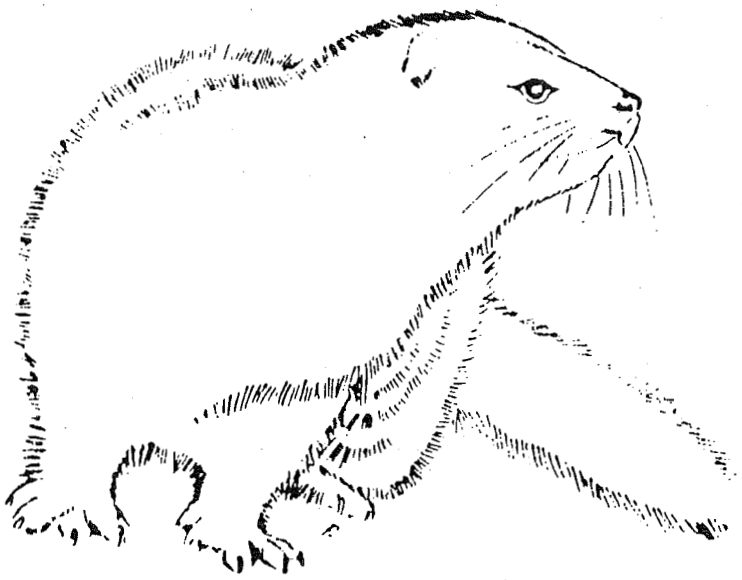

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TITLES OF OTHER PUBLICATIONS - NOT ABSTRACTED

Multidisiplinary

Silverfox bitch's behaviour during whelping.
Braastad, B.: Meeting on Research in Domestic animals, 1986. Statens Fagtjeneste for Landbruket. Aas, Norway, 1986. p. 75-79. In NORG. Code: 11-5-F.

Scientific utilization of data from the fur animal control.
Nina Valberg: Proceedings; Husdyrforsøksmøtet, 1988, Statens fagtjeneste for Landbruket, ISSN Nr. 0333-1121, pp. 414-417. In NORG. Code: 14-13-M-F.

Houses for fur animals.
Kjetil Aarstrand: Proceedings: Husdyrforsøksmøtet, 1988, Statens Fagtjeneste for Landbruket, ISSN Nr. 0333-1121, pp. 418-421. In NORG. Code: 14-10-M-F.

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Leena Blomstedt & Outi Lohi: Helven Saeaetioe. Vantaa, Finland. 1984. 31 p. 1 graph, 4 tables, 35 references. No. 15. In FINH. ISSN-0358-3759. Code: 2-M.

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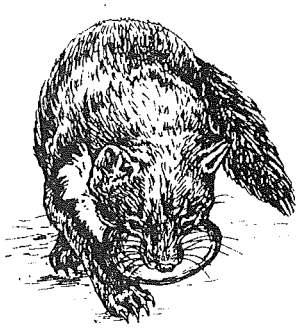


See you in Canada and USA

August 21 - 28, 1988

Notes

SCIENTIFUR, VOL. 12, NO. 2, 1988

It is really hard to me to write this notes, because of the fact that the future of SCIENTIFUR is still uncertain. After discussion in Scandinavia and in accordance to response to Notes from Volume 12, No. 1, it seems to be a slight willingness to try to find the money for ensuring the future.
But, is it a Scandinavian problem ?
Is the international scientific congresses also a Scandinavian problem ?

Until now we may realize that the initiatives to both of the activities come from Scandinavia, where important ideas were realizable thanks to the organizations in the Fur Animal Division of The Scandinavian Association of Agricultural Scientists and thanks to the enormous back up from the Scandinavian Breeders Organizations.

This fact is unique and have shown its value for the world wide fur animal production. But - we could do it much better, if the cooperation on full international basis might come to the same level.

The scientists in both East and West are convinced of the importance of the international cooperation, - but for me, it looks like that only the Scandinavian Breeder Organizations are economical supporting the activities.

We must find a shape and a solution including all parts engaged in the international scientific cooperation.

The matter has been discussed in the Scandinavian countries, and an idea has been born regarding establishment of an INTERNATIONAL FUR ANIMAL SCIENTIFIC ASSOCIATION. Such an association will stand a good change of handling of both activities, economical as well as scientific.

From the Board of the N.J.F.' Fur Animal Division we suggest following proposal discussed - and, hopefully, confirmed - at the Congress in Toronto this year:

1. Establishment of an international scientific committee in fur animal production including one elected member from each fur producing country.
   The object of this committee will be- under chariman- and secretaryship in the regi of the N.J.F., Fur Animal Division - to set up the structure and rules for THE INTERNATIONAL FUR ANIMAL SCIENTIFIC ASSOCIATION (IFASA) for establishment and confirmation at the 5th International Scientific Congress in Fur Animal Production at 1992.

2. The 5th congress will be arranged in Oslo, Norway in 1992. We are aware that Poland by a letter from Prof. Maciejowski (see communication) will be interested in being host for this congress, but, anyway, we think that Scandinavis should be the next place

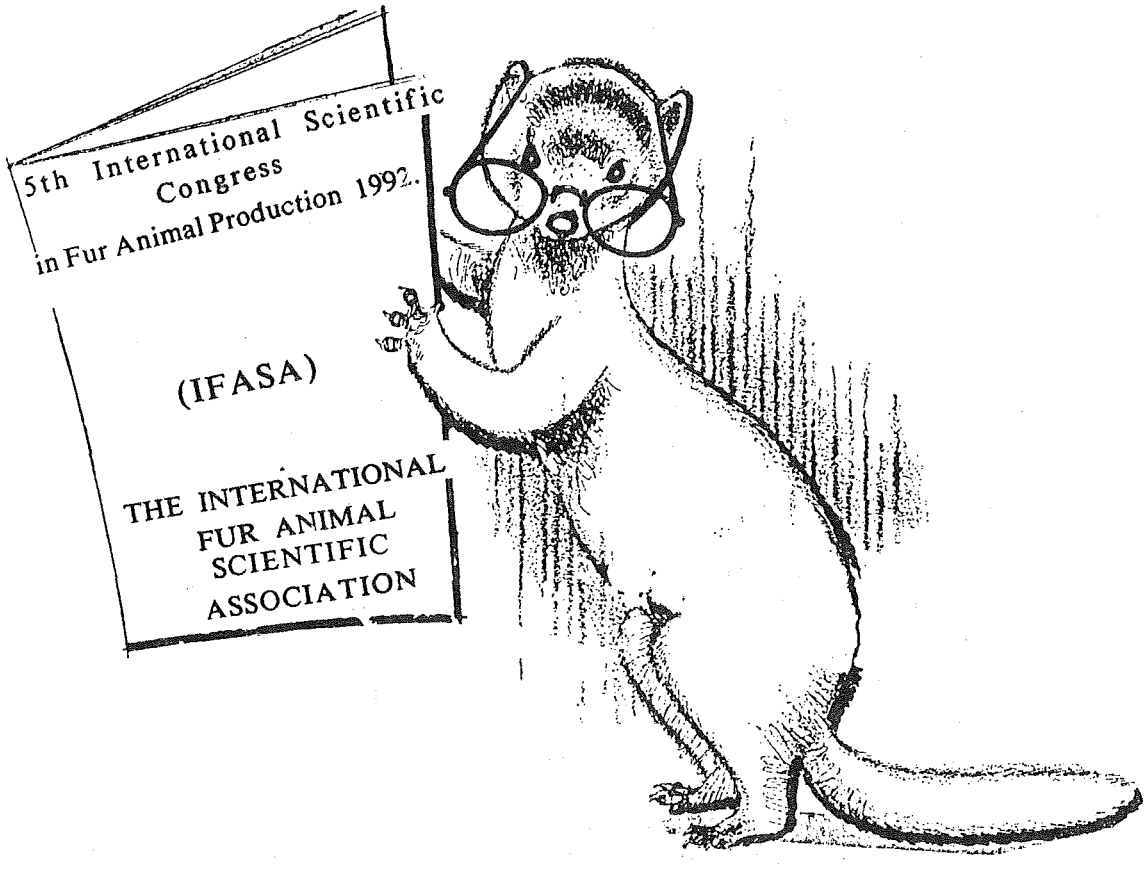
Therefore I will suggest everybody of scientists and organisations to take part in the discussion of the future and the way of arrangement of these congresses for solving of these matter at the congress in Toronto.

As it appears from this issue of SCIENTIFUR, it was going to be rather thin, if we do not have received several contributions from Poland. At the same time as we thank you for all your contributions, we shall, please, ask our colleagues in all other countries to contribute.

Hopefully, we will receive sufficient material so we will be able to bring information from the Scandinavian Scientific meeting in Sweeden April 20-21, and the International Conference on fur Animal Production in Kosice, Czechoslovakia, February 26-28 this year.

Have a good summer. See you in Toronto.

Best Regards
Your editor
Gunnar Jørgensen



Original Report.

Growth cycle of the ferret fur (M. putorius furo)

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2, Research Institute of Animal Production, Hlohovská 2 949 92 Nitra, Czechoslovakia

Introduction

The ferret (Mustela putorius furo, L. 1758) is getting popular with breeders because it is easy to handle, its breeding is not demanding, and also for its high fertility. The value of the fur of this animal is lower compared with other thoroughbred animals; this also contributed to the small spread of the ferret. A prerequisition for a further breeding is the knowledge of the regularities of the fur growth during the ferret onthogenesis. The qualitative and morphological features of the fur at various stages of the postnatal development of ferrets are evaluated in the present paper.

Material and Methods

Evaluation of the morphological structure of the fur was done on the samples taken from the fur of breed animals of the farm of the Research Institute of Animal Production in Nitra. For the evaluation always 5 animals were used from each sex. The samples were taken from four topographical regions i.e. interscapular region (A), central part of the back (B), from the abdomen (C) and from the rump (D). The samples were taken at the age of 1 day, 30 days, 77 days and 133 days after parturition. They were preserved with solid NaCl. Before evaluation they were rinsed with water, defatted with dichlormethane and dried with ethanol. After drying out a microscopic preparations were arranged for optical and electronic microscopy, in the form of the cross sections through the skin layer (corium) and through the individual hairs, in order to find out the density, finness and length of the individual hairs and also their inner structure and the cuticular shape. Individual hairs were used at the evaluation by the optical microscope, during the electronic microscope studies the preparations were vacuum coated with gold. Every evaluation was made by two independent observers. The result represents the average from ten observations of each morphological property.

Results

Hair density during the ferret ontogenesis with both sexes and in four topographical areas of the body is given in fig. 1 and 2. The comparison of both sexes shows the fur of males has significantly higher hair density in all areas of the body, although the number of hairs which fall on cm^2 of the skin surface has a greater dispersion with males. The map of the density spread corresponds in principle in both sexes, the highest density is in the hinder part of the back, then follows the abdomen part (but the fur here is shorter and the guard hair cover is small) and other parts of the surface.

An important fur skin property which conditions mainly the coloration and elasticity of the coat is the number of guard hairs appearing at the unit of fur area. The development of this feature is demonstrated in fig. 3 and 4. It is obvious that the most rapid growth of guard hairs during the first development phase is in the central and hinder part of the back. In the coarse of first 30 days the guard hair creation is more rapid with females. During the next phase the increment in the number of guard hairs is mainly in the interscapular region, so that at the end with this sex the guard hair density dominates considerably though in other parts of the body the female pelts have significantly higher guard hair density. The female pelts are in this respect more balanced and more homogeneous than the male

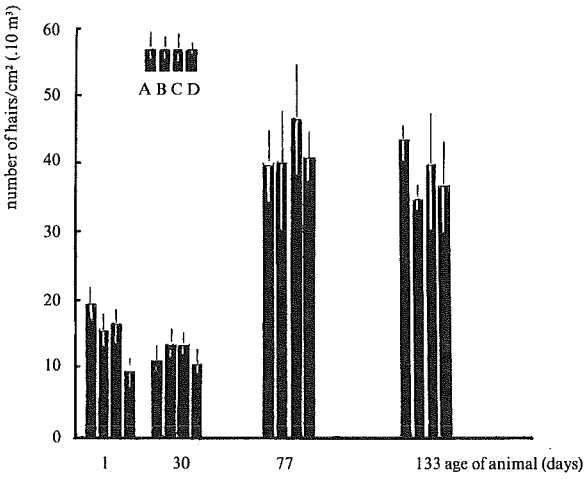

Fig. 1. Total fur density of the ferret (male) per 1 cm² of the fur surface in dependence on the age of the animal for 4 topographical regions. (n = 5)

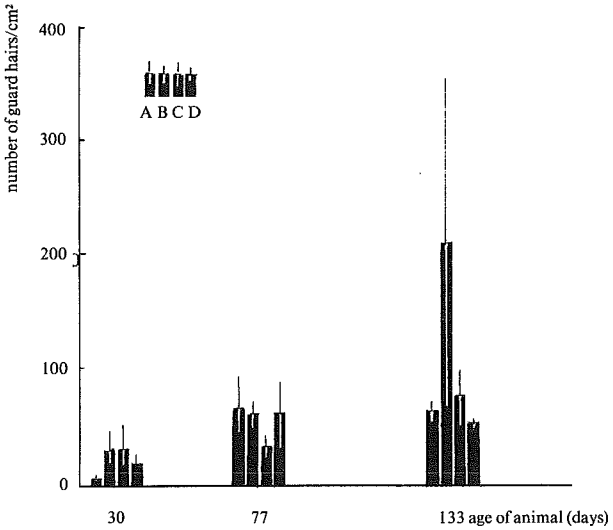

Fig. 3. Density of the ferret guard hairs (male) per 1 cm² of the fur surface in dependence on the age of the animal for 4 topographical regions. (n = 5)

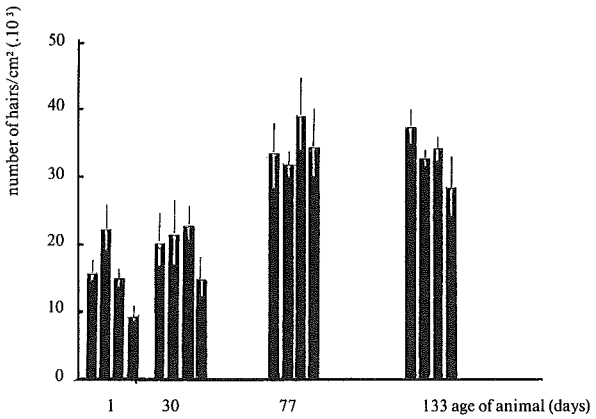

Fig. 2. Total fur density of the female. Other data as in fig. 1.

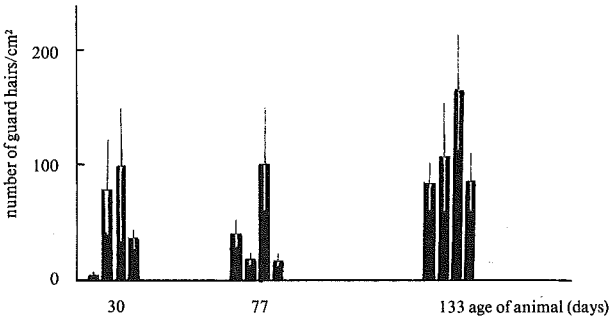

Fig. 4. Density of the female guard hairs. Other data as in fig. 3.

pelts. The other significant feature is the average hair length of the individual hair types.

The development of the hair length with both sexes and in four regions of the body is shown in fig. 5. The individual types of hairs (fine fur fibres, intermediate hairs, guard hairs) are here described in a column diagram where the column length represents the average length of the given hair type as a function of age. It is clearly seen that while with female pelts the average guard hair length is significantly higher when compared with male pelt, in the length of undercoat the situation is opposite – the height and density of fine undercoat fibers is with males more developed.

In fig. 6 the change of hair diameter in the lower part of the scape during the ontogenesis is compared. These results serve for the determination of the anagen period, i.e. of the growth phase. The decrease or stoppage of the guard hair growth is attended by the decrease or stoppage of changes in hair shaft thickness in the lower part. The lower part of the hair is narrower in the mature guard hairs. It can be seen that the guard hairs are earlier developed (approximately after 70 days) in the back region but in the abdomen region is the anagen period after 133 days still not finished. The growth of the fine hairs of the underfur is more quick, the growth period is finished after

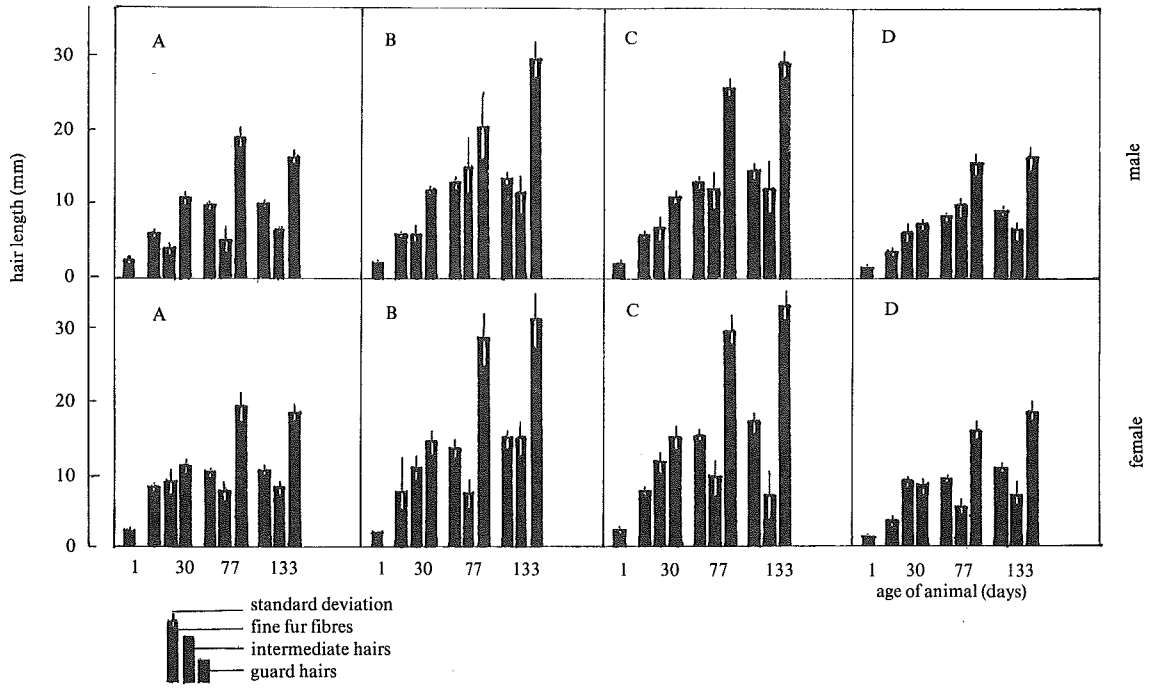

Fig. 5. Length of the ferret hairs (male and female) in dependence on the age of the animal for 4 topographical regions. (n = 5)

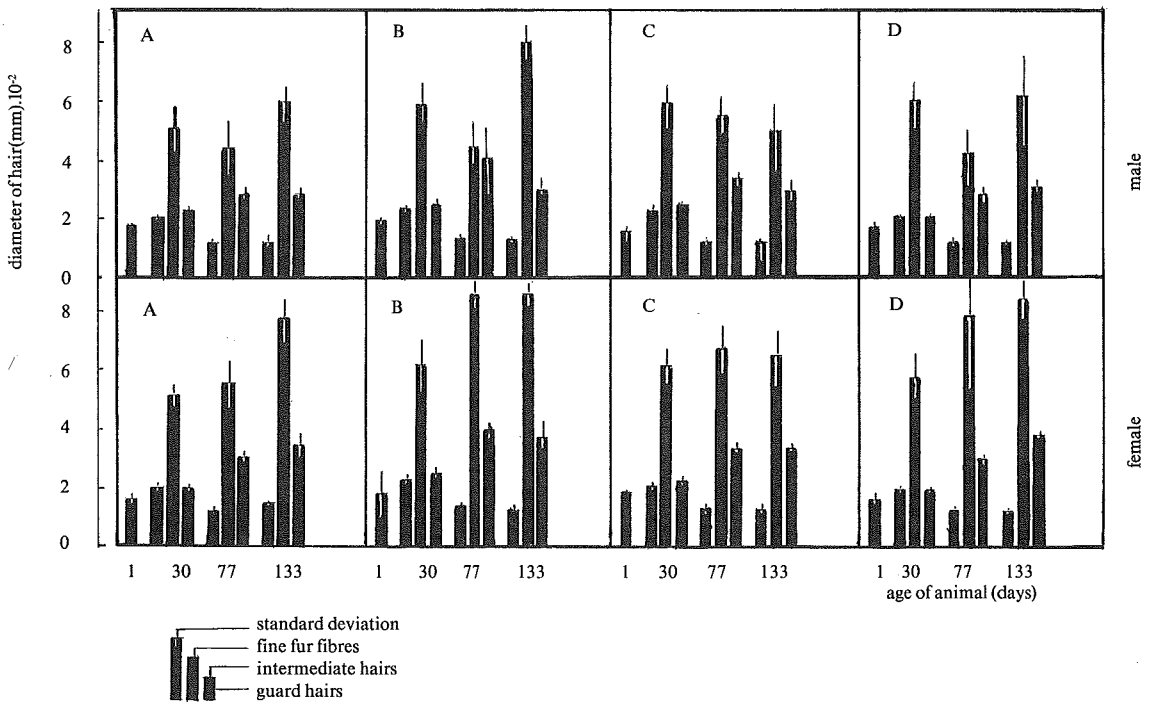

Fig. 6. Diameters of the ferret hairs in their lower part (male and female) in dependence on the age of the animal for 4 topographical regions. (n = 5)

30 days. The accrual of the average lower thickness of the middle hairs indicates the coming of the renewed anagen of the guard hair follicles when before the begin of winter the seasonal exchange of hairs takes place.

