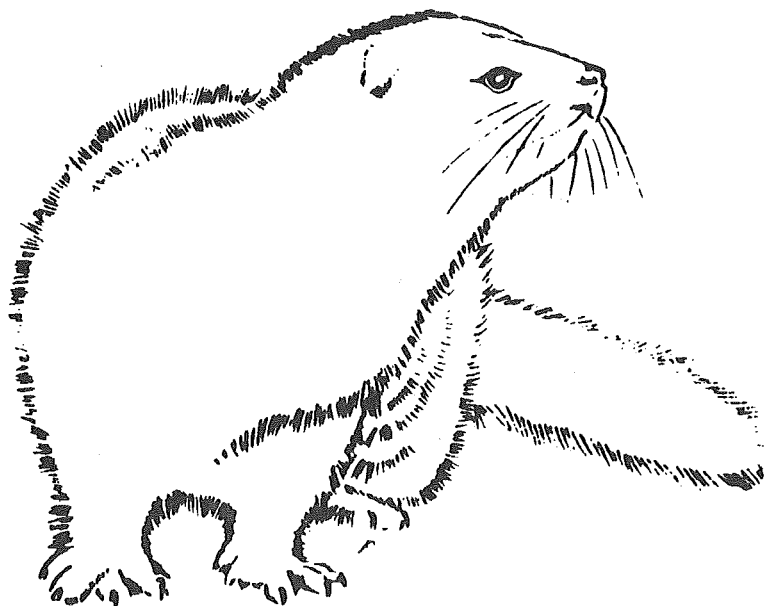


SCIENTIFUR

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NOTES

SCIENTIFUR

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In the biological sciences the things seldom are black or white. It is because of the coherence between the physiological reactions in the organism and coherence between these and nutritional and behavioral influences.

This is all well known facts, and the scientists therefore agree that it is impossible to find the whole black or white fact in every experiment.

The lethal effect of the W. locus in foxes and in the homozygote shadow gene in mink have been accepted as a fact. In this issue of SCIENTIFUR Dr. D.K. Belyaev, USSR, are showing us, that this fact has some moderations, because the effect is depending on the day length during pregnancy.

Every day we are receiving small pieces of the puzzle of understanding the science we are involved in.

This stream of small but important pieces are we regarding fur bearing animals among other journals reading in SCIENTIFUR.

But - dear reader - we are getting to few pieces to the very important puzzle, FUR ANIMAL PRODUCTION.

Remember that - and send reports and abstracts to us for publishing in SCIENTIFUR.

In many areas we feel that there is many pieces of the problem, but it is difficult for the single person to find them all for creating the full picture. Therefore, reviews of specific problems written of specialists in the area are very important for many people for giving them a snapshot of the real status. We think that SCIENTIFUR should be a good journal for publishing such reviews. Your contribution will be wellcome.

As you will see under COMMUNICATION a scientific meeting in fur animal production are going to be held in Sweden in October this year. We hope that many of the reports given there will be translated into English and published in SCIENTIFUR.

THE SECOND INTERNATIONAL SCIENTIFIC CONGRESS IN FUR ANIMAL PRODUCTION seems to be of a great format. Until today we have received preliminary enrollments from nearly 100 scientists from 15 different countries, and there will be given about 40 reports during the congress. Further information about the congress you will find under Communication.

If you are getting appetite of reading about the congress, it is possible for you to send the enrollment now, but in the arrangement committee we will be glad to receive that from you as far as possible, because the reserved congresscenter cannot take more than about 100 persons, and there is not to much time if we have to change meeting place because of the success.

Hope to hear from you in a near future. The readers of SCIENTIFUR thirst after important informations from you.

Your kind regards

The editor



Original report.

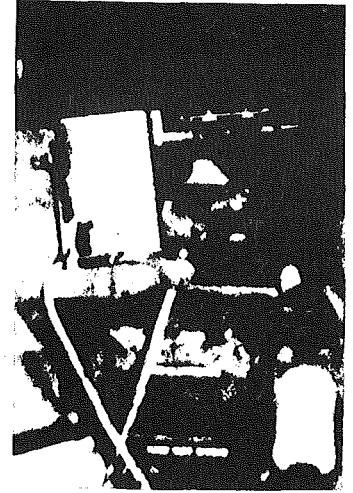
MARKING SYSTEM FOR MINK IDENTIFICATION

By EINAR J. EINARSSON

DEPARTMENT OF POULTRY AND FUR ANIMAL SCIENCE

THE AGRICULTURAL UNIVERSITY OF NORWAY

Boks 17, 1432 Ås-NLH, Norway.



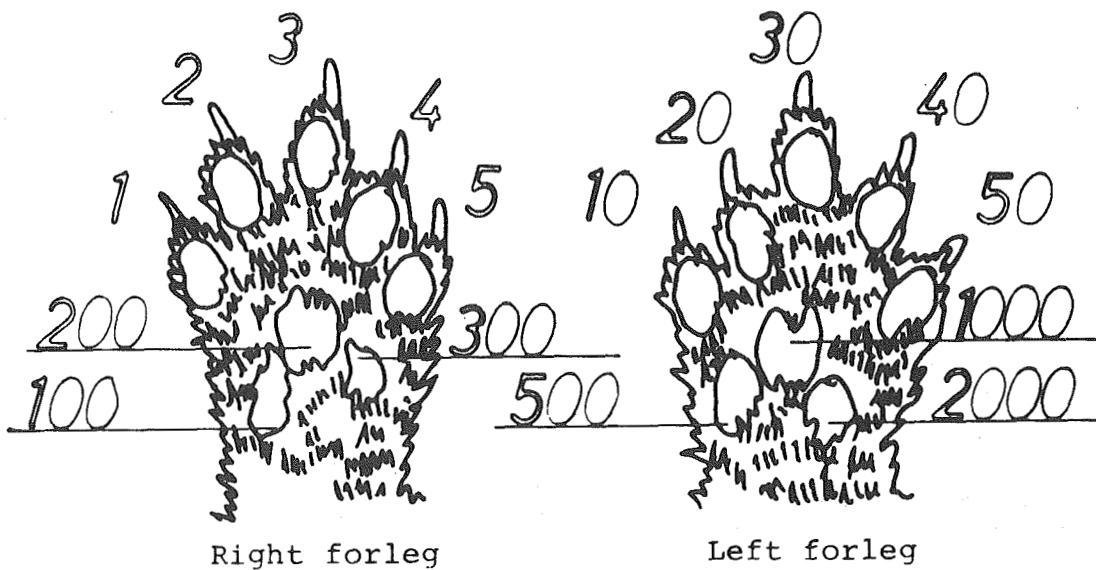
Picture 1.

In other domestic animals it is common practise to mark the individuals for identification. This is done for species like cattle, poultry, swine, sheep and even in the bee keeping. With proper indification of the animals we can separate individuals from each other, and this of course is very important, especially in experimental farms.

In mink ranching different methods for marking of the mink has been attempted. Metallic marks in the ear and cuttings in the ear have been tried, but apparently unsuccessfully. The importance of reliable identification of the mink is greatest in experimental farms. Thus, marking of the mink has been used in the experimental farm of Department of Poultry and Fur Animal Science at the Agricultural University of Norway from 1945. In all these years, except from one year, the mink has been marked by using a Danish method. This method was decribed in "Dansk Pelsdyravl" (1944, p. 190 and 1945, p. 57) and was first used by A.H. Clausen in Svinninge, Denmark. The required equipment is a tattoo-instrument and drawing ink (for instance Pelikan 17 Black). Picture 1 show the tattoo-instrument that is used at our experimental farm for marking of the mink, but other types may be used. The opening in the front of the instrument (with the needles) has been wided out to make the mark more visible. The instrument is coupled with a 6 V battery.

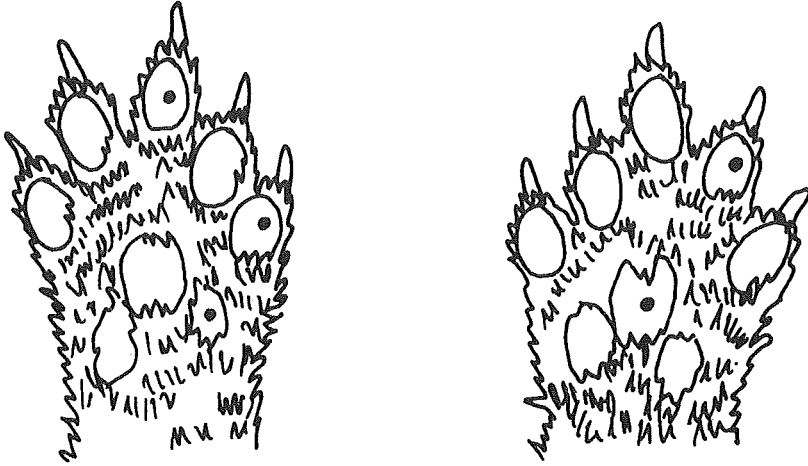
The method is based on a system using marks on the pads of the forelegs. No number is written on the mink as common practise with foxes, but the pad marks represent a system which is explained below.

At our farm the mink is marked at 6 weeks of age, at the same time as the litter is removed from the mother. The tattoo-instrument is used as shown in picture 2. The needles are dipped into the ink and placed on the pad. When starting the instrument, the needles puncture the pad and leave a black permanent mark. By this method (only using the forelegs) we can identity up to 4265 mink. The marks on different pads are added and thereby we find the number of the mink.



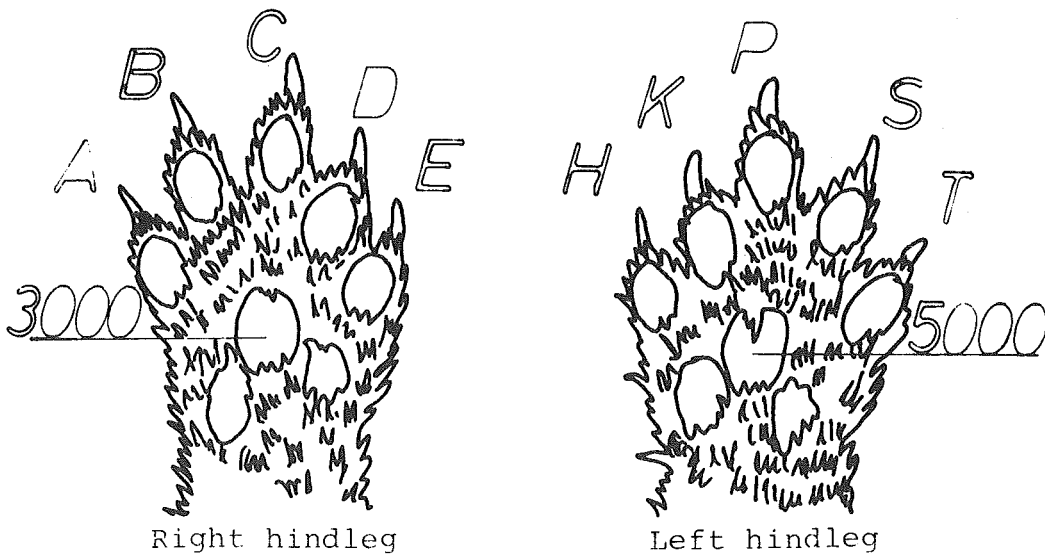
The drawing below shows the forelegs when the mink is laying on the back. The number shows the "value" of the different pads.

The drawing below shows an example, a mink marked with number 1368, to indicate how the method works.



When reading the number we start with the highest number which is 1000 (left foreleg), then add 300 (right foreleg) and further add 40 (left foreleg). This gives 1340 and then 5 + 3 (right foreleg) are added, to yield the number 1348.

The hindlegs can be used to identify the year when the mink is born. If we need numbers higher than 4265 we can also use the hindlegs as shown below. It would then be possible to mark 12265 mink.



Each letter means a year as shown below.

| | | | |
|---|------|---|------|
| A | 1970 | H | 1975 |
| B | 1971 | K | 1976 |
| C | 1972 | P | 1977 |
| D | 1973 | S | 1978 |
| E | 1974 | T | 1979 |
| | | A | 1980 |

★ A CONTRIBUTION TO AGE DETERMINATION OF FARBRED MINK MALES (*MUSTELA VISON*) BY MEANS OF THE PENISBONE.

(Ein Beitrag zur Altersbestimmung beim farmgehaltenen Minkrüden (*Mustela vison* Schreb.) anhand des Penisknochens.)

Ulf D. Wenzel, Jürgen Hartung, DDR-703, Leipzig, Goethesteig, DDR.

It is by the results of measuring length and weight of 1143 penis-bones from farbred minks at different ages (2-68 months) determined, that the increase in length at sexual maturity (10-11 months) is in average 46-47 mm. The weight of the penisbone increases till a higher age. Length or better weight of the penisbone seems to be a good supplement of age determination of dead farm-bred minkmales.

Zool. Garten N.F., Leipzig 43, (1973) 2/3, 104-109.

1 table, 2 photos, 2 figs. 14 references.

Authors summary translated by
Margit Lykkeberg.

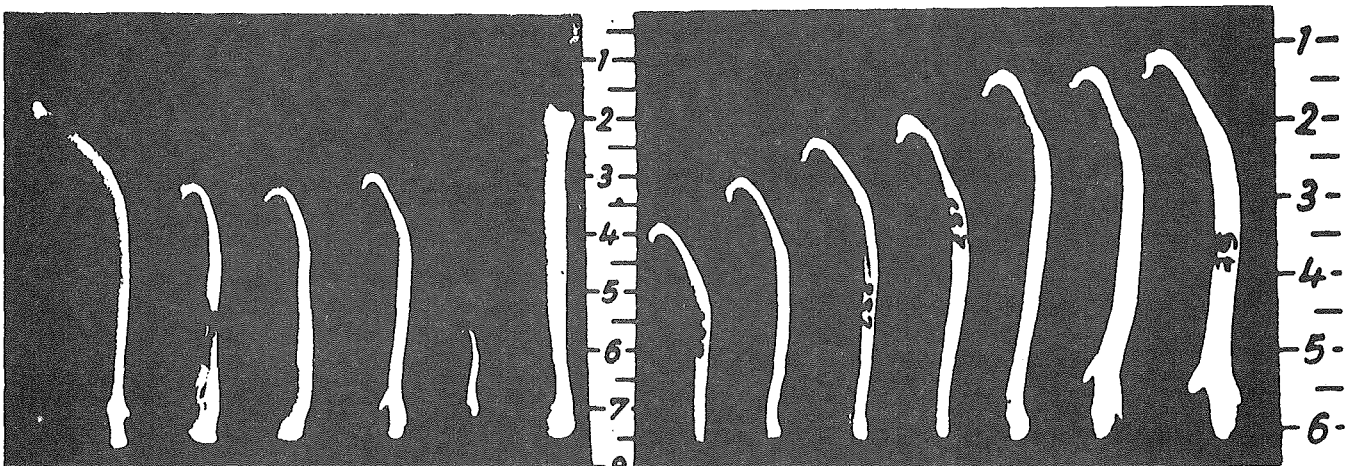


Abb. 1. Penisknochen von *Martes foina*, *Mustela putorius*, *Mustela putorius fura*, *Mustela vison*, *Lutra lutra* (von links nach rechts)

Abb. 2. Anordnung von Penisknochen von *Mustela vison* nach dem Alter (von links nach rechts) 2., 4., 6., 8., 11., 29. u. 47. Lebensmonat

★ MATERIALS ON COMPARATIVE MORPHOLOGY OF FOXES (VULPES
VULPES DOLICHOCRANIA AND V.V. BERINGIANA)

МАТЕРИАЛЫ ПО СРАВНИТЕЛЬНОЙ МОРФОЛОГИИ ЛИЦА
(VULPES VULPES DOLICHOCRANIA и V. V. BERINGIANA)

B.V. Novikov, Central Research Laboratory, "Glavokhota" of the PSFSP
Moscow, USSR.

The results are given for the comparative study of the morphology of males-youngs of the year of two Far East subspecies of foxes: V.v. beringiana and V. v. dolichocrania. The differences between the most skull and postcranial skeleton characters were highly significant ($t=3.1+10.3$ and $4.4+7.8$ resp.) their absolute values being higher in V.v. dolichocrania. The allometric growth of skull was not noted in V.v. dolichocrania. V.v. beringiana has relatively larger size (by 3 parameters) of the skull brain region, width between the upper molars and length of molars. The skull of V.v. dolichocrania is characterized by its small height and width and great total length. V.v. beringiana is relatively taller on legs than V.v, dolichocrania, this feature being most clearly expressed in the hind legs' size. The difference coefficient for the skull size is below the adopted index of subspecific differences and for the most postcranial skeleton characters is above this index.

Zoologic Journal, Vol. 57, Moskva 1978, 801-805.

3 tables, 8 references.

In Russian with Russian and English summary.

Authors summary.

★ SHORT GUIDANCE CONCERNING:

ESTABLISHMENT OF FUR ANIMAL FARM.

obtainable from: Danish Fur Breeders Association,
Langagervej 60, DK 2600 Glostrup, Denmark.

In a small booklet The Danish Fur Breeders Association has

described which considerations there have to be taken when a fur animal farm are going to be established.

