic processes - similar to the cells of Langerhans - are also visible among the columnar epithelial cells.

The uterine gland cells are nearly free of glycogen and lamellar bodies. But secretory granules of varying size do exist during the whole anestrous.

Anat. Anz., Jena 148, 1980, 14-29.
10 photos, 48 references.
In German with summary in English.

Authors abstract.

CONTROL OF LUTEAL FUNCTION AND IMPLANTATION IN THE MINK BY PROLACTIN.

Roger L. Papke, Patrick W. Concannon, Hugh F. Travis,
William Hansel, US Dept. of Agric. and Cornell University,
Request reprints from: P. Concannon, Dept. of Physical Biol.,
New York State College of Vet. Med., Cornell Univ., Ithaca,
NY 14853.

Mink (Mustela vison) were treated during the period of embryonic diapause with prolactin or ergocryptine (CB-154). Prolactin advanced implantation time and hastened onset of luteal phase progesterone secretion. Duration of gestation in prolactin-treated adult mink was shorter than that of control mink. Ergocryptine had the opposite effects, prolonging gestations and inhibiting onset of luteal phase progesterone secretion. Prolactin is suggested to be the luteotropin neccessary for termination of embryonic diapause in mink.

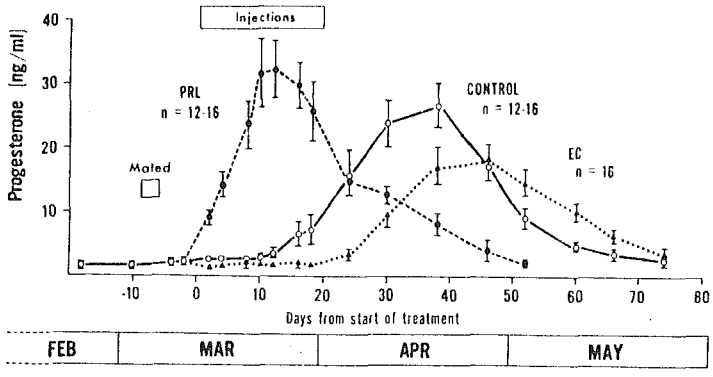


Figure 1. Mean (±SEM) serum progesterone in control (○), prolactin-treated (●) and ergocryptine-treated (▲) mink.

Journ. of Animal Science, Vol. 50, No.6,1980, 1101-1107.
2 tables, 3 figs. 22 references.

Authors summary.

THE ROLE OF PROLACTIN IN IMPLANTATION AND LUTEAL MAINTENANCE IN THE FERRET.

Bruce D. Murphy, Dept. of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N OWO.

The role of prolactin (PRL) in the maintenance of the corpus luteum (CL) of pregnancy in adult female ferrets was investigated. Twelve animals were hypophysectomized on Day 5 or 6 of gestation (Day 0 = mating). Eight received 250 µg bovine PRL/day and the remaining 4 received no further treatment. A third group of 4 ferrets was subjected to sham hypophysectomy. Laparotomy was performed on Day 15 and hyp.ophysectomized ferrets were autopsied on Day 20. No embryos implanted in the hypophysectomized untreated ferrets and serum progesterone levels at Days 15 and 20 were less than in either sham hypophysectomized or hypophysectomized PRL treated ferrets ($P < 0.05$). Implanted embryos were observed in all sham treated females, in 4 of the PRL treated females at Day 15 and in 5 PRL treated females on Day 20. Uterine morphology in PRL treated females that failed to contain implanted embryos could be likened to that seen in pseudopregnant ferrets. Serum progesterone levels were not different between sham treated and hypophysectomized PRL treated females at Day 15 or 20. Both groups had significantly higher progesterone concentrations when compared with hypophysectomized untreated ferrets ($P < 0.05$). It is concluded that PRL can sustain luteal progesterone production during the first half of pregnancy in hypophysectomized ferrets. Further, PRL can qualitatively maintain the CL of pregnancyas evidenced by its ability to induce embryo implantation in hypophysectomized ferrets.

Biology of Reproduction, 21, 517-521, 1979.
1 table, 1 fig., 19 references.

Authors abstract.

LUTEAL FUNCTION IN MINK: THE EFFECTS OF HYPOPHYSECTOMY AFTER THE PREIMPLANTATION RISE IN PROGESTERONE.

Bruce D. Murphy, William D. Humphrey, Shirley L. Shepstone,
Dept. of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N OWO.

Pearl variety mink bred twice between March 4 and 20 were hypophysectomized or sham hypophysectomized between April 4 and 10, after the preimplantation rise in progesterone. Four groups of hypophysectomized females each received one of the following treatments in the form of minipump (Alza) infusion for 170 h of: prolactin (PRL) 1 µg|h, 2 µg|h, luteinizing hormone (LH) 1 µg|h or LH 0.5 µg|h with PRL 1 µg|h. One group of hypophysectomized mink received no further treatment. Blood samples were taken from all animals at the time of surgery (day 0) and day 3, 6, and 9. Hypophysectomized mink were killed by exsanguination and blood samples were taken from sham treated animals. Plasma progesterone was quantitated by radioimmunoassay. The mean level of progesterone increased in sham treated mink at day 6 and remained high through day 12. Mean progesterone declined significantly by day 3 in all hypophysectomized mink. At day 3, two subgroups were present in terms of luteal response: in animals receiving PRL 1 µg|h, 2 µg|h or PRL + LH, progesterone levels were significantly greater than animals receiving no infusion or LH alone. Plasma progesterone levels declined and were statistically homogenous in all hypophysectomized mink by day 6. Sham treated mink produced normal litters. Embryos degenerated in all hypophysectomized mink. It was concluded that the pituitary is necessary for support of the postimplantation corpus luteum and for the completion of gestation. PRL but not LH temporalily ameliorated the decline in progesterone induced by hypophysectomy. LH together with PRL was no more effective than PRL alone. The results suggest that PRL is an important luteotropin in mink.

Animal Reproduction Science, 3, 1980, 225-232.
1 fig., 15 references.

Authors abstract.

CYTOLOGICAL PICTURE OF VAGINA EPITHELIUM IN POLAR FOXES DURING PRECOPULATION AND COPULATION PERIODS.

(Obras cytologiczny Nablonka Pochwy w okresie Przedkopulacyjnum i Kopulacyjnym u Lisow Polarnych.)

Stanislaw Jarosz, Boguslaw Barabasz, Inst. of Animal Nutrition, Academy of Agriculture, Krakow, 30-059 Krakow, Al. Mickiewicza 24/28, Poland.

In 24 female foxes cythormonal and morphological changes in vagina epithelium were investigated with the use of the Papanicolau's method during precopulation and copulation time. The changes in epithelium in the form of basophilic and acidophilic cells were seen about 7 days before copulation time. Up to the 2nd day of precopulation period in citogram predominated basophilic celles typical of proestrus phase. On 1-2 days before copulation and during copulation time predominated (60-80%) acidophilic cells, typical of estrus phase. Among these cells could be differentiated superficial epithelial cells with vesicle nuclei, cells with pycnotic nuclei and a small number (about 10%) of cornified cells.

Acta Agraria et Silvestria,
Series Zootechnica, Vol. XIX, 1980, 73-81.
2 tables, 3 figs., 12 references.
In Polish with subtitles and summary in English and summary in Russian.

Authors summary.

PURSUING THE MINK WHELP EVOLUTION DURING THE PARTURITION AND THE LACTATION.

N. Păstirnac, R. Gruia, Dept. Agric. de Stat, I.A.S. Prejmer 2241, jud. Brasov, R.S. Romania.

Mink reproduction is the starting point for a series of technical

and organizational measures ment to increase the fur production from every female.

This study attempts to detect the manner of evolution of the kit losses during whelping and lactation, in order to discover the causes and respectively, to find out the technical methods to prevent the losses and recover the kits. The critical periods after whelping, respectively after 24 hours, at the age of 10-15 days and of 20-25 days, were particulary analyzed.

During the controls, bedised the observations concerning the existence of layer in the pen, the cleaning degree, the pen partition other aspects were analysed too, such as the number of kits alive as well as dead (which had been withdrawn), the extra kits considering the number of nipples, the underdeveloped kits, the frail ones (given by agalactic mothers), the hypothermic ones (fallen from the dens, injured etc.), the orphans (dead or escaped mothers etc.). These cathegories of kits predisposed to die were transferred by adoption, to other mother, making thus uniform the litter size for every mother.

Considering this point of view, at lot of 2323 females and 11370 kits were analysed, and results were compared with those obtained from a control lot of 171 females and 580 mink kits. It was pointed out that the method used is very profitable because the controls made upon the kits lots preceed the natural selection, counteracting thus the virtual kit losses.

The observations were made considering a series of factors which had been taken into account, respectively the date of the control, the number of females from which the kits had been tranferred, the number of adopted kits, successful adoptions etc. The analysed aspects were compared on 7 colour types of minks, most of them being Standard minks.

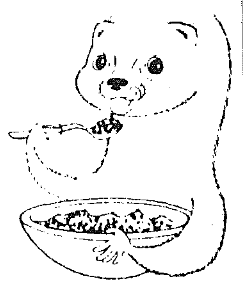
Observing the obtained results, the conclusion is that the prolificity of the lot upon which the described methods had been

applied is better than the control lot with 1.5 kits. The recovered kits by successful adoptions represent more than 80% from all the kits transferred to nursing mothers, which accepted the kits in about 92% of cases. The most efficient controls of the pens are those made in the first 10 days from parturition.

Applying the described methods, 5% from all the whelped kits were recovered, addition which contributes to improve the economical results of the respective activities.

Revista de cresterea animalelor, No.6, 1980, 20-26.
5 tables, 2 figs., 3 references.
Abstracts in English, French and Russian.

Authors summary.



ACTA VETERINARIA SCANDINAVICA
SUPPLEMENTUM 75
AVSPAC 75-1-38 (1980)

BACTERIOLOGICAL QUALITY OF MINK FEED AND ITS EFFECT ON THE HEALTH OF MINK, AS MONITORED BY SOME CLINICAL AND BLOOD PARAMETERS

BY
TAPIO JUOKSLAHTI

Academic Dissertation to be presented with the permission of the College of Veterinary Medicine for public examination in Auditorium Maximum, Hämeentie 57, Helsinki, on December 19, 1980, at 12 o'clock noon.

Akateeminen väitöskirja, joka esitetään Eläinlääketieteellisen korkeakoulun opettajakollegion suostumuksella julkisesti tarkastettavaksi Eläinlääketieteellisen korkeakoulun suuressa luentosalissa, Hämeentie 57, Helsinki, joulukuun 19 päivänä 1980 klo 12.00.

Akademisk avhandling som med tillstånd av Veterinärmedicinska högskolans lärarkollegium offentligen försvaras *i Veterinärmedicinska högskolans stora auditorium, Tavastvägen 57, Helsingfors, den 19 december 1980 kl. 12.00.*

HELSINKI 1980

The present dissertation is based on the following papers:

I T. Juokslahti: Bacteriological quality of ready-mixed mink feed in Finland. Acta vet. scand. 1978, 19, 520-534.
SCIENTIFUR Vol. 3, No. 2. pp. 27.

II T. Juokslahti: Bacteriological quality of raw materials used in Finnish mink feed. Acta vet. scand. 1979, 20, 562-571.
SCIENTIFUR Vol. 5, No 1.

III T. Juokslahti, S. Lindroth & A. Niskanen: Pathogenic, enterotoxin-producing staphylococci in mink feed and mink feed raw materials. Acta vet. scand. (in press).

IV T. Juokslahti, P. Lindberg & J. Työppönen: Organ distribution of some clinically important enzymes in mink. Acta vet. scand. 1980, 21, 347-353.
SCIENTIFUR, Vol. 4, No. 4, pp. 47.

V T. Juokslahti, A. Niskanen, S. Lindroth & T. Pekkanen: Experimental staphyloenterotoxicosis in mink. Acta vet. scand. 1980, 21, 336-346.
SCIENTIFUR, Vol. 4, No. 1, pp. 42

VI T. Juokslahti: The effect of the bacteriological status of feed on some haematological and blood chemical data on mink. Acta vet. scand 1980, 21, 504-515.
SCIENTIFUR, Vol. 5. No 1.