As far as the description of micromorphology of hair is concerned, the results have shown (See fig. 7-20) the surface of skin is wrinkled and has a narrow shape of the follicle edges. On the average the follicles contain a bunch of 4 to

8 hairs (Fig. 8, 9). Fine hairs have a circular cross-sections with a diameter of 10 to 18 μm (Fig. 9). The cuticular scales are cornet shaped in its lower part and leaf shaped in the central and upper part of hair (Fig. 10, 11). The surface of the cuticle scales is fine fluted. The fine hairs do not contain the medulla. The intermediate hairs have an elliptical cross-section with diameter of 30-60 μm. The cuticle is created by comblike or waved scales with fluted surface and straight margins (Fig. 12). In the central part of hair shafts is a narrow uninterrupted medulla of uniserial ladder type with medullar filling of spongy or amorphous structure (Fig. 15, 16). The guard hairs are circular or elliptical in cross-section and their thickness reaches 60 to 130 μm. The cuticle is created by tile-like scales with irregular margin and smooth surface (Fig. 13, 14). With this type of hairs there is a marked broad medulla in the central part of the hair shafts. It has a symetrical shape and it is uninterrupted. The walls of the proper medullar column cavities are perforated with circular or oval openings.

The young, growing animals, have different micromorphological structure of the hair coat (Fig. 17-20). Here the hair follicles are narrower and often contain only one hair shaft. The cross-sectional shape of the hairs is usually ellipsoidal and fine fibres have about 6-10 μm in diameter (Fig. 17, 18). The cuticular scales are cornet-like over the most of the shaft, and during the post-natal development gradually change to the petal or leaf-like scale type. Greater proportion of the hairs is medulated with narrow, central-symmetrical medular column (Fig. 17, 18). The characteristic feature at the newly born animals is the variable diameter of the fibres along the shafts (See fig. 20).

Conclusion

The major conclusion of this study is that ferret coat structure is developing in different rate between male and female animals. In both sexes is also important topographical factor. This was demonstrated by examining the hair density, the number of guard hairs, the average length and thickness of individual hair types. The differences described above are visible during whole onthogenesis and could be noticed even at the newly born animals.

Despite the fact, that the overall features of the hair coat are similar, the detailed analysis showed that both sexes differed in the hair density and other characteristics of the coat. The last results, concerning the micromorphology of the hair, obtained by scanning electron microscopy reveal the change of the microscopical pattern taking place during the animal onthogenesis.

Acknowledgement

We wich to thank Mrs. Jarmila Klhufková and Mr. Zdislav Krul for skilled technical assistance.

Fig. 7. Male ferret, 1 year old, neck area. Skin surface 60 x.

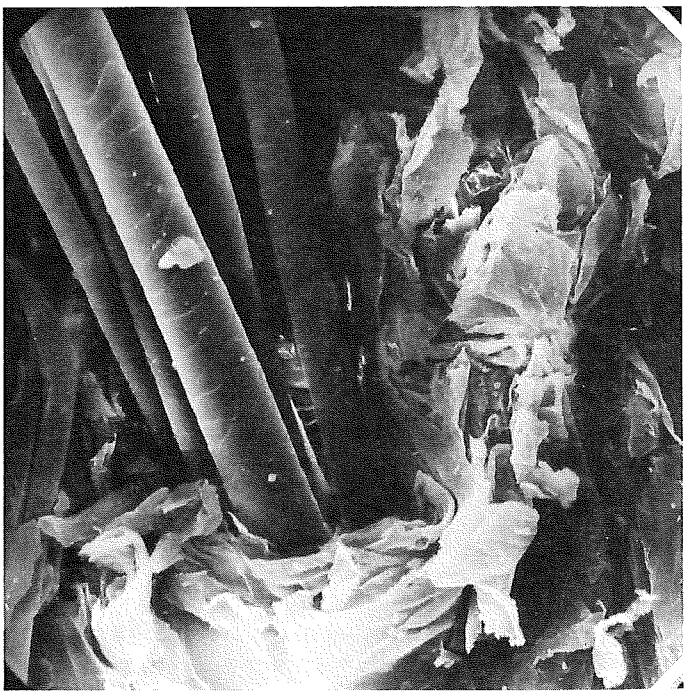

Fig. 8. Male ferret, 1 year old, back area, cluster of hairs in the follicle, 600 x.

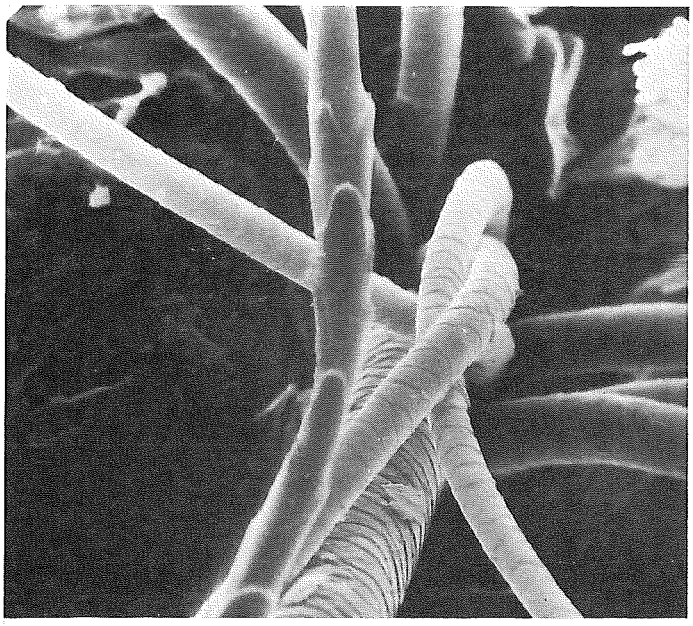

Fig. 9. Female ferret, 1 year old, belly area, bottom part of the hair shafts, 1000 x.

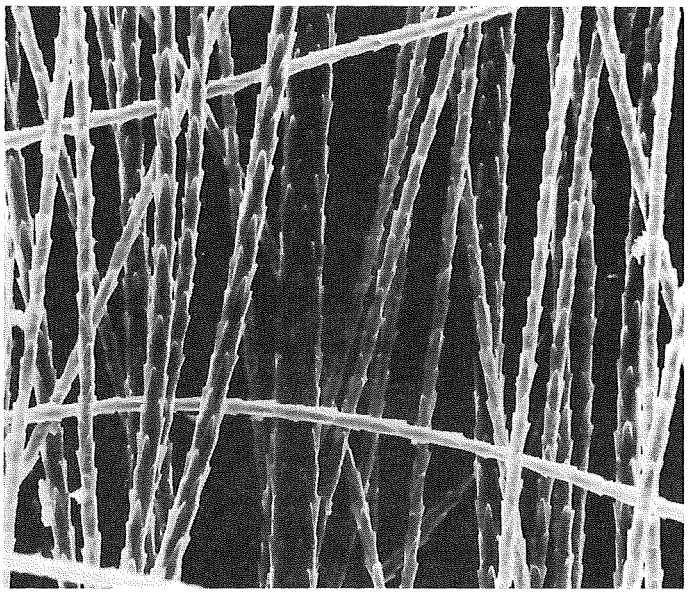

Fig. 10. Female ferret, 1 year old, belly area, the cuticle of fine fur hair in the middle part of the shaft, 200 x.

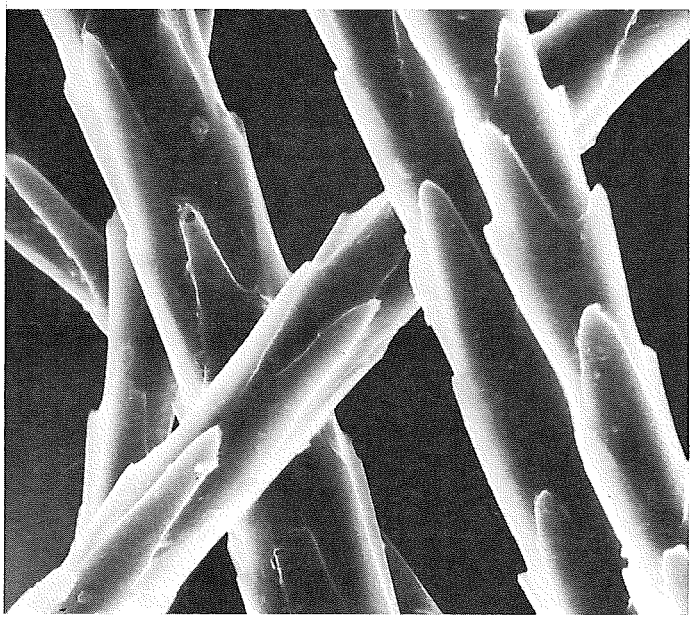

Fig. 11. Male ferret, 1 year old, neck area, fine hairs at the middle part of the hair shaft, 1000 x.

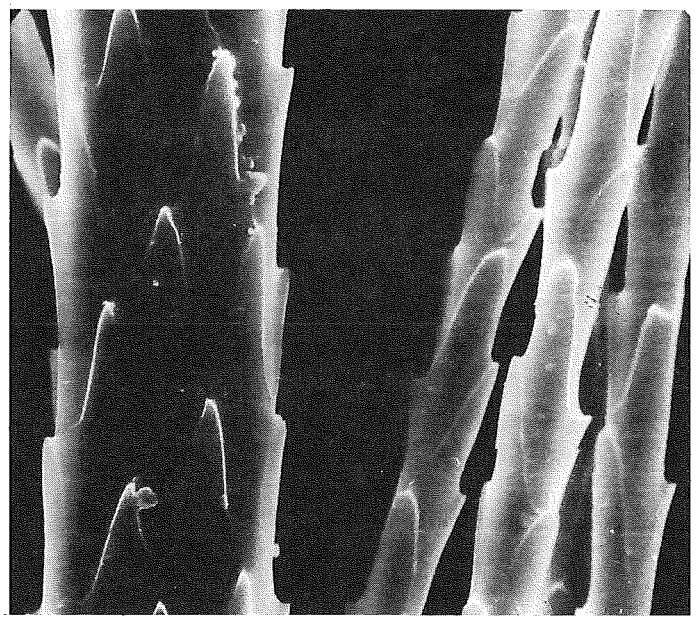

Fig. 12. Female ferret, 1 year old, belly part, the cuticle of the hairs in the middle part of the hair shaft, 1000 x.

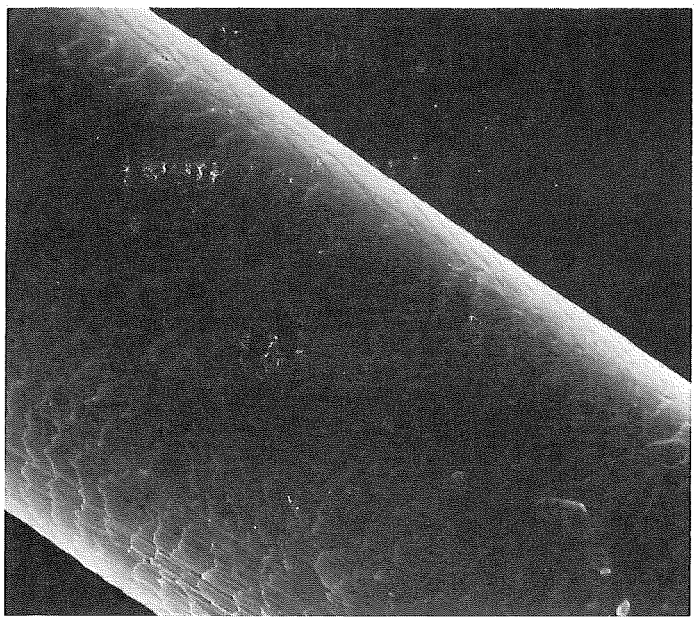

Fig. 13. Male ferret, 1 year old, belly area, the cuticle of the guard hair, 1000 x.

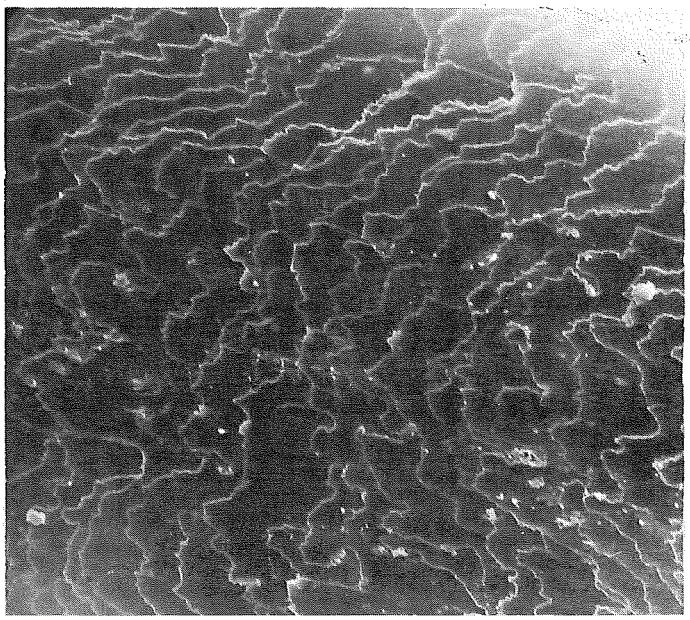

Fig. 14. Male ferret, 1 year old, back area, the surface of the guard hair in the upper part, 1000 x.

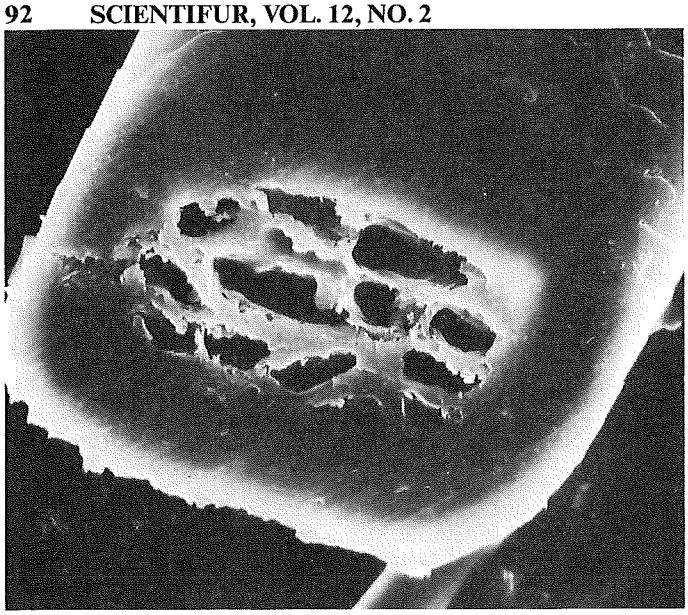

Fig. 15. Female ferret, 1 year old, back area, cross-section in the upper part of the guard hair, 1000 x.

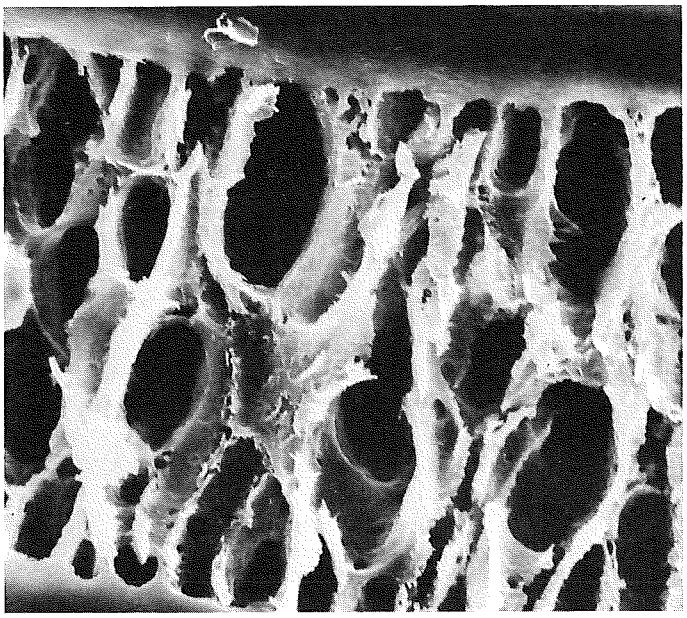

Fig. 16. Male ferret, 1 year old, neck area, the medullar structure of the guard hair in the upper part of the shaft, 1000 x.