The booklet describe the laws there are influencing the establishment regarding environment, nature conservancy. The normal laws concerning agricultural production and the law concerning city- and landzones are also mentioned.

To that here are described the practical demands concering ground, houses and watering systems. Advise are given in buying of breeding animals and feed as well as grading of animals and pelting. Also an adress list of the adviser staff and the offices are given.

9 figs. (12 pages).

In Danish.

Abstract: G. Jørgensen.

★ THE FISHING STRATEGY OF THE MINK (*MUSTELA VISON*);
TIME-BUDGETING OF HUNTING EFFORT.

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

1. Behavioural evidence is presented for the existence of a "hunter" predator class which is postulated in addition to the "searchers", "pursuers" and "ambushers" described by Alcock (1975).
2. The search and pursuit manoeuvres of an amphibious, and thus time-limited, "hunter", the mink, predating schooling fish prey, are examined. Predatory behaviour was investigated at four prey densities (1, 5, 10 and 15 rudd) over three levels of refuge availability for the prey, open refuges, closed refuges, and refuges absent.
3. No underwater stalking or ambushing manoeuvres were observed;

however the prey may be initially located by the predator from an aerial vantage point where the mink may have been concealed from the fish.

4. The mink preferentially visited the fish refuges regardless of the number of fish available in the tank even though the number of fish captured in these structures was small (5 fish in 515 visits).
5. Hunting efficiency was maximised by balancing the proportion of search and pursuit time per dive.
6. Differential refuge usage was noted in the prey. Single fish could effectively utilise the refuges, and commonly did so; whereas individuals to the 10 and 15 group rarely used the hiding places preferring to remain as a school. Quite frequently individuals from the group of five fish would seclude themselves in the refuges.
7. Searching efficiency was lowest with single fish irrespective of the presence of refuges.
8. Following an attempted capture within a refuge a redistribution of search-effort was noted, such that the mink preferentially investigated that hide on subsequent dives whilst the level of tank-search declined. Visits to other refuges were maintained.
9. Searching efficiency increased from the first to the second encounter over the three hide conditions.
10. Search behaviour was categorised as tank-search, spot-search, hide-search, and push-search, where the duration of push-search > spot-search > hide-search > tank-search.
11. When the refuges were permanently closed a general decline in refuge searching frequency was observed over a nine day test period. In contrast, structural modification to the refuges so that they remained open but either more or less accessible to the mink led to an increased frequency of visits.
12. Refuge availability is deemed advantageous to the fish in that the structures interfere with the predator's visual field and manoeuvrability. Advantages accrue to the mink in allowing a stealthy approach to the prey and the development of specific

search strategies. Energetic advantages may also be apparent in that more places are available for the predator to push-off from.

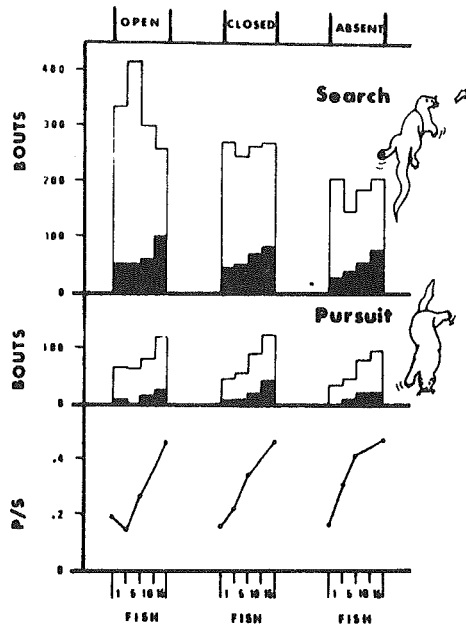


Fig. 3. Search and pursuit behaviour of the mink in relation to prey number and refuge availability. top: Frequency of search. Shaded areas represent the number of successful searches. middle: Frequency of pursuit. Shaded areas represent the number of times the prey was initially located by the predator from an aerial vantage point. bottom: Efficiency ratio of the mink (P/S).

Behaviour, LXVII, 3-4.

8 figs., 10 tables, 21 references.

In English with abstracts in German and English.

Authors summary.

Pursuit

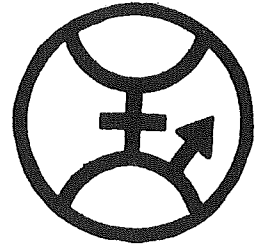


Spot Search



Hide Search





★ GENETICS OF THE W LOCUS IN FOXES AND EXPRESSION OF ITS LETHAL EFFECTS.

D.K. Belyaev, L.N. Trut, A.O. Ruvinsky, Institute of Cytology and Genetics of the U.S.S.R. Academy of Sciences Siberian Branch, Novosibirsk 90, U.S.S.R.

The genetic analysis of coat-color mutations in farm-bred platinum and white-faced foxes has shown that they are controlled by autosomal dominant genes that form an allelic series. Homozygosity for these mutant genes and their compound state exert a lethal effect during embryonic development, so that when platinum and whitefaced foxes are intercrossed a 2:1 ratio of colored to standard (silver-black) offspring is obtained.

In 1943, there occurred a new, hitherto undescribed, mutation in foxes at the Bakuriani Farm of the Georgian Republic (USSR). It was characterized by white coat and black spots on the body, feet, and face and became known as Georgian white or snow mutation. Genetic data on this coat-color mutation are fragmentary. However, experimental crosses carried out independently by Georgidze and Belyaev (unpublished) as well as available farm breeding records have provided sufficient evidence to establish that this mutation has a dominant mode of inheritance and that offspring from inter se crosses segregate in a ratio of 2 Georgian whites to 1 silver black. This leads to the supposition that homozygotes for the Georgian white mutation die during the embryonic period.

The objectives of the present study were to analyze the inheritance pattern of the Georgian white (snow) coat color in foxes, to elucidate how this mutation interacts with the platinum and white-faced mutations, and to evaluate the influence of additional illumination on embryonic development in mutant females during pregnancy.

As reference points for this experimental study were the communications of Belyaev et al., who have demonstrated that leih may

greatly influence embryonic mortality in mammals, particularly in those with genetically determined low viability.

The Georgian white mutation for coat color in foxes is inherited as a partially dominant character. It is allelic to the previously observed white-faced and platinum mutations. It was established that large litter size in Georgian white females and long daylight during pregnancy promote embryonic viability in homozygotes for this mutation. As a result, in offspring segregation patterns for coat color the proportion of homozygotes increases at that of heterozygotes decreases. It is suggested that at competitive relationship between embryos with different genotypes is established as early as at the preimplantation stage.

The Journal of Heredity 66, 331-338, 1975.

5 tables, 8 photos, 3 figs., 9 references.

Authors introduction and summary.



★ EFFECT OF DAY LENGTH ON LETHALITY IN MINK HOMOZYGOUS FOR THE SHADOW GENE.

D.K. Belyaev, A.I. Zhelezova, Institute of Cytology and Genetics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk 90, USSR.

The autosomal mutation shadow, which is manifested in the reduction of the basic coat color in mink, is a dominant mutation with a recessive lethal effect. Nes showed that some of the homozygous embryos die before implantation and the remainder die after it. Shadow to shadow crosses result only in heterozygous shadow pups (S^H_S), with fertility decreased by almost 25 percent due to the death of homozygotes. The shadow mutation is one of the members of the allelic series of dominant mutations black-cross (S) and royal-silver (S^R), which form the $S^H > S > S^R > S$ order of domination, the lethal effect being typical only for shadow. A similar mutation was found recently in blue fox by Nes.

Belyaev et al. reported that in a Georgian white dominant mutation in foxes the death of embryos homozygous for lethals may be overcome or time-shifted by means of changing the length of daylight during pregnancy. Moreover, it was found that a kind of competitive relationship exists between embryos with different genotypes before implantation and a different selective value of embryos from mothers kept under various conditions of illumination. The effect of light is determined by the functional activity of corpora lutea, and, probably, by the progesterone level that is known to play an important part in implantation and in embryonic viability at the first stages of development.

These studies provided the stimulus to investigate the effect of additional illumination during pregnancy on the viability of offspring homozygous for the shadow gene ($S^H S^H$) in mink. ↴

It is postulated that embryonic mortality in mink genetically determined by homozygosity for the shadow gene is controlled to a certain extent by the duration of daylight during the pregnancy of females. Artificial variation of daylight duration postpones the lethal effect of the homozygosity of the shadow gene and modifies the segregation pattern of coat color.

The Journal of Heredity, 69, 366-368, 1978.

3 tables, 7 references.

In English.

Authors introduction and summary.



★ THE ANNUAL REPRODUCTIVE CYCLE OF MINK (*MUSTELA VISON*).

Thomas E. Pilbeam, Patrick W. Concannon, Hugh F. Travis,
Dept. of Animal Science, Cornell University, Ithaca,
NY 14853, USA.

Reproductive organ development, plasma sex steroid concentrations and fur growth patterns were determined for pubescent and adult mink of both sexes, at 1- to 8-week intervals, between July and the following June. Plasma estradiol concentrations and weights (mg/kg) of ovaries, oviducts and uteri decreased slightly in both pubescent and adult females during the first half of anestrus (July to October), then increased slowly throughout the second half of anestrus (October to December). During proestrus (January to February) plasma estradiol concentrations and oviduct weights reached maximum values. During estrus (late February to March) ovarian weights were maximal prior to mating-induced ovulations (before March 11) and subsequently reduced, whereas uterine weights continued to increase until implantation (April 8). During estrus, plasma estradiol concentrations prior to mating were reduced ($P < .05$) from previous peak concentrations and were reduced further following mating. Estradiol remained low throughout pregnancy and lactation. Plasma progesterone remained at or near non-detectable concentrations throughout anestrus, proestrus and estrus, increased slightly ($P < .05$) on March 18 and was maximal on April 8 during initiation of implantation. Progesterone then decreased continually and reached near-basal concentrations following parturitions (May 4 to 11). These data suggest the possibility that sexual receptivity in mink may be a response to declining estrogen and that the changing photoperiod during the vernal equinox may be an environmental trigger for initiation of luteal function and termination of the embryonic diapause.

Winter fur growth development was complete by November 10 in

all animals and was not affected by ovariectomy of females during anestrus.

Plasma androgen concentrations in males were low from July to September and increased during October and November prior to the first observed increase in testis volume in December. Androgen concentrations were maximal in January and declined continually thereafter. Concentrations decreased prior to, during and following the breeding season. In contrast, testis volumes increased to maximal values on March 3 at the time of initial breedings and declined slowly thereafter. The slow decline in plasma androgen prior to matings and the sharp declines following matings suggest the possibility that androgen withdrawal may induce male sexual activity and that mating itself may further suppress androgen secretion.

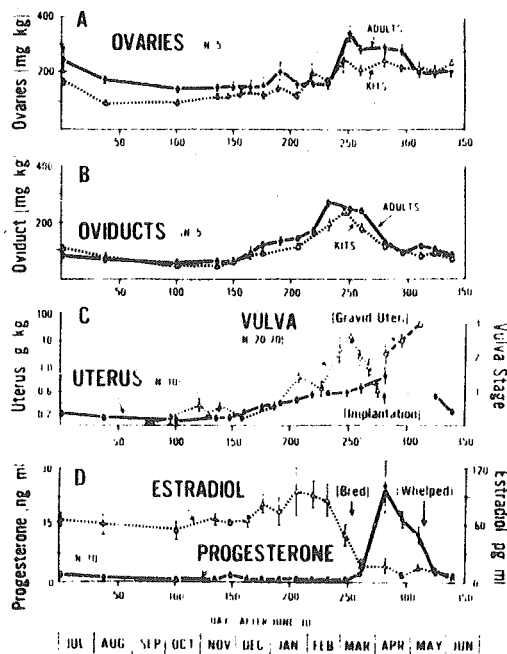


Figure 1. Mean (\pm SEM) weights (per kg body weight) of paired ovaries (A), oviducts (B), and uteri (C), mean (\pm SEM) vulval swelling stage scores (C), and mean (\pm SEM) plasma estradiol 17β and progesterone concentrations (D) for mink maintained at 42° N latitude. Weights of uteri with visible implantation sites (+) are shown separate from those without such sites (-). Mean times mink were bred and whelped litters are indicated by arrows. All values prior to Day 250 are from nonmated mink and all values after Day 250 are from mink bred between Days 224 to 260.

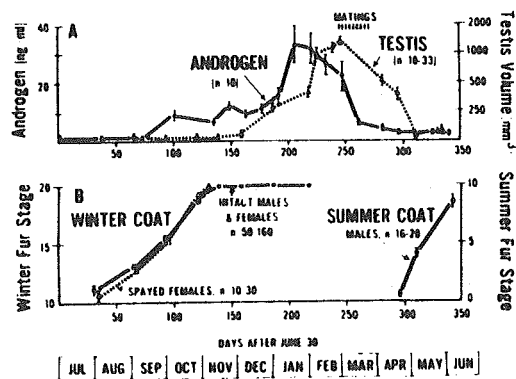


Figure 2. Mean (\pm SEM) plasma androgen concentrations and single-testis volume of male mink from July to June (A). Mean (\pm SEM) fur development stages for intact male and female mink, and for ovariectomized (spayed) mink during growth of winter pelage and for male mink during development of the summer pelage (B).

Journal of Animal Science,

Vol. 48, 3, 1979.

33 reference, 2 figs.

Authors summary.



THE MORPHOLOGY OF THE OVARIES OF THE PREGNANT MINK
MUSTELA VISON.

МОРФОЛОГИЯ ЯИЧНИКОВ БЕРЕМЕННОЙ АМЕРИКАНСКОЙ
НОРКИ — *MUSTELA VISON*

V.M. Kolpovsky, All-Union Research Institute of Hunting and
Fur Farming, Kirov, USSR.

In the ovaries of the pregnant mink a half of scanty primary follicles had signs of degeneration. All secondary and tertiary follicles were at different stages of atresia. The oocytes broke down at the stages of secondary follicle. The atresia was completed by the death of all follicular structures, except zona pellucida, and the filling in of the defect in the cortical layer by young interstitial cells. Upon the embryonic diapause the yellow bodies represent morphologically developed and functioning structures. Prior to the implantation the nuclei of many lutein cells displaced from the excentric position to the cytollemma and remained adjacent to the margin almost until birth. The yellow bodies always had a small amount of lutein cells with picnotic nuclei. On the 26th day before birth the phenomenon of mass picnosis of the nuclei was found. The yellow bodies preserved the signs of functional activity until the end of pregnancy.

Zoologic Journal, Vol. 57, Moskva 1978, 1860-1869.

1 fig., 9 photos, 20 references.

In Russian with English summary.

Authors summary.



NUTRITTON



Original report.

★ FERIPRIVE ANEMY IN MINK. HERIDITARY ASPECTS.

Dr. N. Pastirnac, Department Agric. de stat, I.A. S. Prejmer,
Jud. Brasov, R.S. Romania.

Anemy in fur animals is of great interest, due to the serious economic injuries it may cause, affecting the growth and the fur quality of individuals and a large number of authors pointed out the importance of nutrition as the main factor of its appearance. It is well known the colour, and finally the fur quality, depend on the variation of hemoglobin level. The low level og hemoglobin in early summer leads to disturbances in the appearance and growth of winter hair, resulting in low quality furs, due to the appearance of white colour of the under-fur, called the "cotton fur". The disease may have an increased incidency, affecting up to 50% of youth within a farm.

Although the climate has no influence on the hemoglobin level, the values of it are superior during autumn months to those of summer months. The hemoglobin level is lower in pregnant females and litter up to weaning and it rise with age (1,2). The iron need for litter is higher due to the low iron content in milk and due to the high frequency of gastro-intestinal disturbances. Another factor that determines the variation of hemoglobin values is the sex of the animal.

Thus, in the weaning period the minimum value of hemoglobin related to 100 ml blood is 9,5 g in female and 9 g in male. In autumn the mean value of both sexes is 17-18 g (2,3). If the hemoglobin value decreases below 15-16g, the animal is considered

to be ill. It is well-known that the clinical symptoms are pale teguments, low appetite, losses in weight of pregnant and lactant females and in properties of maternal instinct. The offsprings are weak, with a low viability and often with disturbances of the digestive apparatus, like enteritis or vomitive reactions. Many kits die soon after birth and those survive grow very slowly. In the youth with hemoglobin values below 13 g during the weaning period and later, when the winter hair appears, the colour of the under-fur becomes white, this being a symptom of anemy. The fur with "cotton fur" has, usually, rare, shaggy, non-elastic guard hair that changes easily its direction or falls down.

The hair losses its colour totally or partially. It has been demonstrated that colour loss has no other causes but the reduction of iron quantity in hair (4). Certainly, the hemoglobin values determine the deviation in fur pigmentation from a higher degree to a lower one (a paler tent) but the correlation between colour deviation and anemy is not the same.

Anemy as evolution and symptomatology is a disease relatively easy to be diagnosed but rather complex from the point of view of etiology, being determined by a multitude of factors which complicate its prophylaxis and therapy.

Among the most important causes of anemy in mink are to be mentioned first of all the different intoxications. The chronic intoxications are connected with the nutrition hygiene and water supply for mink. During the transport, preservation and processing of the food, a part of it decomposes because of its high perishability. From the microbial flora that develops and from decomposition of proteins and fats result a series of toxins which act upon hemoglobin. If the water source used by the animals is infected or contains organic impurities it also may cause anemy by gastro-intestinal disturbances.