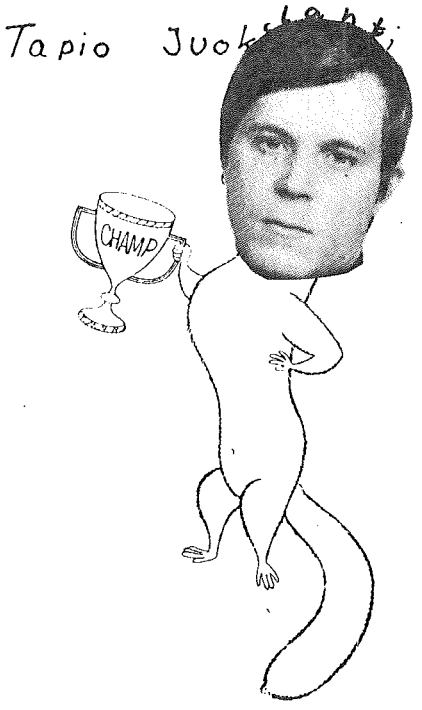
The papers will be referred to in the text by their Roman numerals.

CONTENTS

BACTERIOLOGICAL QUALITY OF MINK FEED AND ITS EFFECT ON THE HEALTH OF MINK, AS MONITORED BY SOME CLINICAL AND BLOOD PARAMETERS

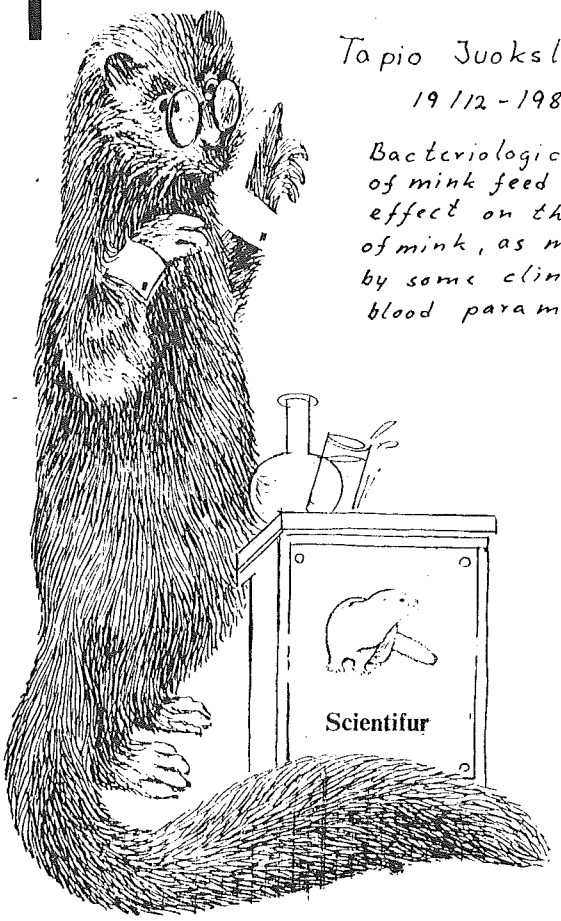
GENERAL CONCLUSIONS

1. The bacteriological status of ready-mixed mink feed in Finland was found to be poorer than in Norway and Denmark. The quality was found to be better in periods of the annual production cycle when special attention was paid to selection of raw material for feed production.
2. Slaughterhouse offals and unpreserved slaughter blood were found to have the poorest bacteriological quality of the raw materials investigated. Single samples of other raw materials could have high total bacterial counts, but specified bacterial counts were relatively low.
3. One third of the ready-mixed mink feed batches were contaminated with pathogenic staphylococci. Potential enterotoxicosis risk is present through slaughterhouse offals containing enterotoxin-producing staphylococci.
4. The enzymes OCT, ASAT and ALAT had higher absolute activities in mink liver compared to many other animals, which is believed to be adaptation to a high protein diet. The relative organ specificities of the investigated enzymes is comparable to many other animals, and their clinical significance in blood studies is therefore of the same value.
5. Minks are susceptible to oral administration of staphylococcal enterotoxin. The clinical symptoms and changes in haematological and blood chemical data on minks resemble those reported in other test animals and human beings.
6. The health of minks receiving bacteriologically poor quality feed was significantly weaker than the health of minks receiving bacteriologically good quality feed, when health was monitored with the aid of haematological and clinico-chemical parameters.



Dr. med. vet.
19. december 1980

1

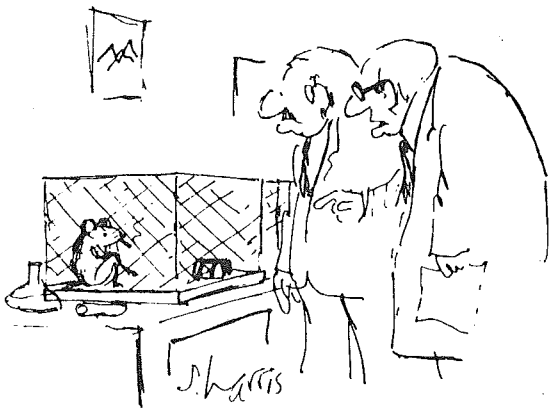


Tapio Juokslahti.
19/12 - 1980

Bacteriological Quality of mink feed and its effect on the health of mink, as monitored by some clinical and blood parameters.

2

But how is Tapio?

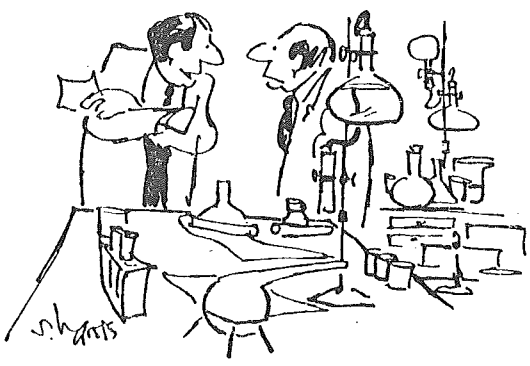


"He's the typical American *mink*—likes a drink before dinner, smokes a little, watches TV...."

3

But he likes best to work with important things

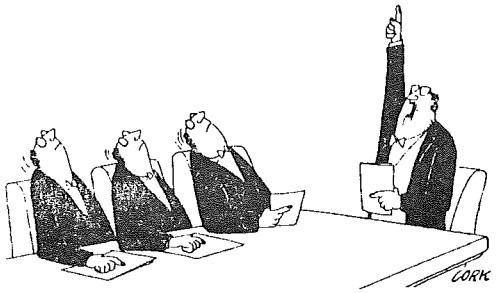
like  and 



"Just for kicks, let's come up with something that has a good side effect."

4

He's thinking is sometimes original.



One original - 3 copies

We can hope that somebody will copy him

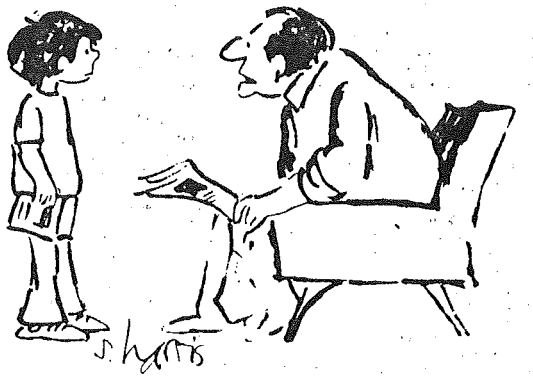
5

And all will understand him.

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

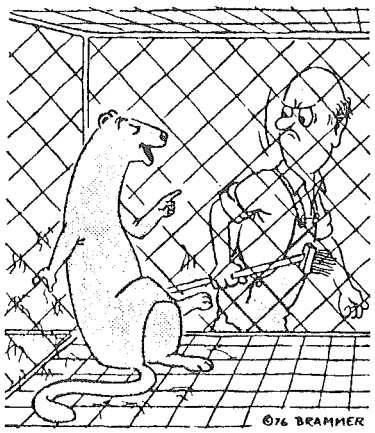
6

One day he will se he's dreams realized.



"Sure you can become a systems analyst if you want to—but tell DADDY, what *is* a systems analyst?"

7 and Tapio will be our ideal.



You are our great Ideal Petterson
Especially what concern hair loss.

Congratulations our dear friend.

Scientifur and

Present adress:
Tapio Joukslahti
Finnish Fur Breeders Ass.
Box 5
SF-01606 Vanda 60
Finland

ORIGINAL PAPER

POTENTIALLY THIAMINASE-CONTAINING FISH SPECIES IN MINK FEEDING

Eva Aldén & Anne-Helene Tauson, Fur Animal Division, Dept. of Animal Husbandry, Swedish University of Agricultural Sciences, Funbo-Lövsta, S-755 90 Uppsala, Sweden.

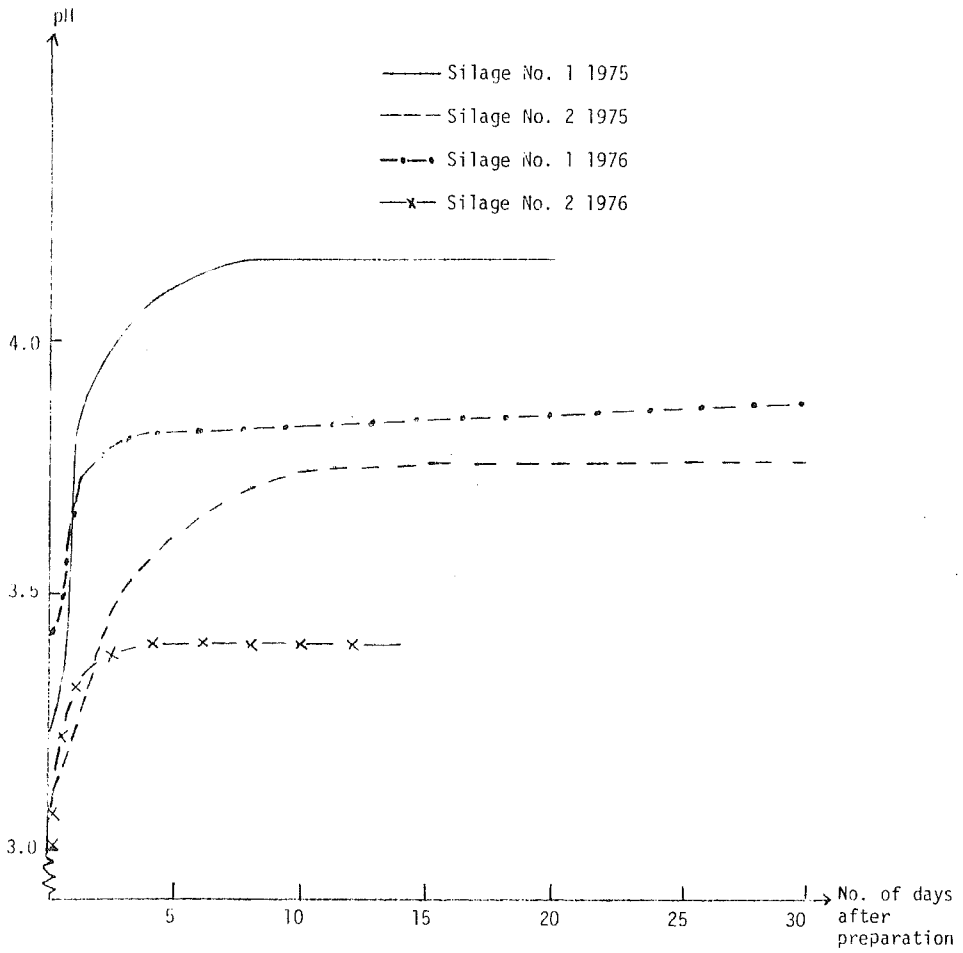
Some fish species may contain thiaminase, an enzyme that destroys thiamine. Feeding such species to fur bearing animals has caused thiamine deficiency. Anyhow, the content of thiaminase varies between different lots of fish. The enzyme is heat labile and is destroyed by heating to 90°C for 10 minutes. Therefore, the recommendation for use of potentially thiaminase-containing fish species in rations for fur bearing animals has been either to use cooked fish or feeding those species every other day. Regarding the feed potential of these fishes, recently there have been motives for further investigations on their properties as ingredient in rations for mink. In 1975-76, investigations were carried out at the Fur Animal Division regarding effect of feeding and storing technique on the possibilities to use potentially thiaminase-containing fish species (also called "litter fish") in rations for mink.

Own investigations

Materials and methods: In 1975 and 1976, fresh frozen "litter fish" and silage from the same species was tested in rations to mink kits in the growth period. Species most frequent in the lot were roach, perch and bream. When caught the fish was brought to the Experimental Fur Farm and frozen at -40°C. Chemical analyses of the different fish species were made and, as expected, the content of ashes was high (about 5 %).

Both years silage was made of some samples of the fish. After thawing over night the fish was ground and acid was added during mixing. In 1975, 2.5 % sulphuric acid and 1 % formic acid, and 3.0 % and 1 % respectively, was tested. As anti-oxidant 200 ppm etoxyquin was used. In 1976, the latter acid addition was first used, but later 4 % sulphuric acid and 0.5 % formic acid was added to the fish to give complete preservation (see Fig. 1). The silage was stored in refrigerator until used. Analyses regarding chemical and bacteriological quality gave adequate values.