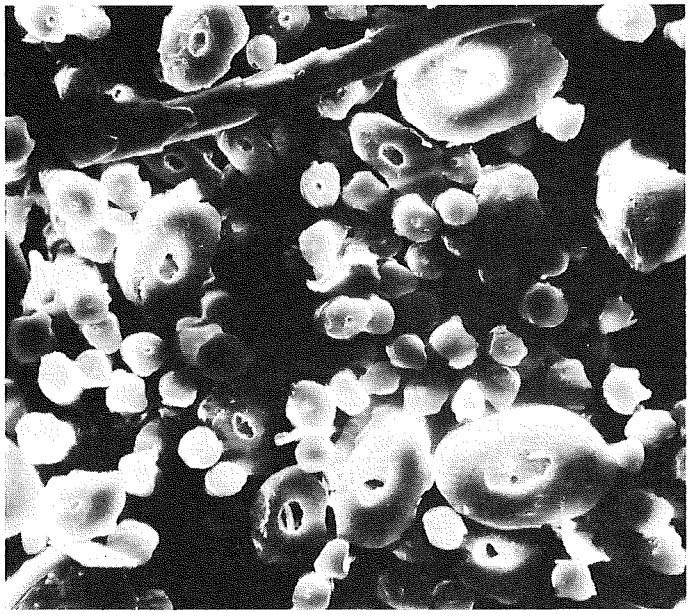

Fig. 17. Female ferret, 133 days old, back part, the cross-sectioned hairs in the lower part of the hair shafts, 400 x.

Fig. 18. Female ferret, 133 days old, back area, cross-sectioned hairs in the upper part of the hair shafts, 400 x.

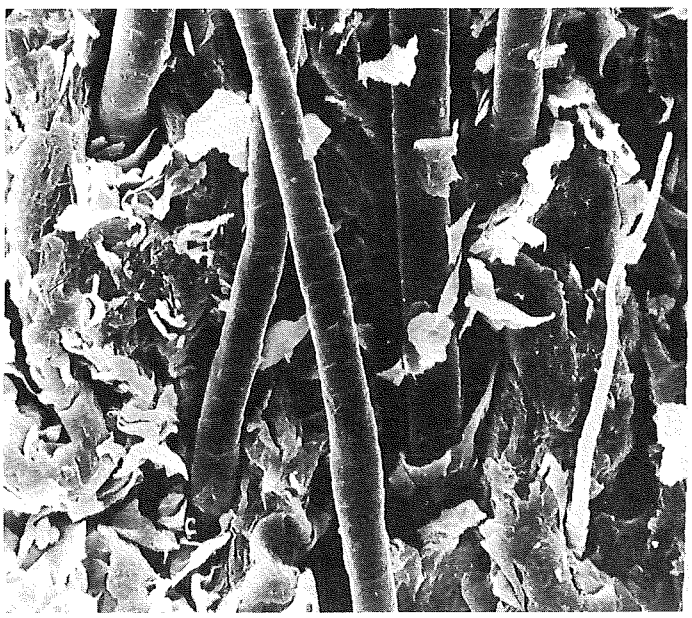

Fig. 19. Male ferret, newly born, back area, the surface of the skin, 400 x.

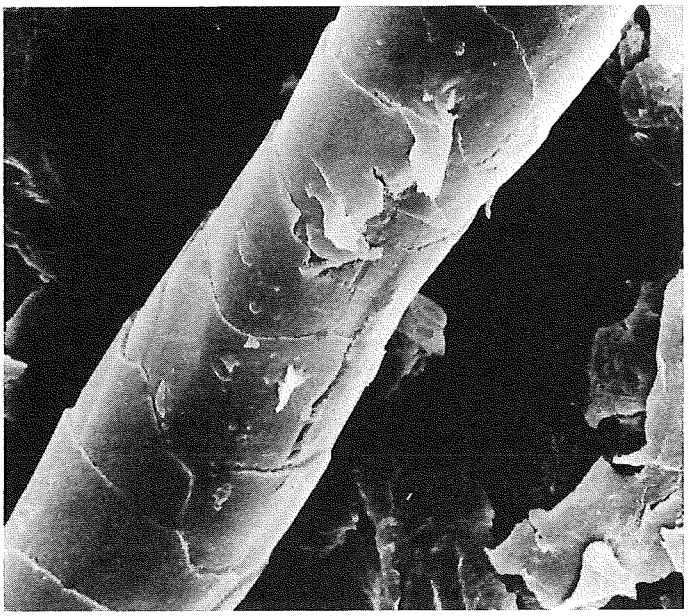

Fig. 20. Male ferret, newly born, back area, the surface structure of the first hair, 2000 x.

For including in SCIENTIFUR Vol. 12, No 1, pp 14-15

We regret that the pictures in this report was not of satisfactory quality. Therefore this reprint

Morphological and Chemical Studies on the Bending Guard Hairs of Mink (Mustela vison) Ranched in Quinghai Plateau, China

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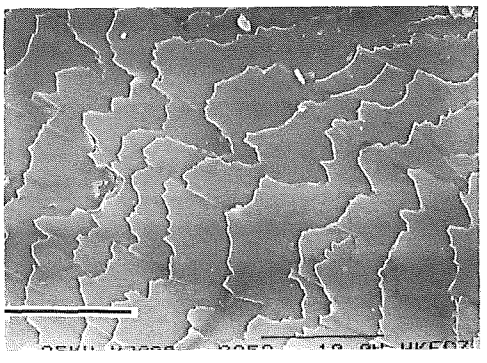

Fig. 1. Scanning electron micrograph of normal guard hair. Bar=5μm

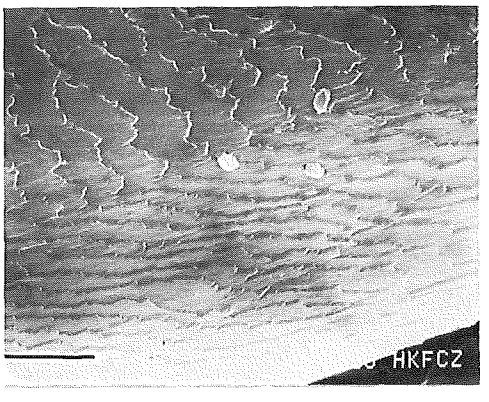

Fig. 2. Scanning electron micrograph of scales of bending guard hair. Bar=5μm

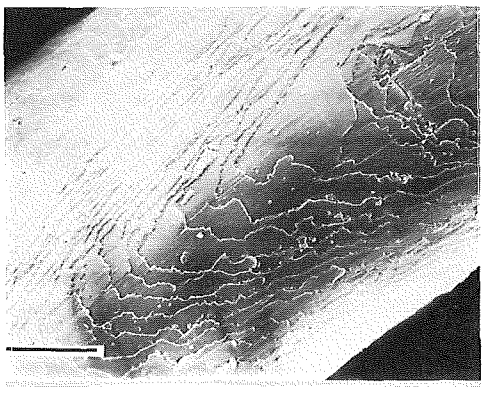

Fig. 3. Scanning electron micrograph of scales of bending guard hair. Bar=5μm

TURN OVER

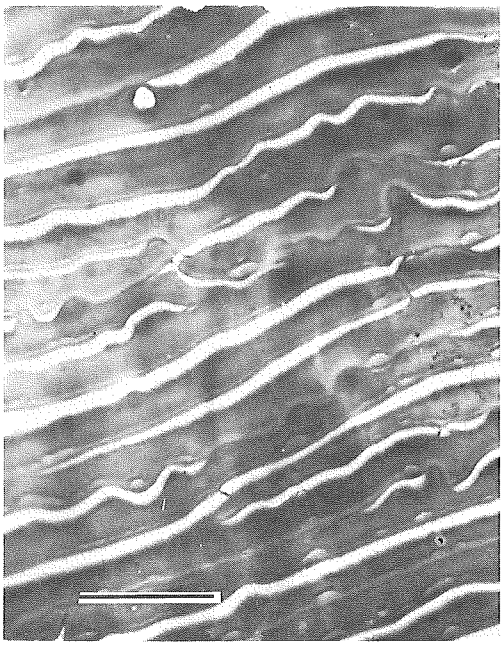

Fig. 4. Transmission electron micrograph of scale layers of bending guard hair. Bar=1μm

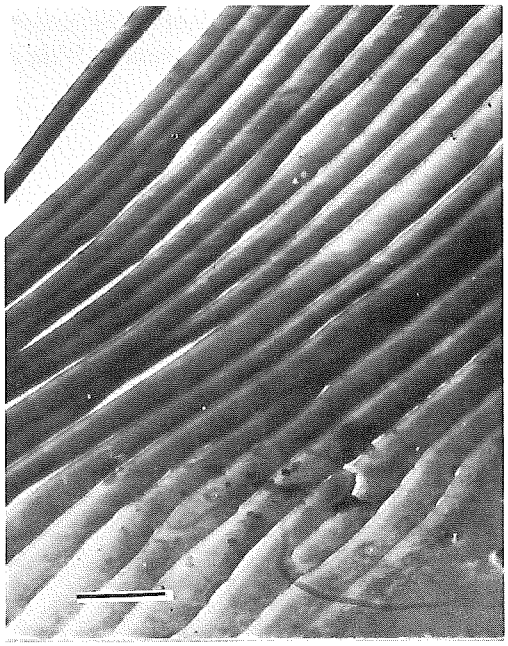

Fig. 5. Transmission electron micrograph of scale layers of normal guard hair. Bar=1μm

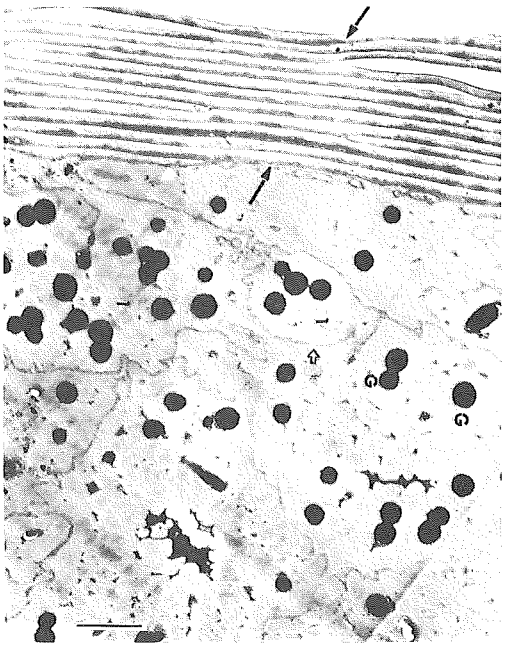

Fig. 6. Transmission electron micrograph of normal guard hair.
→ ←:Scales; G:Melanine granules. Bar=1μm

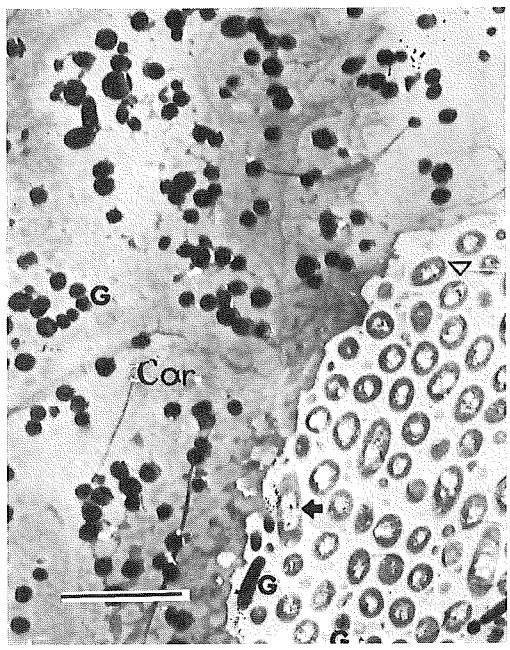

Fig. 7. Transmission electron micrograph of normal guard hair Cor:Cortex; G:Melanine granules;←:medulla;Δ:Air spaces. Bar=1μm

Original report

Acupuncture Nomenclature: Meridians and their European names

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Fundametally, there are 12 paired and 2 unpaired main meridians. Their designations correspond to some of the organs of the body (Table 1). The 12 meridians consist of 6 Yin and 6 Yang meridians. In animals, the Yin meridians are found on the ventral part of the body and on the medial part of the legs, whereas the Yang meridians - with the exception of one (stomach) - are found on the back of the body and on the lateral part of the legs. The 12 main meridians are found on both the right and the left parts of the body. The 2 unpaired main meridians are situated in the midlines of the body on the back and on the abdomen/chest. Furthermore, there are a number of extra meridians.

The acupuncture points are found on the meridians through which the energy flows continously. More than 1000 acupuncture points have been registred on the human body. The acupuncture points have a diameter of 3-5 mm on the surface of the skin, but they also extend into the depth of the body. In the acupuncture points the energy of the meridians get into contact with the outer environment via the skin, and the flow of energy can be influenced through the acupuncture points. The acupuncture points have lower electric resistance than the surrounding skin.

A Japanese scientist has found that the skin resistance is further reduced in the points that have connection with diseased organs,

Table 1. Names and abbreviations of the main meridian.

Name of meridian	Abbreviation in English	German	French
Heart	HT/H	H	C
Small intestine	SI	DÜ	IG
Bladder	BL/Bl/B	B	V
Kidney	KI/K	N	R
Pericardium	HC/P	KS	ECS/MC
Triple Heater	TH/3H/SJ	3E	TR
Gallbladder	GB/G	GB/Gb	Vb
Liver	LV/Liv/Li	LE/Le	F
Lung	LU/Lu	Lu	P
Large intestine	LI	Di	GI
Stomach	ST/St	M/Ma	E
Spleen-Pancreas	SP	MP	RP
Two non-paired:			
Conception Vessel/ Jenn-Mo/Ren Mai	CV	KG/Kg	VC
Governor Vessel/ Pilot Vessel/Tou-Mo Du-Mai	GV/PV/Du	LG/Lg	VG

possibly due to localized changes in the autonomous nervous system.

On histological examination of tissue of acupuncture points, *Kellner*, an Austrian scientist, found an increased number of nerve endings in these points; and *Stiefvater* reports that acupuncture points are often found in areas with many arterio-venous anastomoses and in the neighbourhood of larger blood vessels and nerves.

It is a clinical experience that many of the acupuncture points are more sensitive to pain by pressure (acupressure) than other tissue areas, especially in cases of disease.

The meridians have different numbers of acupuncture points. (9 on the heart meridian and 67 on the bladder meridian) in human beings. Each point has its own Chinese name. In Europe, we have also given the points numbers.

We have not found the same number of points in animals as in humans, and generally it is not possible to transfer the location of a point from the human being to the animals.

The reader is referred to the veterinary literature on acupuncture beginning with "Veterinär-Akupunktur, Spezielle Akupunktur bei Rind, Schwein und Pferd" by *O. Kothbauer* and *A. Meng*, Verlag Welsermühl, Wels, Austria, 1983.

"It must be acupuncture! My toothache is gone."

The topography of acupuncture points responsible for the level of cellular immunity in polar foxes

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Summary
The aim of the research was to locate the acupuncture points responsible for cellular immunity in young polar foxes. The experimental material comprised 35 cubs of polar foxes aged 11 and 20 weeks and originating from different litters. Specific points were located with the help of a prototype sound detector. It has been observed that the localization of the immunity points is possible in young and older foxes. The following points should be considered in further investigations on the immunity stimulation: Du 14, LI 4, LI 11, GB 39, SP 6, and ST 36.

Introduction
The present research is a trial to define the possibility of immunity increase in young polar foxes after their weaning with the help of acupuncture method. At the time of weaning the specific immune mechanisms are not fully developed yet, thus the immunity level of weaned animals is lower as compared to mature ones. That is why, during this period, one can often observe an increased number of deaths of young foxes which leads to high economic losses.

Acupuncture shows anti-bacterial and anti-inflammatory action and also produces an immune response in the lymphatic nodes. Acupuncture affects the defense system of the organism. The points LI 4, LI 11, ST 36, Du 14, GB 39, SP 6, and others greatly increase the immune response as well as leucocytosis and phagacytosis. Some points, such as Du 14, ST 36, show an antipyretic action and also prevent or limit the tissue response to the inflammatory changes after the radiation.

The aim of the research was the localization of acupuncture points responsible for cellular immunity in young polar foxes, namely Du 14, LI 4, GB 39, SP 6, ST 36.

Material and methods
A series of two experiments was carried out on the farm of polar and silver foxes at Duchnice near Ozarów from June to October 1986.

Experiment 1
The experimental material comprised 35 polar fox cubs aged 11 and 20 weeks originating from the litters of 3 dams. The first dam, z-108, was born on 1st May, 1985. It originated from a litter of 17, out of which 12 were reared. On 4th June, 1986 she gave birth to 11 cubs, all of which were reared (7 males and 4 females). The second dam, W-452, was born on 4th May, 1985. She originated from a litter of 9 born and reared cubs. On 4th June, 1986 she gave birth to 10 cubs and reared all of them (4 males and 6 females). The third dam, z-1288, was born on 17th May, 1985. She originated from a litter of born and 9 reared cubs. On 4th June, 1986 she gave birth to 14 cubs rearing all of them (6 males and 8 females).

The foxes were fed according to the standard diets accepted on Polish farms and kept in the pavillon type cages.

All the animals from the three above mentioned litters were used to localize the points responsible for cellular immunity. The animals were not tied up for the examination;

they were put on the table and immobilized by pressing their necks to the table surface. Specific points were localized with the help of a prototype sound detecting device. According to *Tabiejeva* (1980) and *Wogralik* (1974) the acupuncture points are characterized by specific bioelectric features, i.e. an increased electric conductivity as compared to the surrounding tissue (8).

The following points which stimulate the cellular immunity in animals have been checked: Du 14, LI 4, LI 11, GB 39, SP 6, and ST 36.

Results and discussion

Acupuncture points in animals have the same localization as in man. The localization and function of these points and the technique of their activation are described in the special literature and medical and veterinary text books. On the basis of the accessible literature such as Advances in Acupuncture and Acupuncture Anaestesia, 1979 (1), Anatomical Charts of the Chinese Acupuncture, 1975 (3), *Anon, J.* (4), *Brunner, F.* (5), *Klide, A.M.* and *Kung, S.H.* (6), *Rubin, M.* (7), *Westmayer, K.* (9), and *Voisin, H.* (10) the trials were

Table 1. The characteristic of the chosen immunity points.