Other deficiencies of hygienic nature or management may result in other etiologic aspects of anemy, like endoparazites

(coccidiosis) or ectoparasites (louses and scab).

The deficiency in mineral salts is another important cause of anemy. The way in which food is prepared mainly from soft slaughter byproducts (without bones) or integral fish leads to a disturbance of Ca/P ratio because the volume of food and, implicitly, the content of mineral salts are indirect proportional to its energetic value.

The lack of iron some vitamins occurs seldom. These elements are present in many categories of foods and are regularly administered to the animals.

The appearance of some factors which might destroy vitamins is to be avoided. Among them those with a thiaminase content are to be mentioned.

Thus, anemy appears as a secondary factor in case of lack of E vitamin, resulting from feeding mink with fat fish species, like *Sebastes marinus*, *Anarrhicas lupus*, *Mallotus villosus* etc.

They are harmful because of their content in easy oxidable non-saturated fatty acids. Vitamin E is inactivated by the fats oxidation process and it is to be administered in high doses during periods of fur maturation and finishing in order to compensate the destroyed alfatocoferols.

The main element leading to the appearance of "cotton fur" is the unilateral consumption of marine and oceanic fish especially those species with a high content of anemiogenic and thermolabile factors. These species are still not integrally known, but we may mention some of them: *Melanogrammus aeglefinus*, *Merlangius merlangius*, *Merlucius merlucius*, *Micromesistius pou-tasson*, *Palachius virens*. The same harmful effect have *Boreogadus esmarki*, *Brosme brosme*, *Molvo molvo*, *Pollachius pollachius*, *Trisopterus minutus* (3, 5, 6, 7), if they are administered to a high rate in food. It has been shown in literature (7) that

the thermolabile factor is trimethylaminoxide $(\text{CH}_3)_3\text{NO}_2\text{H}_2\text{O}$, a component of the tissue of the above mentioned species.

Laboratory tests have been made by intraperitoneal or oral administration of trimethylaminoxide, which, in contact with iron forms non-soluble compounds like iron oxide-hydroxides (goethite and lepidochrocite) (7,8).

A serie of researches (2, 8, 9) have been carried out for the study of the way of iron assimilation by means of radioactive iron (Fe^{59} and Fe^{55}). The animals have been fed with 60% fish containing thermolabile factors. The highest percent of anemy occurred among those animals fed with mackerel.

The thermolabile factor can be destroyed, partially or totally, by boiling, which leads to a better assimilation of organic or anorganic iron.

Some researches (10) have shown, that no matter which fish species is administered, an addition of iron salts is required, because the iron content of their tissues is extremely low, 0.05-0,1% in comparison to the slaughter byproducts which contain 30-50% more.

Anemy and "cotton fur" appearance may affect half of the youth within a farm, but the same feeding regime in other farms may have a sporadic character or may even not appear at all. This aspect comes to confirm the idea that the disease has a strong hereditary character. The resistance of animals to different etiological factors varies, depending on different fish species consumed by an individual, the colour type etc.

For example, the Saphir mink is much more predisposed to anemy than the Standard mink.

In order to verify the which extent the hereditary factors are involved in the appearance of "cotton fur" an experience has been

carried out in the period 1970-1975. After the first year of feeding 20% of the mink population with raw oceanic fish we selected a group of 75 females and 25 males (A) from the Standard type with significant deviation of the under-fur colour and another group (B) of the same size and colour but with a normal degree of pigmentation.

In order to prevent anemy and "cotton fur" 20 mg of ferrous sulphate per pregnant female have been administered daily in their food starting with april in the respective year. The aim of this procedure was to assure enough iron provision for the offspring.

Subsequently, a progressive dose of ferrous sulphate has been administered to the youth from weaning to slaughter period, starting with 1-2 mg (June 15) and ending with 5-6 mg (September 15). In the following 4 years group A including offspring, has been fed only with slaughter residues and group B, including offspring, with 45-55% of raw oceanic fish. From both groups all individuals with an abnormal under-fur pigmentation have been slaughtered yearly. In the last year of our experience the food of all tested animals consisted of 70% raw fish residues.

The results concerning the genetic character of anemy have been conclusive. Group A, with a predisposition to this disease, reacted in a proportion of 89% and group B, resistant to this diseases, reacted in a proportion of only 17%.

Therefore, the following conclusion can be drawn out, that a yearly selection and elimination of minks showing a predisposition to anemy determines the increase of the resistance of population and a gradual adaptation to a nutrition with whatever kinds of fish.

However, it is to be pointed out that such a selection may sometimes result in the elimination of highly valuable individuals from a breeding point of view with repercussions in economy.

In this way, the farms specialized in carnivorous animal breeding should use other means to prevent losses caused by "cotton fur". The administration of ferrous sulphate, though unsatisfactory still remains the basic remedy for the prophylaxis and therapy of anemy. Up to the present no other ferrous compounds have been identified. Satisfactory results have been obtained with a dose of 0.5 ml ferric glutamate per individual daily, which is equal to 10 mg Fe, but even in this case the appearance of white under-fur couldn't be totally avoided (6.7).

The best results are obtained by combining the medicamental therapy and the improvement of feeding regime.

To prevent anemy the total fish amount boiling is recommended as being the most efficient method. Another efficient method could be the boiling of only that amount of fish which exceeds 10% of food.

Also, it is desirable to reduce thermolabile fish quantity in critical periods like May-June and specially August 15, when the winter fur begins to grow.

At the same time, continous feeding with fish has to be avoided. Raw fish should be administered 5 days, followed by two days of slaughter byproducts or only boiled fish. In this feeding system iron products (FeSO_4 etc.) are recommended to be administered every two days.

A radical means to prevent and control anemy is the total elimination of fish as an anemiogenic factor and its replacement by food with a high iron content, like liver, spleen, blood, yolk, fodder yeast, pea or oat meal etc.

These are the only means known to be efficient in the prevention of "cotton fur" and , implicitly, a low fur quality and a low economic efficiency of fur animal breeding.

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COOKED FISH-SILAGE IN RATIONS FOR MINK

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For three consecutive years experiments have been carried out concerning the use of cooked fish silage in rations for mink. Two kinds of silage were tested, namely cooked, partly defatted fish silage from Denmark (1976-1977) and cooked, partly defatted silage of filleting scrap from Baltic herring (1977-1978). In both cases sulphuric acid and formic acid were used as preserving agents.

The experiments were performed as group trials with growing mink kits from the beginning of July to pelting. The main experimental design is shown in Table 1.

Table 1. Experimental design in 1976-1978.

| Year | 1976 | | | 1977 | | | 1978 | |
|--|----------------------|-------------------------------|----------------------------------|--|--|---|----------------------|--|
| No. of kits per group | 30 ♂♂ + 30 ♀♀ pastel | | | 30 ♂♂ + 30 ♀♀ dark and 25 ♂♂ + 25 ♀♀ sapphire | | | 30 ♂♂ + 30 ♀♀ pastel | |
| Group No. | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 |
| Feeding | Control diet | Danish silage + 4 % fish-meal | Danish silage + 4 % soybean-meal | Control diet | Danish silage | Filleting scrap silage | Control diet | Filleting scrap silage |
| Silage, %: | | | | | | | | |
| Exp.start- -Aug. 31 | - | 15 | 15 | - | 15 | 10 | - | 15 |
| Sept. 1- -pelting | - | 20 | 20 | - | 20 | 15 | - | 20 |
| Feedstuffs partly replaced with silage | / | Cod offal | Cod offal | / | Cod offal, Baltic herring, filleting scrap from Baltic herring | Baltic herring, filleting scrap from Baltic herring | | Cod offal, filleting scrap from Baltic herring |

Results

In 1976, pH in the Danish silage never exceeded 3.2 and the hygienic quality was good. In 1977, however, some problems

arose which were ascribed to elevated pH. pH in filleting scrap silage varied between 2.5-3.3 and the hygienic quality was good all over.

The lowest pH in the rations fed was in 1976 5.1, in 1977 5.4 and in 1978 4.9. No neutralization was made. The growth curves for the experimental animals suggested, provided that pH of the rations was not less than 5.4 and the hygienic quality of the silage was good, that the growth rate for silage fed animals was as good as for control animals. In 1977, group 2 showed decreased growth rate from the end of September due to bad hygienic quality of the silage. In 1978, the group fed filleting scrap silage had a period of lowered weight gain from the middle of August to the end of September. The decreased weight gain appeared when pH of the ration was below 5.4 and was on some occasions only 4.9. From the beginning of October to pelting there was a considerable weight gain in this group resulting in nearly the same mean weight at pelting as the control group. The standard deviation in weight in group 2 exceeded that of the control group during most of the experimental period which probably was an effect of different tolerance of the acidic diet among the experimental animals.

Pelt characteristics were rather similar between groups and years with the exception of clots which were more frequent on skins from silage fed animals than on skins from control fed ones.

The effect of storing time and temperature on food consistency was investigated. In mixtures with silage stored at room temperature deterioration in consistency due to hydrolysis was fast during the first 24 hours and thereafter proceeded at a slower rate. The control ration was only slightly worse in consistency after 24 hours, but 48 hours after preparation its consistency was worse than that of the silage containing rations. This was due to decay which had not occurred in the experimental rations since the acidifying effect of the silage acted as short-time preservation. In food mixtures stored at 8-10°C deterioration of consistency due to hydrolysis was less obvious. Neither were there any signs of decomposition in the control ration.

Table 2. Recommendation for maximum use of acid preserved silage in rations for mink.

| Period | Maximum use of silage, % | Lowest pH permitted in the ration |
|------------------|--------------------------|-----------------------------------|
| July | 7 | 5.5 |
| 1-15 Aug. | 15 | 5.4* |
| 15 Aug.-15 Sept. | 15 | 5.4* |
| 16 Sept.-pelting | 20 | 5.4* |
| Pelting-June | 7 | 5.5 |

* If needed, neutralization with $\text{Ca}(\text{OH})_2$

The Swedish recommendation for the use of acid preserved feed-stuffs is designed on the basis of the results of experiments and practical experiences in other countries and the results of these experiments (see Table 2).

Våra Pälsdjur, 1979, 50, 119-120, 122-123, 125.

4 tables, 4 figures, 3 references.

In Swedish.

Authors summary.



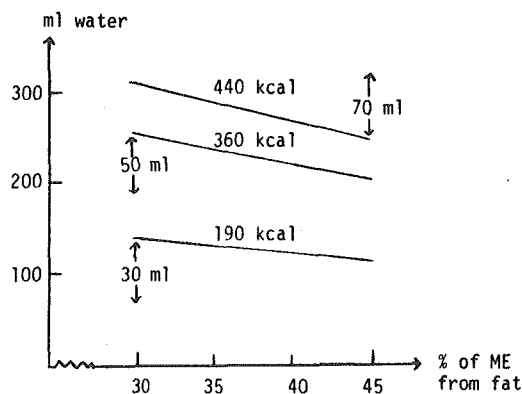
EFFECTS OF REPLACING WET FOOD INGREDIENTS WITH DRIED

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In recent years energy concentration in food mixtures for mink has tended to increase as an effect of more distributed use of fish-silage and dried food ingredients. As shortage of and increasing costs of traditional ingredients tend to become more pronounced, a still more extended use of dried food ingredients is likely to occur. Accordingly, less water will be supplied by the food mixtures. Roughly, mink need 0.7-0.8 ml water per kcal metabolizable energy, which is about 200 ml per day and grown-up male and 160 ml per day and female. By using a conventional wet food mixture with 27 % dry matter it will supply about 85 % of

the water requirement. If the dry matter content is elevated to 33 % the percentage of water supplied by the food mixture diminishes to about 65 % of the requirement. The part of the metabolizable energy derived from fat is also a matter of consequence for water supplementation. Increasing the fat part of the metabolizable energy at constant energy level means lowered water content in the food mixture (see Figure 1).

Figure 1. Water content of food mixtures at constant energy level but increased percentage of metabolizable energy derived from fat.



The water balance can also be affected by the percentage of dry ingredients in the mixture. Usually, dry matter content rises with increasing level of dry ingredients. Meanwhile, water losses by feces can be increased due to lowered digestibility of the food mixture. This is not the case, however, if dried ingredients with high digestibility are used. By using very concentrated rations or rations with high percentage of dry ingredients one should be aware of the effects of this on water supplementation.

Some dried food ingredients with high protein content are available and useful as mink food ingredients (see Table 1). Table 2 is an example of how fresh animal by-products are substituted with such dried ingredients in rations for the periods of 15 July-15 September and 16 September-pelting. As can be seen, the substitutions have given a slight increase in the content of digestible protein in the rations.

The effects of the substitutions on amino-acid composition of the mixtures (described in Table 2) can be seen in Table 3.

Table 1. Nutritive value for mink for some dried feedstuffs with high protein content.

| Feedstuff | DM % | Ashes % | Digestible, g/kg | | | ME, kcal/kg |
|---------------------------|------|---------|------------------|-----|----------------|-------------|
| | | | Protein | Fat | Carbo-hydrates | |
| Fish meal (mink quality) | 93.0 | 12.0 | 615 | 70 | - | 3420 |
| Feather meal (hydrolyzed) | 96.0 | 5.0 | 500 | 23 | - | 2460 |
| Maize gluten meal | 88.0 | 2.1 | 527 | 35 | 61 | 2950 |
| Potato protein | 93.1 | 3.0 | 690 | - | 77 | 3435 |
| Soybean meal (defatted) | 87.0 | 5.6 | 381 | 2 | 83 | 2070 |



Table 2. Fresh animal feedstuffs replaced with dry ingredients in rations for mink 15 July-15 Sept. and 16 Sept.-pelting.

| Feedstuff (%) | 15 July - 15 sept. | | 16 Sept. - pelting | |
|---------------------------------|--------------------|-------|--------------------|-------|
| | I | II | III | IV |
| Fish meal | - | 2 | - | 3 |
| Feather meal | - | - | - | 1 |
| Maize gluten meal | - | 1 | - | 1 |
| Potato protein | - | 2 | - | 2 |
| Cod offal | 25 | 5 | 25 | - |
| Baltic herring | 12 | 12 | 10 | 10 |
| Baltic herring, filleting scrap | 10 | 10 | 8 | 8 |
| Slaughter offal | 12 | 12 | 10 | 10 |
| Poultry waste | 10 | 10 | 8 | 8 |
| Wheat | 5 | 5 | 6 | 6 |
| Barley } Cooked | 2.5 | 2.5 | 3 | 3 |
| Oats } | 2.5 | 2.5 | 3 | 3 |
| Dry matter, % | 25.37 | 25.97 | 25.90 | 27.39 |
| Digestible protein, g/kg | 100.5 | 104.9 | 91.6 | 100.4 |
| ME, kcal/kg | 1035 | 1060 | 1065 | 1115 |
| % of ME from | | | | |
| protein | 44 | 45 | 39 | 41 |
| fat | 36 | 35 | 38 | 36 |
| carbohydrates | 20 | 20 | 23 | 23 |

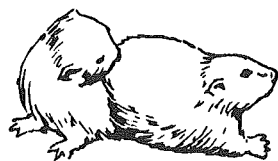
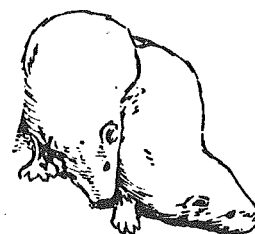


Table 3. Amino-acid content in the rations.

| Amino-acid | Amino-acid, g/100 g protein | | | | Content, g/Mcal | | | |
|----------------------|-----------------------------|-----|-----|-----|-----------------|-----|-----|-----|
| | I | II | III | IV | I | II | III | IV |
| Threonine | 3.6 | 4.0 | 3.6 | 4.1 | 3.5 | 4.0 | 3.1 | 3.7 |
| Valine | 4.6 | 5.3 | 4.6 | 5.5 | 4.5 | 5.2 | 4.0 | 5.0 |
| Isoleucine | 3.6 | 4.1 | 3.6 | 4.3 | 3.5 | 4.1 | 3.1 | 3.8 |
| Leucine | 6.4 | 7.7 | 6.4 | 8.0 | 6.2 | 7.6 | 5.5 | 7.2 |
| Tyrosine | 2.8 | 3.5 | 2.8 | 3.6 | 2.7 | 3.4 | 2.4 | 3.2 |
| Phenylalanine | 3.7 | 4.3 | 3.7 | 4.5 | 3.6 | 4.3 | 3.2 | 4.0 |
| Lysine | 5.2 | 6.4 | 6.0 | 6.2 | 5.1 | 6.3 | 5.2 | 5.6 |
| Histidine | 1.9 | 2.0 | 1.9 | 1.9 | 1.8 | 2.0 | 1.6 | 1.8 |
| Methionine + cystine | 3.4 | 3.7 | 3.4 | 3.9 | 3.3 | 3.7 | 2.9 | 3.5 |
| Tryptophan | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.0 | 1.0 |



Per 100 g protein there are only minute differences. In both cases there is a tendency towards higher content of essential

amino-acids when fresh animal feedstuffs are replaced with dry ingredients. As compared to recommendations for amino-acid content in rations for mink (Glem-Hansen, 1974), there is a slight shortage of histidine in the "conventional" ration for the period of 16 September-pelting. Regarding other essential amino-acids the content is in all cases above recommendations. Provided that there is the same availability for amino-acids in the "alternative" feedstuffs as in the "conventional", the protein quality in the rations II and IV would be at least as good as in the rations I and III.