Fig. 1. pH development in different silage lots.



In 1975, the experimental animals were 20 male and 20 female kits of standard and 20 male and 20 female kits of pastel per group. In 1976, there were 30 male and 30 female standard kits per group.

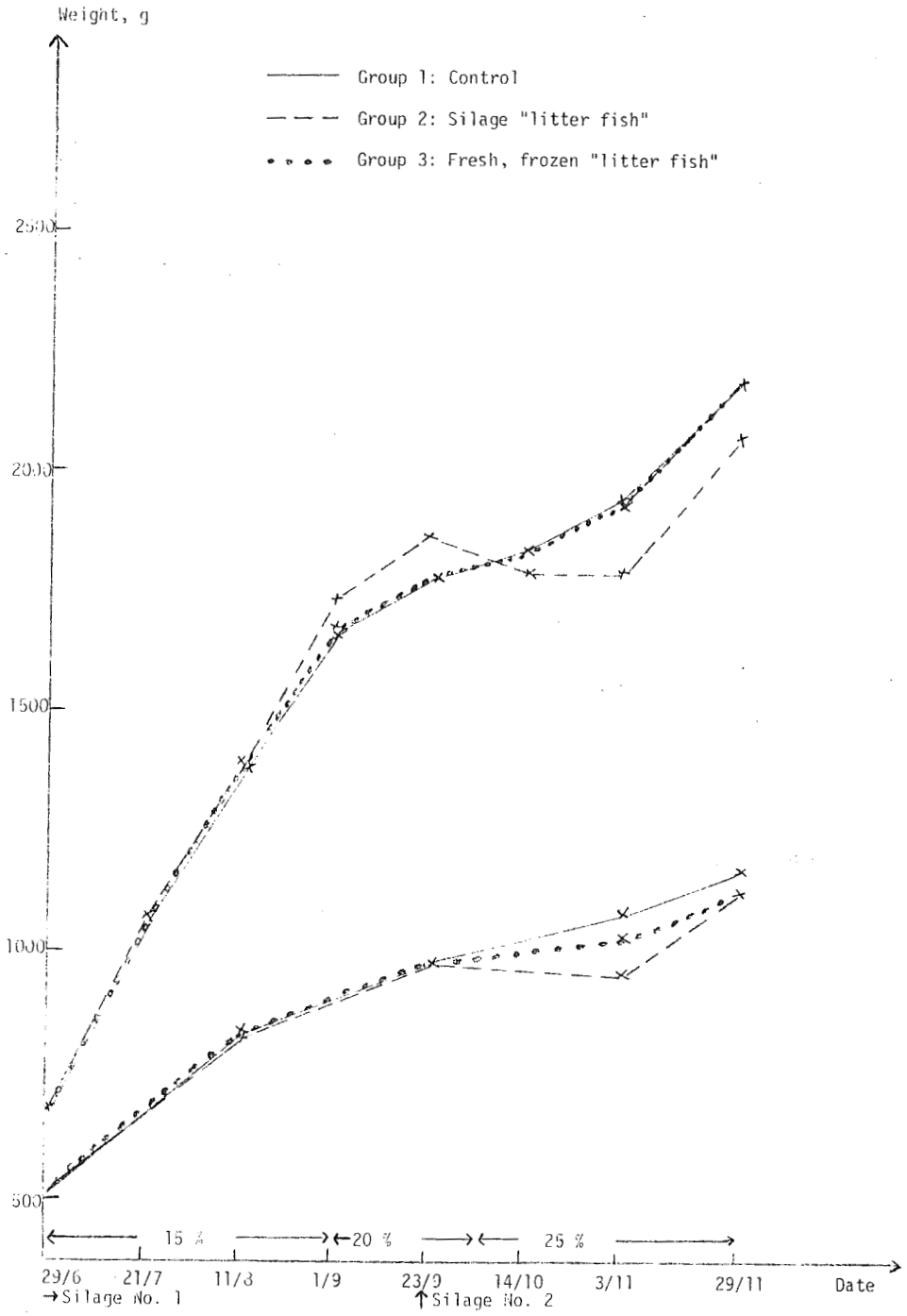
In 1975, both frozen fish and silage was fed every other day with extra supplement of thiamine during the days when no experimental rations were fed. In 1976, the fresh frozen fish was fed every other day as in 1975, but silage was fed every day. Further information on the experimental design is found in Table 1. Cod offal and baltic herring in the control diet was replaced by silage or fresh frozen "litter fish" in the experimental diets.

Table 1. Experimental design

Groups →	1	2		3	
	Control	Silage		Fresh, frozen fish	
Date 1975 and feeding levels		21/7-23/9 24/9-30/9 1/10-pelting	15 % 20 % 25 %	21/7-23/9 24/9-30/9 1/10-pelting	15 % 20 % 25 %
Date 1976 and feeding levels		8/7-31/8 1/9-30/9 1/10-pelting	15 % 20 % 25 %	8/7-31/8 1/9-30/9 1/10-pelting	15 % 20 % 25 %

Results and conclusions: In 1975, only minor differences in growth rate between groups appeared. In Figure 2, the growth curves for 1976 can be seen. The retarded growth for animals in group 2 by the end of September is explained by start of use of silage with 4 % sulphuric acid roughly at the same time as the silage level in the ration was elevated to 25 %. pH in the control ration was on an average 6.5. In 1976, when the silage level was 20 % pH was 5.1 and with 25 % silage pH was lowered to 5.0. There were only slight differences in pelt quality between groups, but there was a tendency towards darker skins in the experimental groups.

Fig. 2. Growth curves, "litter fish" trial, 1976.



The results from the experiments can be summarized as below:

For sufficient preservation effect silage of "litter fish" should be prepared by addition of 4 % sulphuric acid and 0.5 - 1.0 % formic acid due to high content of ashes in the

fish species used. The silage should be stored in refrigerator. The strong acidity of the silage will be limiting for the use of unneutralized silage. In these investigations four different lots of fish from the same catching place were used, but there were no evidences of thiamine deficiency.

Other investigations

Other investigations are reviewed and references are given.

General conslusions

All the experiments, reviewed in this context, indicate that acid preservation of thiaminase-containing fish species lowers the thiaminase activity. Thus, provided good quality of other feed ingredients and adequate supplementation of thiamine, silage of thiaminase-containing fish can be used without risk for thiamine deficiency. High levels of sulphuric acid in the silage will limit the level in the rations. Neutralization with small amounts of $Ca(OH)_2$ may be used to elevate pH in the ration to about 5.5. Experimental results regarding neutralization are, however, hitherto sparse.

It would be interesting to investigate thiaminase activity in several lots of fish from different catching places, beacuse thiaminase activity in lots tested here seem to have been low.

Våra Pälsdjur, 1981, 52, 19-21.
2 figures. In Swedish.

Authors abstract.

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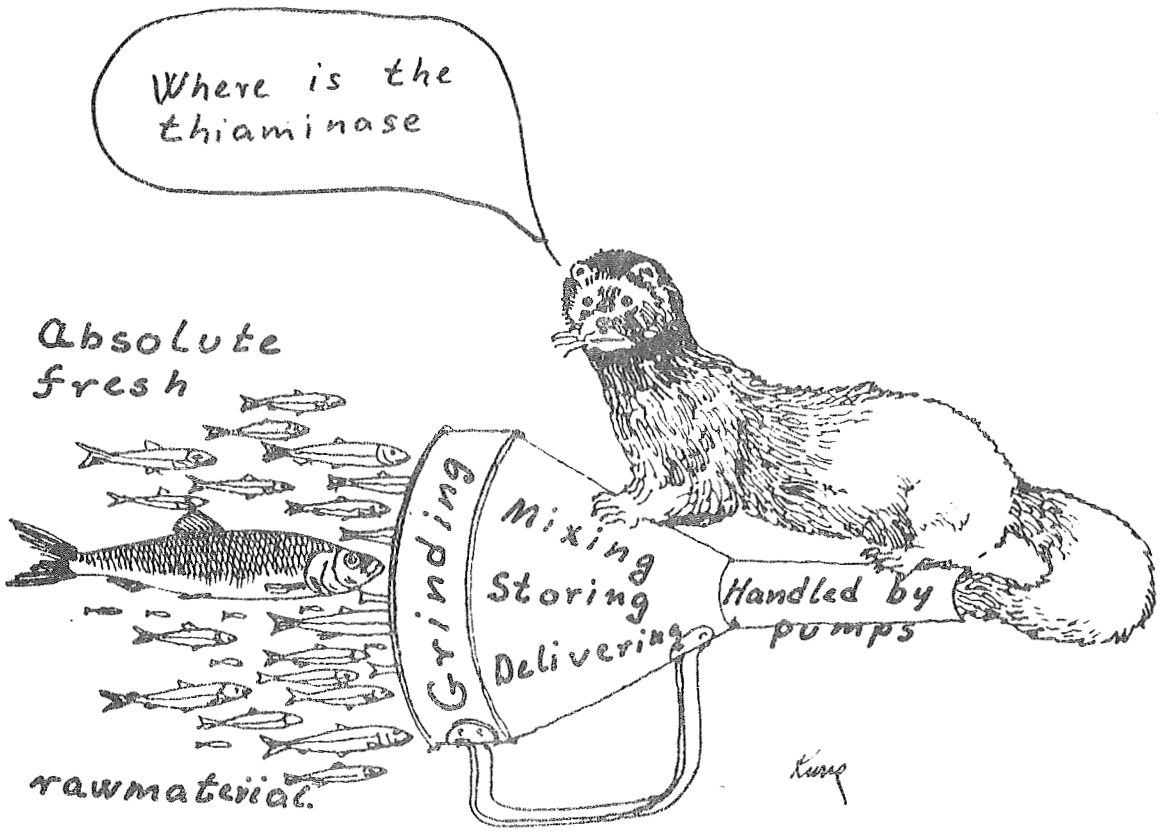
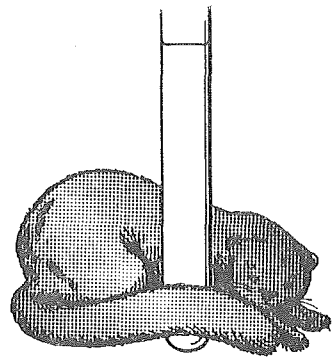




ORIGINAL PAPER *

СОДЕРЖАНИЕ КОБАЛЬТА В ОРГАНИЗМЕ НОРОК, ПЕСЦОВ И ЛИСИЦ РАЗНОГО ВОЗРАСТА

(Cobalt contents in the body of mink, arctic foxes (Alopex lagopus) and silver foxes at various stages of growth.)

*) Original report translated from Russian by Eugenia Jørgensen and Charlotte Haarløv.

V.I. Berestova, Uch. Zap. Petrozavodsk. Gos. Univ.

Cobalt is a vital bio-element. It is a constituent of the vitamin B12 complex and influences a number of important organic functions. It stimulates body metabolism of protein, fat, carbohydrate and minerals and influences the function of the nervous system, digestion and cardio-vascular system (Berensztein, 1958; Vojnar, 1960).

Research on the physiological role of cobalt is primarily an investigation on contents in organs and tissues. One of the terms of reference of the team of researchers was to determine the distribution of this trace element in mink, arctic fox and silver fox bodies and to see whether these amounts had any relation to the age of the animals. The experimental animals used were young animals of 6-7 months of age and adult animals of 2-5 years of age from the "Prjazinskij" fur farm.

Number of organs examined varied from 5 to 17.

Cobalt determinations were carried out according to the E.Ja. Taucin method (1961). Results are given in Table 1.

Cobalt was ascertained in all organs examined.

High contents of this trace element were demonstrated in the spleen, pancreas, liver and kidneys of all animals examined.

Table 1. Cobalt contents in organs and tissues in fur animals (µg/% in wet substance).

Statistical parameter	Blood	Muscle	Heart	Kidney	Liver	Spleen	Pancreas
				MINK			
$M^1 \pm m$	5.5±1.0	5.6±0.6	4.9±0.9	10.6±2,3	12.4±1.6	25.9±4.0	19.3±0.7
$M^2 \pm m$	7.6±1.1	6.4±1.1	14.6±1.6	15.3±4.5	14.1±1.9	42.5±3.1	22.5±5.2
t	1.5	0.7	1.5	2.3	0.7	3.7	0.7
p	0.15	0.5	0.15	0.05	0.5	0.005	0.5
				ARCTIC FOX			
$M^1 \pm m$	5.5±0.8	4.7±0.8	5.4±0.8	5.2±0.8	10.9±1.8	15.3±1.7	17.7±1.7
$M^2 \pm m$	5.2±1.1	5.1±0.9	11.4±2.3	5.5±0.9	14.6±3.1	11.3±5.2	18.1±3.9
t	0.2	0.3	3.9	0.1	1.0	0.8	0.9
p	>0.5	>0.5	0.001	>0.5	0.15	0.4	0.4
				SILVER FOX			
$M^1 \pm m$	3.9±0.4	4,1±0.7	8.1±2.4	10.0±1.4	14.1±1.5	11.9±1.2	21.8±6.0
$M^2 \pm m$	4.6±1.2	4.1±1.1	3.5±1.3	8.1±1.3	11.0±1.1	14.6±2.2	17.3±3.8
t	0.5	0.0	2.0	1.4	2.0	0.9	0.6
p	>0.5	>0.5	0.05	0.2	0.05	0.4	0.5

M^1 average cobalt contents in organs from young animals.
M^2 = average cobalt contents in organs from adult animals.