No.	European and Chinese name	Localization of the points	Intensity of the tone
1	DU 14 Dazhui	Between the spinous processes of the 7th cevical vertebra the 1st thoracic vertebra	
2	Li 4 Hegu	Between the 1st and 2nd metacarpal bones, approximately in the middle of the 2nd metacarpal bone on the radial side	High
3	LI 11 QUCHI	When the elbow is flexed, the point is in the depression at the laternal end of the transverse cubital crease, midway between Chize (Lu 5) and the lateral epicondyle of the humerus.	High
4	GB 39 Xuanzhong	The tip of the external malledus in the depression between the posterior border of the fibula and the tendons of m. peronaeus longus and brevis.	Quite high
5	SP 6 Sanyingiao	Directly above the tip of the Medial malleous, on the posterior border of the tibia, on the line drawn from the medial malleolus.	Quite high
6	ST 36 Zusanli	Below Dubi (ST 36) one fingerbreadth from the anterior crest of the tibia.	high

undertaken of the localization of the points responsible for the increase of the cellular immunity in polar foxes. These trials were based on the topographical arrangement of these points in man and other species of animals (see Table 1 and Fig. a and b). Six points have been localized (see Table 1). This localization of the points in the polar fox cubs both at the age of 11 as well as 20 weeks did not cause any special difficulties.

Conclusions

1. The localization of the immune acupuncture points is possible both in young and older polar foxes.
2. The following points should be considered for further investigations of the stimulation of immunity in foxes: Du 14, LI 4, LI 11, GB 39, SP 6, and ST 36.

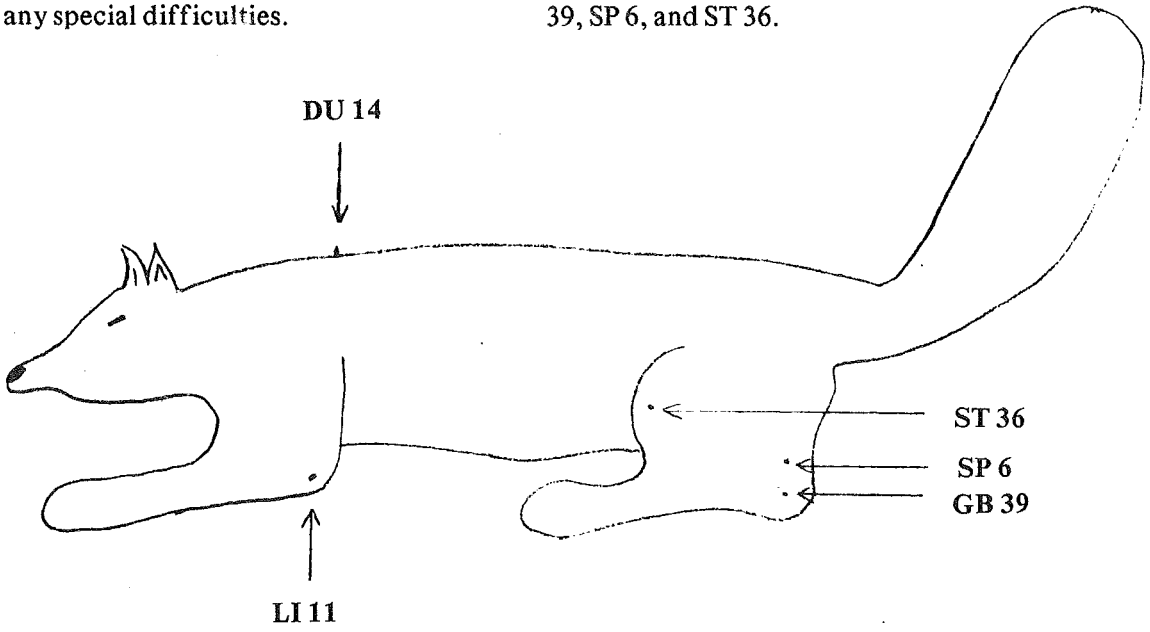

Fig. a. The topography of the points responsible for immunity in fox (lateral view).

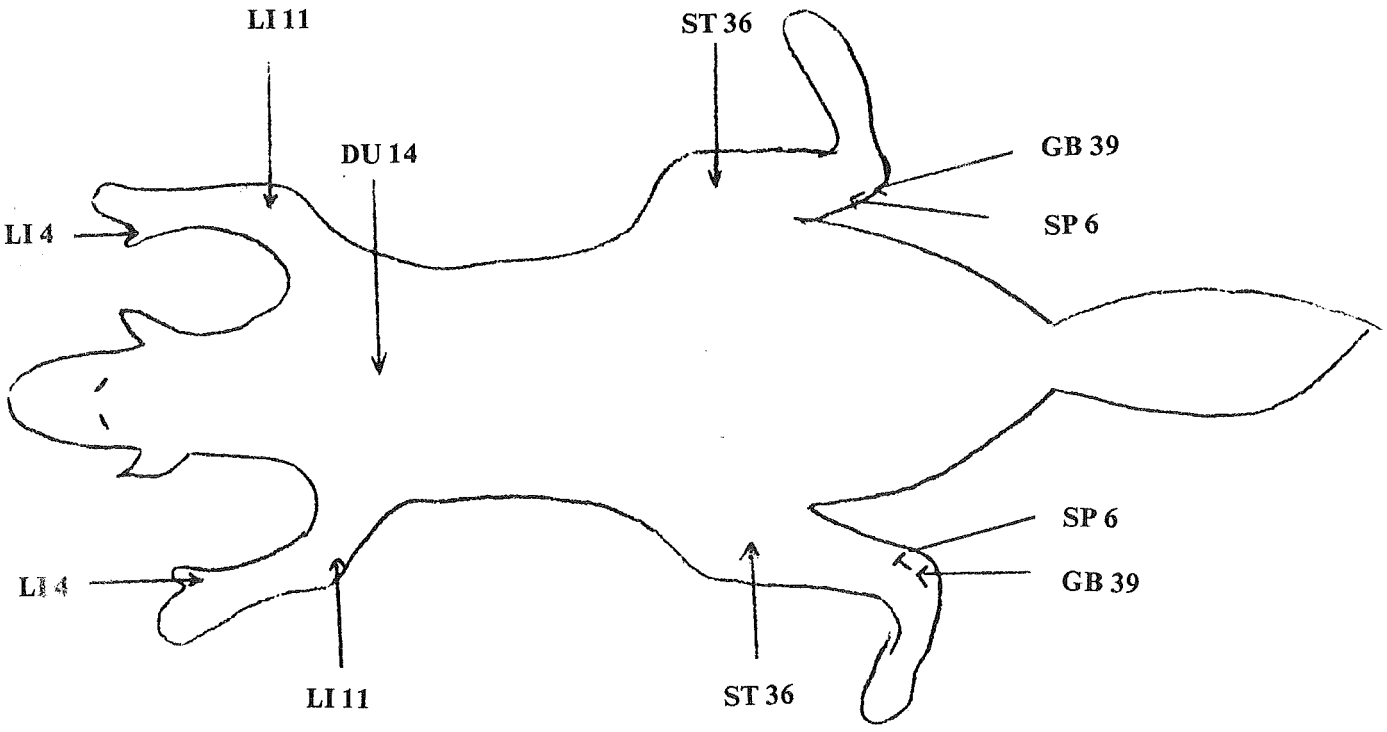

Fig. b. The topography of the points responsible for immunity in fox (dorsal view).

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Original report

Immunity stimulation in young polar foxes with the help of acupuncture

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Summary

The aim of this research was the application of acupuncture in young polar foxes in order to create an increased leucocyte reaction as an immunological factor during the period prior to prophylactic vaccinations. The experiment was carried out on young polar foxes divided into 2 groups. Group I comprised 12 young foxes aged 6 weeks and Group II - 12 foxes aged 8 weeks. The acupuncture points were localized using a prototype sound detector. In both control groups the electroacupuncture was applied in the spots nonspecific for immunological reaction (placebo) in the region of gluteal muscles. In the experimental groups the electroacupuncture was applied in the points LI 4 (Hegu) and LI 11 (Quichi). Blood samples for the investigations were collected prior to needling and in 4, 10, 28, and 42 days
after the stimulation. Quantitative picture of white blood cells was evaluated according to Arnett-Schilling and the number of white cells was determined.

In 6 week old foxes, 4 days after the stimulation, the leucocyte level increased by 99%, in 10 days by 71%, in 28 days by 48% and in 42 days still by 43%. The obtained results are highly significant. In 8 week old cubs, 4 days after the acupuncture elctrostimulation the level of leucocytes increased by 65%, after 10 days by 36%, after 28 days by 30% and after 42 days by 34%. The obtained differences are highly significant.

In 6 week old polar fox cubs, 10 and 28 days after the acupuncture stimulation, lymphocytopenia and per cent increase of the number of rod-shaped and segmented neutrophils are observed in the investigated group. After 42 days the number of neutrophils decreases and the number of lymphocytes increases. From the 4th to 42nd day after the needling the decrease of the number of monocytes is observed.

In 4, 10, and 28 days after the needling of 8 week old cubs, the increase of the number of rod-shaped and segmented neutrophils and a per cent decrease of lymphocytes were observed. In 42 days the number of lymphocytes increases and percentage of neutrophils decreases. From 4th to 42nd day after the needling also a per cent decrease of monocytes is noted. A significant increase of the level of leucocytes has been noted in the polar fox cubs after their needling in the points LI 4 and LI 11. The increase of the level of neutrophils had been observed up to 28th day since the stimulation. In 42 days after needling the level of leucocytes increases and neutrophils decreases. In animals subjected to acupunctture, the number of moncytes decreases. The changes in the number of leucocytes and their percentage composition should be connected with the immunostimulation of the points LI 4 and LI 11.

Introduction

The problem of immunity in young animals is of great importance for their survival rate, growth, and further development. During the first period of their postnatal life, in a big number of mammals, the immune mechanisms do not act yet. During the lactation period some immune bodies are passed to the suckers with their mothers' milk. The crucial and critical stage in the life of young animals is the period of weaning. After the weaning they do not get the immune bodies contained in the milk and their own immune mechanisms are not yet fully developed and adapted to the production of adequate amounts of an-

tibodies. Thus, in the discussed period the incomplete immunity cannot prevent different infections and diseases often leading to death.

According to Evans (1), 6 weeks after weaning 30% of dog pups do not have maternal antibodies, after 8 weeks - 65%, and after 12 weeks - 98% of young pups. This period when young animals do not have their mother's antibodies and their own immunity system does not act yet is described as the "immunity gap". It can be assumed that because of it, during that period, one can observe frequent deaths of young foxes causing serious economic losses. In order to prevent that, an attempt was made at the stimulation of cellular immunity in young polar foxes after their weaning (at the age of 6 -7 weeks) with the help of electroacupuncture.

Material and methods

The experiment was carried out on a farm of polar foxes at Duchnice near Ozarrów from June to July 1985.

Experiment I was carried out on 12 polar foxes cubs aged 6 weeks originated from the dam W 664, including 3 males and 3 females in the control group and 2 males and 4 females in the experimental group. In Experiment II, both the experimental and control groups amounted to 6 cubs each, all of them aged 8 weeks and originated from one litter of the dam U 200. The control group comprised 1 male and 5 females and the experimental group - also 1 male and 5 females.

The foxes were fed standard diet accepted on Polish farms and kept in pavillon type cages. Acupuncture points responsible for the level of cellular immunity were localized with the help of a prototype sound detector[xx].

In the control groups of both experiments the electroacupuncture was applied in the spots non-specific for the immune reaction (placebo), i.e. in the region of gluteal muscles. In the experimental groups the electroacupuncture was applied in the specific points LI 4 (Hegu) and LI 11 (Quichi) according to the rules described in the paper by *Sciesinski* et al. (5). A prototype electric stimulator[x] was used in the experiment.

Needles were inserted in the non-specific spots (on the buttocks) and specific points LI 4 and LI 11 (see Fig. a and b). The needles were connected with the stimulator operating on variable current producing the voltage of 6 V, current intensity of 200 mA and frequency of 6 Hz. The time of the stimulation of the points both in the control and experimental animals was 5 min.

Blood samples for the investigations were collected from the forefoot after cutting off the clow. The samples were collected before needling and in 4, 10, 28, and 42 days after it. The qualitative picture of white blood cells was evaluated (according to *Arnett-Schilling)* and the number of white blood cells was determined (2,3).

Statistical analysis of the results was done by the method of two-way variance analysis. The value of the F (Fischer test) was determined. The results were statistically evaluated applying t Student test at the level p=0.05 and 0.01 (4).

Results and discussion

Table 1 and Figure 1 show the level of leucocytes in 6 week old foxes after the acupuncture electrostimulation of the points LI 4 and LI 11 before needling and after the single needling. In 4 days since the needling the level of leucocytes increased by 99%, in 10 days by 71%, in 28 days by 48% and in 42 days by 43%. The obtained results were highly significant.

Table 2 and Figure 2 show the level of leucocytes in 8 week old foxes after the acupuncture electrostimulation of the points LI 4 and LI 11 before and after the needling. In 4 days since the needling the level of leucocytes increased by 65%, in 10 days by 36%, in 28 days by 30% and in 42 days by 34%. The obtained differences were highly significant.

Table 3 shows the proportional composition of leucocytes in 6 week old foxes after the acupuncture stimulation in the points LI 4 and LI 11. In 10 and 28 days since the needling, in the investigated group one can observe lymphocytopenia, monocytopenia and the increase of the rod-shaped and segmented neutrophils. In 42 days the number of neutrophils decreased and the number of lymphocytes incresed in the investigated group. From 4th to 42nd day after the needling the number of monocytes decreased.

In Experiment II (see Table 4), after the stimulation of LI 4 and LI 11 points in 8 week old foxes, in 4, 10, and 28 days since the needling, the increase of the number of rod-shaped and segmented neutrophils could be observed as well as the proportional decrease of lymphocytes. In 42 days since the needling the number of lymphocytes increased and the number of rod-shaped and segmented neutrop-

Experiment I

Table 1. The level of leucocytes in 6-weeks old polar foxes after the electrostimulation of the LI 4 and LI 11.

Needling	Control group			Experimental group			% increase of the number of leucocytes
	X	S	V	X	S	V	
Prior to	7.683	1.406	18.3%	7.367	388	5.3%	-
4 days after	6.400	698	10.9%	14.667*	3.027	20.6%	99%g
10 days after	6.342	1.029	16.2%	12.633*	3.329	26.4%	71%
28 days after	6.808	227	3.3%	10.925*	461	4.2%	48%
42 days after	6.867	627	9.1%	10.567*	355	3.4%	43%

X - mean value of the level of leucocytes in 1 mm^3 of blood.
S - standard deviation
V - coefficient of variation
* - differences highly significant p = 0.01.
Graphic picture of the changes of the level of leucocytes are presented in Fig. 4.

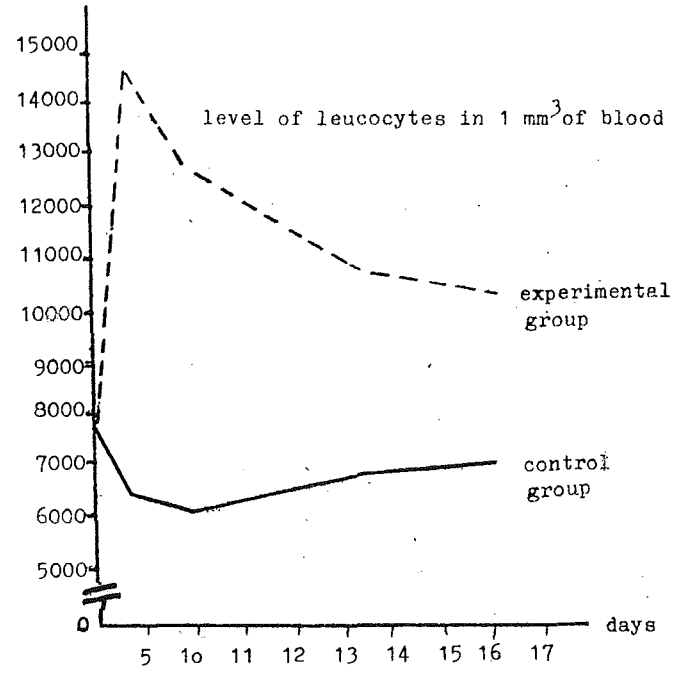

Fig.1 The level of leucocytes in 6 week old polar foxes after the electrostimulation of the points Li 4 and Li 11.

Experiment II

Table 2. The level of leucocytes in 8 weeks old polar foxes after the electro stimulation of the points LI 4 and LI 11.

Needling	Control group			Experimental group			% increase of the number of leucocytes
	X	S	V	X	S	V	
Prior to	6.892	666	9.7%	8.000	871	10.9%	-
4 days after	7.458	788	10.6%	13.233*	1.693	12.8%	65%
10 days after	6.608	881	13.3%	10.842*	582	5.4%	36%
28 days after	6.850	686	10.1%	10.377*	355	3.4%	30%
42 days after	7.050	570	8.1%	10.683*	693	6.5%	34%

X - mean value of the level of leucocytes in 1 mm^3 of blood.
S - standard deviation
V - coefficient of variation
* - differences highly significant = 0.01

Graphic picture of changes of the level of leucocytes are presented in Fig. 2.

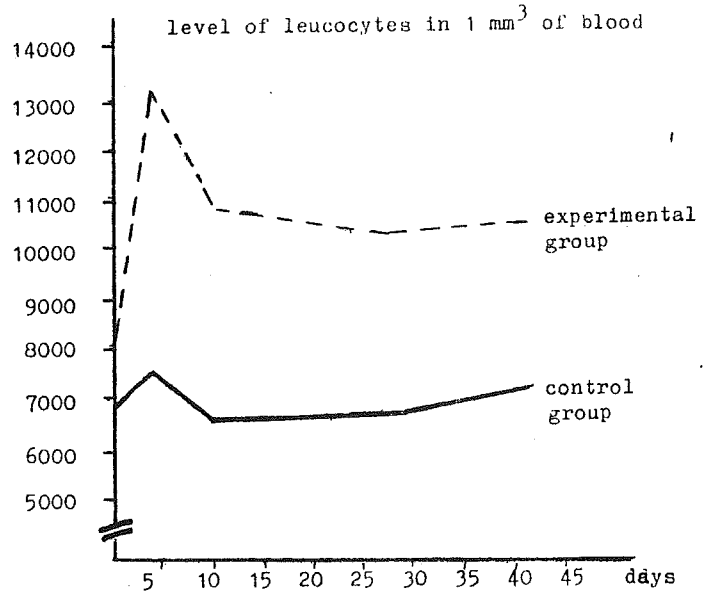

Fig.2 The level of leucocytes in 8 week old polar foxes after electrostimulation of the points LI 4 and LI 11.

hils decreased. Since the 4th day after the needling the proportional decrease of the number of monocytes was observed.

Considerable leucocytosis was observed in rabbits after the acupuncture stimulation of LI 4 and LI 11 points (5). Similar results were obtained by *Wu* et al. (1978) who drew the conclusion that it was possible that the acupuncture in the point LI 11 caused a secretion of leucocyte factor to the blood (6).

While investigating the electrostimulation of the acupuncture points LI 4 and LI 11 in polar fox cubs, one could notice a considerable leucocytosis and the change in the proportional composition of leucocytes, first - neutrophilia and then lymphocytosis were observed. The observed changes in fox cubs should be connected with the immunostimulation of the organisms by the acupuncture stimulus.

Table 3. Proportional composition of leucocytes in 6 weeks old polar foxes after the electrostimulation of the LI 4 and LI 11.