When deciding about such feedstuff substitutions the effect on the cost of the ration is of great importance. Therefore, the relative costs per kg, per 100 g metabolizable energy and per Mcal for the four mixtures are compared in Table 4. Evidently, cod offal is expensive on protein basis. Slaughter offal and poultry waste are so expensive on protein basis that they must be considered mainly as energy feedstuffs.

Replacing fresh animal feedstuffs with dried has resulted in cheaper rations with as good protein quality as in the original mixtures. Dry matter content has not increased to such a level that it can affect the water balance of the animal.

Table 4. Feedstuff costs (relative) and ration costs.

| Feedstuff/ Ration | Relative cost | | |
|------------------------------------|---------------|----------|---------------------------------|
| | per kg | per Mcal | per 100 g digestible protein |
| Fish meal | 331 | 97 | 54 |
| Feather meal | 275 | 112 | 55 |
| Maize gluten meal | 225 | 76 | 43 |
| Potato protein | 350 | 102 | 51 |
| Cod offal | 100 | 143 | 74 |
| Baltic herring | 88 | 84-55* | 59 |
| Baltic herring, filleting scrap | 44 | 39-30* | 33 |
| Slaughter offal | 100 | 67-49* | 80 |
| Poultry waste | 100 | 64 | 83 |
| Wheat | 125 | 47 | 151 |
| Barley } Cooked | 125 | 48 | 167 |
| Oats | 125 | 48 | 139 |
| ----- | | | |
| Ration: | | | |
| I (15 July-15 Sept.) | 74.5 | 72.0 | 74.1 |
| II " " " " | 70.3 | 66.3 | 67.0 |
| III (16 Sept.-pelting) | 70.3 | 66.0 | 76.7 |
| IV " " " " | 67.3 | 60.4 | 67.0 |

Authors summary.

* According to fatness

Våra Pälldjur, 1979, 50, 158-160, 163.
5 tables, 2 figures, 3 references.
In Swedish.

★ UTILIZATION OF FISH VISCERA. CHEMICAL AND BIOCHEMICAL CHARACTERISTIC OF FISH VISCERA.

(Utnyttelse av fiskeslo. Kjemisk og biokjemisk karakterisering av fiskeslo.)

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Minced cod viscera can be preserved by addition of 0.75% (volume-%) formic acid and 0.75% propionic acid. The pH of this silage is 4.1-4.5.

If the temperature is raised to about 30° C, the native enzymes of the material leads to quick tissue degradation (autolysis).

The autolysate can be separated in a lipid phase, an aqueous soluble phase and a sediment of insoluble material.

Most of the protein of the silage is released into the aqueous phase. On dry matter basis the aqueous phase contains about 80% protein and less than 0.5% lipid.

Mixtures of dried plant material and the aqueous soluble phase can be stored for months without being attacked by microorganisms. Such combination products or even the liquid silage (if defatted) can be used as animal feed without being dried or neutralized.

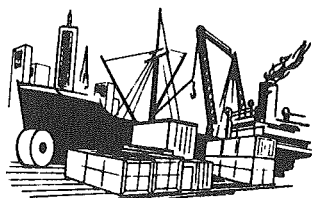
Fiskeriteknologisk Forskningsinstitutt, Tromsø. 1976.

Report No. 663.2-4-2. (36 pages).

23 references, 16 figs., 3 tables.

In Norwegian with English summary and subtitles.

Authors summary.



★ PROPERTIES OF A PROPIONIC ACID/FORMIC ACID PRESERVED
SILAGE OF COD VISCERA.

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Protein of cod viscera has an amino acid composition which resembles that of cod muscle. A fully preserved silage of minced viscera is obtained by addition of 0.75% (v/w) propionic acid and 0.75% (v/w) formic acid. After a few days of autolysis at 27° C, the silage can be separated into three phases: a lipid phase, an aqueous soluble phase and a sediment. The aqueous phase, which contains most of the protein and very little fat, is suitable for animal feed. Moist mixtures of silage and barley straw meal stored at room temperature do not deteriorate by microbial attack.

J. Sci. Fd. Agric. 1977, 28, 647-653.

5 fig., 2 tables, 15 references.

In English.

Authors summary.

★ PRESERVATION OF FISH VISCERA.
(Ensilering av fiskeslo).

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Fish viscera represents a major environmental problem for the fish industry. The viscera spoils quickly after the fish has been gutted, thereby reducing possible utilization as feedstuff in a mink farming, in trout or salmon farming, or as raw material in fishmeal production. Only a small part of the fish viscera is used in these ways.

This report describes the industrial process of producing fish

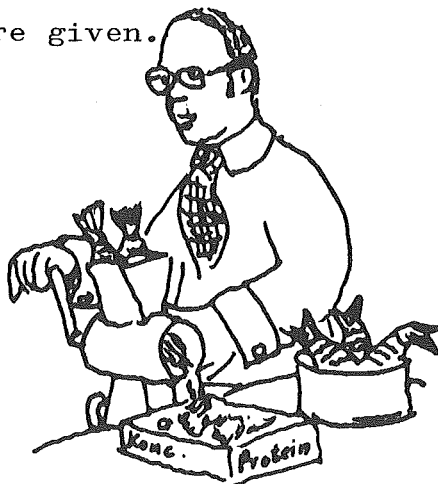
viscera silage, following the method of Raa and Gilberg (1975) for silaging fish viscera, using a mixture of equal amount of propionic- and formic acid. By this method fish viscera silage can be stored for months at the fish factories. A following report will describe the subsequent processing of fish viscera silage into a feedstuff and the utilization of this feedstuff.

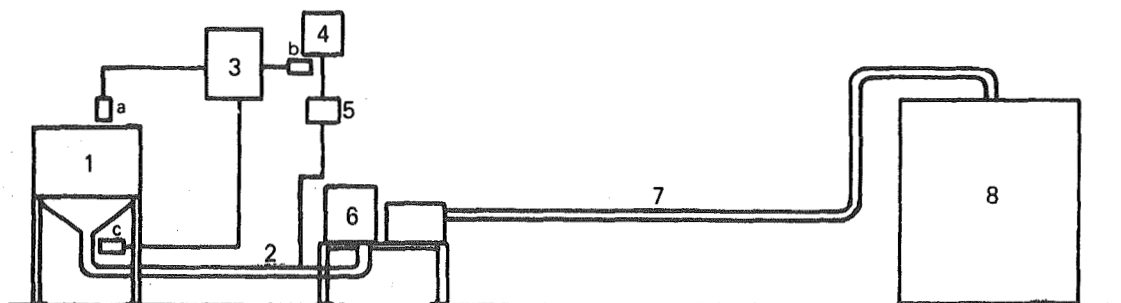
The fish viscera, without storage prior to silaging, is minced and added 1.5% (v/v) of the mixture of propionic- and formic-acid. The mincing can be achieved either by a chopper used for mincing fish heads (e.g. Palmia or Wolfking) or by a combined mincer and monopump (e.g. Mutrator).

The latter equipment can be used only for fish viscera, and not for fish heads or backs. These bony materials must be minced separately in a chopper. The addition of the acids and the subsequent mixing can be carried out manually, semiautomatic or automatic. All of these processes have been tried out.

Usually the fish factories have a chopper, and the total investment for the manual process, including storage tanks will then be N.kr.40.000,-. For the fully automatic process, also including the purchase of a Mutrator, the investment will be N. kr. 113.000,-. The processing costs have been calculated to N.kr. 0,30/kg silage for the manual process, silaging 50 tons of fish viscera per year. For the fully automatic process the processing cost will be N.kr. 0,25/kg silage when 200 tons of silage are produced per year.

The technical specification for the equipment in the three different processes are given.





- 1 Samlekar (Fish viscera container).
 2 Sugeledning (Mains).
 3 El. skap (Electrical connections).
 4 Syrebeholder (Acid container).
 5 Syredoseringspumpe (Acid dispenser, pump).
 6 Kvern/pumpeenhet (Mincing unit, Mutrator).
 7 Trykkledning (Mains).
 8 Lager tank (Storage tanks).
 a, b, c. Nivåbrytere (Level switches)

Fig. 17 Eks. på oppbygging av automatisk ensileringsanlegg.
 Layout of the automatic silaging process.

Fiskeriteknologisk Forskningsinstitut, Tromsø. 1978.
 Report No. 663. 2-4-3. (40 pages). ISBN 82-7251-036-7.
 30 figs., 6 references.
 In Norwegian with English summary.

Authors summary.

★ FISH SILAGE; PREPARATION, MICROBIAL AND CHEMICAL STABILITY, AND NUTRITIONAL VALUE IN FEEDING EXPERIMENTS WITH CHICKS.

Rachmat Arufudin, Putu Kompiang, Jan Raa, Research Institute of Fishery Technology, Jakarta, Indonesia.

1. The fish species in the by-catch on shrimp trawlers differ markedly in chemical composition. The nutritional value of silage, or fish meal, produced from the by-catch may therefore be variable, depending on the relative distribution of lean and fatty fishes in the catch. It is in particular the lipid content of a silage which puts the limit of the quantity which can be used in diets for animals.
2. By-catch fishes could be preserved satisfactory with 3% (v/w) of a 50:50 mixture of propionic acid and formic acid

or with 3% (v/w) of formic acid alone. In the latter case the silage was often infected by molds, a more serious problem when this silage was absorbed in a dry carbohydrate meal. The propionic acid/formic acid silage remained non-infected by molds, even when mixed with carbohydrate and stored moist in open containers and infected on purpose by Aspergillus flavus.

3. If fish meal is to be produced of the by-catch
 - a) the raw material can be kept non-preserved for not more than 30 hours, before it becomes technically impossible to separate a cake from the liquid by conventional pressing.
 - b) Almost 40% of the protein is lost if the pressliquid is discarded, and the remaining cake yields a fish meal low in protein and high in lipid and ash.
 - c) The press-liquid becomes toxic to chicks if the fish is left to spoil 24 hours prior to boiling and pressing.
4. Fish silage were too hygroscopic to dry in the sun, unless they were mixed with a carbohydrate meal. Silages, or moist mixtures of silage and carbohydrate absorbants, could be left in open troughs without fly infestation, due to the repellent action of the acidic vapours.
5. Press-cake of fresh fish can be sundried without too serious degree of fly infestation, but not the press-liquid. Partly spoiled fish destroyed completely when left to dry in the sun, due to microbial activity and fly worms.
6. The use of organic acids (acetic acid, propionic acid) to prevent fly infestation and spoilage during sundrying of fish should be followed up, to generate methods to preserve fish for human consumption. Analysis of residual levels of acids are then necessary.
7. The amino acids were stable in silages of by-catch fish (tryptophane has not yet been determined) and the amount of ammonia produced after 21 days at 30° C corresponded to 1.3 and 1.8% of the total Kjeldahl nitrogen in a formic acid and a propionic acid/formic acid silage, respectively. ↴

8. Fish meal of fresh fish, with and without press-liquid, as well as the press-cake of 24 hours spoiled fish, were good sources of protein for the chicks. The press-liquid of the spoiled fish was toxic.
9. Diets based on fish silage as the protein source had a poor nutritional value; both feed gain and the efficiency of feed conversion was lower than for the fish meal diet. Boiling of the silage significantly improved the feed conversion efficiency of the silage diets, but did not affect the feed consumption. Addition of thiamine to the silage diets did not affect significantly neither the weight gain nor the feed conversion efficiency. Enzymatic reactions in the silage are apparently not responsible for the low palatability of the silage diets, since a 10 days silage of boiled fresh fish had the same nutritional value as a silage boiled after 10 days of storage.
10. The silages and the silage diets had a pungent and astringent taste, which may have caused the low feed intake. The chemical nature of the unpleasant taste is yet uncertain, but it seems to be chemically transformed lipids, mainly.
11. Sardines could be preserved by adding 2.5-3% (v/w) of propionic acid/formic acid (1/1). Acid addition caused an efficient extrusion of the body oil, which could be skimmed of the surface. Even after 13 days at 30° C this oil contained less than 1.4% free fatty acids.

Acid addition not only preserves the fish, but also facilitate the extrusion of a high quality oil. The use of the press-cake for human food should be investigated.

12. Fish can be preserved for a limited length of time by lactic acid bacterial fermentation, if a carbohydrate source is added together with a starter culture of bacteria. Selective agents like organic acids, present in locally available plants like tamrind, may improve this preservation. The method is a noteworthy alternative in communities where money outlay has to be kept low in order to save the

resources and the products for own consumption.

There is still a need of experimentation to come up with practical methods which are applicable to various circumstances.

Preliminary stenciled report. (29 pages).

20 references, 10 tables, 4 figs.

Authors summary.

★ ACID PRESERVATION OF FISH.

(Syrekonservering av fórfisk).

Erland Austreng, Alf E. Andersen, Anders Skrede, Institutt for fjørfe og pelsdyr, Norges Landbrukshøgskole, 1432 Ås-NLH, Norway.

The stability of grounded fish treated with 30 different combinations of acids is examined. Five of the acid combinations were also examined in mixes of 95 percent fish and 5% dried snitzels of sugarbeet. The effectiveness of preserving thawed deepfrozen fish was also investigated. The used acids were sulphuric acid (S), acetic acid (E), and formic acid (M). All mixes were added sorbic acid and antioxidant.

Except the mixes containing dried sugar beet snitzels all the mixes in few days got at liquid consistence. This liquidization was fastest with the smallest acid addition. Use of dried snitzels of sugar beets caused a less liquid and a grainy consistence.

All the silages containing formic acid were stable during the experimental period (11 months). Also the silage containing the weakest acid amount e.g. 1.5% S + 0.5% M or 1.5% M was not disturbed. The combination of S + E was first effective with

higher concentrations as 2.5% S + 0.5% E or 2.0% S + 1% E. 2.5% sulphuric acid alone gave also satisfactory results. The frozen and thawed fish had to be added 3.0% S + 0.5% E giving an acceptable stability.

Norsk Fiskeoppdrett, Vol. 4, 1979, 4-7, No.1.

2 figs., 4 tables, 6 references.

In Norwegian.

Authors summary translated
by Gunnar Jørgensen.



THE STORAGE OF COMPOSED FOODS FOR RATS AND MINKS AFTER
ADDITION OF PRESERVING AGENTS. MICROBIOLOGICAL
EVOLUTION.

(Stockage d'aliments composés pour rats et visons
après addition d'agents conservateurs.
Evolution microbiologique).

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J. Rougeot, Laboratoire de biophysique des aliments et de
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It is difficult to preserve foods for small animals, i.e. pellets for rats and mashes for minks. For example, pellets for rats often have such a high water content (19 p. 100) that a rapid fungic proliferation may take place. In minks mashes, with a water content of about 50 to 55 p. 100 the bacterial and fungic germs multiply actively.

In order to prevent with these disadvantages, we propose the addition of sorbic acid, potassium sorbate, propionic acid and sodium propionate. These are antimicrobial and non toxic preserving agents for warm-blood animals.

The present study deals with the microfloral behaviour in the chick pellets and mashes or in the products after addition of preserving agents. This allows to assess the action and the efficiency of the process.

From the very beginning of the treatment, sorbic acid has a depressive effect upon the microbial flora of the pellets. This action is more marked with regard to bacteria and especially unsporulated bacteria than moulds, among which *Mucor* are more sensitive than *Penicillium* and *Aspergillus*.

The duration of this depressive effect was determined according to the quantity of sorbic acid used. Moulds grew on the pellets only.

It was then possible to develop an isothermal storage diagram (23° C) from the evolution curves of the pollution level. This diagram shows the recommended amount of sorbic acid for the desired storage time.

Compared to sorbic acid, potassium sorbate and sodium propionate are more efficient under our experimental conditions. The antimicrobial action of sorbic acid is intensified by propionic acid as a synergist.

In the case of mashes for minks, propionic acid has a higher inhibiting effect than sorbic acid on the multiplication of bacteria other than *Lactobacillus*. All preserving agents lower the mold germ content of the mashes and keep it at a low level. In the same time, propionic acid seems to have a stimulating effect on food consumption by minks.

Ann. Technol. Agric. 1977, 26 (I), 59-77.

9 figs., 16 references.

In French with summaries in English and French.

Authors summary.

★ TOXIN PRODUCTION BY CLOSTRIDIUM BOTULINUM TYPE E IN FRESH HERRING IN RELATION TO THE MEASURED OXIDATION REDUCTION POTENTIAL (Eh).

H.H. Huss, I. Schæffer, E. Rye Petersen, D.C. Cann,
Technological Laboratory, Ministry of Fisheries, Technical
University, DK 2800 Lyngby, Denmark.