In other organs and tissues examined, the concentrations were lower than in the above organs. In older mink concentrations were higher in comparison with those found in young animals, but the differences were significant only in the spleen (P=0.005) and the heart (P=0.05).

A comparison of cobalt contents in the organism in 6-month old and adult arctic foxes, respectively, exhibited and analogy in the distribution of elements.

The average content of cobalt in the liver of adult arctic foxes proved to be slightly higher (14.6 µg %) than in young arctic foxes (10.9 µg %, but this difference is unreliable. The investigation showed, that amounts of cobalt in kidney varied considerably, i.e. 5.2 µg % in young animals, to 11.3 µg % in adult ones (P = 0.001).

Results obtained also showed that it is possible to distribute organs from silver foxes examined by cobalt contents in the same sequence as for young animals, viz. in blood and muscles they are not very high, while amounts are considerably larger in kidney, liver, spleen, and pancreas, i.e. up to. 2.0-3.9 times those in blood and muscles.

In many organs and tissues from adult silver foxes, cobalt concentrations fluctuated within the same limits as in young animals exceptions being heart and liver, which had lower contents of the trace element - in adult silver fox heart tissue 3.5, in young silver fox heart tissue 8.1 µg % and in liver from adult silver foxes 11.0 as compared with livers of young animals 14.1 µg %.

Some changes in contents of cobalt in fur animals organisms have been determined in this way.

The impact of this trace element in organs of other domestic animals has been investigated by M.I. Vsjakih (1949), P.F. Kuzmin (1964) and T. Szaberdin (1965).

Kuzmin found a sharp rise in cobalt concentrations in poultry liver and blood from birth up to six months of age followed by a drop and subsequent rise up to 10 months of age. The author interprets the drop in cobalt levels in poultry after six months of age by the formation of reproductive organs.

The drop in the cobalt level is due to increased requirements for cobalt and short supply of it in the diet.

The same factors may, probably, have determined too low a cobalt content in some organs in 6-month-old mink and arctic foxes, as compared with figures for adult animals.

The low cobalt contents in heart and liver from adult silver foxes may possibly be explained by short supply of this trace element to fur animals throughout their lives and depletion of their depots for vital processes.

Conclusion.

The distribution of cobalt in organs and tissues in adult fur

animals is analogous to that in young animals.

Deviations in cobalt contents in fur animal organisms were observed. A higher cobalt content was recorded in heart and spleen in adult mink and in silver fox kidney. Adult silver foxes have a lower cobalt content in heart and liver than that in young animals.

Uch. Zap. Petrozavodsk. Gos. Univ. 1969, 1971, 17, (4), 125-127.
6 references.

ORIGINAL PAPER *

Я. З. ЛЕБЕНГАРЦ, ст. научн. сотрудник

ВЛИЯНИЕ РАЦИОНОВ С ПОВЫШЕННЫМ УРОВНЕМ ЖИРА НА СВОБОДНЫЕ АМИНОКИСЛОТЫ СЫВОРОТКИ КРОВИ ПУШНЫХ ЗВЕРЕЙ

Центральный питомник лабораторных животных АМН СССР

(Effect of rations with an increased level of fat on free amino acids in the serum of fur-bearing animals).

V.Z. Lebengarts, Trody Moskovskoi Veterinarnoi Akademii,

*) translated by Eugenia Jørgensen and Charlotte Haarløv.

This investigation dealt with a determination of contents of free amino acids in blood serum in various species of fur animals following feeding of 50% fat|38% protein diets, based on convertible energy, as stated by Pierieldik in 1972.

Contents of free amino acids in blood serum of the animal species mentioned (10 animals in each group) were analyzed in an autoanalyzer (K|A-ZW) manufactured by Hitany, Japan.

Blood serum samples from male silver fox, arctic fox, and standard mink (see Table) were examined. The animals were fed a high-fat diet, as recommended by NIIPZK, from weaning to the time of killing. The results of analyses confirm that the levels of free amino acids in blood serum of fur animals are high, and higher than in other domestic animals (pigs, cattle, poultry) and laboratory animals (mice, rats).

Table 1. Contents of free amino acids in blood serum of various fur animals (mg %).

Free amino acids	Silver fox	Arctic fox	Standard mink
Lysine	17.78	15.05	13.68
Histidine	0.57	0.97	1.80
Arginine	0.45	1.02	2.12
Aspartic acid	1.54	1.69	2.95
Treonine	2.46	1.49	1.31
Serine	1.47	3.07	3.22
Glutamic acid	4.69	4.99	5.99
Glycine	2.63	1.54	1.22
Alanine	6.46	6.75	16.23
Valine	2.12	2.54	3.89
Isoleucine	0.99	0.81	0.67
Leucine	4.65	4.99	5.89
Tyrosine	2.91	2.28	2.02
Phenylalanine	2.56	2.31	3.68

It must be stressed that the sum of free amino acids in arctic fox and silver fox is at the same level (corresponding to 51.29 and 49.50 mg %).

Amounts of lysine, threonine, glycine, isoleucine, and tyrosine are lower in mink than in arctic fox and silver fox whilst levels of other amino acids are higher.

The results of the experiment offered possibilities of elucidating the difference in contents of free amino acids in the blood serum of fur animals. This might be explained by the difference between the intensity in the metabolic processes in the organism.

Summary.

Level of blood serum free amino acids in various fur-bearing animals while giving them rations with increased fat content accor-

ding to data of F. Sh. Pierieldik in 1972 was studied. The results show that in the blood serum of fur-bearing animals there are more amino acids than in the other kinds of farm animals. Difference in these data and those among various kind of animals are observed, which is due to different intensity of metabolic processes.

Trody Moskovskoi Veterinarnoi Akademii, 1974, 76, 239-240.
In Russian with English summary.

THE PROTEIN REQUIREMENTS OF MINK DURING THE GROWTH PERIOD. I. EFFECT OF PROTEIN INTAKE ON NITROGEN BALANCE.

Niels Glem-Hansen, National Inst. of Animal Science, Fur Bearing Animals, Trollesminde, 48 H Roskildevej, DK 3400 Hilleroed, Denmark.

Experiments to determine the protein requirements of mink were carried out with six groups of 4 male and 4 female standard kits during the growth period.

The groups were given diets with a digestible protein content varying from 17% to 54% of the ME.

The differences in protein requirement between males and females was found to depend on body size. The optimal, dietary protein, i.e. the quantity of protein which caused maximum N-deposition, decreased during the growth period.

The requirement for protein was found to be met by a content of digestible crude protein equal to 40 to 42% of the ME in the period from 10 to 17 weeks of age, and 31 to 32% of the ME in the period from 19 to 24 weeks of age. The investigation also indicated that the protein requirement in the period from 25 weeks until pelting was equal to or perhaps greater than in the preceding period.

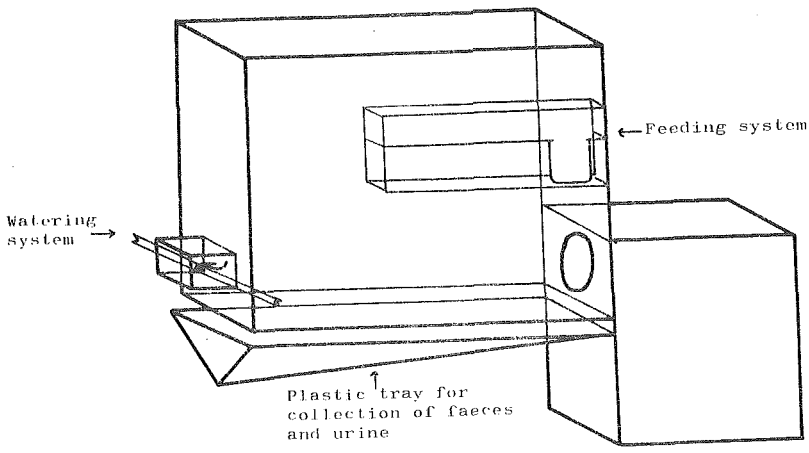


Fig. 1. Draft showing the cage with its feeding-watering and faeces-urine collection system.

Acta Agriculturæ Scandinavica, 30, 1980, 336-344.
8 tables, 5 figs., 39 references.

Authors summary.

THE PROTEIN REQUIREMENT OF MINK DURING THE GROWTH PERIOD. II. EFFECT OF PROTEIN INTAKE ON GROWTH RATE AND PELT CHARACTERISTICS.

Niels Glem-Hansen, National Inst. of Animal Science, Fur Bearing Animals, Trollesminde, 48 H Roskildevej, DK 3400 Hilleroed, Denmark.

The influence of different protein levels throughout the entire growth period on growth rate and pelt characteristics was investigated. The experiment comprised three groups of 50 mated standard females and their kits in the period from parturition until weaning. From each of these groups 50 male and 50 female kits were randomly chosen to continue the experiment during the growth period.

Variations in digestible protein content from 66% to 41% of the ME during the suckling period influenced the growth rate significantly, but this was probably due to differences in fatness of the kits rather than differences in fullfilment of the protein requirement. This conclusion was based on the lack of differen-

ces in body weight and length of the skins at pelting. It was further concluded that the quantity of protein, which satisfactorily meets the protein requirements for maximal growth does not meet the requirement for maximal fur development. Unfortunately, the experiment failed to show the lower limit of protein needed for maximal development of the fur quality, but it was certain that 24% of the ME from digestible protein did not meet this requirement. This confirms the results of previous investigations.

Acta Agriculturæ Scandinavica, 30, 1980, 345-348.
8 tables, 11 references.

Authors summary.

THE REQUIREMENTS FOR SULPHUR CONTAINING AMINO ACIDS OF MINK DURING THE GROWTH PERIOD.

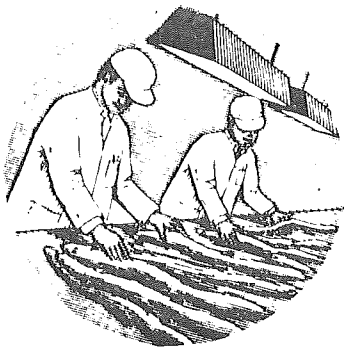
Niels Glem-Hansen, National Inst. of Animal Science, Fur Bearing Animals, Trollesminde, 48 H Roskildevej, DK 3400 Hilleroed, Denmark.

The requirement for the sulphur containing amino acids (SAA), methionine and cystine, was investigated in experiments comprising ten groups of 4 standard male kits fed five different levels of SAA at two protein levels. The diets were based partly on traditional feedstuffs and partly on a synthetic amino acid mixture. The content of SAA in the diets was varied by addition of DL-methionine and the N-retention was used as a parameter to evaluate the SAA requirement.

The optimum level of SAA in diets for mink at different stages during the growth period was found to be 3.3-3.4 g SAA per 100 g crude protein in the period from 10 to 19 weeks of age, 4.6-5.1 g SAA per 100 g crude protein from 20 to 24 weeks of age, and 3.7-3.8 g SAA per 100 g crude protein from 26 weeks of age until pelting.

Table 9. *Mean protein intake, SAA-intake at maximal N-retention, and the calculated optimum of SAA in the diet at different stages during the growth period*

Year of experiment	Approximate age in weeks	Protein intake in g/kg body weight/day	SAA-intake at max N-retention in g/kg/day	Calculated SAA optimum in % of the protein
1976	10–13	14.7	0.49	3.3
1976	15–19	9.6	0.32	3.4
1976	20–24	8.0	0.37	4.6
1975	21–24	8.6	0.44	5.1
1975	26–29	5.1	0.19	3.7
1976	26–30	5.2	0.20	3.8



Acta Agriculturæ Scandinavica, 30, 1980, 349-356.
9 tables, 8 figs., 16 references.

Authors summary.

BACTERIOLOGICAL QUALITY OF RAW MATERIALS USED IN FINNISH MINK FEED.

Tapio Juokslahti, Finnish Fur Breeders' Association, Feed Laboratory, Vaasa, Finland.