	Control group					Experimental group				
	Prior to needling	4 days after	10 days after	28 days after	42 days after	Prior to needling	4 days after	10 days after	28 days after	42 days after
P	0.9	0.0	1.0	0.3	0.5	0.8	0.5	1.7	1.2	0.0
S	47.9	46.8	44.5	47.3	42.1	50.8	51.8	60.7	59.8	39.7
E	4.1	5.3	6.5	4.9	5.5	4.0	5.9	4.5	2.8	4.0
L	45.2	45.8	46.2	45.4	48.7	41.2	40.3	34.0	34.0	55.5
M	1.9	2.1	1.8	2.1	3.2	3.2	1.5	1.1	2.2	2.8

P - rod-shaped neutrophils S - segmented neutrophils E - eosinophils
L - lymphocytes M - monocytes

Table 4. Proportional composition of leucocytes in 8 weeks old polar foxes after the electrostimulation of the LI 4 and LI 11.

	Control group					Experimental group				
	Prior to needling	4 days after	10 days after	28 days after	42 days after	Prior to needling	4 days after	10 days after	28 days after	42 days after
P	0.2	0.2	0.2	0.2	0.2	0.0	0.4	1.0	0.5	0.0
S	45.3	45.3	47.5	47.6	43.2	46.3	47.6	50.1	48.2	31.2
E	4.0	5.0	3.7	2.7	3.2	2.2	2.8	3.7	4.0	4.2
L	48.3	46.5	45.8	46.7	49.0	47.7	46.7	43.0	45.3	62.0
M	2.2	3.0	1.8	2.8	4.4	3.8	2.7	2.2	2.0	2.3

P - rod - shaped neutrophils S - segmented neutrophils M - monocytes
E - eosinophilis L - lymphocytes

Conclusions

1. The increase of the leucocyte level was observed in polar fox cubs in the points LI 4 and LI 11.
2. The increase of the level of neutrophils was observed up to 28 days after needling.
3. In 42 days after the needling, the increase of lymphocytes and the decrease of neutrophils were observed.
4. The decrease of moncytes was observed from the beginning of the needling.
5. The changes in the number of leucocytes and in their proportional composition should be connected with the immunostimulation of the organisms of young foxes with the applied acupuncture stimulus.

[xx] The scheme for the detector was worked out by *K. Sciesinski* and built by the Department of Instrumentation.

[x] The scheme of the stimulator was worked out by *K. Sciesinski* and built by Dr *A. Cielecki*.

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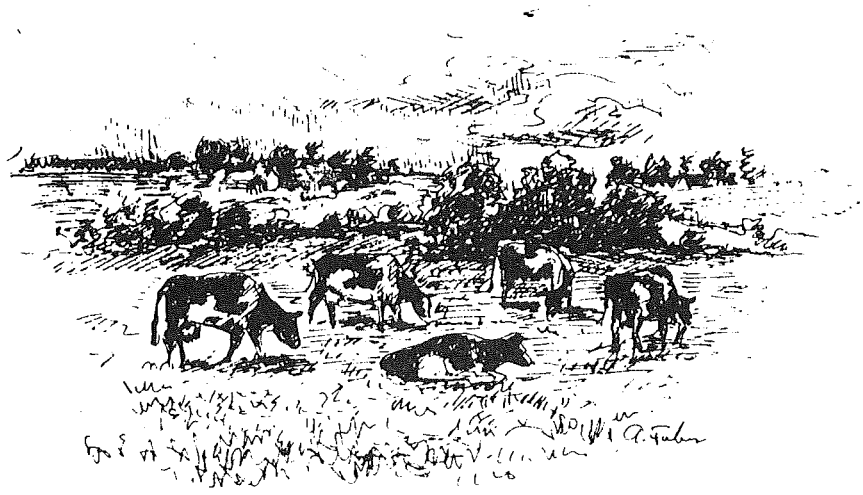

Original report

Stimulation of cell immunity in young polar foxes by electro-puncture of the QUCHI point

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Summary

The aim of the experiment was an attempt at establishing the possibility of increasing the cell immunity of young polar foxes after their weaning using the electropuncture method. The experimental material comrised 24 cubs of polar foxes aged 7 weeks originated from litters of 3 females.

The experiment was carried out on 4 males and 4 females from each litter.

The control and experimental groups comprised 12 animals each, i.e. 4 animals from each litter.

The acupuncture point was localized with the help of the Acupuncture expert system produced by soft Electronic System-Szczecin. It is an apparatus on the basis of ZX Spectrum computer with the interface and the program based on the Ryodoraku method. In the experiment carried out in the control group the electro-puncture was applied in the points non-specific for the immune reaction (placebo) localized in the region of gluteal muscles. In the experimental group the electropuncture was applied in the specific point QUCHI (LI 11).

Significant differences as to the level of leucocytes and their per cent composition in young polar foxes after the electropuncture of the QUCHI (LI 11) point show the possibility of the future use of electropuncture as a method increasing the cell immunity in young polar foxes.

Introduction

The aim of present work was an attempt at establishing the possibility of increasing the immunity of young polar foxes after their weaning applying the method of acupuncture. Since the immune mechanisms are not yet developed at the age, the level of immunity is lower as compared to adult animals. Right after weaning young animals are exposed to infections of different types. Additionally they face different environmental conditions (especially different feeding) and are under stress caused by the fact of weaning. Such situation causes an increased number of deaths among young animals leading to great progeny losses.

Because the possibility of immunity increase in young foxes breed on Polish farms are limited, an attempt was made to apply a new method such as the acupuncture.

Material and methods

The experimental was carried out on a farm of polar foxes and silver at Duchnice near Ozarow during the period from July to September 1987.

The experimental material comprised 24 fox cubs aged 7 weeks originated from litters of 3 females.

Z 2040 (born 9.06.87 - 11 cubs)
Z 954 (born 7-06.87 - 9 cubs)
A 686 (born 9.06.87 - 9 cubs)

The experiment was carried out on 4 males and 4 females from each litter. The control group comprised 12 animals, i.e. 4 from each litter.

The foxes were fed according to the traditional system accepted on Polish farms. The cubs were kept in the pavillon type cages. The acupuncture point was localized with the

help of the Acupuncture expert system produced by SOFT Electronic - Sxczecin. It is an apparatus on the basis of ZX Spectrum computer with the interface and the program based on the RYODORAKU metheod (4, 6, 7, 8, 9).

The therapeutic part of the apparatus allows the identification of the points and their stimulation through the skin with direct current the voltage of which can be regulated. During the experiment in the control group the electropuncture was applied in non-specific places for the immune reaction (placebo) localized in the region of gluteal muscles. In the experimental groups the electropuncture was applied in the specific point QUCHI (LI 11). The point was identified with the help of active electrode. Then the active electrode was applied to the non-specific points (on the buttocks) in the control group and to the specific point QUCHI (LI 11) in the experimental group.

The electrodes were connected to the interface Acupuncture system operating on direct current producing the voltage of 12V, intensity of 200 mA and frequency of 10 Hz. The time of stimulation of the points both in the control and experimental animals amounted to 10 min.

Blood samples were collected after cutting off the claw in the fore leg before the stimulation and 3, 6, 20, 27, 34, 42, and 56 days after the stimulation.

The number of white blood cells was determined and their qualitative picture was evaluated (according to *Arnett Schilling*).
The results were evaluated statistically using the t-Student test at the significance level of p=0.05 and p=0.01.

Results and Discussion

The level of leucocytes increases from 3rd day after the electrostimulation of the QUCHI point. This increase is observed up to 42nd day (6 weeks) after the procedure (Table 1). The obtained results are highly significant. In 56 days after the electropuncture of the QUCHI (LI 11) point the result are non-significant.

Table 1. The level of leucocytes (in thousands) in young polar foxes after the acupuncture of the QUCHI point (LI 11).

Time of examination	Control group		Experimental group	
	X	V	X	V
Prior to stimulation	7.042	13.7%	6.550	7.4%
3 days after stimulation	7.346	33.3%	14.504^{XX}	5.6%
6 days after stimulation	8.021	9.4%	13.775^{XX}	7.8%
13 days after stimulation	9.598	2.45%	15.350^{XX}	8.0%
20 days after stimulation	9.487	11.1%	14.712^{XX}	7.2%
27 days after stimulation	9.583	8.56%	13.525^{XX}	17.4%
34 days after stimulation	9.354	10.1%	12.070^{XX}	15.6%
42 days after stimulation	11.129	13.5%	14.050^{XX}	9.9%
56 days after stimulation	12.146	23.3%	10.610^{XX}	15.9%

X - mean value of leucocyte in 1 mm^3 of blood.
V - Changeability coefficient.
^{XX} - differences statistically highly significant.

Similar picture of leucocytosis was obtained in rabbits punctured in the points QUCHI and HEGU (11).

Table 2 presents the per cent composition of leucocytes in young foxes before and after electropuncture.

There is observed an increase of the rod-shaped and segmented neutrophiles and a decrease of the level of lymphocytes. The per cent of monocytes increases from 27th day since the acupuncture (Table 2). A slight increase of eosinophils is observed in the experimental group 42 days after the procedure (Table 2).

In 6 days after the procedure a slow decrease of neutrophils and an increase of lymphocytes can be observed.

Table 2. Per cent composition of leucocytes in 7 weeks old polar foxes after electropuncture of the QUCHI (LI 11) point.

Needling	P		S		L		E		M	
	K	D	K	D	K	D	K	D	K	D
Before	0.2	0.5	37.5	30.8	56.1	63.1	3.3	1.5	2.9	3.1
3 days after	0.3	0.6	44.4	52.3	50.6	41.6	2.6	5.5	2.1	3.0
6 days after	0.2	0.8	45.6	53.5	49.90	40.7	2.1	2.5	2.3	2.5
13 days after	0.4	0.7	36.9	48.5	56.7	45.7	3.5	2.6	2.5	2.5
20 days after	0.5	0.8	40.32	47.4	53.0	44.3	4.08	2.5	2.1	2.5
27 days after	0.8	0.7	31.5	47.0	60.2	47.0	4.9	2.4	2.6	3.0
34 days after	0.08	0.5	41.8	46.0	51.8	55.7	4.0	2.3	2.2	5.5
42 days after	0.2	-	30.9	41.8	60.8	47.8	5.6	5.0	2.4	5.4
56 days after	0.08	-	28.9	32.6	63.8	56.9	5.2	6.0	2.5	4.5

P - rod-shaped neutrophiles S - segmented neutrophiles E - eosinophils
L - lymphocytes M - monocytes
K - control group D - experimental group

Conclusions

1). An increase of the level of leucocytes was observed in young polar foxes after the electropuncture of the QUCKI point.

2). Electropuncture caused some changes in the composition of leucocytes in fox cubs.

3). Significant differences in the level of leucocytes in polar foxes after acupuncture point to the possibility of its future use as a practical method increasing the immunity of young fox cubs.

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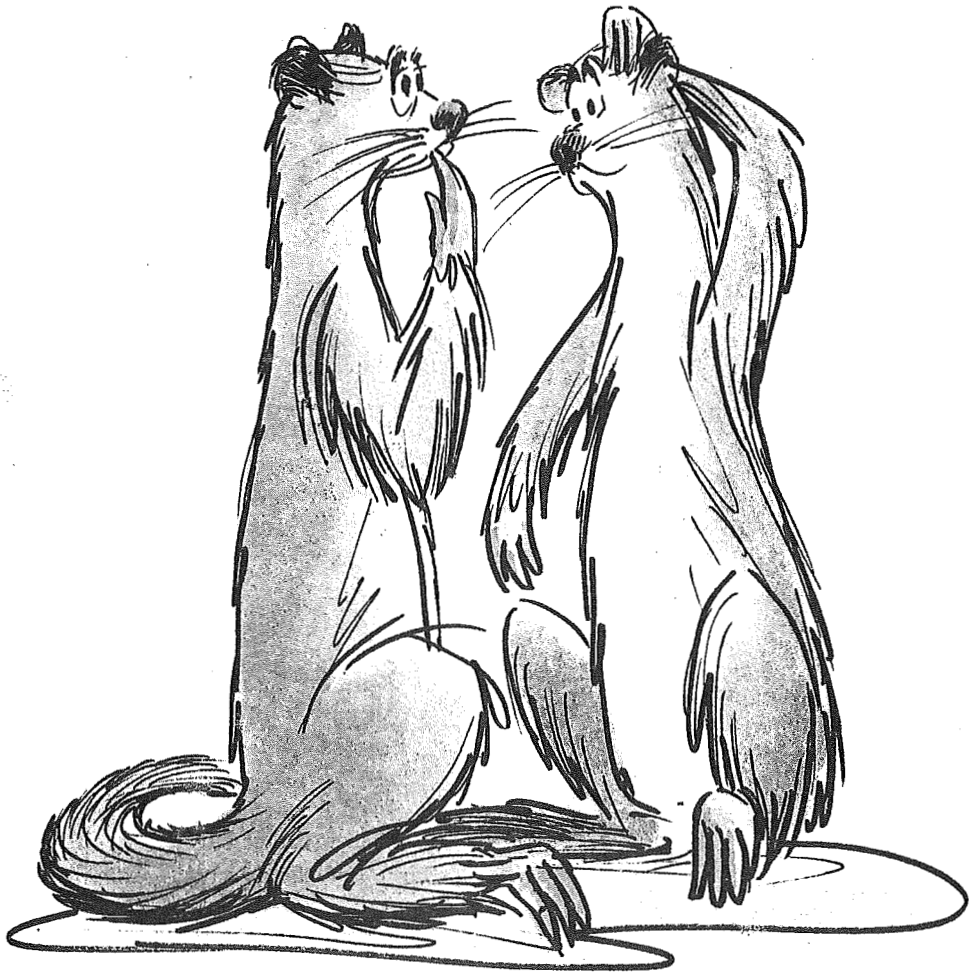

Original report

Producing immune reaction in adult foxes with the help of the acupuncture method

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Summary

The aim of the work was to produce leucocytosis as an immune factor in adult polar foxes.

The experimental material comprised 10 adult polar foxes aged 8.5 months and 12 foxes aged 6 months. The points were localized with sound detector. In the control groups the placebo points were localized with sound detector. In the control groups the placebo points were localized in the region of gluteal muscles. In the experimental groups the electrostimulation was applied in the points LI 4 (Hegu) and LI 11 (Quichi). Blood samples for the investigations were collected prior to needling and 4 h, 4 and 7 days after needling (8.5 month old foxes). The quantitative picture of white blood cells was evaluated according to Arnett-Schilling and the number of white blood cells was determined. In 24 h after the electrical stimulation of the points LI 4 and LI 11 in 8.5 month old foxes, the level of leucocytes increased by 89%, in 4 days by 61% and in 7 days by 99%. The obtained differences are highly significant. In 6 month old foxes the stimulation of LI 4 and LI 11 points produced an increase of the leucocyte level also after 16 days by 109%, after 74 days by 34%. The obtained results are highly significant.

In the experimental group of 8.5 month old foxes, already after 24h, the decrease of lymphocytes and the increase of the level of neutrophils are observed. On the 7th day after the electrostimulation the increase of neutrophils amounted to 9.7% and the decrease of lymphocytes to 13.3%. In the group of 6 month old foxes, in 16 days after the stimulation of the points the increase of neutrophils amounted to 13.5% and the decrease of lymphocytes to 14%. These tendencies are still observed in 73 days after the stimulation of the LI 4 and LI 11 points.

Introduction

There are proofs in the literature that acupuncture activate the immune mechanisms in animal organism.

Acupuncture is used with succes in the treatment of some infections, inflamations and alergies in animals (9, 13, 18). The effect of acupuncture on the reactions of the immune system in animals has been investigated in a number of aspects:

a) the differences in the production of antibodies,
b) the reactions in the form of leucocytosis and phagocytosis,
c) the reactions to an experimentally induced temperature,
d) the reactions in irradiated animals,
e) the antimicrobiological reactions,
f) the reactions in the lymphatic nodes (the effect on the lymphatic nodes),
g) the antiinflammatory reactions.

Acupuncture increases the production of antibodies with the use of specific antigen (2). It also increases phagocytosis and leucocytosis (9, 11, 16, 17). The papers by *Brunner* (5), *Klide* and *Kung* (9), *Milin* (10), *Westermayer* (18), *Shinohar* (15), *Annon* (1) and *Braemer* (4) describe the therapeutic effects of acupuncture in such animal diseases as: metritis, pyometria, mastitis, gastritis, enteritis and collibacillosis in piglets (6).

The therapeutic effect of acupuncture in

cases of inflammatory conditions and alergies in man and animals can only be explained as the activation of the defensive forces of the organism.

The aim of this research was to produce the leucocyte reaction in adult polar foxes applying the acupuncture method in order to intensify the immune reaction in adult foxes.

Material and methods

A serial of two experiments was carried out on a farm of polar and silver foxes at Duchnice near Ozarów during the period from September 1985 to March 1986. The experimental material in the first experiment comprised of 10 adult polar foxes aged 8.5 months. The animals were chosen at random. They were divided into 2 groups: control and experimental of 3 males and 2 females each. The experimental material in the second experiment comprised 12 polar foxes at the age of 6 months originated from one litter. The litter was divided into 2 groups: control and experimental of 6 animals each. The control group comprised 3 males and 3 females and the experimental one - 4 males and 2 females. The foxes were fed standard diet accepted on Polish farms and kept in pavillon type cages. The animals in both experiments were healthy and did not show any clinical signs.

The acupuncture points responsible for the immunity level were localized with the help of sound detector. In the control groups in the Experiment I and II, the acupuncture was applied in the placebo points (non-specific for cellular reaction) which were located in the region of gluteal muscles. In the experimental groups the electroacupuncture was applied in the specific points LI 4 (Hegu) and LI 11 (Quichi) similarly as in an experiment on rabbits (16).

In both experiments the stimulation of the above mentioned points was done with variable current of the voltage of 6V, current intensity of 200 mA and frequency of 6 Hz. The time of the stimulation in the first experiment was 10 min and in the second 5 min. Blood for the investigations was collected from the wound produced by cutting off a clow in the fore foot. The blood samples were collected prior to the stimulation of the points and in 24 h, 4 and 7 days after the stimulation in the first experiment and in 16, 30, 44, 59, and 73 days in the second experiment. The quantitative picture of the white blood cells was evaluated (according to Arnett-Schilling) and the number of white blood cells was determined (7, 12).

Statistically analysis of results was done using the two-way variance analysis. The values of F (Fischer test) were determined. The results were evaluated with t-Student test at p=0.05 and 0.01 (14).

Results and discussion

The levels of leucocytes observed after the acupuncture stimulation of the points LI 4 and LI 11 in 8.5 month old polar foxes are presented in Table 1 and Fig. 2. Prior to needling the leucocyte level was within limits of 6.7-9.8 in 1 mm^3 of blood. Theese data agree with the physiological norm reported by *Berestov* (3).

In 24 h after the electrostimulation of the points LI 4 and LI 11 in 8.5 month old polar foxes the level of leucocytes increased by 89%, after 4 days by 61% and after 7 days by 99% (see Table 1, Fig. 1).