Recent work has shown high positive oxidation-reduction potential (Eh) values in fresh fish flesh, whereas strongly reducing conditions exist in fish viscera and spoiled fish flesh. The present study has demonstrated that this difference in measured Eh does not significantly influence growth and toxin production by *Cl. botulinum* type E. In comparison, storage temperature and the spore load in fish markedly influence toxin production. The public health significance of rapid toxin formation and high toxin titers demonstrated in ungutted fish is pointed out.

| Sample examined | Site of inoculation | Storage temp. | Days of storage | | | | | | | | | | |
|----------------------------|---------------------|---------------|--------------------|-------|-------|-------|-------|------|------|------|------|------|------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| gutted fish | muscle | 15° | diagonally hatched | black | black | black | black | NT | NT | NT | NT | NT | NT |
| | | 10° | open | open | open | open | open | open | open | open | open | open | open |
| whole ungutted fish | viscera | 15° | diagonally hatched | black | black | black | black | NT | NT | NT | NT | NT | NT |
| | | 10° | NT | open | open | open | open | open | open | open | open | open | open |
| fillets from ungutted fish | viscera | 15° | open | black | black | black | black | NT | NT | NT | NT | NT | NT |
| | | 10° | NT | open | open | open | open | open | open | open | open | open | open |

Fig. 1. Toxin production in raw herring and herring viscera inoculated with 10^2 g^{-1} spores of *Cl. botulinum* type E. Open Area, no toxic samples; diagonally hatched area, one of two samples toxic; black area, two samples toxic. NT: not tested.

Nord. Vet.-Med. 1979, 31, 81-86.

1 table, 3 figs., 14 references.

In English with summaries in English and Danish.

Authors summary.



Original Report.

★ SOME CAUSES OF LOSS OF MINK IN THE POSTNATAL STADIUM.

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Zentralstelle der veterinären Entseuchungsinstitute Prag
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The fact that a high economy in mink breeding is influenced by the number of bred and pelted animals of a female is well known in practical mink farming. The average number of offspring of a female is in common too low and amount often only to 3 kits per female. Udris (1970) stated for example 5.22 kits per female, who has born, Kirk (1963) 4.8, Akuratov (1973) as well as Wojtowiczowa and Wolinski (1969) 4.37 kits per mated female and 5.34 kits per female, who had born. By Mühl and Lölinger the number lies on 2.8 - 5.34 kits per female.

At the same time it is well known, that the reproduction ability of a minkfemale is very high. The number of kits per female can be up to 10 or more. Of that you can see, that you have to use this great reproductionability, which is one of the limiting factors for getting a better economy and you have to do your best to increase the average number of kits per female.

As well our (Konrád 1968, Kukla and Dohnalova 1972) as foreign (Udris 1970, Mühl and Lölinger 1977) experience state that the most critical period as far as the number of kits produced is concerned, is the first part of the postnatal life more specific the first two weeks of it.

In the year of 1968 we told on the VI congress in the Section

for Smaller Animals Diseases and also in details in the periodical "Kleintierpraxis" in general about the veterinary medical problems by the loss of kits of furbearing animals in CSSR (Konrád 1968).

To look at the causes for loss of minkkits in the first week of post partum, we have made our experimental plan directed at the problems about the health in mink breeding. Our research lean on the patomorphological post mortem examination of 98 minkkits and the microbiologically examination of 83 minkkits, and they were examined before 2 hours had gone from the time of death. These examinations were made in co-operation with the Institute of pathological morphologi and microbiologi.

The results of the experiment confirmed many interesting facts, which have direct meaning for the breeding practise. Of the 98 dissected kits were the highest percentage stillborn kits (21.9%), (Atelectasis pulmonum). The second largest group with pathological changes was hyperaemie of the liver (16.1%), which together with fatty liver (9.5%) gives a sum of 25.6% of the loss immediately after the birth. Other diseases which were found at the dissection shows a much lower percentage of dystrophie of the heartmuscle (7.3%), enteritis (7.3%) and diseases of the respiratorial system (hyperaemie of the lungs and pneumonia) and small haemorrhages in the renal cortex (9.5%). Other diseases (hyperaemie of the kidney, infarcts of the kidney, dilation of the heartmuscle and acute pneumonia og the bronchies) lies expressed in percentage in average only around 3%. In contrast to this nearly around 6% (5.8%) of the kits did not show any morphological changes at all.

The analyses of these diseases have shown that the biggest part is metabolic disturbances and circulation disturbances.

An extraordinary high percentage of stillborn kits, which together with anaemiae (3.7%) and kits where no pathomorphological changes can be seen, makes up the loss immediately after the birth or shortly after this a percentage of 31.4%.

The reasons for this must be the insufficient condition of the female as far as the preparation for the reproduction period is concerned, but mainly it must be the genetic potentials, lactation capacity and nutrition. It is factors, which for a great deal is influenced by the breeder and his knowledge.

We have drawn the conclusions on account of the weight differences of the post partum died kits, which were weighed immediately after death. These weight differences have shown, that the average body volume in this experiment for all of the examined kits only amounted to 6.28 g, which was not even the lower limit of the weight increase of normal kits (the normal kits amounted to a body volume of 8.0-12.0 g, which was also found by Frindt (1973), Udris (1970) a.o.

The analysis, which was made, showed about the weight experiment that up to 20.7% of the kits, who died, was 3.5 g (lowest limit) to 5 g smaller of body volume and in the whole complex of the weight experiment it was only 48.3% of the kits of which the body volume was normal.

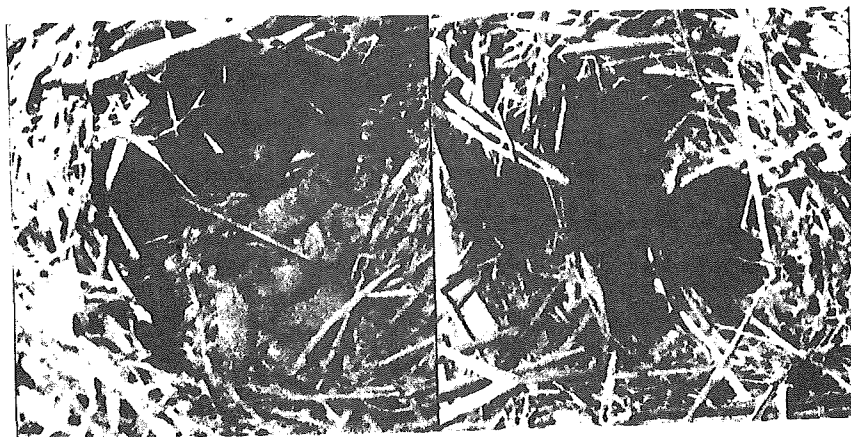
The results of the microbiological experiments of 83 kits, which had died immediately after the birth, showed that in 73.4% the bacterial composition was so that it could have been responsible for the death. But it was not so. In these cases 13.3% were represented by *E. coli* and *Proteus vulgaris* and this is normal. Also the results of the microbiological examinations confirm that the biggest part of the kits, who died shortly after birth not any case can be caused by their ethiologi after an infection by bacterial agents, which is often thought by the breeders.

You can therefore say that the factors, which as reasons for loss of kits immediately of shortly after the birth, plays no role. Not once in the examination you can say that the loss was caused by a virus agents. The omitted mainfactors of the losses of mink kits in the postnatal stadium are as follow:

- A) Causes, which are in the complex of metabolic disturbances and which make itself usefull as well through the nursing female as individual by the affected kit, can be a complex of as well qualitative as quantitative factors (insufficient nutrition, lack of resorptionability and further digestion of colostrum and milk, insufficient consumption of colostrum as a result of an exhausting birth, consumption of colostrum too late, which then restrain or spoil the further lactation, subcooling of the body). In contrast the cooling of the kit itself, which as deathreason has pneumonia, is in average rather low at 2.2%.
- B) Causes of a rather broad area, which include 31.4% of all losses and which can be summarized as a complex of the injurious preventive medicine and breeding and taking care work in the minkbreeding joined with the choice of breeding animals and breeding technology, dietic questions, and so on, can show.

In the experiment with the purpose to state the causes of the loss of minkkits in the postnatal stadium, it was found that it is necessary with at better veterinary knowledge and care and by that as well decrease the loss of minkkits as increase the average number of kits per female.

Translated by Margit Lykkeberg.



ON MORPHOLOGY AND BIOCHEMISTRY OF BLOOD IN SOME MUSTELIDAE
(Beiträge zur Morphologie und Biochemie des Blutes einiger
Musteliden)

★ I. VARIOUS TECHNIQUES OF BLOOD SAMPLING IN THE CONTEXT OF
CERTAIN MUSTELIDS UNDER SPECIAL CONSIDERATION OF USE OF
A TISSUE ADHESIVE "Fimomed"

(1. Mitteilung: Blutentnahmetechniken bei einigen Musteliden
unter besonderer Berücksichtigung des Einsatzes des Ge-
webeklebstoffes "Fimomed")

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A problem which has so far been unsolved is that of finding a simple, standardized method for sampling the blood from mustelids and martes species. This point is proved by the fact that such a wide range of methods have been applied since animals were first bred for their fur. It is now becoming increasingly necessary, in order to answer the many scientific and practical questions raised relating to mink research, to develop a suitable method whereby the blood or plasma can be obtained in sufficient quantity and of the right quality. There is no doubt at all that the method of sampling has a considerable influence on the exact production and reproducibility of haematological and clinical chemical analysis data.

As the technical literature available does not give any comprehensive information on the various possibilities of sampling the blood of mustelids and martes species, the publication under reference presents a detailed survey of all the methods of blood collection applied thus far. The results of this study are shown in the two tables. A critical evaluation revealed that the methods used to date do not come up to the required standards for haematology, enzymatology and clinical chemistry.

Bearing the above points in mind, tests were carried out using

Table 3: Advantages and disadvantages as well as the practical application of the tested blood collection methods with certain mustelids

| Method of blood collection | Advantages | Disadvantages | Practical application |
|---|---|--|--|
| Cardio puncture | <ul style="list-style-type: none"> - no injury to fur - repeated collection of blood possible - collection of blood only takes 2 - 3 minutes | <ul style="list-style-type: none"> - sedation or anaesthesia - blood is not of definable form - unreliability of method, danger to animal | <ul style="list-style-type: none"> - controversial opinions as to whether anaesthetic should be used or not |
| Amputation of tail tip | <ul style="list-style-type: none"> - no narcosis - blood collection can be repeated - involves little work | <ul style="list-style-type: none"> - mixture of venous and arterial blood obtained - collection takes up to 10 minutes - injury to fur - partly haemolytic plasma or serum - injury treatment necessary in some cases | <ul style="list-style-type: none"> - simple technical application - application possible only when haemolytic influence can be disregarded - multi-screening only possible under limited conditions |
| Cutting of claw | <ul style="list-style-type: none"> - no narcosis - no injury to fur - involves least work - no wound treatment necessary | <ul style="list-style-type: none"> - capillary blood obtained - only small quantity of blood - partly haemolytic plasma or serum | <ul style="list-style-type: none"> - under farm conditions this is choice method when only a few drops of blood are required |
| Puncture of external jugular vein | <ul style="list-style-type: none"> - definite form of venous blood obtained - possible to obtain non-haemolytic additive-free plasma - blood collection can be repeated - i.v. injection possible | <ul style="list-style-type: none"> - narcosis necessary - surgical effort - injury to fur - blood quantity too small | <ul style="list-style-type: none"> - under certain conditions for pharmacological or toxicological multi-screening |
| Bleeding by means of catheterisation of abdominal aorta * | <ul style="list-style-type: none"> - definite form of arterial blood obtained in large quantities (40 cm³) from adult animals - possible to obtain non-haemolytic additive-free plasma - no injury to fur | <ul style="list-style-type: none"> - narcosis necessary - surgical effort - loss of animal | <ul style="list-style-type: none"> - under laboratory conditions this is choice method for multi-screening |

the following blood collection methods, the results of which are reported in this paper:

Cardio puncture, amputation of tail tip, claw cutting, incision of the aural vein, puncture of the jugular or femoral vein, and catheterisation of the abdominal aorta. Reference is made to details of the use of all techniques, characteristics, advantages and potential setbacks, and the preferable use of some of the tested methods to collect blood from *Mustela* and *Martes* species (cf also tab. 3).

Particular reference is made to the puncture of the external jugular vein and the newly developed method of catheterisation of the abdominal aorta. Biochemical, pharmacological and toxicological follow-up checks may be feasible under certain conditions following surgical exposure of the external jugular vein. Blood collection from the abdominal aorta may be helpful in obtaining non-haemolytic, bacteria-free and additive-free plasma for biochemical multi-screening.

The use of "Fimomed" (n-butylcyano-acrylate), a tissue adhesive, may help to reduce efforts in terms of time and material and, consequently, rationalise veterinary surgical action as a whole, provided that the conditions for its application are observed. The skin adhesive is properly applicable to skin lesions of mustelids. A combination of suturing with adhesive should be used to close laparotomy wounds for better mechanical strength of the abdominal wall. Possible applications of "Fimomed" should be tested with other species as well.

Author's supplement to his publication

The new tissue adhesive has been applied successfully in human medicine for years in the seamless surgery of blood vessels.

These positive results have not yet been achieved in the case of minks due to the fact that the technique has not been developed to a satisfactory standard. Further experiments showed that instead of using a catheter a canula can be used for the puncture of the abdominal aorta or V. cava caudalis. These ways life of the animal can be preserved using only minimum surgical effort and in addition further blood samples can be taken after the animal's complete recovery.



Arch. exper. Vet.-med. Leipzig, 1978, 32 (5), 727 - 736.
3 tables, 53 references

Authors introduction and abstract and one original table

This report has also been abstracted in SCIENTIFUR Vol. 3, No.2,
but this abstract is more complete.

The Editor.

- ★ II. EFFECTS OF VARIOUS BLOOD SAMPLING TECHNIQUES UPON CERTAIN
PLASMA ENZYME ACTIVITIES IN MINK (*Mustela vison* Schreber, 1777)
- (2. Mitteilung: Einfluß verschiedener Blutentnahmetechniken auf
einige Plasmaenzymaktivitäten vom Nerz (*Mustela vison*
Schreber, 1777))

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Blood sampling by catheterisation of the abdominal aorta to test
plasma haemoglobin and various plasma enzyme activities was
compared with two other blood sampling techniques and their
application to farm-kept minks under general anaesthesia, cardiac
puncture and tail-tip amputation. The plasma haemoglobin values
in plasma obtained from the abdominal aorta were significantly
lower than those recorded from the two other blood sampling tech-
niques, which applied to plasma enzyme activities, as well.
Those findings were equal for males and females. The plasma
enzyme activities tested were glutamate oxalo-acetate transaminase,
glutamate-pyruvate transaminase, lactate dehydrogenase, α -hydroxy-
butyrate dehydrogenase, and malic dehydrogenase.

Some plasma enzyme activities were tested from a random sample
of 164 animals for sex-dependence (88 males and 76 non-pregnant
unserved females), with no consideration being given to blood
sampling techniques. The standards or physiological indices
derived from those tests are reported.

Table 1: Plasma haemoglobin values (g/100 ml) and plasma enzyme activities (mU/ml) in females minks under special consideration of effects of various blood sampling techniques

| Number of animal | n = 44 | n = 19 | | n = 22 | |
|------------------------|---|-----------------------|------------|-------------------------|------------|
| Parameter | catheteri- sation of the abdominal aorta | cardiac puncture | α^1 | tail-tip amputation | α^1 |
| Zyan-Hb | 0,04 0,02 0,004 | 0,11 0,02 0,002 | +++ | 0,092 0,009 0,002 | +++ |
| GOT | 44,9 15,4 2,8 | 70,3 28,3 6,5 | +++ | 54,7 22,2 4,7 | +++ |
| GPT | 48,5 16,5 3,0 | 66,9 23,7 5,4 | +++ | 56,8 24,4 5,2 | ++ |
| GOT/GPT (De Rhitis) | 0,94 0,43 0,08 | 1,07 0,34 0,08 | ++ | 1,14 0,69 0,15 | +++ |
| LDH | 232,9 31,8 9,5 | 323,0 75,4 17,3 | +++ | 287,0 28,7 6,1 | + |
| LDH ₁ | 131,8 21,0 3,8 | 205,7 50,9 11,7 | +++ | 179,0 40,1 8,6 | +++ |
| LDH ₁ /LDH | 0,52 0,20 0,09 | 0,65 0,91 0,04 | + | 0,62 0,19 0,04 | +++ |
| MDH | 464,8 134,6 25,9 | - | - | 738,8 54,8 10,7 | +++ |

¹Irrtumswahrscheinlichkeit für signifikante Unterschiede zur Blutentnahme aus der Aorta abdominalis nach dem χ -Test.