Mink feed raw materials were analyzed for total bacterial count, the number of faecal streptococci, the coliform count, the number of haemolytic bacteria and the number of sulphite reducing bacteria. The investigation comprised samples from the following raw materials: four slaughter-house offal products, preserved and unpreserved slaughter blood, Baltic herring, cod filletting offal, fish silage, blood meal, fish meal, meat-bone meal, protein concentrate, brewer's yeast and cereal feed.

The slaughter-house offals and unpreserved slaughter blood had the poorest quality, in terms of all the bacterial types, for which the samples were analyzed. There were statitically significant differences in bacterial contents between slaughter-house offals from different sources. The preserved slaughter blood had significantly lower bacterial contents as compared to the unpreserved slaughter blood. Single samples of the cod filletting offal, Baltic herring and the blood meal had relatively high total bacterial counts, but the specified mean bacterial counts were relatively low. The bacterial counts for the rest of the investigated raw materials were relatively low.

Acta. vet. Scand. 1979, 20, 562-571.
1 table, 12 references.

Authors summary.

THE EFFECT OF THE BACTERIOLOGICAL STATUS OF FEED ON SOME HAEMATOLOGICAL AND BLOOD CHEMICAL DATA ON MINK.

Tapio Juokslahti, Dept. of Biochemistry, College of Vet. Med., Helsinki, Finland.

Blood samples from 100minks from a research farm using bacteriologically high quality feed and from 55 minks from another farm supplying bacteriologically inferior feed, as well as from nine minks from Denmark from two farms providing still better quality feed than both Finnish farms - all minks apparently clinically healthy - were analyzed for some haematological and chemical data: total leucocyte count, haemoglobin, ornithine carbamoyltransferase (OCT), alkaline phosphatase (AP), alanine aminotransferase (ALAT), aspartate aminotransferase (ASAT), γ-glutamyltransferase (γ-GT), total bilirubin and creatinine. TheFinnish minks supplied with high quality feed had more optimal values of total leucocytes, haemoglobin, OCT, AP and creatinine than minks receiving feed with higher bacterial contamination. The Danish minks had better blood values in the investigated parameters

except for lower haemoglobin and total bilirubin, which showed no significant difference.

Acta vet. Scand. 1980, 21, 504-515.
4 tables, 30 references.

Authors summary.

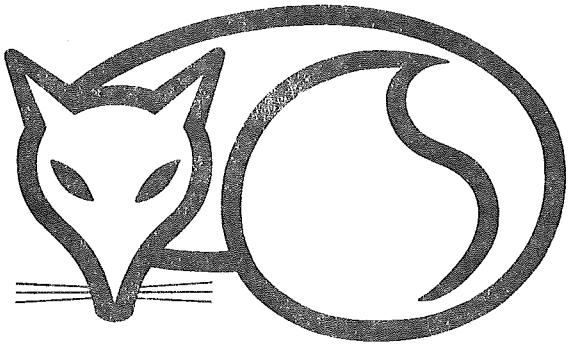
THIAMIN STATUS OF FOXES WITH CHASTEK'S PARALYSIS.

F.M. Loew, R. J. Austin, Animal Resources Centre and Dept. of Vet. Pathology, University of Saskatchewan, Saskatoon, Saskatchewan S7N OWO.

Thiamin deficiency encephalopathy (Chastek's Paralysis) was diagnosed in a commercial fox farm, based on clinical signs, history, lowered erythrocyte transketolase activity, response to treatment and necropsy findings. Lack of dietary thiamin may have resulted from thiaminase I activity supplied by the fish Lota lota in the feed.

Can. Vet. Jour. Vol. 16, No. 2, 1975, 50-52.
1 table, 19 references.
In English with summaries in English and French.

Authors summary,



OCCURRENCE OF DIOCTOPHYMA RENALE (GOEZE, 1782) IN MINK FROM NORTH DAKOTA.

Dennis G. Jorde, Dept. of Biology, University of North Dakota, Grand Forks, North Dakota 58202, USA.

A total of 1185 mink (Mustela vison) from North Dakota was examined for Dioctophyma renale. Two specimens of the nematode were found and represents the first report of this parasite in North Dakota.

Journ. of Wildlife Diseases, Vol. 16, No.3, 1980. 381-387.
12 references.

Authors abstract.

SUPPRESSION OF MATURATION OF DIROFILARIA IMMITIS IN MUSTELA PUTORIUS FURO BY SINGLE DOSE OF IVERMECTIN.

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

In a previous study, avermectin B_1a was shown to suppress maturation of Dirofilaria immitis in ferrets, when given as a series of five daily treatments, beginning approximately 1 mo after inoculation. More recently we reported the suppressive activity of ivermectin aginst D. immitis in the same host and in dogs. Ivermectin is 22,23-dihydroavermectin B_1a. The present study was designed to establish the minimum dosage of ivermectin that would be effective when given as a single oral dose.

The ferrets were killed 166 days after treatment, that is, when the infection was approcimately 6 mo old. The lungs and heart were removed and examined for worms. The results of these necropsies are recorded in Table 1. It is evident that maturation of D. immitis in the heart and associated vessels of ferrets was

suppressed totally by a single treatment at 0.2 or 0.05 mg/kg, and that a marked effect was produced even by a dosage of 0.0125 mg/kg.

The present findings add further evidence that the avermectins are of potential significance in the prevention of heartworm disease, and perhaps other filarial diseases. The data also indicate that the minimum effective dosage, for full suppression of the maturation of 1-mo-old D. immitis in ferrets, lies between 0.0125 and 0.05 mg/kg.

J. Parasitol. 66 (4), 1980, 691-692.
1 table.

Abstract: G. Jørgensen.

STUDY INTO DIAGNOSIS OF VIRUS ENTERITIS IN MINK. I. CLINICAL PICTURE, HAEMATOLOGICAL FINDINGS, COURSE OF DISEASE, VIROLOGICAL RESULT, VACCINATION.

(Untersuchungen zur Diagnostik der Virusenteritis des Nerzes. 1. Mitt.: Klinik, Hämatologie, Seuchenverlauf, Virologie und Vakzination).

R. Kokles, A. Tohtz, U. Johannsen, 25 Rostock, Thierfelder Strasse, Ger. Dem. Rep.

Virus enteritis of mink was recorded from a fur farm, between 1965 and 1970. This had been the first recorded outbreak in the GDR. Clinical observations included apathy, vomiting, dry nasal condition established by rhinoscopy, typical diarrhoea with mucous plugs of pie consistence contained in the faeces. Morbidity was between 50 and 70 per cent and lethality up to 25 or even 30. The haematological findings included rise in haematocrit and haemoglobin, significant reduction of total erythrocytes

and total leucocytes, and shifting of the lymphocyte to neutrophil granulocyte ration from 1:1 in intact probands to 1:2 in affected animals. Experimental transmission, using minks aged eight weeks, yielded positive results. Experiments, using baby cats and ferrets, turned out negative. No success was obtained either when detection of the pathogen of mink enteritis was attempted by experimental virus isolation from cell cultures. The disease was eradicated by use of mink enteritis vaccine.

Monatshefte für Veterinärmedizin, 30, 7, 269-274.
5 tables, 1 fig., 30 references.
In German with summaries in German, Russian, and English.
Authors summary.

PNEUMOVIRUSES: THE CELL SURFACE OF LYTICALLY AND PERSISTENTLY INFECTED CELLS.

J.E. Parry, P.V.Shirodaria, C.R. Pringle, MRC Virology Unit., Inst. of Virology, Church Street, Glasgow G11 5JR, Scotland.

Human embryonic lung (MRC-5), feline embryo (FEA), mink lung (MviLu) and monkey kidney ($BSC-_1$) cells infected by respiratory syncytial virus showed characteristic morphological changes when viewed by scanning electron microscopy. The surfaces of respiratory synctial virus-infected cells developed a profusion of slender filaments after 48 h incubation af 31 °C. Similar changes in surface morphology were observed in $BSC-_1$ cells infected by murine pneumonia virus. Filament production therefore appears to be a common property of pneumoviruses. Filaments were not observed in cells infected with either syncytial and non-syncytial herpes simplex virus, the cytocidal vesicular stomatitis and Batai (Bunyaviridae) viruses, or the focus-inducing rabbit fibroma virus.

Filament production was not observed in cells infected with ts mutants ofrespiratory syncytial (RS) virus during incubation at

the restrictive temperature, or in a persistently infected culture of $BSC-_1$ cells at 37 °C. The persistently infected cells (the RS ts $1/BSC-_1$ line) had some of the characteristics of cells transformed by oncogenic viruses, namely ability to overlap adjacent cells and agglutination by a low concentration of concanavalin A. The pseudo-transformed phenotype was temperature-dependent, however, and suppressed by raising the temperature of incubation to 39 °C. The presence of virus antigen at the cell surface was similarly temperature-dependent in these cells, diminished at high temperature (39 °C) and enhanced at low temperature (31 °C), suggesting that the changes in the host cell were the result of insertion of virus protein into the cell membrane. Evidently, persistent infection by a cytoplasmic virus can produce alterations in the host cell usually associated with transformation by nuclear viruses.

J. gen. Virol. 1979, 44, 479-491.
1 table, 6 figs., 24 references.

Authors summary.

ANATOMY OF THE RETINA OF THE MINK (MUSTELA VISON).

Mark Wm. Dubin, Linda Turner, Molecular, Cellular and Developmental Biology, University of Colorado, Boulder, Colorado 80309, USA.

The retina of the normal pigmented mink has been studied by light and electron microscopy. This retina resembles the typical vertebrate retina in its patterns of lamination and synaptic interconnectivity. Rod and cone outer segments and receptor spherule and pedicle endings are found. At least two different types of horizontal cell processes are seen with the electron microscope, suggestive of rabbit A and B types. Ribbon and conventional synapses are found in both plexiform layers; conventional synapses

are also present in the inner nuclear layer. Quantitative studies of the inner plexiform layer revealed amacrine:bipolar synapse ratios (3.3:1) similar to those of the cat and monkey. Other quantitative parameters also resembled those previously reported for species with retinas that predominantly contain concentric-type receptive fields.

J. Comp. Neur. 173, 275-288.
2 tables, 3 photos, 26 references.

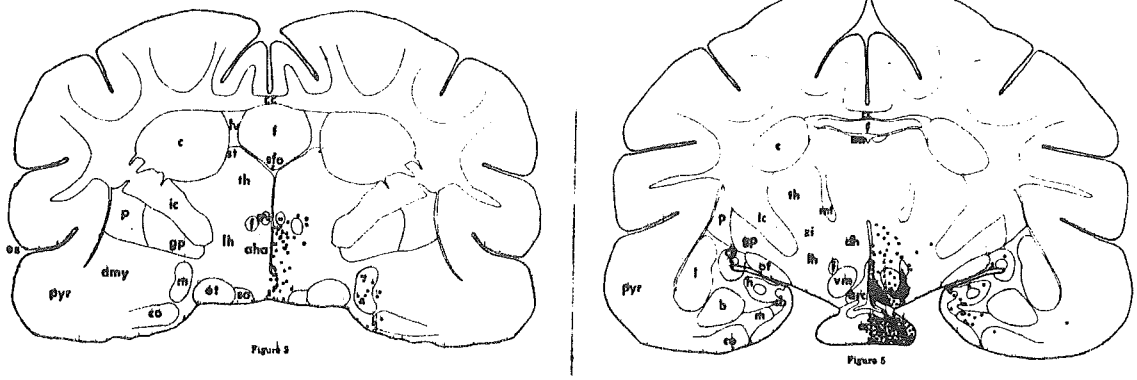
Authors abstract.

AUTORADIOGRAPHIC DEMONSTRATION OF THE PATTERN OF ^{3}H-ESTRADIOL CONCENTRATING CELLS IN THE BRAIN OF A CARNIVORE, THE MINK, MUSTELA VISON.

J.I. Morrell, A. Ballin, D.W. Pfaff, The Rockefeller University, New York, New York 10021, USA.

The purpose of this study was to examine the neuroanatomical pattern of celles which concentrate ^{3}H-estradiol in the brain and pituitary of a carnivore, the mink, Mustela vison. In addition, since the mink has one breeding season a year it was possible to compare the pattern a number of estradiol concentrating cells in the brains of estrous versus anestrous animals. Five female mink (three estrous; two anestrous) were ovariectomized, and one week later administered ^{3}H-estradiol. The animals were sacrificed, and autoradiograms were prepared with the method for steroid autoradiography used routinely in this laboratory (Pfaff and Keiner, '73). The entire brain was sampled and subsequently analyzed with the aid of a light microscope.