The differences in the levels of leucocytes in the experimental and control groups were highly significant.

In Experiment II, carried out on 6 month old foxes, 16 days after the electrostimulation of the points LI 4 and LI 11, the level of leucocytes increased by 109%, after 30 days by 71%, after 44 days by 66%, after 59 days by 29% and after 73 days by 34% (see Table 3, Fig. 3). The obtained differences are highly significant.

There were also observed some changes in the proportional composition of leucocytes (see Table 2) in relation to neutrophils and lymphocytes. Already in 24 h after the stimulation of 8.5 month old foxes, a slow decrease of lymphocytes and increase of segmented and rod-shaped neutrophils are observed. In 7 days since the electrostimulation of the LI 4 and LI 11 points, there is observed a proportional increase of the level of rod-shaped neutrophils by 9.2% and segmented by 0.5%. There is also observed 1.8% increase of eosinophils, a slight increase of monocytes (by 0.8%) and a decrease of lymphocyte level by 13.3%.

Table 4 shows proportional composition of leucocytes in 6 month old polar foxes after the electrostimulation of the points LI 4 and LI 11. In 16 days after the needling, a proportional increase of segmented neutrophils by 13% and rod-shaped by 0.5% is observed as well as a decrease of lymphocytes by 14%. In 44 days the level of lymphocytes increases by 11% and neutrophils decrease by 9.1%. In 73 days the decrease of neutrophils still amounts to 7.9% and the increase of lymphocytes to 9.5% (see Table 4).

Experiment I

Table 1. The level of leucocytes in 8.5 - month old polar foxes after the electrostimulation of the points LI 4 and LI 11.

Needling	Control group			Experimental group			% increase of the number of leucocytes
	X	S	V	X	S	V	
Prior to 24 hour	6.775	921	13.6%	6.738	648	9.5%	-
after 4 days	7.975	1.295	16.2%	12.725*	1.856	14.6%	89%
after 7 days	7.167	1.470	20.5%	10.825*	362	3.4%	61%
after	7.688	1.504	19.6%	13.388*	2.539	18.9%	99%

X - mean value of the level of leucocytes in 1 mm^3 of blood.
S - standard deviation
V - coefficient of variation
* - differences highly significant p = 0.01.

Graphic picture of the changes of the level of leucocytes are presented in Fig. 4.

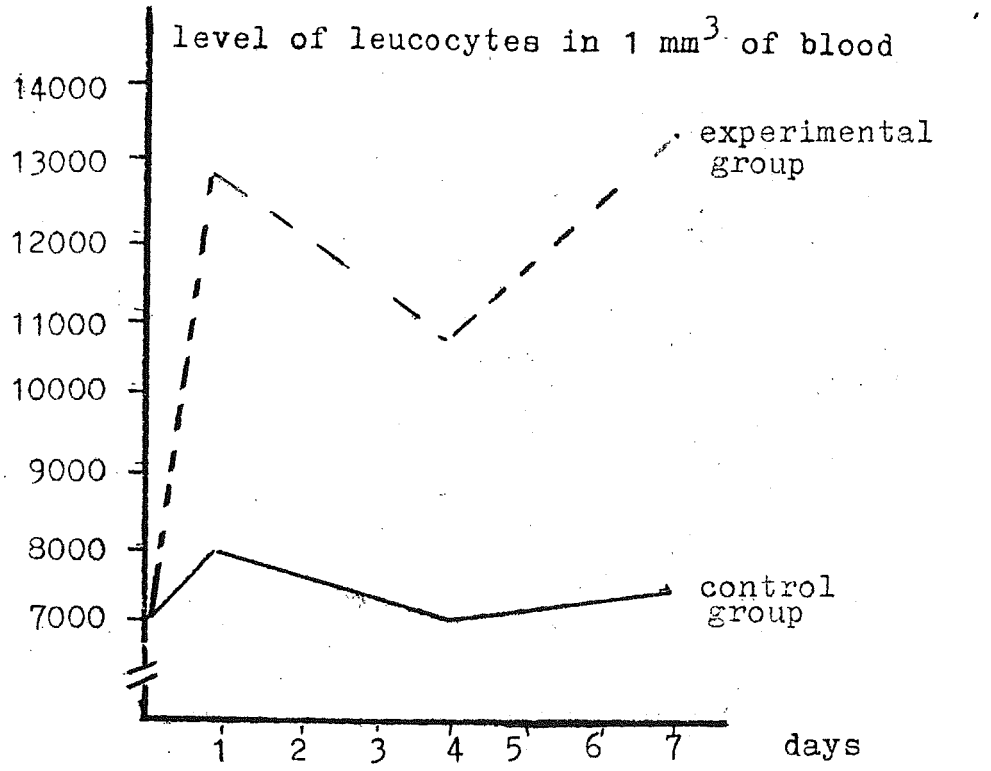

Fig. 1. The level of leucocytes in 8.5 month old polar foxes after the electrostimulation of the points LI 4 and LI 11.

Table 2. Proportional composition of leucocytes in 8.5 month old polar foxes after electrostimulation in the points LI 4 and LI 11

	Control group				Experimental group			
	Prior to needling	After needling 24 hours	4 days	7 days	Prior to needling	After needling 24 hours	4 days	7 days
P	1.0	0.0	0.3	0.0	0.2	0.4	0.4	0.7
S	47.8	45.6	48.5	46.7	50.9	44.6	55.3	60.1
E	3.4	2.8	2.2	4.3	1.8	2.6	3.8	4.6
L	45.2	49.4	46.5	46.7	45.2	40.0	38.0	31.9
M	2.6	2.2	2.5	2.3	1.9	2.4	2.5	2.7

P - rod - shaped neutrophils
S - segmented neutrophils
E - eosinphils
L - lymphocytes
M - monocytes

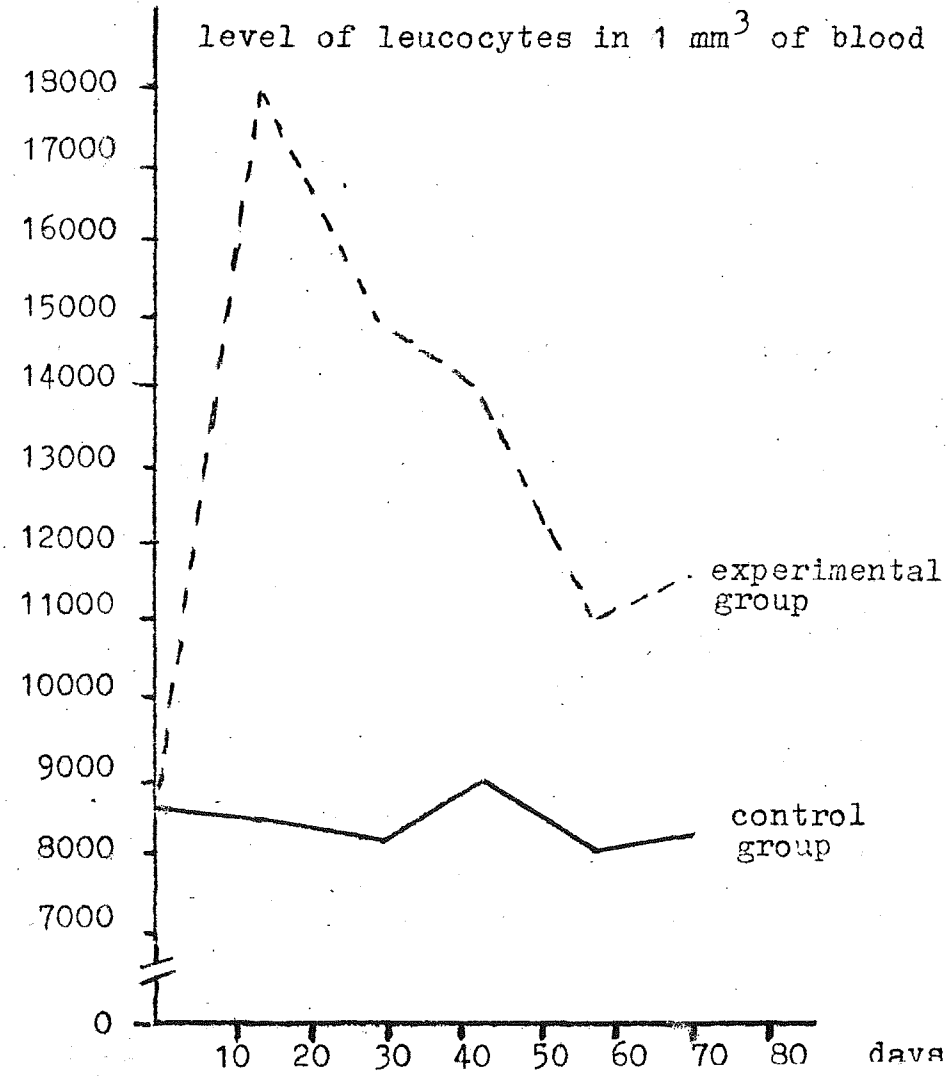

Fig. 2. The level of leucocytes in 6 month old polar foxes after the electrostimulation of the points LI 4 and LI 11.

Experiment II

Table 3. The level of leucocytes in 6-months old polar foxes after the electrostimulation of the points LI 4 and LI 11.

Needling	Control group			Experimental group			% increase of the number of leucocytes
	X	S	V	X	S	V	
Prior to	8.617	82	0.9%	8.625	242	2.8%	-
16 days after	8.583	125	1.5%	18.000*	606	3.4%	109%
30 days after	8.417	103	1.2%	14.783*	445	3.0%	71%
44 days after	9.067	383	4.2%	14.275*	1.801	12.6%	66%
59 days after	8.158	816	10.0%	11.125*	779	7.0%	29%
73 days after	8.425	976	11.6%	11.525*	1.284	11.1%	34%

X - mean value of the level of leucocytes in 1 mm^3 of blood.
S - standard deviation.
V - coefficient of variation.
* - differences highly significant = 0.01.

Graphic picture of the changes of the level of leucocytes are presented in Fig. 3.

Table 4. Proportional composition of leucocytes in 6 month old polar foxes after the electrostimulation of the points LI 4 and LI 11.

	Control group						Experimental group					
	Prior to needling	After needling 16 days	30 days	44 days	59 days	73 days	Prior to needling	After needling 16 days	30 days	44 days	59 days	73 days
P	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.7	0.7	0.0	0.0	0.0
S	45.3	44.0	42.7	46.7	47.5	46.8	45.8	58.8	56.0	36.7	28.8	37.9
E	2.0	3.5	4.0	5.3	4.0	4.2	4.5	3.7	3.3	3.0	2.7	3.3
L	49.7	50.8	50.4	44.8	46.5	46.5	48.0	34.0	38,0	59.0	65.8	57.5
M	3.0	1.7	3.0	3.2	2.2	2.3	1.5	2.8	2.0	1.3	2.7	1.3

P - rod - shaped neutrophils S - segmented neutrophils E - eosinophils
L - lymphocytes M - monocytes

The increase of the level of leucocytes after the needling of the LI 11 point in a rabbit and man was observed by *Wu* et al. (19). Similar opinions on the leucocyte effect of acupuncture in animals are presented by *O'Connor* and *Bensky* (11) and *Sciesinski* et al. (15). *Wei* (17) is of the opinion that the LI 11 point possesses specific leucocytic properties.

Hwang and *Edwards* (8) noted that acupuncture increases the number of neutrophils and lymphocytes in dog.

Conclusions

1. Leucocytosis was observed in polar foxes aged 8.5 and 6 months after the electrostimulation of the points LI 4 and LI 11 already

in 24 h after needling. It persists up to the 73rd day.
2. Proportional increase of the level of neutrophils and decrease of the level of lymphocytes were observed already in 24 h after the stimulation of the LI 4 and LI 11 points.
3. In 44 days after the stimulation a proportional decrease of neutrophils and increase of the level of lymphocytes are observed.
4. It results from the investigation that it is possible to produce an intensified immune reaction in polar foxes with the help of acupuncture method.

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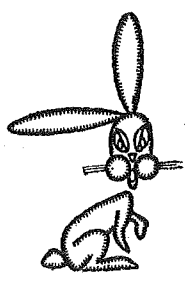


Apparent role of melatonin and prolactin in initiating winter fur growth in mink

Jack Rose; James Oldfield, and Frederick Stormshak

A study was conducted to determine the effects of exogenous melatonin and bromocryptine (CB-154), an inhibitor of prolactin synthesis and secretion, on the induction of winter fur growth in mink. Melatonin (10 and 120 mg) was administrated to mink (N = 5/group) via silastic implants inserted sc over the scapular area during the last week of June 1985. Treatment of mink (W=5) with CB-154 alone or in combination with 10 mg melatonin (N = 5) consisted of daily SC injections of 2 mg of the drug in sterile saline from June 25 through July 30. Control animals (N = 5) did not recieve injections of vehticle or sham implants. Administration of CB-154 alone or in combination with 10 mg melatonin, as well as 120 mg melatonin alone, initiated growth of the winter fur significantly earlier than that of controls or mink treated with 10 mg melatonin (PLO: 05). These data suggest that inhibition of prolactin secretion by melatonin is requisite for induction of molt of summer fur and growth of winter fur of mink.

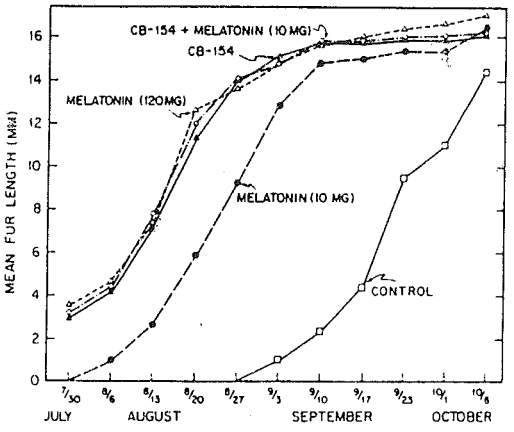


FIG. 1. Fur growth of adult female standard dark mink treated with melatonin (0, 10, and 120 mg) from June 25 through October 8, and bromocryptine (CB-154) either alone or in combination with 10 mg melatonin from June 25 through July 30. The estimate of the common standard error of the mean was ±0.78 mm.

General and comparative endocrinology 65, 212-215 (1987)
1 fig., 16 references.

Authors summary

Some blood indices and body weight of minks receiving a growth hormone (cattle somatotropine)

Henryk Biegaszewski

After a repeated injection of somatotropine in 20 minks an influence of the hormone on the increase of body weight has been observed, as well as on the increase of glucose content in the blood serum in comparison with control animals. The content of hemoglobin in blood, the level of aminic nitrogen in the serum, as well as the hematocrite did not change in minks under the influence of STH.

Bydgoskie Towarzystwo Naukowe, Prace Wydzialu Nauk Przyrodniczych, Seria B, 1977, Nr 24, pp 111-115 Nadbitka
2 tables, 15 references.
In POLH, su. ENGL, RUSS.

Authors summary

The iron level and total iron binding ability of plasma protein and selected blood indicators in polar vixens (Alopex Lagopus L.)

B. Stanislawska; H. Bieguszewski, and O. Lorek

The following data were collected from 83 polar vixens: the level of iron, the total iron binding ability of plasma protein, the level of hemoglobin and hematocrit, the number of red blood cells, the content of protein and electrophoretic protein fractions in blood serum from the vixens of group *A* (15 vixens). Blood samples were collected in the morning, and the animals were injected physiological salts on the 5th day after copulation and on the 14th day of pregnancy after the first collection of blood samples. From the vixens of group *B* (10 vixens) blood samples were collected in the afternoon, and the animals got iron dextran in doses of 1 ml/vixens each time (75 mg Fe). Both groups were examined during the periods of pregnancy and lactation. The collections of blood samples marked the following experiment

periods: I - on the 14th day of pregnancy, II- on the 28th, III - on the 42nd day, IV - in the second week of lactation (5 - 15 days), V - in the fourth week (19 - 29 days), VI - in the sixth week of lactation (33 - 42 days). Blood samples from sterile vixens of group *C* (15 vixens) were collected in the morning, and those from group *D* (13 vixens) in the afternoon. Both groups were examined once at the end of June (VI period). Blood samples from *E* and *F* in the postlactation period (15 vixens each) were collected in the morning. Group *F* got 1 ml of Fe preparation in the 4th week after weaning. These groups were examined in the time of slaughter (November) - VII experiment period. The lowest level of plasma Fe in vixens of group *A* and *B* was found at the end of lactation in the fourth and sixth week. The level of plasma Fe was also low in vixens of group *C*. In vixens of group *B* the total Fe binding ability of plasma protein did not change but in *A* group was significantly higher at the end of lactation. The pregnant vixens of *B* group reacted in a higher increase of hemoglobin than of iron, and those of group *F* in a bigger growth of Fe level. The content of total serum protein was relatively low before and after the delivery. The level of $alfa_2$ globulin was even or relatively lower in group *A* and *B* and much lower in group *E* and *F* (vixens in postlactation period) and in group *C* (sterilized). It should be mentioned that anemia observed in polar fox puppies in their 4 - 8 weeks of life coincided with the occurrence of the lowest level of plasma iron in the vixens examined by us. In this period the hemoglobin level, the number of erythrocytes and the hematocrit values showed a tendency to increase in them. These indicators had very low values at the end of pregnancy.

Polskie Archiwum Weterynaryjne 25, 2-3, pp. 213-224, 1987
1 table, 4 fig., 17 references.
In POLH su. ENGL, RUSS.

Authors abstract

Some morphological and biochemical rates in the blood of Norwegian and Polish polar foxes

S. Kubacki, and H. Bieguszewski

The haematological studies on 36 Norwegian foxes and 35 Polish ones, at the age of 5-7 months were carried out. There was observed a higher level of white blood cells in Norwegian foxes in comparison with Polish ones. The lower level of total protein and higher concentration of urea in the blood serum of Norwegian foxes indicate an increased process of protein katabolism in this group of animals.

Zeszyty Problemowe Postepów Nauk Rolniczych 1987 z. 341, 89-94.
1 table, 5 references.
In POLH. Su. RUSS, ENGL.

Authors abstract

Some Hematological indices of silver and polar foxes

Henryk Bieguszewski; Beata Glowinska, and Ludwik Narewski

Some differences in morphological and biochemical indices in blood, between silver and polar foxes were found on the ground of experiments on 60 foxes. There were shown effects of the age of animals and different physilogical states on picture of polar foxes females blood.

Zeszty Naukowe Nr 136 - Zootechnika (13)- 1986 pp. 113-121.
5 tables, 18 references.
In POLH. Su. RUSS, ENGL.

Authors summary

Aminonitrogen and free aminoacids in polar foxes plasma different times following feeding

Stefanczyk, and H. Bieguszewski

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

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

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

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

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

The decrease of free aminoacids content in blood, 12 and 24 hours following the observations suggest that the polar foxes have the ability of storing and saving exogenous aminoacids, absorbed from the gastrointestinal tract to the blood or they mobilize these aminoacids during the body protein catabolism in the time of starving.