Zeichenerklärung: + = zweiseitig gesichert α = 5 %;
 ++ = zweiseitig gesichert α = 2 %
 +++ = zweiseitig gesichert α = 1 %

Table 2: Plasma haemoglobin values (g/100 ml) and plasma enzyme activities (mU/ml) in males minks under special consideration of effects of various blood sampling techniques

| Number of animal | n = 32 | | | n = 22 | | | | | | | |
|-----------------------|---|-------|-------|---------------------|------------|------------------------|------------|-------|------|----|-----|
| | catheteri- sation of the abdominal aorta | | | cardiac puncture | α^1 | tail-tip amputation | α^1 | | | | |
| Zyan-Hb | 0,047 | 0,026 | 0,005 | 0,090 | 0,02 | 0,02 | 0,004 | +++ | +++ | | |
| GOT | 43,7 | 12,9 | 2,4 | 51,8 | 21,0 | 4,5 | 48,7 | 24,4 | 5,2 | ++ | + |
| GPT | 43,6 | 16,8 | 3,1 | 66,4 | 33,7 | 7,1 | 49,9 | 16,3 | 3,5 | ++ | ++ |
| GOT/GPT | 1,16 | 0,46 | 0,01 | 0,87 | 0,28 | 0,06 | 1,07 | 0,46 | 0,10 | - | - |
| LDH | 228,9 | 57,5 | 10,5 | 275,9 | 74,2 | 15,8 | 270,6 | 22,2 | 4,7 | ++ | + |
| LDH ₁ | 124,9 | 30,4 | 5,5 | 154,8 | 33,1 | 7,1 | 174,5 | 38,4 | 8,2 | ++ | +++ |
| LDH ₁ /LDH | 0,52 | 0,20 | 0,04 | 0,46 | 0,04 | 0,009 | 0,64 | 0,16 | 0,03 | - | ++ |
| MDH | 325,2 | 77,6 | 13,7 | - | - | - | 541,9 | 178,4 | 35,6 | - | + |

¹Irrtumswahrscheinlichkeit für signifikante Unterschiede zur Blutentnahme aus der Aorta abdominalis nach dem χ -Test.

Zeichenerklärung: + = zweiseitig gesichert α = 5 %
 ++ = zweiseitig gesichert α = 2 %
 +++ = zweiseitig gesichert α = 1 %

★ CATARACT AND IRIDOCYCLITIS IN MINK.

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Ocular lesions are seldom observed in mink (Løliger 1970). The intention of this communication is to report briefly on the occurrence of cataract and iridocyclitis in a comparatively large number of mink in a district in northern Norway; the total number of affected animals is not known, however, since the disease occurred over several years as scattered cases in several farms receiving food from a central feed plant. The ocular lesions, with varying degrees of opacity of the lens (Fig. 1), were sometimes unilateral, although bilateral involvement was not uncommon. The disease seemed to progress quite slowly, over several months. Severely affected animals appeared to be blind.

The feed did not differ much from that used in other districts in Norway; supplementation of large doses of vitamins did not seem to influence the course of the disease. The water included in the feed was of poor bacteriological quality and had a remarkably high content of sodium chloride (165 mg/l).

Five affected animals, 4 females and 1 male were placed at the Research Station for Fur Bearing Animals, Heggedal. All attempts to mate them were unsuccessful. Microscopic examination of the eyes revealed advanced lenticular degeneration and deformation, with massive calcium deposits; microorganisms were not detected in sections stained with Gram, Methylene blue or PAS. Bilateral iridocyclitic lesions were also observed, the infiltrating cells being predominantly mononuclear cells, with a preponderance of plasma cells. Some eyes also had anterior synechia and/or incipient infiltration of mononuclear inflammatory cells in the retina and optic nerve.

The aetiological background remains unknown. Cataract may be related to certain deficiencies and exposure to a wide variety of toxic substances (Jubb & Kennedy 1970, Kronevi et al. 1977), and it seems probable that the described ocular lesions were attributable to some, at yet, unknown environmental conditions, possibly toxic agents in the water.

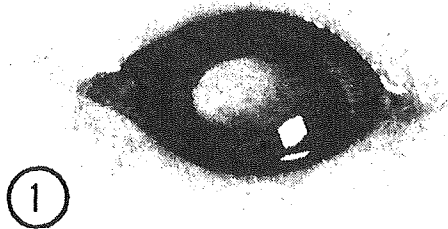


Figure 1. Lenticular opacity in a pearl mink.

Acta vet. scand. 1979, 20, 151-153.

3 figs., 3 references.

In English.

Abstracter: G. Jørgensen.

★ STUDIES ON PHYSIOLOGICAL PROTEINURIA IN THE MINK.
COMPARISON OF PROTEINURIA AND GLOMERULAR FILTRATION
RATE WITH HISTOLOGICAL FINDINGS.

(Untersuchungen zur physiologischen Proteinurie des
Nerzes Vergleich von Proteinurie und glomerulärer
Filtrationsrate mit histologischen Befunden.

R. Müller-Peddinghaus, H. Hackbarth, J. Alt, W. Küpper,
Tierärztliche Hochschule, Kali-Chemie - Pharma,
Experimentelle Pathologie, Hans-Böckler-Allee 20,
D-3000 Hannover 1, Germany.

Various renal physiological parameters were determined in 3 male and 3 female mink ("natural black" mutants). Protein excretion of the male mink is significantly higher than that of the female. After microdisc electrophoresis (Neuhoff 1977) the unconcentrated urine showed 3 peaks, globulins, albumins and main pre-albumins.

The peaks were higher in the males but their distribution in both sexes was similar. After SDS-polyacrylamidegel electrophoresis the X 25 concentrated urine shows macroproteins (MG>albumin), albumin and microproteins (MG<albumin). The relative distribution is similar in the two sexes. After castration, the proteinuria (measured by the Lowry and Biuret methods) increases. In contrast, the amount of protein in both sexes determined by micro-disc electrophoresis decreases. The glomerular filtration rate (^{51}Cr -EDTA-total clearance) in both sexes prior to castration was around 64 ml/min/m²: it was subsequently reduced. Renal plasma flow (^{125}I -hippurate-total clearance) in both sexes was around 110 ml/min/m² before castration and 94 ml/min/m² afterwards. Light and immunofluorescent microscopy revealed mild age-related glomerular lesions in 3 mink which could only conditionally be blamed for the high urinary protein excretion after castration. A sex- or androgen-dependence for the microproteinuria could not be shown by castration. The reason for the physiological microproteinuria in mink remains unexplained.

Zbl. Vet. Med. A. 26, 130-145, 1979.

3 tables, 6 figs., 38 references.

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

Authors summary.



MASS POISONING IN CATTLE, PALM DOVES AND MINK
CAUSED BY THE COCCIDIOSTAT DIBUTYLTIN DILAURATE.

Alan Shlosberg, Michael N. Egyed, Kimron Veterinary Institute,
P.O. Box 12, Bet Dagan, Israel.

Since the discovery of its efficacy, more than 25 years ago, dibutyltin dilaurate (DBTD) has been extensively used as a coccidiostat in the diet of turkeys at the concentration of 375 ppm. DBTD is not used in other than avian species. To the author's knowledge no cases of poisoning by this compound

have been reported. In 1975, two outbreaks of DBTD poisoning, involving 3 species of animals (cattle, palm doves and mink), were recorded in Israel.

Poisoning in mink.

A vitamin-mineral supplement containing about 1700 ppm DBTD, and formulated for turkeys, was inadvertently fed to mink on two farms.

The mink received this supplement at the end of the whelping season. Mothers with large litters became inappetent and started to lose weight several days after receiving the supplement. They all died within 3 weeks. Mothers with small litters, non-whelping females, and males had significant but smaller weight losses with no mortality. The major losses occurred in the kits, the signs seen were inappetance, a mucoid diarrhea, paralysis of the hind-legs, and convulsions and opisthotonus in some cases. Most animals lay in a state of profound depression. All affected kits died within one week of showing illness. Analysis of tissues and the vitamin-mineral supplement revealed excessive tin levels (Table 3). DBTD was found in the supplement.

Table 3. Tin residues (ppm dry weight basis) in mink poisoned by dibutyltin dilaurate.

| Tissue | Normal mink | | | Mink in field poisoning | | | | Mink in experimental poisoning (375 ppm DBTD in diet) | | |
|--------|-------------|----|----|-------------------------|----|-----|------|---|------|------|
| Liver | nd | nd | nd | 16.2 | 3 | 7.6 | 11.4 | 22.8 | 20.1 | 12.6 |
| Kidney | nd | nd | nd | -- | -- | 2.9 | 3.9 | 6.7 | | |
| Brain | nd | nd | nd | 16.1 | -- | -- | -- | -- | 12 | 10.5 |

nd = not detected (less than 0.5 ppm).

Summary.

Poisoning caused by dibutyltin dilaurate (DBTD) was diagnosed in cattle, mink, and palm doves. The accidental addition of a DBTD premix to calf concentrates at levels up to 25000 ppm

on 18 farms caused poisoning in 1000 cattle, of which 171 died and 287 were slaughtered.

High concentrations of tin were found in the cattle tissues and precluded their consumption by humans. Palm doves ingesting concentrates containing 12500 ppm DBTD on one farm were also poisoned and had high concentrations of tin in tissues. Mink were inadvertently fed a vitamin-mineral supplement containing about 1700 ppm DBTD. They appeared the most susceptible of the three species to this compound.

Scientific Report presented at the Scientific Session of the American College of Veterinary Toxicologists, Atlanta, Ga.
July 11, 1977.

3 tables, 17 references.

The original section about mink
+ authors introduction and
summary.

★ ANATOMIC LOCATION AND AGE-RELATED CHANGES IN THE
CHINCHILLA THYMUS.

Robert E. Cartee, Dept. of Animal Science, Coll. of Vet. Med.,
P.O. Box 1071, The University of Tennessee, Knoxville,
TN 37901, USA.

Thymuses of chinchillas varying from 2 weeks to 8 years of age were studied grossly and histologically and were determined to be entirely intrathoracic. Histologically, the amount of actual thymic tissue in the older chinchillas appeared to be less than that in the younger chinchillas. Lymphocyte concentration within medullary centers of the older chinchillas was significantly ($P < 0.05$) less than that of the younger animals. Lymphocytopoietic activity was evident in the oldest animals studied. Body weight and thymic mass (thymus plus adipose tissue) weight

were greater ($P < 0.05$) in the older chinchillas.

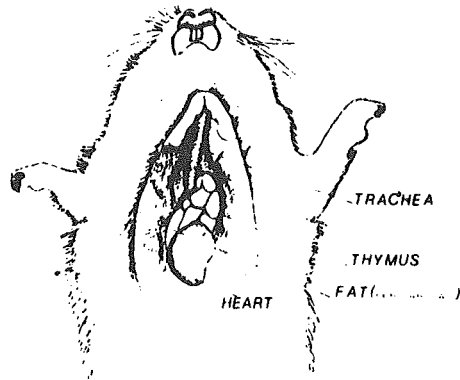


Fig 2—A drawing of the thorax of the chinchilla, showing the location of the thymus and its relationships to other structures

American Journ. of Vet. Research, Vol. 40, 4, 537-540. 1979.
1 table, 2 photos, 2 figs., 19 references.

Authors summary.



THE ORAL VACCINATION OF THE FOX (*VULPES VULPES* L.)
AGAINST RABIES.

(Zur oralen Immunisierung des Fuchses gegen Tollwut).

J.W. Frost, Christiane Kiefert, Staatliches Veterinär-Untersuchungsamt, Deutschordenstrasse 48, D-6000 Frankfurt/M.

Discussed is the possibility of vaccinating foxes orally against rabies, which already is given under laboratory conditions. Various questions, such as choice of the bait, production of a highly effective vaccine, its position and protection within the bait are answered or at least pose no serious problems. Studies on residual pathogenicity of vaccinal virus strains suitable for the oral vaccination, however, demonstrated fatal vaccinal rabies for non-target species which could eventually consume the baits. The present state of innocuity testing of live rabies-virus vaccines is reported with regard to free-living species.

Z. f. Säugetierkunde, 44, 1979, 1, 52-55.

11 references.

In German with abstracts in German and English.

Authors abstract.

★ HELMINTHS IN COYOTES (*CANIS LATRANS* SAY), WOLVES
(*CANIS LUPUS* L.), AND RED FOXES (*VULPES VULPES* L.)
OF SOUTHWESTERN MANITOBA.

W.M. Samuel, S. Ramalingam, L.N. Carbyn, Dept. of Zoology,
University of Alberta, Edmonton, Alta., Canada T6G 2E9.

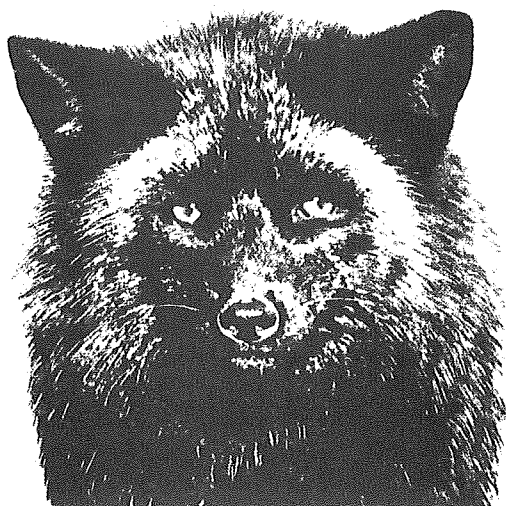
Forty-three coyotes, 12 wolves, and 6 red foxes from an area around Riding Mountain National Park in southwestern Manitoba were examined for parasitic helminths. Eleven, 8, and 5 species were found in coyotes, wolves, and red foxes, respectively. *Alaria marciana*e, *Alaria arisaemoides*, and *Toxascaris leonina* were found in all three host species; *Echinococcus granulosus*, *Taenia hydatigena*, *Uncinaria stenocephala*, and *Oslerus* (*Oslerus*) *osleri* in wolves and coyotes; and *Echinococcus multilocularis* in coyotes and red foxes. *Taenia pisiformis* and *T. leonina* were the most prevalent species in coyotes; *E. multilocularis* and *E. granulosus*, the most numerous. *Echinococcus granulosus* was the most prevalent and numerous species in wolves. *Alaria marciana*e and *T. leonina* were found in all red foxes. The significance of the coyote as a major definitive host of *E. multilocularis* in southwestern Manitoba is discussed.

Canadian Journal of Zoology, Vol. 56, 12, 1978, 2614-2617.

1 table, 22 references.

In English. Abstracts in English and French.

Authors abstract.



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JORDBRUKSFORSKARES

of Agricultural Scientists

FÖRENING**Subsektionen för pälsdjur**

Fur Animal Division

INBJUDER TILL MÖTE DEN 10-12 OKTOBER 1979

Scientific meeting 10th to 12th of
October 1979.Place/ PLATS: HOTELL FARS HATT
KUNGÄLV
SVERIGEProgram:

Environment problems and ethic aspects in fur animal production.

by Åke Qvist, Finland,

Helge Olsen, Denmark,

Leif Sjöblom, Sweden,

Gudbrand Loftsgaard, Norway.

Effects of different pen size.

by Eva Aldén, Sweden.

Virus enteritis and unspecific diarrhoeas in mink.

by Ebba Lund, Denmark,

Tony Kronevi, Norway,

Torbjörn Mejerland, Sweden.

Plasmacytosis control.

by Mogens Hansen, Denmark.

Pneumonia in mink.

by Torbjörn Mejerland, Sweden.

Normal Blood values in mink.

by J.S. Dirch Poulsen, Denmark,
Øyvind Runge Jepsen, Denmark.

Examinations of mink sera.

by Jouni Kangas, Finland.

Bacteriological and mucological examinations of feed and
feed stuffs.

by Tapio Juokslahti, Finland.

Morphometric and chemical measurements of metallic and normal
hair's of mink.

by Outi Lohi, Finland

Experiences from use of acid preserved fish silage in mink
feed.

by Kjeld Hansen, Denmark.

Treatment, storing and transport of cereals.

by Rudolf Sandø Lund, Denmark.

The use of potato products in minkfeeding.

by Niels Glem-Hansen, Denmark.

Results from feeding intensity experiments with mink.

by Anne-Helene Tauson, Sweden.

Experiments with fresh water fish to mink.

by Jaako Mäkelä, Finland.

Dried fish protein for young minkkits.

by Anders Skrede, Norway.

Dry feed as pellets to blue foxes.

by Hans Rimeslåtten, Norway.

Reproduction problems in foxes and mink.

by Ordin Møller, Norway, and/or
Jan Fougner, Norway.

Suggestions for gene symbols for foxes.

by Norodd Nes, Norway.

The mark for breeding mink.

by Allan Olausson, Sweden.

Selectionsmethods in mink breeding.

by Einar Einarsson, Norway.

Orientation about current research on Fur bearing animals in the Scandinavian countries. (Printed papers will be distributed).

Language: Scandinavian languages will be used.