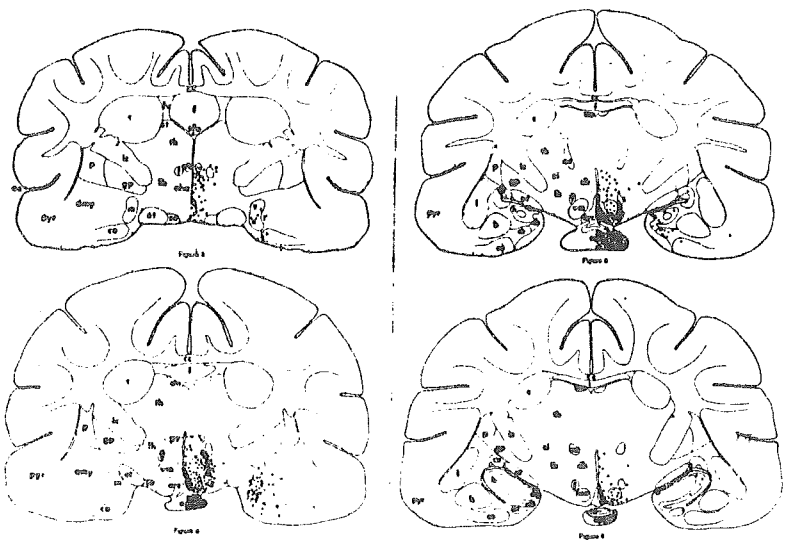
The majority of estradiol concentrating cells were found in the hypothalamus and limbic system, although a small number were seen in other structures. Specifically, structures containing a large number of estradiol concentrating cells were: the ventral lateral septum, the bed nucleus the stria terminalis, the medial



preoptic area, medial anterior hypothalamus, the ventromedial and arcuate nuclei of the hypothalamus, the medial and cortical nuclei of the amygdala, and the anterior pituirary. Structures containing a small number of estradiol concentrating cells were also seen in the telencephalon and diencephalon. The most posterior population of estradiol concentrating cells was in the central grey of the mesemcephalon. No difference in the neuroanatomical pattern or number of estradiol concentrating cells was seen when the autoradiograms from estrous animals were compared to those from anestrous animals.

Anat. Rec. 189, 609-624.
8 figs., 1 table, 4 photos, 41 references.

Authors abstract.



POLYCHLORINATED BIPHENYLS (AROCLORS 1016 AND 1242): EFFECT ON SURVIVAL AND REPRODUCTION IN MINK AND FERRETS.

Michael R. Bleavins, Richard J. Aulerich, Robert K. Ringer,
Fur Animal Project, Poultry Science Dept., Michigan State University, East Lansing, MI 48824, USA.

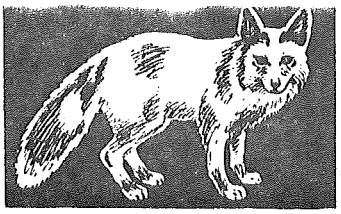
Diets that contained various levels of supplemental Aroclor^{R} 1242 or Aroclor^{R} 1016 were fed to mink and ferrets to investigate the chronic toxicity of these PCBs in two closely related species.

In mink, Aroclor 1242 was found to be more toxic than comparable or higher levels of Aroclor 1016. The Aroclor 1242 diets caused complete reproductive failure at levels as low as five ppm of the diet. Aroclor 1016 impaired reproduction less than Aroclor 1242. Although fewer females whelped and the four-week kit weights were less than the control animals, no outward signs of abnormalities beyond their smaller size were found in the kits whelped and nursed by dams fed Aroclor 1016.

Ferrets were more resistant to the effects of either PCB mixture than were the mink, as noted by the lower mortality rate on the Aroclor 1242 diet and the almost normal level of reproduction on the Aroclor 1016 diet. Feeding Aroclor 1242 at 20 ppm resulted in complete reproductive failure, but was not fatal to adult ferrets. This finding is in sharp contrast to the 100% mortality of adult mink fed the same level. Although the chlorine content is similar in both compounds, Aroclor 1242 has a higher percentage of molecules with five or more chlorines per biphenyl. This difference in higher substituted biphenyl isomer content and/or reduced level of contaminants in the Aroclor 1016 mixture may be a major importance in evaluating the toxicity of these compounds.

Arch. Environm. Contam. Toxicol. 9, 627-635, 1980.
4 tables, 23 references.

Authors abstract.



FOX RABIES CLINICAL DESCRIPTION. EXPERIMENTAL STUDY.

(Description clinique de la Rage du Renard. Etude Experimentale).

J.P. George, J. George, J. Blancou, M.F.A. Aubert,
Ministère de l'Agriculture, Direction de la Qualité,
Services Véterinaires, Centre National d'Etudes sur la Rage,
54220 Malzeville, France.

Rabies clinical symptoms were daily observed and noted on 53 captive foxes inoculated with wild virus.

The disease prodromes, when they exist, are essentially anorexy (94 p. 100 cases) or behaviour alterations.

The symptoms are mainly psychic or parapsychic: deep prostration or, inversely, agressivity (43 p. 100 cases) that rarely turns into furious form (11 p. 100 cases). Other symptoms (digestive, respiratory or neuro-muscular disorders) were noted but less frequently.

These disorders are very similar to those noticed in wild animals. Agressive forms are as many as in other carnivores species particularly cat and dog.

Revue Méd. vét. 1980, 131, 2, 153-160.
3 tables, 4 figs., 7 references.
In French with summaries in English, German, French and Spanish.

Authors summary.

PRESENCE OF TRICHINELLA SPIRALIS IN FREE-LIVING RED FOXES (VULPES VULPES) IN SWEDEN RELATED TO TRICHINELLA INFECTION IN SWINE AND MAN.

Otto Ronéus, Dan Christensson, The Natl. Vet. Institute,
S-750 07 Uppsala, Sweden.

One thousand one hundred and fifty-one free-living foxes (Vulpes vulpes) from different parts of Sweden were investigated. Totally 19.6% were infected with trichinella. Infected foxes were found in all countries except the geographically isolated island of Gotland. In the different countries 6-48% of investigated foxes were infected.

Trichinella was more common in old foxes than in young, 40% and 11%, respectively. Regarding male and female, however, the frequency was the same.

The number of trichinella per g of muscle varied between 0.05 and 200. Less than 1.0 trichinella larva per g muscle was established in 27.3% of the foxes, between 1 and 49.9 trichinella larvae in 69.3% and 50 or more trichinella larvae per g muscle in 3.4% of the foxes. The number of trichinella larvae per infected fox was roughly the same in both sexes as well as in different age groups.

The potential danger of transmitting trichinella from foxes and other carnivores to swine and man is pointed out.

The high frequency of trichinella in foxes, 19.6%, was compared to the very low frequency in swine, 0.00018%, and in man, 0.00003%.

Acta vet. scand. 1979, 20, 583-594.
8 tables, 1 fig., 11 references.
In English with summaries in English and Swedish.

Authors summary,

A CONTRIBUTION TO THE TREATMENT OF PENIS PARALYSIS IN NUTRIAS.

(Beitrag zur Behandlung der Penislähmung beim Nutria (Kurzmitteilung).

I. Ivascu, Facultatea de Zootechnie si Medicinà Veterinara, Manastur 3, Cluj-Napoca 3400, Rumänien.

In twelf male nutrias with penis paralysis nervous stimulants and immobilisation of the penis by André-Suture in the preputium were used. In some cases the suture with U-suture were applied for fixation of preputial mucusa and albuginea to the outral skin.

Abb. 2

Deutsche Tierärztliche Wochenschrift, 87, 381-383.
3 figs., 7 references.

Authors summary.

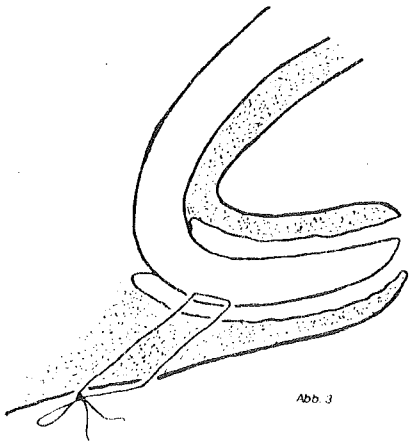
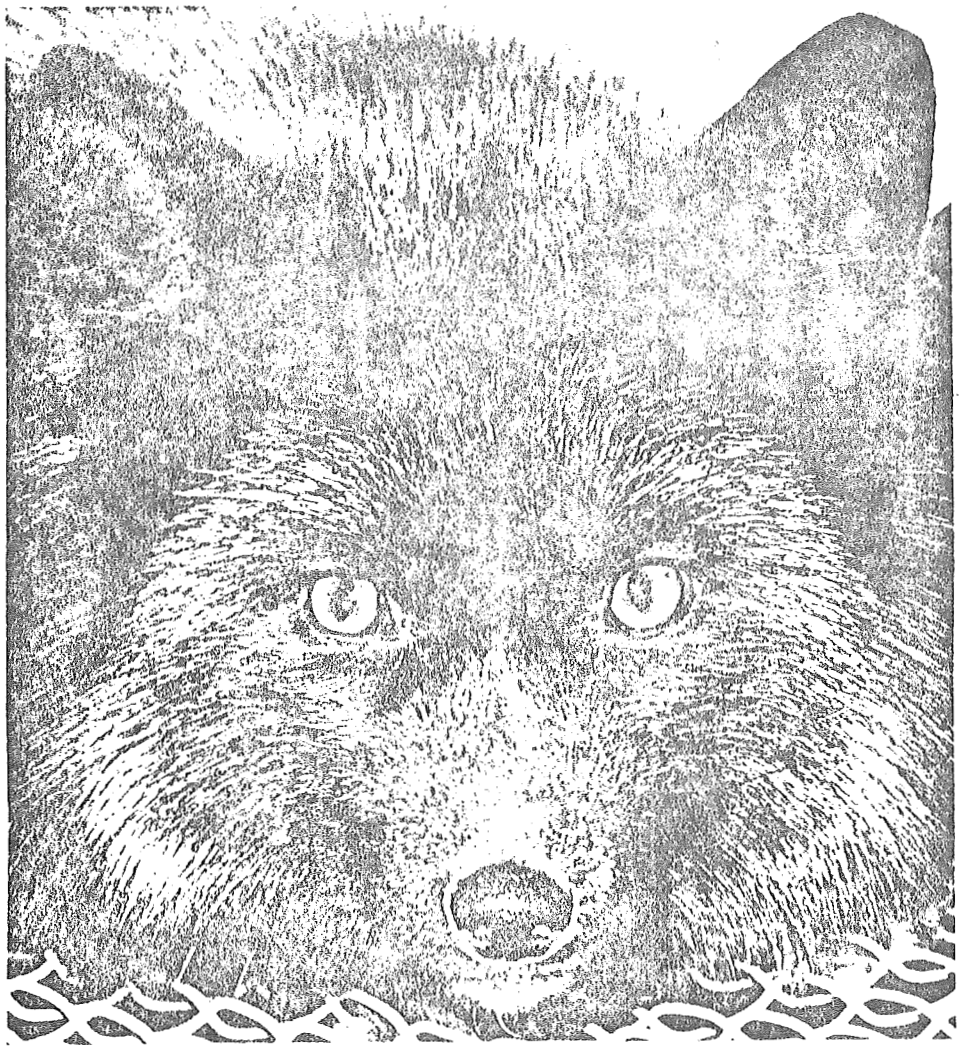


Abb. 3

COMMUNICATION.

Gouvernement du Québec
Ministère de l'Agriculture,
des Pêcheries et de l'Alimentation

Renards



Juillet 1980

Conseil des productions animales du Québec

BOOK REVIEW

Belzile, R. et al.

"RENARD" (A practical ranching guide for Silver Fox). Service de l'Information, Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec, 200-A Chemin Ste-Foy, Québec, Canada G1R 4X6. 1980. 40 pages with 20 Tables and Illustrations. Written in French.

The authors have written a field guide for Silver Fox to provide needed informations to Quebec ranchers. The chapters are as follows:

Chapter I - Social & economic factors (statistics, associations, marketing, investments, budgeting).
Chapter II - Fur characteristics.
Chapter III - Genetics.
Chapter IV - Reproduction.
Chapter V - Feeds & feeding.
Chapter VI - Diseases.
Chapter VII - Buildings & equipment.
Chapter VIII - Pelting.

The guide may be obtained free of charge by making a request at the address given above.

René Belzile,
Université Laval.

Blåræven

BOOK REVIEW.

Af H. Konnerup-Madsen og Mogens Hansen
1980

The Blue Fox.
by H. Konnerup Madsen and Mogens Hansen, 1980.

A new book about the Blue Fox has just come out in Denmark.

It deals with breeding, nutrition, pelting, and diseases of the Blue Fox.