Zesz. nauk. WSR Olszt. Tom 26, Nr 741, Rok 1970, pp. 65-75
3 tables, 21 references.
In POLH. Su. RUSS, ENGL.

Authors summary

Certain haematological indexes of the raccoon dog (Nyctereutes procyonoides gray)

Henryk Bieguszewski, and Andrzej Dopka

There were carried the investigations of blood on 24 clinically healthy raccoon dogs of a different age. Investigated the count of red blood cells, haemoglobin content in the blood, haematocrit index, level of glucose, level of urea, of creatinin, of alfa amino nitrogen, activity of transaminases AspAT and AlAT, concentration of total protein and electrophoretical proteins in plasma of blood. There were stated that the morphological and biochemical picture of raccoon dogs blood is similar to picture of polar foxes blood and polecat ferrets. The age of animals have influence on certain haematological indexes.

Akademia Techniczno-Rolnicza Im. Jana I Jedrzej Sniadeckich W Bydgoszczy Zezyty Naukowe nr 140 - Zootechnika (14) - 1986
3 tables, 11 references.
In POLH. Su. RUSS, ENGL. *Authors abstract*

Certain haematological indexes in raccoon dogs (Nyctereutes procyonoides gray) in different physiological states

Henryk Bieguszewski

The investigations were carried out on 12 clinically healthy raccoon dogs males in three different periods: I - period of winter fatness, II - period of reproduction activity, III- period after reproduction activity.

There was indicated the influence of physiological state on certain morphological and biochemical indexes of blood in raccoon dogs. Haemoglobin content, hematocrit value, level of total protein and activity of transaminases in plasma of the blood were the lowest in the period of winter fatness.

Bydgoskie Towarzystwo Naukowe Prace Wydziali Nauk Przyrodniczych Seria B 1987 Nr 35 pp 7-14
3 tables, 9 references.
In POLH. Su. RUSS, ENGL.

Authors summary

Morphological components and blood serum proteins in hybrids of the skunk and ferret during the postnatal period

Henryk Bieguszewski, and Roman Szymeczko

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

Acta Theriologica Vol. 23, 15: 269-276, 1978
2 tables, 16 references
In ENGL. Su. POLH

Authors abstract

Branches of the hepatic artery in silver fox

Violetta Knasiecka

On 36 silver foxes the hepatic artery divides into right medial, right lateral and left branches. Main differences concern the origin of the artery.

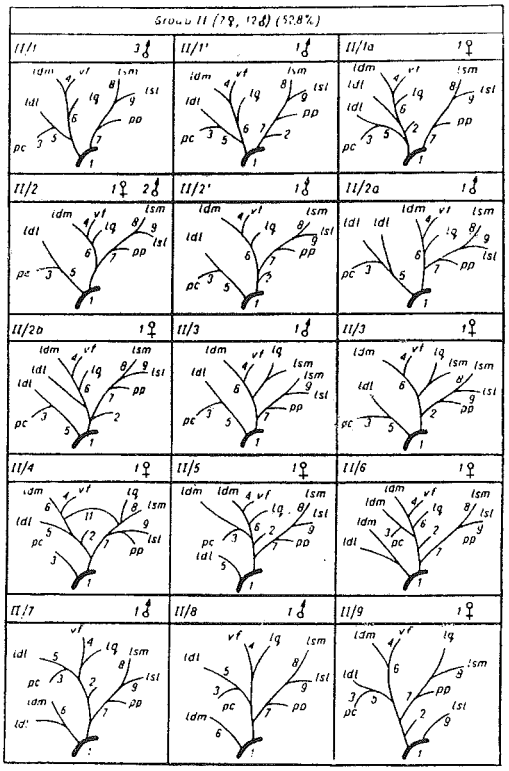


Fig. 1

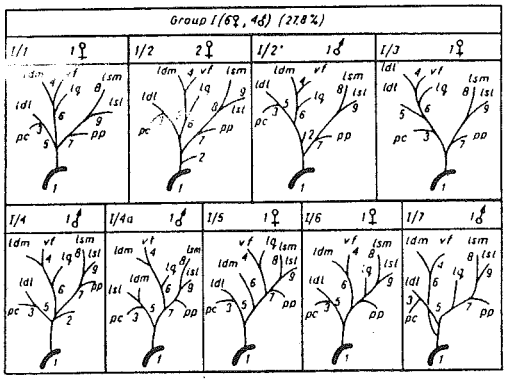


Fig. 2

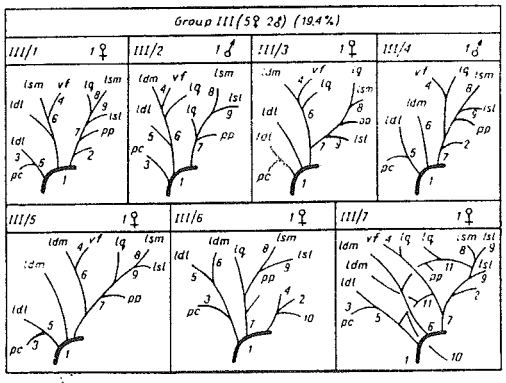


Fig. 3

Figs. 1, 2, 3 present variations in origin and division of the branches of the hepatic artery.

Pc — processus caudatus, ldl — lobus dexter lateralis, ldm — lobus dexter medialis, vf — vesica fellea, lq — lobus quadratus, pp — processus papillaris, lsm — lobus sinister medialis, lsl — lobus sinister lateralis.

Rys. 1, 2, 3 przedstawiają warianty odejścia i podziału gałęzi tętnicy wątrobowej. 1 — arteria hepatica, 2 — arteria gastrica dextra, 3 — arteria lobi quadrati, 4 — arteria cystica, 6 — ramus lateralis dexter, 7 — ramus medialis dexter, 8 — ramus medialis sinister, 9 — ramus lateralis sinister, 10 — ramus pancreaticus, 11 — ramus anastomoticus.

Folia Morphologica, Poland: 45 (2): 96-101, 1986
3 tables, 3 fig., 9 references.
In ENGL. Su. POLH

Authors abstract

Basis and evaluation of coat colour in chinchillas

G. Clemen

A description is given of some chinchilla colour types, and the evaluation of coat colour is discussed.

Deutsche Pelztierzuchter: 61 (5): 70-71, 1987
In GERM. *CAB abstract*

Effect of removal on growth and pelt quality in raccoon dogs

Hannu Korhonen, and Mikko Harri

After weaning, raccoon dogs were hosed (1) in cages containing 2 large animals until pelting (controls), (2) in cages with 1 large and 1 small animal until 12 August, when they were moved to individual cages, (3) 2 small animals per cage until pelting, (4) 2 large and 1 small

animal per cage until 12 August, when the smallest animal was removed, or (5) 3 small animals per cage. In the 5 groups resp., body weight on 21 November averaged 8.7 plus or minus 1.0, 8.9 plus or minus 0.5, 7.7 plus or minus 0.8, 8.5 plus or minus 0.9 and 7.9 plus or minus 0.8 kg ($p = 0.05$), pelt quality score 7.0 plus or minus 1.1, 7.7 plus or minus 1.1 and 8.6 plus or minus ($p = 0.01$), fur density score 6.5 plus or minus 0.8, 8.1 plus or minus 1.1, 8.7 plus or minus 1.2, 7.0 plus or minus 1.1 and 8.2 plus or minus 1.2 ($p = 0.01$), and overall appearance score 5.9 plus or minus 1.4, 8.1 plus or minus 1.3, 7.6 plus or minus 0.8, 7.6 plus or minus 1.3 and 8.2 plus or minus 0.9 ($p = 0.001$).

Finsk Palstidskrift: 21 (7-8): 430-431, 1987
1 table, 1 fig.
In SWED

CAB abstract

The effects of cage size on the wellbeing of raccoon dogs

Hannu Korhonen, and Mikko Harri

For 28 male and femal raccoon dogs, half were reared in standard cages measuring 60 x 60 x 105 cm and half in large cages measuring 60 x 240 x 105 cm. In the 2 groups resp., weaning weight averaged 2.0 plus or minu 0.3 and 2.1 plus or minus 0.4 kg, body weight at pelting 8.7 plus or minus 0.9 and 8.4 plus or minus 1.1 kg, daily feed consumption 508 plus or minus 105 and 488 plus or minus 112 g, pelt quality score (on a 10-point scale) 7.0 plus or minus 1.1 and 7.3 plus or minus 0.7, fur density score 6.7 plus or minus 1.7 and 6.8 plus or minus 1.1, colour score 5.3 plus or minus 1.3 and 5.5 plus or minus 1.2, fur cover score 6.3 plus or minus 0.7 and 6.5 plus or minus 0.8 and overall condition score 5.9 plus or minus 1.1 and 6.4 plus or minus 1.1. None of the differences between the groups was significant. Details are given of behaviour. It was concluded that there is no need to increase the size of the standard cages currently used in Finland.

Finsk Pälstidskrift: 21 (5): 280-282, 1987
1 table, 1 fig.
In SWED.

CAB abstract

Population of breeding animals in Sweden in 1987

Anonymous

In May 1987, in Sweden, there were 479795 mink breeding females vs. 475172 in 1986, of which 207104 were Scan Black, 70193 Pastel, 28494 white, 26371 Sapphire, 22263 Black Cross and 15728 Silverblue. There were 6972 silver fox females (+ 37.7% compared with 1986), 14557 blue fox females (-3.9%), 2121 chinchilla females (-2.1%) and 410 polecat females (-33.0%).

Våra Pälsdjur: 58 (7): 234, 1987.
2 tables.
In SWED.

CAB abstract

Breeding of fur bearers in Norway in 1986

Anonymous

In 1986, in Norway, the number of young born per mink, blue fox and silver fox female whelping averaged 3.71, 4.24 and 2.24 resp., and that per female mated 4.2, 4.7 and 2.9. Approximately 45.000 fox females were inseminated and 73% conceived. Details are given of results in previous years, feeding, shows and health and research, and economic aspects are considered.

Våra Pälsdjur: 58 (7): 238-240, 1987.
2 tables.
In SWED.

CAB abstract

World production in 1986 - 1987

Anonymous

In 1986 the world production of mink pelts totalled 33.265.000, of which 15.815.000 were produced in Scandinavia (including Finland and Iceland), 4.700.000 in the U.S.A., 4.400.000 in the USSR, 1.500.000 in Canada, 2.200.000 in China and 1.400.000 in the Netherlands. The world production of blue fox pelts was 2.979.000 (of which 2.280.000 were produced in Scandi-

navia), that of shadow + white fox pelts 706.500 (420.500 in Scandinavia, 100.000 in Canada, 75.000 in the USSR and 60.000 in Poland), that of blue frost fox pelts 467.500 (449.500 in Scandinavia), and that of other types of fox 405.000 (382.000 in Scandinavia).

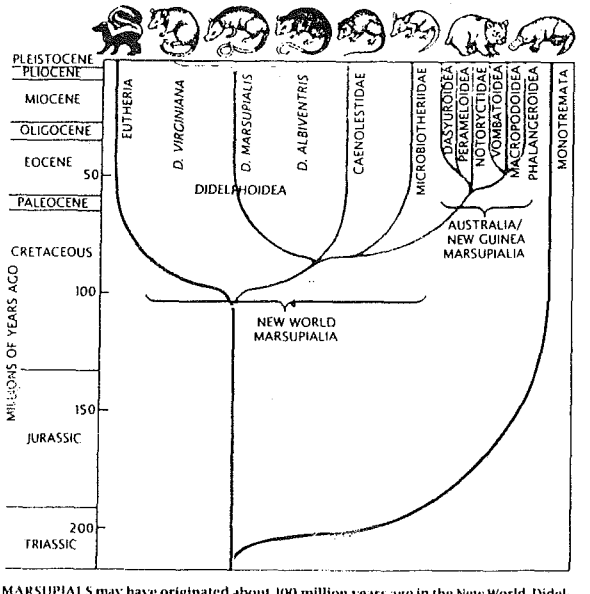
Våra Pälsdjur: 58 (7): 236, 1987.
1 table.
In SWED.

CAB abstract

The adaptable opossum

Steven N. Austad

The Virginia opossum can adapt quickly to a changing world. Part of its success may be due to a highly efficient reproductive strategy that includes the ability to adjust the sex ratios of its progeny.



MARSUPIALS may have originated about 100 million years ago in the New World. Didelphoidea, to which the Virginia opossum belongs, is considered the oldest superfamily to survive to the present day. Morphologically *Didelphis* is remarkably similar to the earliest marsupial fossils. *D. virginiana*, which appeared only 75,000 years ago, is the sole marsupial species that has been able to range into nontropical North America.

Scientific American, February, 1988, 54-59.
6 fig.

Authors heading

Use and interpretation of the gompertz model. Application to the study of the growth of young muskrats (Ondatra zibethica L.)

A. Pave, A. Corman, and B. Bobillier-Monot

The GOMPERTZ model is used to analyze muskrats growth curves. We attempt to explain this model in terms of biological mechanisms: growth governed by a catalytic factor (a growth factor). Our approach leads to propose two parametrizations of the model, the first explanatory (parameters of the growth process are explicit) but nor useable for parameter estimation (parameters are very correlated), the other, intermediary between the classical mathematical expression and the explanatory one which have better properties for parameter estimation. At biological level the analysis leads particularly to confirm and illustrate the hypothesis of the growth rate variations of young animals relatively to their birth date in the year.

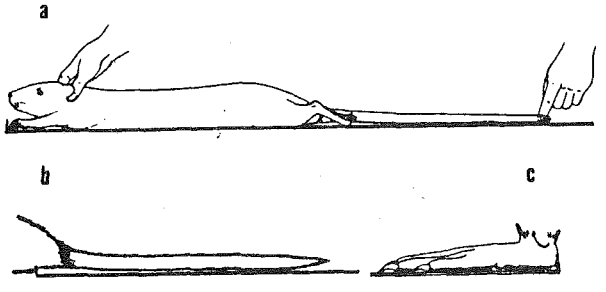


figure 1 - *Dispositif expérimental pour la mesure des longueurs*
(a) mesure de la longueur du corps,
(b) mesure de la longueur de la queue,
(c) mesure de la longueur de la patte (arrière gauche).

Biometrie - Praximetrie (Belgium). v. 26(3-4) p. 123-140.
4 tables, 7 fig., 27 references.
In FREN. Su. FREN, ENGL.

Authors summary

MINK RESEARCH NEWSLETTER

OREGON STATE UNIVERSITY... CORVALLIS

November, 1987 Volume XXIII, No. 1

Fred Stormshak; John Adair; Cliff Thomson; Ron Scott; James Oldfield, and OV Slayden

Hormone Studies

This year, 100 standard dark kit mink are being used to continue our work on the induction of early winter fur growth. These mink have been implanted with either 0.0, 2.5, 8.5, 10.0 or 17.5 mg of melatonin using a new type of implant which may allow the effective administration of low doses of melatonin. Specifically, we are attempting to determine the minimum dose of melatonin which will stimulate early priming when delivered by the new implants. Treshold administration is desireable both from the standpoint of savings in the cost of the implants as well as in preventing potential deleterious effects due to overdose on pelage color or quality. We are further investigating the effect of 8.5 mg melatonin (using the new implants) on pelt color and quality with 79 adult mink (38 males and 41 females). Color and quality evaluations of pelts will be made by professional fur graders at the Seattle Fur Exchange.

In addition to our work with melatonin we have 53 standard dark kit mink on experiment to test the effectiveness of growth hormone releasing hormone (GRF) and synthetic GRF on body weight gain in mink during the summer, final pelt size and overall fur quality at pelting. These two new hormone implants may increase the overall pelt size for kit mink, and improve the efficiency of feeding programs which maximize growth.

Study of delayed embryonic implantation

We have previously demonstrated that the pituitary hormone prolactin (Which stimulates the implantation of embryos in mink) acts on the ovary as well as the uterus. However, the nature of these actions is not known. Two experiments are underway to further elucidate these mechanisms. First, ovarian tissue from 60 adult standard dark mink is being treated in the laboratory with prolactin to determine if this hormone acts directly to stimulate ovarian production of steroids. Second, uterine tissues from these animals are being quantified for steroid receptors to evaluate the ability of the uterus to respond to ovarian steroid hormones.

Mink reproductive performance

A total of 274 female mink were retained in the 1987 breeder herd. Of this total, 215 were standard dark (including 15 tyrosinemic potential carriers) and 59 were Blue Iris. To further investigate the feasibility of single mated females versus multiple mated over 2 or more cycles, 15 dark females were mated ones only on the fifteenth of March. Based on a kit count of May 18, the ranch average for multiple mated females was 4.04 versus 3.73 for single mated females, whereas litter average was 4.95 and 5.09, respectively.

Fly control

Moisture, feed, manure and close confinement at a mink ranch provide an optium environment for reproduction of flies. Controlling fly populations with insecticides has been costly, time consuming and oftentimes not too effective with the sprays that were safe to use. The oral larvacide "Larvadex" has been effective in controlling fly populations but has not received governmental approval for use with mink. This year a new biological control approach has been implemented at the Experimental Fur Farm. Beginning on June 5, parasitic wasps were released at weekly intervals. These are small nocturnal insects that lay their eggs in the pupa of the fly which the hatched wasp larva in turn kills. Results have been strikingly evident by absence of flies as opposed to numbers seen in previous years.

An attempt was made to quantifiy the effect of the biological control by counting flies in a 2 x 2 foot square grid; however, fly

density was suppressed by the wasps to the extent that no flies could be counted by this method. Unfortunately, the system does not work on yellow jackets, of which there is a bumper crop this vear.

Wet belly (WB) disease

Work is continuing in the area of WB in an attempt to gain an insight into this costly and perplexing problem. Three groups of 20 each littermate standard dark male mink are being closely monitored for evidence of WB throughout the growing/furring season. Manipulation of fat level and feed restriction are being imposed on respective groups. Urine collections are being taken from known WB and non-WB mink for fatty acid determinations. If differences can be found, it may shed new light on the basic cause of the disease.

Computer system update

The Milk Specialities Co. has offered the Fur Farm the use of their "mink System" at no charge. After studying the various aspects of this system, we have decided to enter our breeding records into the system. We are particularly interested in the application of the selection index and the statistical information from various breeding schedules.

We have just completed the initial entries of the 1987 breeding herd. With receipt of the kit card we will be prepared to enter the live pelt grades into the system.

Diet composition study

Producers have shown interest in substituting dry for fresh ingredients in the mink diet. There are some obvious advantages in using

Percentage composition of the diets is as follows:

	OSU Control	Co-op Control	3% Herring meal	7% Herring meal
Chicken offal	25	20	20	20
Liver, beef	--	10	10	10
Tripe/lung mix	10	5	5	5
Fish scrap	55	40	25	5
Eggs, cooked	--	10	10	10
Herring meal*	--	--	15	35
Cereal - OSU	10	--	--	--
Cereal - Co-op	--	15	15	15
Total	100	100	100	100

* Herring meal was substituted for fish scrap on a 1:5 basis, which meant that the protein levels in all diets remained about the same.