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AND MARKETING
Truro, Nova Scotia B2N 5E3
MEMO

From: Dr. G. G. Finley

To: Dr. Gunnar Joergensen

Date: June 21, 1979

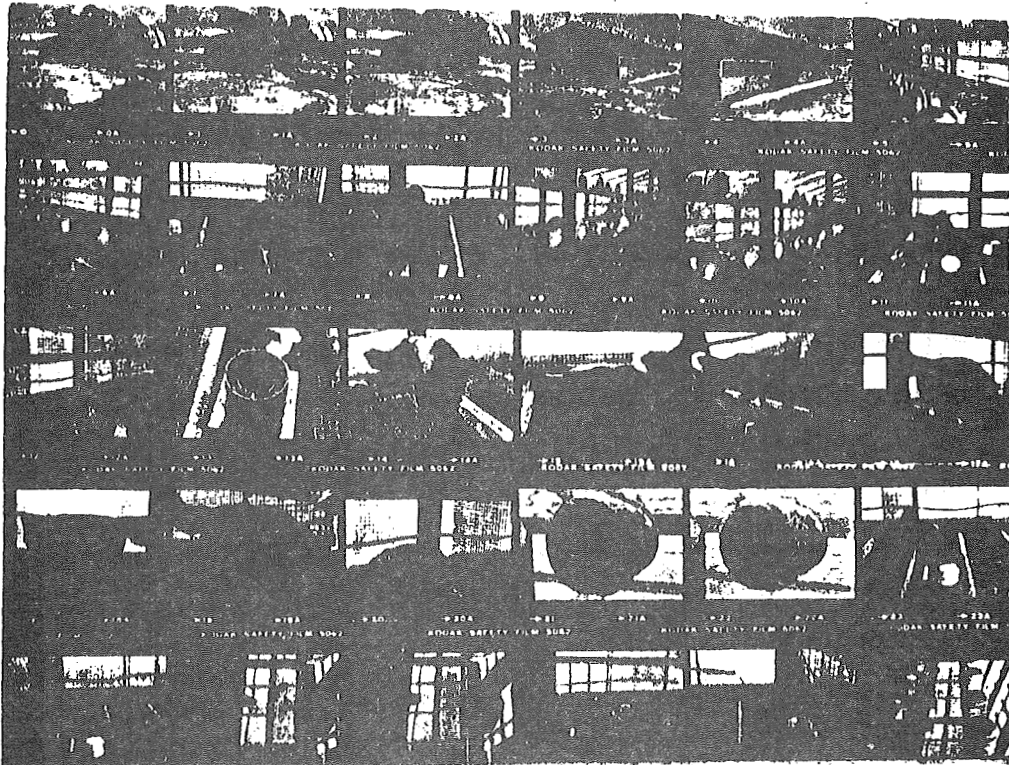
Subject: Fox Production Short Course

Enclosed please find 2 copies of the recently published "Fox Production Short Course", which you may find of interest.

Yours very truly,

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

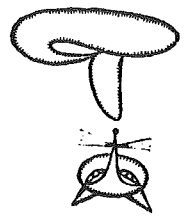
FOX PRODUCTION SHORT COURSE



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| 86 | Licensed Nova Scotia Fox Breeders |
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| 24 | Specimen Submission |
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| 20 | M. Bollert |
| 19 | Registration of Foxes |
| 18 | R. J. Huggard |
| 17 | Capital Grants - Extension Branch |
| 16 | Cecil Johnstone |
| 15 | The Industry Today |
| 14 | M. MacKay, M. Bollert & B. Murray |
| 13 | Skinning, fleshing, boarding and drying |
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A new compilation of research references on mink and foxes.

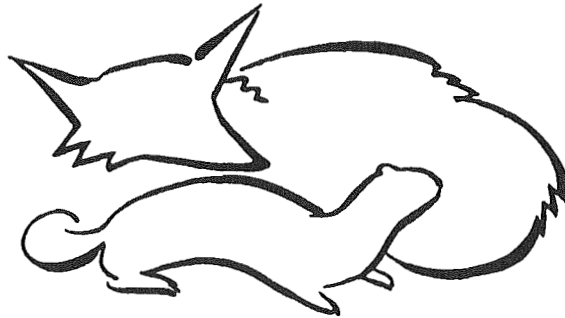
43 titles about mink and 11 about foxes.

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24 May, 1979

Dear Dr. Jorgensen,

... Thank you for your letter of 26 March. We are pleased to send you some abstracts on Fur Bearing animals for you to publish in Scientifur. We trust that you will find these items of value and interest to your readers and that we can look forward to establishing this collaboration on a regular basis. The abstracts enclosed are supplied free of charge. If you should wish to publish any or all of these, we ask only that you acknowledge CAB as the source in the way indicated. On a regular basis we would be pleased to make abstracts available to you at £2 each.

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Bucks., UK.

Literature searches on other agricultural topics can be done on demand. Over 3,000 searches already done are published and available from the above address.

FUR-BEARING ANIMALS

AFROSIN, M. F. Distribution of succinate dehydrogenase and acid and alkaline phosphatases in the cells of the anal glands of mink. *Sbornik Nauchnykh Trudov, Moskovskaya Veterinarnaya Akademiya* (1977) 93 103-106

AFROSIN, M. F. Mydepithelial cells of the tubular section of the anal glands of mink. *Sbornik Nauchnykh Trudov, Moskovskaya Veterinarnaya Akademiya* (1977) 93 99-103

MILADINOVIC, Z.; JABLAN-PANTIC, O. Blood vessels of the kidney in the fox. *Acta Anatomica* (1977) 99 (1) 107

JABLAN-PANTIC, O.; MILADINOVIC, Z. Bronchography and vasography of the lungs in the fox. *Acta Anatomica* (1977) 99 (1) 97

JABLAN-PANTIC, O.; MILADINOVIC, Z.; DREKIC, D. Lymph nodes of mink's abdominal and pelvic walls and viscera. *Acta Anatomica* (1977) 99 (1) 97

CAREY, A. B.; GILES, R. H., JR.; MCLEAN, R. G. The landscape epidemiology of rabies in Virginia. *American Journal of Tropical Medicine and Hygiene* (1978) 27 (3) 573-580

MARTINET, L.; ALLAIN, D.; MEUNIER, M. Photo-periodic control of plasma testosterone concentration in the mink (*Mustela vison*). *Scientifur* (1978) 2 (3) 16-19.

ANDERSEN, K. Fine structure of spermatogonia and spermatocytes in the blue fox (*Alopex lagopus*). *Acta Veterinaria Scandinavica* (1978) 19 (2) 229-242.

KENYON, A. J. Treatment of aleutian mink disease with levamisole. *Current Chemotherapy* (1978) 357-358.

KENYON, A. J. Treatment of aleutian mink disease with levamisole. *Current Chemotherapy* (1978) 357-358. See Jnl Source: *Scientifur* (1978) 2 (3) 34-35.

SCHWARTZ, T. M.; LARSON, A. E. One-shot vaccination for distemper, virus enteritis, botulism in mink. *Fur Rancher* (1978) 58. See Jnl Source: *Scientifur* (1978) 2 (3) 30-31.

HIGAZI, M. G.; EL-ASHRY, M. Effect of massive deep X-irradiation on the liver of albino chinchilla rabbits. *Journal of the Egyptian Veterinary Medical Association* (1976) 35 (3) 140-146.

MORRELL, J. I.; BALLIN, A.; PFAFF, D. W. Autoradiographic demonstration of the pattern of 3H-estradiol concentrating cells in the brain of a carnivore, the mink, *Mustela vison*. *Anatomical Record* (1977) 189 (4) 609-623

KENYON, A. J.; KENYON, B. J.; HAHN, E. C. Protides of the mustelidae: immunresponse of mustelids to aleutian mink disease virus. *American Journal of Veterinary Research* (1978) 39 (6) 1011-1015

COWPER, S. G. Helminth parasites of dogs and cats and toxoplasmosis antibodies in cats in Swansea, South Wales. *Annals of Tropical Medicine and Parasitology* (1978) 72 (5) 455-459

FORSTER, U. Adaptability of two Central European rabies virus strains to one domesticated and two wild animal species. Contribution to the epidemiology of rabies. 1. Transmission experiments with weasels. [Zur frage der adaptionsfahigkeit von zwei in Mitteleuropa isolierten tollwutvirusstammen an eine domestizierte und zwei wildlebende spezie. Ein beitrag zur epidemiologie der tollwut. 1. Mitteilung: ubertragungsversuche mit wiesel.] *Zentralblatt fur Veterinarmedizin* (1978) 25B (5) 394-405. Staatl. Veterinaruntersuchungsamt, Deutschordenstr. 48, D 6000 Frankfurt 71, German Federal Republic.

MOEGLE, H.; KNORPP, F. The epidemiology of rabies in wildlife. II. Observations on the badger. [Zur epidemiologie der wilotiirtollwut. 2. Mitteilung: beobachtungen uber den dachs. *Zentralblatt fur Veterinarmedizin* (1978) 25B (5) 406-415. Referat Veterinarwesen, Regierungssprasadium, Nauklerstr. 47, D 7400 Tubingen, German Federal Republic.

SMITH, H. J. Parasites of red foxes in New Brunswick and Nova Scotia. *Journal of Wildlife Diseases* (1978) 14 (3) 366-370. Anim. Path. Lab., Hlth Anim. Branch. Atlantic Area Lab., PO Box 1410, Sackville, New Brunswick, EOA 3C0, CANADA.

852 ALLAIS, C.; MARTINET, L. Relation between daylight ratio, plasma progesterone levels and timing of nidation in mink (*Mustela vison*). *Journal of Reproduction and Fertility* (1978) 54 (1) 133-136 [En, 13 ref.] Station centrale de Physiologie animale, INRA, 78350 Jouy-en-Josas, France.

Mink were mated between 17 Feb. and 22 Mar. In ♀♀ maintained in natural daylight, the concentration of progesterone in the blood began to rise between 25 and 30 Mar., whatever the date of mating. After reaching peak values of 40-160 ng/ml, progesterone concentrations decreased before the end of pregnancy. In ♀♀ maintained under 14-h light:10-h darkness immediately after mating, the rise of progesterone began a few days earlier than under natural daylight, indicating that the extra light induces earlier progesterone secretion, nidation and parturition.

853 BONNIN, M.; MONDAIN-MONVAL, M.; DUTOURNÉ, B. Oestrogen and progesterone concentrations in peripheral blood in pregnant red foxes (*Vulpes vulpes*). *Journal of Reproduction and Fertility* (1978) 54 (1) 37-41 [En, 17 ref.] Laboratoire d'Endocrinologie Expérimentale, Domaine de Carrière-Bordeaux Université II, 146, rue Léo Saignat, 33076 Bordeaux Cedex, France.

Oestrogen levels were low during most of gestation, but there was an increase ($P < 0.05$) in oestradiol concentrations at implantation. Early pregnancy was characterised by high levels of progesterone which decreased ($P < 0.001$) thereafter, but there was no decline in progesterone or rise in oestrogen levels at parturition. There was no difference in the duration of progesterone secretion between pregnant and non-pregnant ♀♀.

541 ZOLOW, W.; KARAGIOSOW, T. [Softboard made from bark.] Faserdämmplatten aus Rinde. *Holzindustrie* (1978) 31 (4) 117-118 [De, 3 ref. BLL]

Data are tabulated on bending strength, face strength, water absorption and swelling, sound absorption coefficient,

and heat conductivity of insulating fibreboard made from *Pinus sylvestris* bark with 3-12% phenol/formaldehyde or carbamide/formaldehyde resin.

541 UK, INSTITUTE OF ANIMAL PHYSIOLOGY **Report for 1976-77.** London, UK; Agricultural Research Council. (1978) 150 pp. ISBN 0-7084-0079-5 [En, Price £2.00]

Short accounts are given of work published in 1976, 1977 and early 1978 by members of the Institute's staff. Subjects falling within the scope of ABA are the following: (1) the maturation of sheep oocytes *in vitro*; (2) the regulation of ovulation in the sheep; (3) non-surgical egg transfer in cattle; (4) the measurement of the proportion of motile spermatozoa and the velocity of sperm motion; (5) the motility of boar, bull, rabbit, ram and stallion spermatozoa in artificial media; (6) the identification of acrosin in mouse spermatozoa; (7) the immunocytochemical localisation of acrosin in bull, boar and ram spermatozoa; (8) the composition of fluids in the σ reproductive tract; (9) the function of inhibin in the rete testis fluid; (10) factors affecting the acquisition of fertility and motility by spermatozoa in laboratory and farm mammals; (11) diluents for freezing and thawing boar spermatozoa; (12) techniques for AI in the mink; (13) the duration of the fertilising capacity of inseminated rabbit spermatozoa; (14) the synchronisation of oestrus in sheep and pigs, using analogues of PGF₂ α ; (15) androgens, 16-androstenes and oestrogens in the σ pig in relation to boar taint, growth, castration and the use of anabolic steroids; (16) maternal recognition of pregnancy in the ewe, cow and sow; (17) a new laboratory method for detecting pregnancy in cows from progesterone levels in the milk; (18) methods for the cooling and deep freezing of embryos of farm mammals for transplantation; (19) the *in vitro* culture of early rat embryos; (20) the hormonal control of the onset of parturition in the goat and horse; (21) factors affecting neonatal mortality in the rat; (22) the control of the oestrous cycle in laboratory mammals; (23) the recognition by ewes of their lambs; (24) the inheritance of 2 types of glutathione deficiency in sheep; (25) the inheritance of arginase deficiency in sheep; (26) the relationship of Hb type with the ovulatory response to PMSG in sheep; (27) the possible migration of germ cells between chimaeric twins in cattle. AR

854 GERASIMCHUK, A. V.; ROMANOV, L. M. [Heterogeneous mating of coloured mink.] O geterogennykh skreshchivaniyakh v tsvetnom norkovodstve. *Krolikovodstvo i Zverovodstvo* (1978) No. 2, 14 [Ru]

Data were obtained over 3 yr at a farm where Silverblu σ σ are mated with Sapphire σ σ . For matings of *ppaa* σ σ with *ppAA* σ σ (155, 342 and 211 litters in the 3 yr resp.), the number of kits registered/mated σ averaged 5.4, 4.1 and 3.1, and the number of kits registered/ σ whelping averaged 6.1, 4.4 and 4.1. Corresponding figures for matings of *ppAA* σ σ with *ppAA* σ σ were 5.5, 4.4, 4.4, 6.0, 4.8 and 5.2. PM

855 GRAKOVA, N. A.; RYAZANTSEV, V. V. [The effect of a zinc sulphate supplement on the physiological state of mink.] Vliyanie dobavok sernokisllogo tsinka na fiziologicheskoe sostoyanie norok. *Sbornik nauchno-tekhn. Inform. vses. nauchno-issled. Inst. okhot. Khozyaistva i Zverovodstva* (1978) No. 60, 45-51 [Ru] From *Referativnyi Zhurnal* (1978) 10.58.379.

The provision of a zinc supplement to the diet of standard mink did not adversely affect kit production. The addition of 1.8 mg copper sulphate per head daily to the diet decreased the number of σ σ failing to conceive and the number of stillborn kits. JDT

857 MARKOWICZ, M. [The value of nutria meat.] Der Wert des Nutriaflisches. *Deutsche Pelztierzüchter* (1978) 52 (10) 144-145 [De]

Data on 30 σ and σ nutria, slaughtered at 8-24 mth of age, were analysed. For σ σ and σ σ slaughtered at 8 mth, carcass weight averaged 3.94 and 3.46 kg resp., with a dressing percentage of 59.3 and 59.6. Males and σ σ

slaughtered at 24 mth weighed 8.27-9.24 and 5.27-5.96 kg resp., and had a dressing percentage of 66.3 and 60.2. Details are given on the chemical composition of the meat and on the weights of various organs. AF

858 PSAREV, I. P. [Some experiments with breeding "wild" mink.] Iz opyta raboty s "dikimi" norkami. *Krolikovodstvo i Zverovodstvo* (1978) No. 2, 13 [Ru]

Data were obtained on the progeny of 117 σ and 456 σ wild mink kept at a farm in 1971. For whelping seasons 1975, 1976 and 1977 resp. (2850, 3850 and 5220 σ σ), the number of young registered/housed σ averaged 3.9, 4.7 and 4.2, corresponding figures for breeding nucleus of the farm being 4.6, 5.0 and 4.7. PM

859 REITEN, J. [Hair length in Standard mink.] Harlaengden hos standardmink. *Dansk Pelsdyravl* (1978) 41 (8) 277-281 [Da] Norges Landbrukshøgskole, 1432 Ås, Norway.

Data on approx. 700 adult Standard mink and 3000 kits pelted in 1973-75 were analysed. Older mink had longer hair than young animals, with guard hairs and wool fibres being an average of 1 and 0.5 mm resp. longer in the former. Males had longer hair than σ σ . Detailed studies on the pelts of 3 σ mink kits revealed great variations in hair length within small areas of the pelt, and measurements on 5 pelts from σ and 5 from σ kits (40 measurements/pelt) showed that the hair was longer on the back than on the belly and longer on the rump than on the neck. AF

860 SKŘIVAN, M.; ŠÍMA, A. [Meat production of two-year-old nutria.] Masná užitkovost dvouletých nutrií. *Sborník Vysoké Školy Zemědělské v Praze, Fakulta Agronomická, B (Živočišná Výroba)* (1977) No. 1, 187-198 [Cs, en, ru, 5 ref.] Vysoká škola zemědělská, Prague-Suchbát, Czechoslovakia.

Data were obtained on unspecified numbers of σ and σ Standard nutria culled from breeding and slaughtered for skins at 2 yr of age. For σ σ and σ σ resp., body weight at slaughter was 8910-8675 and 5500-6300 g, carcass weight averaged 5050 and 2760 g, dressing percentage 60.0 and 50.1, skin weight as a percentage of slaughter weight 8.4 and 10.8, and lean percentage of the carcass 78.1 and 77.7. Detailed carcass data are tabulated. Sex differences were significant for slaughter weight, carcass weight and skin weight. PM

870 DEWLY, M. J.; MINTZ, B. Genetic control of cell-type-specific levels of mouse β -galactosidase. *Developmental Biology* (1978) 66 (2) 560-563 [En, 7 ref.] Institute for Cancer Research, Fox Chase Cancer Center, Philadelphia, Pennsylvania 19111, USA.