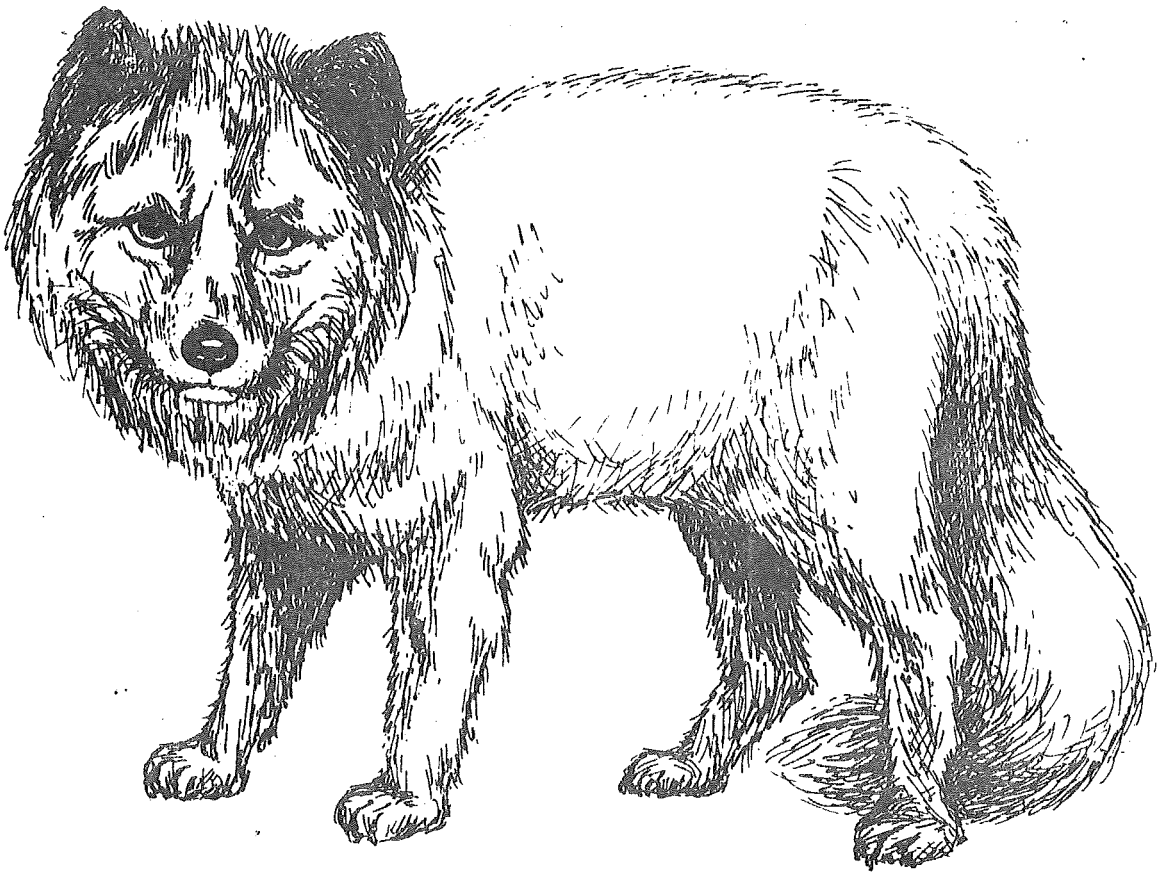
The first half of the book is occupied with breeding, nutrition, and pelting of the Blue Fox and its mutations. It tells about all the practical problems around breeding Blue Foxes and is good reading for people who are or are going to breed Blue Foxes. The second half of the book is a work of reference on diseases of the Blue Fox and especially this part will no doubt become a valuable help for the breeders of this species because of its logical composition, which makes it very easy to find out what disease your animals possible suffer from.

The book is well illustrated with figures and colour photos.

In all this new book about the Blue Fox will become very helpful in the breeding of Blue Foxes.

The book is on 177 pages. Written in Danish. Available from the Danish Fur Breeders Association, Langagervej 60, DK 2600 Glostrup, Denmark, at a price of Dkr. 122.-.

Reviewed by Margit Lykkeberg.



BOOK REVIEW.

Dr. Reinhard Scheelje
SUMPFBIBER, Zucht und Haltung.
Animal-Verlag Burgdorf.

A new book about nutria (myocaster coypu) farming has just come out in Germany.

The book deals with breeding and nutrition of the nutria and how to build up a nutria farm.

The book is divided into ten sections as follows:

I. Origin
II. Place in the zoological system.
III. Anatomy.
IV. Reproduction.
    1. Heat and mating.
    2. Sexually maturity.
    3. Pregnancy.
    4. Determination of pregnancy.
    5. Birth.
    6. Sucking period.
    7. Growth.
V. Breeding.
    1. Adaption of quantitative yields.
    2. Breeding work and selection.
    3. Valuation.
    4. Mating methods.
VI. The fur.
    1. General about nutria fur.
    2. Coat colours and their heredity.
    3. Killing.
    4. Pelting and the treat ment of the fur.
    5. Utilization of the fur.
VII. Nutrition.
    1. Generel about animal nutrition.
    2. The principles of digestibility and nutrient requirements.

3. Nutrient requirements according to production and time of the year.
4. Value determinating standards for the feed.
5. Requirements for nutrients and vitamins.
6. Feed rations.

VIII. Farm conditions.

1. The possible conditions under which you can keep the nutria.
2. Are breeding nutria without water still a problem?

IX. Nutria meat.

X. Diseases.

1. Bacterial diseases.
2. Parasitic diseases.
3. Trichinosis.
4. Diseases in the urinary- and reproductive organs.
5. Diseases in the respiratory organs.
6. Diseases in the digestional organs.
7. Poisoning.
8. Wounds.

As can be seen the book deals with an aspect of bnreeding nutria and is good reading for anyone, who wants to know how to build up a nutria farm. The book is in German and on 96 pages, published from Animal-Verlag Burgdorf.

Reviewed by
Margit Lykkeberg

Pelztierzuchtbücher des Animal-Verlages
– Band 1–

SUMPFBIBER

– Zucht und Haltung –

von

Dr. Reinhard Scheelje
Landwirtschaftsdirektor
Landwirtschaftskammer Hannover

unter Mitarbeit von

Dr. H. Heupel
Landwirtschaftskammer Westfalen-Lippe

Animal Verlags-,
Beratungs- und Verwaltungsges. mbH.
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3167 Burgdorf
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3150 Peine

MICHIGAN STATE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
DEPARTMENT OF POULTRY SCIENCE

EAST LANSING · MICHIGAN · 48824

November 20, 1980

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

Dear Gunnar

Enclosed are reprints of two articles concerning the effects of PCBs' on mink and a copy of part VII - Badgers, of our Mustelid Bibliography. Perhaps readers of Scientifur would be interested in knowing of these articles and the badger bibliography.

I talked with Hugh Travis recently and he informed me that the NRC publication on the Nutrient Requirements of Foxes and Mink is in the final review process. Hopefully it will be published in the near future.

Sincerely yours

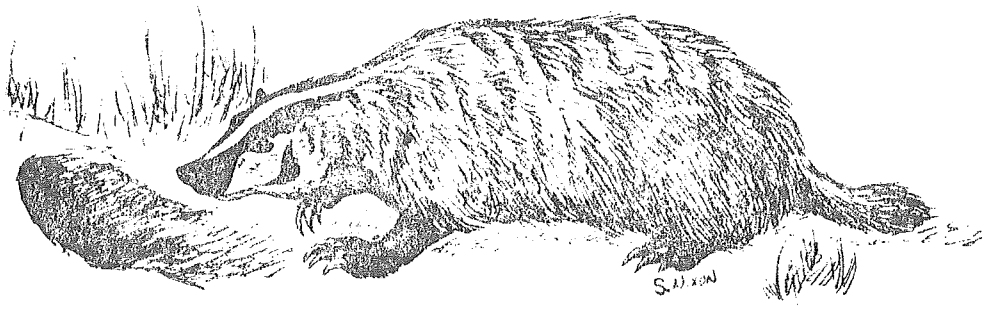
Richard J. Aulerich
Professor

RJA/cmd

Enclosures

A BIBLIOGRAPHY OF MUSTELIDS

PART VII: BADGERS



A BIBLIOGRAPHY OF MUSTELIDS

PART VII: BADGERS

COMPILED BY

DAVID A. THEUERKAUF AND RICHARD J. AULERICH

This is the seventh of a series of bibliographies on Mustelids prepared to assist individuals interested in these species in obtaining information published from 1900 through 1979. Although a fairly thorough search has been undertaken, this bibliography is not entirely complete. There are many general texts that pertain to Mustelids, as well as other animals, which are not included. Undoubtedly some foreign references have been omitted, although many are cited.

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

Articles pertaining to more than one subject are listed under each appropriate heading. All authors names appear in the author index (page 28).

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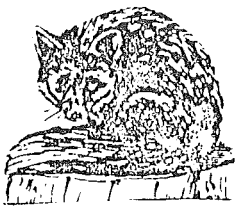
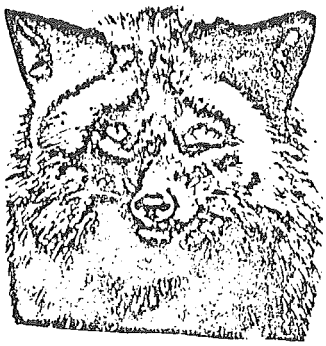
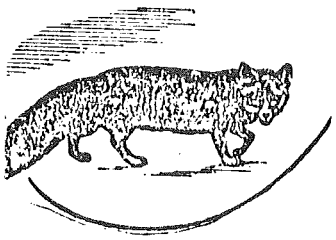
[1] Journal Article No. 9706, Michigan Agricultural Experiment Station, Michigan State University, East Lansing, MI 48824.

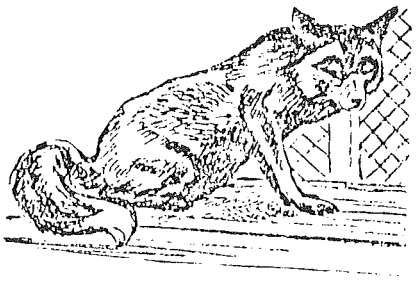
[2] Department of Animal Sciences, Michigan State University, East Lansing, MI 48824.

FOX PRODUCTION SHORT COURSE









January 7th-11th, 1980
VETERINARY PATHOLOGY LABORATORY
LIVESTOCK SERVICES BRANCH
N.S. DEPT OF AGRICULTURE & MARKETING
TRURO, N.S. CANADA B2N 6E3

INTRODUCTION

The second Fox Production Short Course was held in the classroom of the Hancock Veterinary Building on the N.S.A.C. campus from January 7 - 11th, 1980. Use was also made of the small experimental ranch established in the fall of 1978.

A committee from the Fox Breeders Association and the Department of Agriculture lined up the course.

A total of 33 students attended from Nova Scotia with one each from, New Brunswick and Prince Edward Island.

Speakers included various people from industry and government. A major contribution was made during the week by Mike Bollert, Simcoe, Ontario.

Excellent presentations combined with numerous questions were strong features of the course - the second one offered to the fox industry. Nearly all students were attending for the first time.

On behalf of the Livestock Services Branch, I would like to express our thanks to all involved with the successful course.

G. G. Finley, D.V.M.

FOX PRODUCTION SHORT COURSE

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Carnivore
CARNIVOROUS MAMMALS INCLUDING HUMANS
P.O. Box 384 □ Petersburg, Ill. 62675

30 September 1980

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

Dear Gunnar,

Thank you for continuing to exchange SCIENTIFUR for CARNIVORE, a recent issue of which is enclosed.

Best wishes and kind regards.

Sincerely,

Randall L. Eaton, Ph.D.
Editor

Editorial Office: P.O. Box 370, Ashland, OR 97520.

P.S. We wonder if you could announce the Fifth International Congress On Ecology, Behavior & Conservation of the World's Cats (and Sociobiology of Carnivores), convening mid-March 1981. Interested people should write us at the Editorial Office.

Thank you!

CARNIVORES, CARNIVORY AND HUMAN EVOLUTION
A Special Issue of *Carnivore*
Edited by
R. L. Eaton, W. C. McGrew and H. Hemmer

CONTENTS

Appearing late 1980. Subscribers to CARNIVORE receive this issue as part of their subscription. Individual copies available for $15.00 (U.S.). Send check or money order to Carnivore, P.O. Box 384, Petersburg, Ill. 62675.

NATIONAL BOARD
OF FUR FARM ORGANIZATIONS

3055 North Brookfield Road
Brookfield, Wisconsin 53005
[414] 786-4242

October 17, 1980

Mr. Gunnar Joergensen
48H Roskildevej
DK - 3400 Hilleroed
Denmark

Dear Mr. Joergensen:

It is our pleasure to invite the sponsors of the International Conference in Fur Animal Production to hold the 1988 conference somewhere in North America.

We join in this invitation with the Canada Mink Breeders Association, which is sending you a separate invitation. Although we realize that 1988 seems a long way off, it is appropriate that this invitation be extended to you at this time.

Rest assured that the mink and fox farmers of North America look forward to serving as hosts for the 1988 conference.

Cordially,

Gordon Sill
President

GS:lp

cc: William Rietveld
Ronald Gengel

Oct 30/80
Forwarded via
Canada Mink Breeders office -
not received on time here to be
have delivered this week.
D. E. Boyd

TELEPHONE: 274-5812

CANADA MINK BREEDERS ASSOCIATION

58 OAKWOOD AVE. N. • MISSISSAUGA, ONTARIO, L5G 3L8

October 27th, 1980

Miss Outi Lohi.
Secretary,
Arrangement Committee,
Int'l Scientific Congress.
PB5 01601 Vanda 60.
Finland.

Dear Miss Lohi:

The National Board of Fur Farm Organizations in the United States has passed a resolution to host the 1988 Scientific Congress in North America and they will be communicating with your committee in this regard.

Canada Mink Breeders Association has endorsed this recommendation by the following resolution passed during the 28th Annual Meeting held in Winnipeg, Manitoba on September 24-25, 1980:

> The Executive Committee of Canada Mink Breeders recommends the support and endorsement of a Scientific Congress to be hosted in North America in 1988 and will offer all assistance, encouragement and co-operation necessary"

This motion was passed unanimously by the Board of Directors and we would ask you to submit this letter to your committee for consideration of the American proposal.

Yours sincerely,

Doris E. Boyd.
Managing Director.

DEB:ak
cc: Executive Committee
Mr. Gunnar Joergensen
Mr. N. O. Griffin

THE BACTERIOLOGICAL QUALITY OF MINK FEED AND ITS IMPORTANCE TO ANIMAL HEALTH

In December 1980, Mr. Tapio Joukslathi, B.V.Sc., Finland, defended his Thesis on "Bacteriological Quality of Mink Feed and Its Effect on The Health of Mink, as Monitored by some Clinical and Blood Parameters". A summary of the thesis is given in the following.

This describes the bacteriological quality of Finnish feed as compared with similar investigations in Norway and Denmark. By examinations of organ enzymes in mink, it has, furthermore, been shown, how bacteriological quality of the feed influences animal health.

Since 1970, routine analyses of mink feed have been carried out in Norway and Denmark to evaluate bacteriological quality. This work has later on been extended to an evaluation of various raw materials, so that it has become possible to assess the bacteriological quality of a complete feed on the basis of that of the raw materials used.

This work started late in Finland, but analyses have been carried further, in that is has been possible, via analyses of mink blood, to describe the importance of high quality feed to animal health.

BACTERIOLOGICAL ANALYSES OF MINK FEED

Mink feed contains approximately 70% water and thus offers possibilities of great bacterial activity. Ready mink feed will thus always contain bacteria - numbers and species being dependent on the quality of the raw materials used and hygiene at the feed preparation centres.

In order to assess the bacteriological quality of the feed, examinations for total count, coli bacteria and faecal streptococci were carried out. These bacteria need not be pathogenic, but they indicate bacteriological changes in the feed, and, also, that other bacteria, which have not been counted, may be present and may cause infections.

Table 1. shows results of examinations in Finland, Norway and

Denmark and indicates, that Finnish feed has a poorer bacteriological quality than that used in the other countries. A major cause of this quality deterioration is the high content of offal in Finnish feed mixtures.

Table 1.

Bacteriological examination of compounded mink feed in Finland, Norway and Denmark.

Group Bacteria/g feed	Finland 1978	Norway 1973	Denmark 1973
Total Count			
Satisfactory:			
Less than 1 million	16.7%	13.8%	44%
1 - 6 million	48.3%	62.0%	40%
Unsatisfactory:			
6 - 20 million	18.3%	20.2%	10%
20 - 100 million	9.4%	3.6%	5%
More than 100 million	7.3%	0.4%	1%
Coli bacteria			
Satisfactory:	23.1%	34.3%	34%
Less than 1,000	14.1%	38.7%	22%
1,000 - 5,000	24.8%	21.1%	24%
5,000 - 25,000			
Unsatisfactory:			
25,000 - 100,000	25.2%	11.6%	14%
More than 100,000	12.8%	4.2%	6%
Faecal streptococci			
Satisfactory:			
Less than 1,000	11.6%	-	23%
1,000 - 5,000	10.7%	-	39%
Unsatisfactory:			
5,000 - 25,000	27.5%	-	20%
25,000 - 100,000	35.6%	-	12%
More than 100,000	14.6%	-	6%

The limits for a satisfactory bacteriological quality have been fixed on the basis of practical experience, but with due regard to counts in minced meat for human consumption.

As the Table shows, the high counts for faecal streptococci in Finnish feed are the major deviating factor, as compared with figures from Danish analyses. The reason should be sought in the high content of offal - 20% - in Finnish feed mixtures. It is, furthermore, known that prospective pathogenic bacteria or their toxins can be traced back to offal.

Besides the quality of the raw materials and the hygienic standards at feed preparation centres, temperature plays an important role in bacterial growth.

Table 2 shows how high temperatures during the summer months aid bacterial growth. The Table further shows, that the ingredients used are of importance to the final result, i.e. the quality of the feed (compare with Table 1).

Table 2

Distribution of satisfactory, fair and unsatisfactory feed in Finland and Denmark 1979. Classification is based on total count, coli counts, faecal streptococci counts and anaerobe bacteria counts. The classification system is identical to that used in Denmark.

Bacteriological quality	July - August		September - November	
	Finland	Denmark	Finland	Denmark
1 & 2 Satisfactory	14%	63%	16%	76%
2 & 4 Fair	40%	26%	46%	24%
5 Unsatisfactory	46%	11%	38%	0%

To elucidate the contents of bacteria in offal as compared to those in fish and fish waste, bacterial counts were carried out in these raw materials. The examinations show, that, on average,

offal contains 10 - 100 times as many bacteria as fish.

As mentioned, the classification system is based on indicator bacteria counts, which only cover the possible presence of pathogen bacteria. Bacterial counts have consequently been carried out in raw materials and feed mixtures known to cause reactions in other animal species, viz. diarrhoea, vomiting and inappetence. Toxin-producing staphylococci may be present in offal. To examine how mink react to entero-toxins from staphylocci, known quantities of toxin have been added to the feed of experimental groups, and the resulting syndrome has been described.

When the dose used was 200 micrograms of toxin/mink, most of the experimental animals reacted within 24 hours by vomiting, diarrhoea and/or reduced appetite.

During the experiment, blood samples were collected. These showed changes in the composition of leucocytes and a rise in the contents of urea nitrogen.

Post mortem examinations showed changes in the intestinal wall, kidney and liver.

ORGAN ENZYMES

Various organs, such as heart, kidney and muscles, contain different enzymes, which maintain normal cell activity. In case of organic disturbances, these enzymes will be secernated into the blood making it possible to record higher values than those pertaining in healthy animals. Measurements may, therefore, be used to ascertain harmful organic changes in the animals.

In order to utilize such records, the normal values must be known. The author, therefore, examined eight different enzymes in different organs in healthy mink and determined normal values. As compared with other animal species, larger amounts of Ornithin carbamoyltransferase (OCT), Aspartate aminotransferase (ASAT) and Alanine aminotransferase ALAT) were recorded; this is, supposedly, the result of higher protein contents in the feed.

When it thus became possible for the author to assess both the bacteriological quality of the feed and blood parameters in the animals, he examined mink fed bacteriologically satisfactory feed and mink fed poor quality feed in Finland and compared his findings with results obtained from Danish feed mixtures.

Results showed differences in the blood parameters of mink fed mixtures from the three feed preparation centres, in that blood analyses proved reaction to poor feed.

Table 3 shows the blood parameters examined.

Table 3.

Survey of the haematological and chemical blood parameters examined to assess reactions to bacteriologically satisfactory and poor feed

Numbers of leucocytes (10^6/litre)
Haemoglobin content (mmoles/litre)
OJT (Ornithin carbomoyltransferase (nanocat/litre)
AP (Alkaline phosphatase (microcat/litre)
ALAT (Alanine aminotransferase (microcat/litre)
ASAT (Aspartate aminotransferase (microcat/litre)
gamma-GT (gamma-glutamyltransferase (microcat/litre)
Total bilirubin (micromoles/litre
Creatinine (micromoles/litre)

1 cat = the catalytic amount of a system which catalyses as many cycles per second of a stated reaction scheme as there are atoms in o.012 kg of the pure nuclide ^{12}C.

CONCLUSIONS

1. The bacteriological quality of mink feed mixtures has been examined in Finland; it was poorer than that of feed used in Denmark and Norway. At certain times of the year, the quality is better, and especially when the raw materials used have been selected with care.

2. Offal and non-preserved blood from carcasses are of a lower quality than other raw materials examined. Some consignments of other raw materials may have a high bacterial count, but counts of specific bacteria are relatively low.

3. One third of the feed mixtures contain pathogen staphylococci. Consequently the possibility exists of intoxication with enterotoxins from offal.

4. The enzymes OCT, ASAT and ALAT have a greater activity in mink liver than that known from other animal species. This is considered to be related to the high protein level in mink feed. A number of different organ enzymes have been examined. The values recorded makes it possible to compare the enzymatic status in mink with that of other animal species.

5. Mink are prone to staphylococcal toxins. The clinical manifestations and changes in blood parameters are similar to corresponding changes in other animal species and in man.

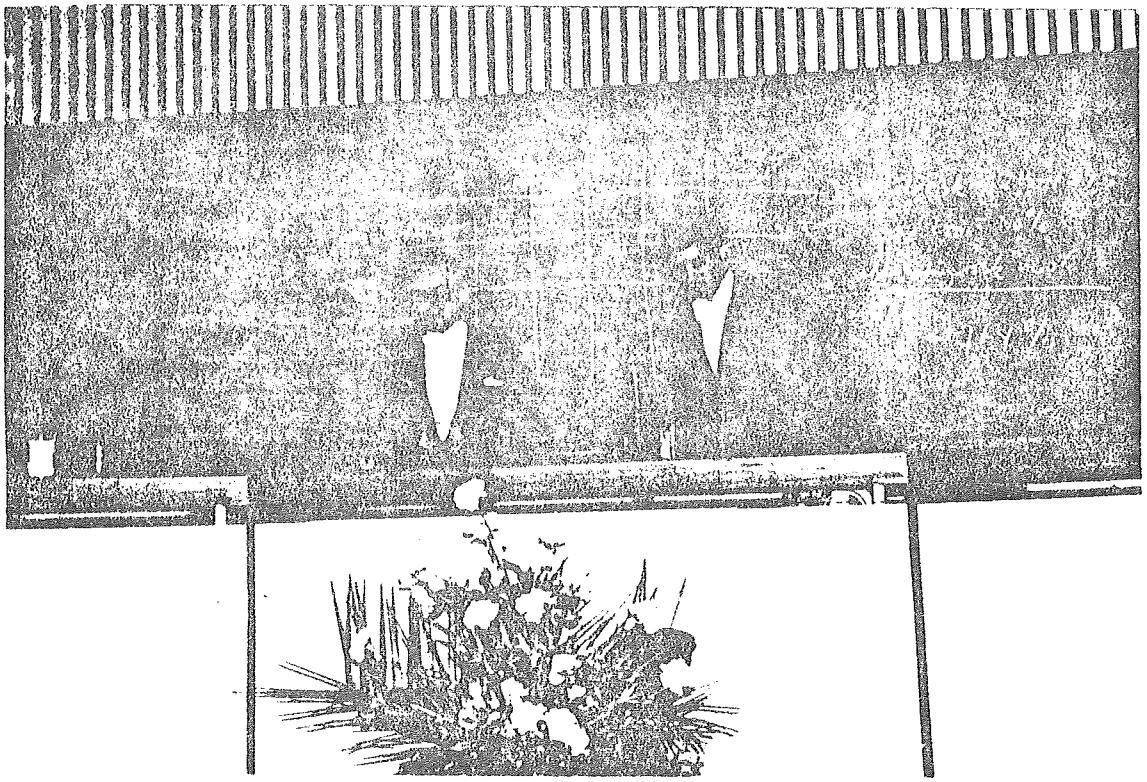
6. Mink on poor bacteriological quality feed are in poorer health than mink fed a high quality feed. Health has been expressed through readings of haematological and clinical blood parameter records.

Mogens Hansen.

(Translated by Charlotte Haarløv).

Picture Caption

Conferrence of Doctor's Degree. From the right Tapio Juokslathi, who has just concluded his dissertation. His Chief, Professor Poul Lindberg (centre) and Dr. J. Dirch Poulsen, Denmark (far left) both acted as Critics.



Picture Caption

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