The existing distinction between the genotypes *Bgs^b* (high activity of β -galactosidase) and *Bgs^d* (diminished activity) is based on enzyme activity levels in the brain. However, other tissues in a strain with high activity levels in the brain may be relatively low in activity, and *vice versa*. Evidence was obtained that different cell types within a tissue (e.g. exocrine and endocrine pancreatic cells) can vary independently of each other in the activity of this enzyme. In the strains studied, the β -galactosidase activity in a given tissue was 1.8-3.6 times as great in the highest strain as in the lowest. It is suggested that there may be "controlling genes" determining specific enzyme levels by causing a limited somatic amplification of the structural gene, and by controlling the degree of amplification in a given cell type and strain.

1011 KOVAL'CHUK, E. S.; PODGORNAYA, R. D. [The biology of *Trichinella* in the Tyumen Priirtvsh.] In *Problemy parazitologii. Materialy VIII nauchnoi konferentsii parazitologov UkSSR. Chast' 1*. Kiev, USSR; Izdatel'stvo "Naukova Dumka". (1975) 223-225 [Ru]

In the Tyumen region, USSR, *Trichinella* was recorded in 20 of 420 foxes, 3 of 10 wolves, 2 of 4 bears, 3 of 9 lynxes, one of 27 dogs and one of 136 cats, the remaining carnivores, rodent and insectivore species were not infected. *Trichinella* larvae from frozen bear meat (initially in natural winter conditions at temperatures ranging from -7 to -42°C and

later at -12°C) remained infective to mice and hamsters for almost 1.5 years. *Trichinella* from fox passaged once in mice, failed to infect domestic piglets; after 6 passages through mice one of 3 piglets became infected. The recovered muscle larvae were all, either partially, or totally calcified and no intestinal *Trichinella* were found. The circulation of *Trichinella* in the Tyumen region is believed to be maintained mainly by, wild carnivores. The concept of natural foci of trichinellosis is discussed. EG

413 DONG, L. **First report of human myiasis due to *Wohlfahrtia vigil opaca* in California and a review of the distribution of the subspecies in the state.** *California Vector Views* (1977) 24 (3/4) 13-17 [En, 8 ref., 3 fig.] Vector and Waste Management Section, California Department of Health, Berkeley, CA 94704, USA.

Furuncular myiasis in an infant in California was confirmed by identification of a larva of *Wohlfahrtia vigil opaca* (Coq.) removed from a lesion. The child had contracted the infestation prior to the age of 2 weeks. An examination of museum specimens indicated that the subspecies is widely distributed in the state. Literature records show that elsewhere in western North America *W. v. opaca* has caused rare cases of myiasis in humans and numerous cases in young foxes, mink and other mammals.

1330 WELSH PLANT BREEDING STATION **Report for 1976.** Aberystwyth, Dyfed, UK; Welsh Plant Breeding Station. (1977) 216pp. [En, Price £2.00]

[1337] WELCH, R. W. **Protein content and quality in barley.** 98-99 [En]

Data are given on grain protein and lysine contents of 20 barley genotypes including commercial cv. and high protein/high lysine accessions grown in a replicated pot trial. Protein content ranged from 10.3% in cv. Maris Mink (4.3% lysine in protein) and in Risø 1508 (5.7% lysine in protein) to 16.1% in Notch-2 mutant (4.0% lysine in protein). Line Cb 2834 had plump grain, 12.0% protein and 4.5% lysine and was considered the most promising.

980 MIROS', V. V.; MORGUN, E. M. **[Growth dynamics of the chemical composition of meat and bones in rabbits.]** *Vozrastnaya dinamika khimicheskogo sostava myasa i kostei krolikov. Krolikovodstvo i Zverovodstvo* (1978) No. 3, 20-21 [Ru]

Data on chemical composition are tabulated for Soviet Chinchilla, Grey Giant, New Zealand White and Californian White rabbits at various ages from 20 to 90 days. PM

982 PALKIN, G. A. **[The problem of body constitution and conformation of rabbits.]** *K voprosu o konstitutsii i ekster'ere krolikov. Krolikovodstvo i Zverovodstvo* (1978) No. 2, 29-31 [Ru]

Standard body weights, and body constitution and body conformation criteria, are tabulated for the Soviet breeds Grey Giant [Flemish Giant \times local Ukrainian], Black-and-Tan [Blue Vienna \times Flemish Giant \times White Giant], Silvery [Argente de Champagne], Soviet Chinchilla [Chinchilla \times White Giant], Soviet Marder [Russian Ermine \times Chinchilla \times local blue] and White Down [Angora \times local down], and for Western breeds bred in the USSR [White Giant, Blue Vienna, Californian and New Zealand White]. PM

981 MIROSHNICHENKO, I. M. **[Reproductive performance of females of different body conformation.]** *Vosproizvoditel'nye sposobnosti samok raznykh tipov teloslozheniya. Krolikovodstvo i Zverovodstvo* (1978) No. 2, 28-29 [Ru]

Data were obtained on broad-bodied, narrow-bodied and medium-bodied $\text{q} \text{q}$ of 3 breeds. For 46, 21 and 63 New Zealand White $\text{q} \text{q}$ of the 3 types resp., litter size averaged 7.7, 9.0 and 8.4, and survival rate to weaning 89.3, 78.0 and 92.4%. Corresponding figures for 42, 10 and 45 Californian $\text{q} \text{q}$ were 8.1, 8.8 and 9.2, and 93.5, 76.8 and 91.2%, and for 44, 51 and 194 Soviet Chinchilla $\text{q} \text{q}$, 8.8, 9.5 and 10.5, and 86.1, 71.8 and 90.7%. PM

752 HANSEN, N. G.; JØRGENSEN, G. **[Plant protein in mink feeding.]** *Pflanzliches Eiweiss in der Nerzfütterung. Deutsche Pelztierzüchter* (1978) 52 (5) 65-67 [De, 10 ref; also *Dansk Pelsdyravl* (1978) 41 (1) 30-32]

1064 ROBINSON, R. **Colour inheritance in small livestock.** UK; Fur and Feather. (1978) 192 pp. ISBN 0-903775-06-9 [En, Price £4.60]

Roy Robinson begins his account with an elementary introduction to genetics, dealing with such aspects as cell division, chromosome number and genes. He then follows with a 35-page chapter entitled "Elementary heredity", which covers simple heredity, two and three-gene inheritance, multiple alleles, the masking of genes, sex and other linkage (with hair type), lethal genes, modifiers and polygenes, as well as inbreeding. All are illustrated by examples from colour inheritance, with sound conclusions based on recent research. This chapter ends with details of the six main colour loci, A, B, C, D, E and P, with their alleles, plus three less common loci, and a table showing the presence or absence of these alleles in the eight species covered by the book. These are: cats, guinea-pigs, chinchillas, gerbils, hamsters, rabbits, rats and mice, each being discussed in greater detail by a separate chapter, which is adequately illustrated by black-and-white diagrams of colour patterns.

There is a list of books for further reading, and a short index of genetical terms, but no general index. The results of colour inheritance studies are so spread through the literature that this book does a great service by drawing together the information necessary to provide an excellent and easily readable account of current knowledge. M.L. Ryder.

707 SMITH, H. J. **Parasites of red foxes in New Brunswick and Nova Scotia.** *Journal of Wildlife Diseases* (1978) 14 (3) 366-370 [En] Anim. Path. Lab., Health of Anim. Branch, Agric. Canada, Atlantic Area Lab., P.O. Box 1410, Sackville, New Brunswick, E0A 3C0, Canada.

In Canada, examination of 61 *Vulpes vulpes* from New Brunswick and Nova Scotia revealed *Alaria americana* in 15, *A. arisaemoides* in one, *A. mustelae* in 2, *Cryptocotyle lingua* in 9, *Echinostoma revolutum* in 5, *Metorchis conjunctus* in 3, *Capillaria aerophila* in 41, *Crenosoma vulpis* in 33, *Toxocara canis* and *Uncinaria stenocephala* each in 43 and *Taenia crassiceps* in 31.

791 BOEV, S. N.; BRITOV, V. A.; SOKOLOVA, I. B. **[The species composition of *Trichinella* in Kazakhstan.]** *In Problemy parazitologii. Materialy VIII nauchnoi konferentsii parazitologov UkSSR. Chast' I.* Kiev, USSR: Izdatel'stvo "Naukova Dumka". (1975) 71-72 [Ru] Zool. Inst., Acad. of Sci. of the Kazakh SSR, Alma-Ata, USSR.

Trichinella obtained from dogs, cats, foxes, lynxes and hedgehogs (experimentally infected with parasites from wolves and polecats) from various areas of Kazakhstan, USSR, were all identified, by the method described by Britov in 1971 [see *Hm/A* 41, 3732], as *T. nativa*. This confirms Boev and Britov's opinion [see *Hm/A* 41, 4338] that, in Kazakhstan, the spread of trichinellosis should be controlled by the prevention, on the one hand, of the import of *T. spiralis* into pig farms and, on the other hand, by preventing the spread of *T. nativa* from natural foci to inhabited areas.

417 NORDSTOGA, K.; MOHN, S. F.; ÅAMDAL, J.; HELGEBOSTAD, A. **Nosematosis (encephalitozoonosis) in a litter of blue foxes after intrauterine injection of *Nosema* spores.** *Acta Veterinaria Scandinavica* (1978) 19 (1) 150-152 [En] Vet. Coll. of Norway, Oslo, Norway.

In Norway, 2 female *Alopex lagopus* were injected intrauterinely with mouse peritoneal exudate containing 4×10^5 spores of *Nosema cuniculi*/ml, shortly after artificial insemination. One vixen was mated naturally the following season and delivered 2 dead and 9 live young which were normal at birth. At the age of 6 to 8 weeks, however, 8 of the 9 developed clinical *Nosema* infection. 2 had indirect fluorescent antibody titres of 1:800 and a 3rd had a titre of $1 \geq 1,600$. The mother had previously been serologically negative but had a titre of $1 \geq 1,600$ at the same time as the young became positive.



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THE SECOND INTERNATIONAL SCIENTIFIC
CONGRESS IN FUR ANIMAL PRODUCTION

DENMARK APRIL 1980.

We want to thank these participants of the congress whose already have sent preliminary enrollment forms and titles of reports.

Many colleagues have told us that they want to participate and give reports at the congress, and only few of these names we can see on the following list.

We therefore may ask all of you, who not already have returned the preliminary enrollment, to do it quickly, because of setting up the right program and because of the dispositions concerning the place for the congress.

As appetizer for probable participants we are giving the following list over the report titles received until the 1.st of August 1979.

PLEASE, SEND YOUR ENROLLMENT FORM AS FAR AS POSSIBLE AND BEFORE THE 1st of OCTOBER 1979 TO OUTI LOHI, FINNISH FUR BREEDERS ASSOCIATION, PB 5, 01601 VANDA 60, FINLAND.

For the arrangement committee.


Gunnar Jørgensen

THE SECOND INTERNATIONAL SCIENTIFIC CONGRESS IN FUR ANIMAL PRODUCTION

Preliminary list of enrollments and reports

| Name and institution | Title of report |
|---|--|
| 1. Dr. med.vet Kjell Andersen Institutt for reproduksjonsfysiologi og -patologi, Norges Veterinærhøgskole | Seasonal variation in morphological function of cells in blue fox |
| 2. Dosent dr. med.vet. Ordin Møller Veterinary College of Norway | Measurement of electric resistance of the vaginal smear/mucous membrane in silver and blue foxes as an aid for heat detection |
| 3. L.N. Trut Academy of Sciences of the USSR Siberian Department, Institute of cytology and genetics | Correlations between some parametres determining the litter size in silver foxes |
| 4. Dr. Bazhan N.M. Institute of cytology and genetics | Interaction between adrenal and gonad funtion in silver foxes |
| 5. Dr. Logvinenko N.S. Institute of cytology and genetics | The level of androgens, estrogens and progesterone in the peripheral blood and their production by gonads and adrenals in the postnatal ontogenesis of the silver foxes |
| 6. D.K. Belyaev Institute of cytology and genetics | Genetically determined embryonic mortality in foxes and minks, and methods to overcome it |
| 7. A.O. Ruvinsky Institute of cytology and genetics | Inheritance of some fur colours in foxes and their pleiotropic effects |
| 8. O.L. Serov Institute of cytology and genetics | Studies on biochemical polymorphism in silver foxes |
| 9. Agro.forst lic Mäkinen Auli Institutionen för husdjursförädling, Sveriges Lantbruksuniversitet | The chromosomes of blue foxes (Alopex lagopus) |
| 10. V.I. Yevsikov Institute of cytology and genetics | Strategy and tactics in conversation of reproductive potential of colour minks |

- | | |
|---|---|
| 11. D.V. Klochkov Institute of cytology and genetics | Influence of photoperiodic conditions on the development of reproductive function in minks |
| 12. Einar J. Einarsson Norges Landbrukshøgskole, Institutt for fjørfe og pelsdyr | Prenatal and early postnatal mortality in mink |
| 13. Dr.med.vet. Pastirnac Nicolae Intreprinderea Agricola de Stat Prejmer | Genetic parameters of some traits in mink and the opportunity of dising them in Fur |
| 14. Maître de Recherches Martinet Lise Institut National de la Recherche Argonomique, Sation de Physiologie Animale | Hormonal and photoperiodic control of implantation in mink |
| 15. Agrégée en Sciences Noulin Claudie Institut National de la Recherches Argonomique, Laboratoire des Pelages, Toisons et Fourrures | Sexual behaviour of the mink - sexual behaviour, description, cry, hormonal approche |
| 16. O.V. Trapezov Institute of cytology and genetics | The influence of food restriction on the growth and development of different genotypes of American mink |
| 17. J.S Benimetzky, D.V. Klotchkov Institute of cytology and genetics | Thyroid activity in minks of various genotypes at the initial stages of postnatal onotgeny under natural and shortened daylight |
| 18. Doctor D.V. Klotchkov Insitute of cytology and genetics | The influence of photoperiodic conditions upon the reproductive function of young minks |
| 19. Belyaev D.K., Isakova G.K. Institute of cytology and genetics | Spontaneous heteroploidy at early postnatal period in mink |
| 20. O. K. Baranov Institute of cytology and genetics | Analysis of allotypes of heavy lipoproteins of blood serum of minks |
| 21. Agronom Allan Olausson Department of Animal Breeding and Genetics | The use of selection index in mink |
| 22. Professor Richard J. Aulerich Fur Animal Project, Poultry Science Dept. Michigan State University | Toxicity of polychlorinated biphenyls to mink |

23. Dr. Gordon Finley
Dept. of Agricultural, vet.path.lab
A Pot Pourri of disease problems in Nova Scotia
mink and foxes
24. Maître de Recherches Rougeot Jean
Institut National de la Recherche
Agronomique, Laboratoires des Pelages,
Toisons et Fourrures
Hormonal and photoperiodic regulation of spring and
autumn moults in mink
25. Prof. Janusz Maciejowski, Dr. Sławoń Jerzy
Wyzsza Szkoła Rolniczo Pedagogiczna
Objectivization of methods of exterior evaluation of
standard mink
26. Nutrition chemist M.G. Stuart Jones
Ministry of Agriculture
The composition of diet fed on Commercial mink
farms in Britain
28. Ass. prof. Niels Enggaard Hansen
Department of Animal Nutrition
Royal Veterinary and Agricultural University
Sulfuric acid preserved feed and deposition of
minerals in mink
29. Ingénieur Allain Daniel
Institut National de la Recherche
Agronomique
Technique of feeding pellets to mink
30. Maître de Recherches Charlet - Lery
Institut National de la Recherche
Agronomique, Laboratoire de la Physio-
logie de la Nutrition
1. Energy and nitrogen balance in male mink during
the growing phase
2. Energy and nitrogen balance in male mink during
the animal adult life
31. Lic.agr. Anders Skrede
Norges Landbrukshøgskole
Amino acid digestibility in mink
32. Prof. René Belzile
Dept. de Zootechnie, Université Laval
Mink response to enzymatic pre-hydrolysis of
micronized soybean meal
34. General Manager A.A. Rietveld
Management at Northwood Fur
Some significant changes in farms since
Helsinki 1976
35. Dr. O.K. Baranov
Institute of cytology and genetics
Genetic systems of serum protein allotypes
in domestic mink

THE SECOND INTERNATIONAL SCIENTIFIC CONGRESS IN FUR ANIMAL PRODUCTION

8 - 10 of April 1980

DENMARK

Preliminary registration of delegates who are wanting to attend the congress, and titles of possible contributions.

The undersigned wants to take part in the congress

Name: _____

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I want to present to following paper(s)

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Subject: _____

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Manuscripts must be in the hands of the arrangement committee at the latest on December 15th 1979.

Accompanying person(s) Yes _____ No _____ Number _____

I want to participate the
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the congress Yes _____ No _____ Number _____

Please return this form to the arrangement committee by August 1st 1979.

Address: Finnish Fur Breeders Association
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