The mink were weighed at 28 day intervals and preliminary results show:

Group	Weights, grams						Gain, grams	
	August 17		September 14		October 12			
	M	F	M	F	M	F	M	F
1 OSU control	1589	986	2032	1146	2055	1144	466	158
2 Co-op control	1566	979	1897	1125	2088	1176	522	197
3 + 3.0% Herring meal	1645	985	2005	1114	2243	1198	598	213
4 + 7.0% Herring meal	1564	989	1796	1094	2009	1164	445	175

dry supplements, such as eliminating freezer-storage costs. These advantages need to be balanced against the cost of the dried products, which are nearly always higher than fresh. However, to date, comparison of dry feed substitution has yet to be made.

Four groups of standard dark pelter mink are being used to investigate the substitution of herring meal for fresh fish by-product. There are 20 mink (10 each male and female) in each group and they are fed once daily, to appetite. The following treatments were imposed: (1) control, OSU ranch diet, (2) control, Northwest Fur Breeders Co-op ranch diet, (3) Co-op control diet with3.0% herring meal substituted for fresh fish; (4) Co-op control diet with 7.0% herring meal similarly substituted.

At this point, performance is approximately the same across all treatments, suggesting that substitution of herring meal for fresh fish scrap at levels of 3 or 7% is feasible, provided it is economically sound. The weights of mink on the 7.0% herring meal-substituted diet appeared slightly lower than those of the other groups, possible indicating a lower dietary energy level. Final assessment of these treatments must await completion of the experiment and consideration of pelt color and quality characteristics.

Separating mink kits to experimental treatment groups June 30, 1987. Volunteer help is always greatly appreciated at this busy time. Fur Farm staff John Adair (cap), Cliff Thompson (far left) and Ron Scott (3rd from left). Jim Posch, fur rancher volunteer (2nd from left). Graduate research assistants Teri Martin and OV Slayden.

Genetics and evolution of the mink Lpm system VII. new species-specific allotype Lpm14

T.V. Kutyavina; V.I. Yermolaev; M.A. Savitc and O.K. Baranov

Data om immuno- and biochemical identifikation, genetic control and phylogenesis of new allotype Lpm14 of the Lpm system in domestic mink are presented. This allotype is encounted in mink population with frequency 0,94. The availability of Lpm14 genetic marker permitted another haplotype to be revealed, in addition to the nine Lpm haplotypes known, by means of genetic analysis. It was established that, apart from the earlier described haplotype $Lpm^{1, 2, 6, 7, 10, 11, 13}$, there exists a similar haplotype - $Lpm^{1, 2, 6, 7, 10, 11, 13, 14}$, comprising the Lpm^{14} gene as well. Of the rest eight haplotypes, seven have the Lpm^{14} gene and one has no such gene. Taking into account this gene and the corresponding antigenic marker, the differentiation of 30, instead of 28 phenotypes, and 55, instead of 45 genotypes for the Lpm system became possible. No Lpm14 allotype was found in all individual serum samples taken from ten species and interspecific hybrids of Mustelidae which are closely related to domestic mink. The data obtained give grounds to refer the newly identified Lpm^{14} gene to the second category of genes of the multigenic Lpm system which are also represented by the Lpm^{1}, Lpm^{2}, Lpm^{3}, Lpm^{4}, Lpm^{5}, Lpm^{7}, Lpm^{8}, and Lpm^{12}.

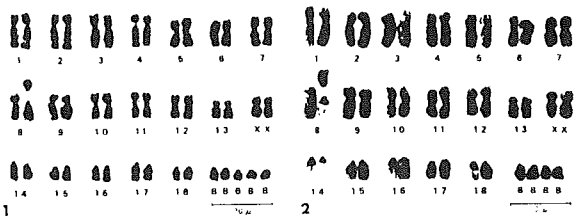
Genetika, USSR: 23(4): 738-750, 1987.
5 tables, 3 fig., 17 references.
In RUSS. Su. ENGL.

Authors summary

Further studies on the Japanese raccoon dog karyotypes, with a special regard to somatit variation of B-chromosomes

Tosihide H. Yosida; Masayasu Y. Wada; Oskar G. Ward, and Doris H. Wurster-Hill

Chromosomes of skin cells from 2 females were studied. Both females had a basic karyotype of 39 chromosomes vs. 38 for 3 previously studied specimens see Proceedings of the Japan Academy B (1983) 59, 267-270; there were 2 X-chromosomes. Both females showed a centric fission of one of the chromosomes of pair 8. The number of B-chromosomes varied from 1 to 6 (modal values = 2 and 5) in one female, and was 3 or 4 in the other female.



Figs. 1-2. 1: G-banding karyotype of a female Japanese raccoon dog (specimen, RD-83021 with 5B's. Two B's are slightly larger than the others. Pair no. 8 is heteromorphic by centromeric fission of one chromosome. 2. C-banding karyotype of a female Japanese raccoon dog (specimen, RD-83021 with 4B's. B-chromosomes are stained heavily through the whole length, although the staining is different by the chromosome. Centromeric regions of autosomes are stained heavily, but those of B's are not.

Proceedings of the Japan Academy, B: 60(2): 17-20, 1984.
1 table, 2 fig., 5 references.

CAB abstract

Fecundity of colored female American mink heterozygous for certain fur color genes

V.I. Evsikov; Yu. V. Vagin; T.D. Osetrova, and E.K. Matysko

A study of the genetic-physiological mechanisms of the regulation of mink fecundity has revealed a number of regularities of the formation and realization of their reproductive capacities (1-4). Knowledge of these regularities makes it possible to develop appropriate methods of a breeding program aimed at increasing the fecundity of the animals. Such measures include the method of heterogeneous crosses of mink which makes it possible to clearly plan the breeding program and to use most completely the advantages of monohybrid heterosis of colored mink under farming conditions: in-

creased reproductive qualities of the heterozygous females and obtainment of young with a more valuable color (5-7).

Earlier investigations of monohybrid heterosis, which is expressed in an increase of the fecundity of females heterozygous for a number of color genes, were carried out in the Altai and in Karelia, the climate of which substantially differs from the climate of the Ukraine. Since the phenotypic expression of genes, including those determining heterotic effects, is to some extent limited by the environmental conditions, it was necessary to repeat such investigations at one of the fur farms of the Ukraine. And only thereafter, in the case of a positive result, is it possible to recommend to the fur farms of the republic the use, on the basis of the method of heterogeneous crosses, of monohybrid heterosis for increasing the reproductive potential of the stock of colored mink.

Our report gives data of an analysis of the fecundity of silver-blue female mink heterozygous for the aleutian color gene (genotype ppAa) and royal-pastel heterozygous for the gene socklot ($bbTt^s$). Investigations of the $bbTt^s$ mink were carried out in Karelia, being the final stage of the work begun earlier (8).

Conclusion

The fecundity of silver-blue mink heterozygous for gene aleutian (ppAa) and of royal-pastel mink heterozygous for gene socklot ($bbTt^s$) on the whole is higher than for mink homozygous for these genes.

Their reproductive succes is due to a decrease in the portion of barren females and a reduction in early postnatal death of the kits.

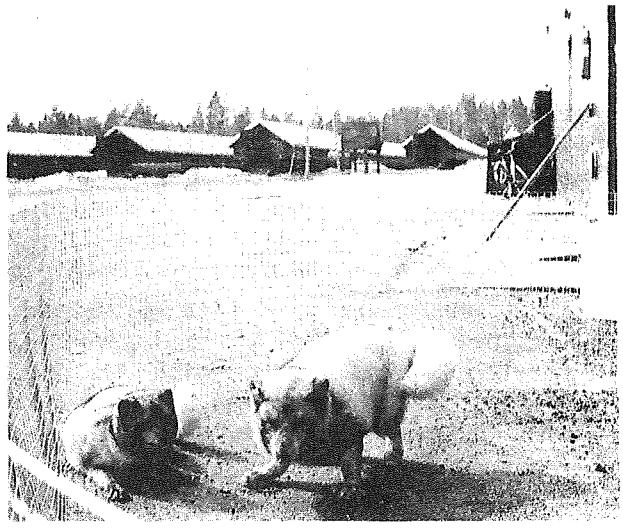
Cytology and genetics. New York, N.Y. Allerton Press 1985 v. 19(5): p. 61-66.
Translated from: Tsitologiia i genetika, v. 19 (5), 1985, p. 377-383
2 tables, 13 references.

Authors introduction and conclusion

Giant blue fox

Ulla Joutsenlahti

An illustrated description is given of a new blue fox mutation (FF Superblue) which appeared in Finland in 1984 in a litter from a Shadow female. Foxes of the new mutation are similar to normal blue foxes at birth, but have a much more rapid growth rate, and their pelts seem to mature earlier than those of other blue foxes. at maturity, FF Superblue foxes are considerably larger than other blue foxes, with a large head and paws and sturdy legs. Matings of FF Superblue males with standard blue fox females have produced Superblue cubs in almost every litter, but the mode of inheritance of the Superblue genotype has not yet been established.



Finsk Palstidskrift: 21(5):272, 1987.
In SWED.

CAB abstract

The artic Beige blue fox

Ulla Joutsenlahti

An illustrated description is given of the Arctic Beige blue fox mutation, which appeared in Finland i 1985, 5 of 12 cubs in a litter born to a blue fox female were white at birth, with a brown tinge, the adult winter coat becoming sand-coloured, with a light-coloured underfur. The appearance of the Arctic Beige fox is similar to that of Arctic Pearl, which appeared earlier in Norway, and which also has a recessive mode of inheritance. However, test matings between the 2 types will be required to establish whether they have the same genetic make-up.

Finsk Pälstidskrift: 21(7-8): 396, 1987.
1 fig.
In SWED.

CAB abstract

Heterochromatin composition and nucleolus organizer activity in four canid species

B. Mayr; G. Geber; H.Auer; M. Kalat, and W. Schleger

Sequential staining with a counterstain-contrasted flourescent banding technique (chromomycin A_3 - distamycin A - DAPI) revealed the occurrence of distamycin A - 4,6-diamidino-2-phenylindole (DA-DAPI) staining heterochromatin in the centromeric regions of chromosomes 33, 36, 37, and 38 in the wolf (*Canis lupus pallipes)* and of chromosomes 13, 16, and 23 in the blue fox *(Alopex lagopus). The red fox (Vulpes vulpes)* lacked such regions. Staining with DAPI - actinomycin D produced a QFH-type banding pattern with clearcut differences in the staining behaviour of DA-DAPI positive regions between these three canid species. Staining with the fluorochrome D 287/170 did not preferentially highlight any of the DA-DAPI positive regions in any of them. Counterstain-enhanced chromomycin A_3 R-banding and studies ofnucleolus organizer region location and activity confirmed a close relationship between the karyotype of the wolf and the domestic dog. Few heterochromatic marker bands were encountered in these two species, but heterochromatin polymorphism was evident in the blue fox.

Can. J. Genet. Cytol. 28: 744-753.
2 tables, 9 fig., 25 references.

Authors summary

TABLE 2. Details of the investigated species of Canidae

Species	2n	Autosomes M	SM	A	T	Sex pair X	Y	NOR locations	DA–DAPI⁺ bands
Canis lupus pallipes (wolf)	78	—	—	—	76	SM	SM	7, 11, 25, Y	33, 36, 37, 38
Canis lupus familiaris (domestic dog)	78	—	—	—	76	SM	SM	7, 11, 27, Y	33, 36, 37, 38
Alopex lagopus (blue fox)	48, 49, 50*	18	6	20†	2	SM	A	13, 15, 17, 18, 20, 22	13, 16, 23
Vulpes vulpes (red fox)	34	16	16	—	—	SM	A	11, 12, 13, 14	None

*Robertsonian series.
†All have heterochromatic short arms.

Studies of the seasonal changes in testicular activity in the blue fox (Alopex lagopus) (Thesis)

Adrian J. Smith

Paper I reports the presence of soluble Mn^{2+}-dependent adenylate cyclase activity in cytosol from the testis of the adult blue fox in the mating season and describes investigations into the optimal assay conditions for the enzyme. Activity was of the same order as that found in the rat testis. The enzyme appeared to be relatively stable during storage at -70^0C. activity was abolished in the absence of Mn^{2+}.

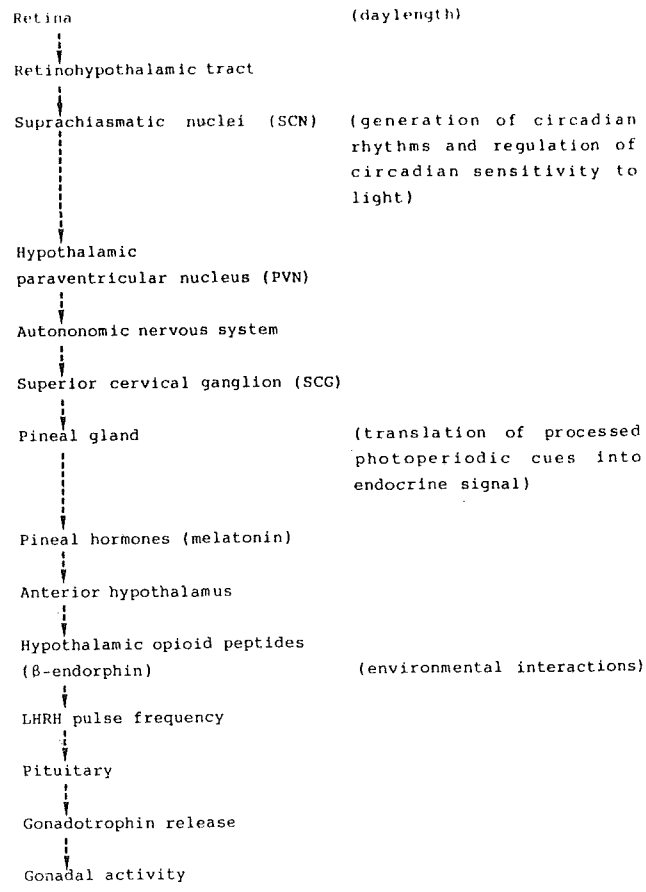
Paper II records some physiochemical properties of the soluble Mn^{2+}-dependent adenylate cyclase in the testis of the adult blue fox and shows that it shares many of the characteristics of the corresponding enzymes in the rat and human testis. The molecular weight was estimated by several methods to be 40,000-51,200 daltons, with a sedimentation coefficient (S_{20},w) of 4.2S, a Stoke's radius of 28Å and a frictional ratio (f/f_o) of 1.15.

Paper III demonstrates the presence of both Mn^{2+}- and Mg^{2+}- sensitive, membrane-bound adenylate cyclase activity in the adult blue fox testis in the mating season and describes some kinetic properties of the enzyme.

Paper IV describes the seasonal variations observed in the testes of adult blue foxes castrated at monthly intervals over a one-year period. Variations in testicular weight and volume, and in the numbers of haploid, diploid and tetraploid cells (assessed by DNA flow cytometry) were recorded. In addition, soluble Mn^{2+}-dependent adenylate cyclase activity was measured; highest activity coincided with the onset of the mating season.

Paper V discusses the histological findings in the testes of the animals used in Paper IV and also describes membrane-bound Mg^{2+}-sensitive adenylate cyclase activity during the course of the year. There was a good correlation between DNA flow cytometric measurements and testicular histology. There were only minor seasonal variations in membrane-bound adenylate cyclase activity.

The likely sequence of events from reception of daylength to a reproductive response can be summarized as follows (modified after Hastings et al., 1985):



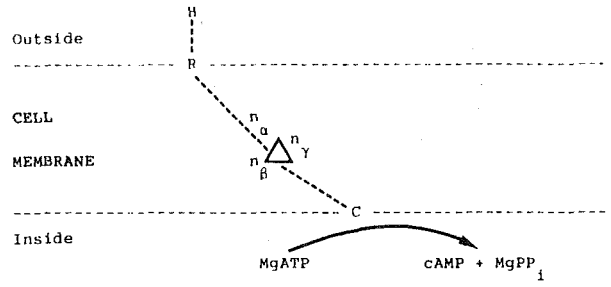
Paper VI correlates the seasonal variations in testicular weight in the adult blue fox to those of plasma LH, prolactin, androstenedione and testosterone, and to testicular FSH binding. While LH levels varied between individuals at all times of the year, plasma concentrations of androstenedione and testosterone, and to testicular FSH binding. While LH levels varied between individuals at all times of the year, plasma concentrations of androstenedione and testosterone reached peak values at the time of the mating season. Plasma prolactin levels were highest in May and June as daylength became maximal. FSH binding increased from January and declined again after castration whereas prolactin concentrations continued to vary in relation to photoperiod.

Paper VII illustrates the effects of melatonin administration to adult male blue foxes on testicular regression and the spring moult. The normal decline in testicular weight after the mating season was delayed and the animals retained a winter coat until the end of the study in August. The spring rise in plasma prolactin levels was prevented and testosterone release was prolonged.

Paper VIII describes preliminary studies into the effects of bromocriptine on testicular regression and the spring moult. Animals treated from March to May retained a winter coat until the end of the study in August, and the spring rise in plasma prolactin levels was prevented. There were individual differences in the effects of bromocriptine on the testis; plasma testosterone levels fell normally after the mating season, but testicular regression was somewhat delayed.

FIGURE 2

(a) Simplified structure of the membrane-bound, hormone sensitive adenylate cyclase system.



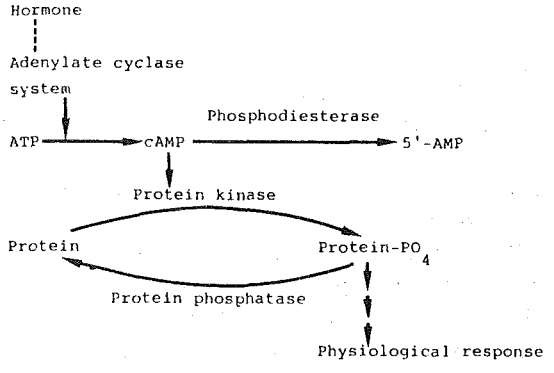
H = hormone

R = hormone receptor

n_α, n_β & n_γ = components of the regulatory subunit (see text)

C = catalytic unit

(b) Schematic representation of the production and degradation of cAMP.



Paper IX describes testicular development in the immature male blue fox and compares it with that in the adult animal (described in Papers IV-VII). The results suggest that immature males reach full sexual maturity at the beginning of the first mating season after birth, when they are approximately 40 weeks old.

Authors abstracts

The thesis was based on the following papers:

I *Smith, A.J.; Jahnsen, T.; Attramadal, H. & Hansson, V.* (1984: Soluble Mn2+-dependent adenylate cyclase activity in the testis of the blue fox *(Alopex lagopus)*. Archives of Andrology 12: 225-230.

II *Smith, A.J.; Jahnsen, T. & Hansson, V.* (1985): Physicochemical properties of the soluble Mn2+-dependent adenylate cyclase in the blue fox testis. Archives of Andrology 15: 53-57.

III *Smith, A.J.; Jahnsen, T. & Hansson, V.* (1985): Membrane bound adenylate cyclase activity in the testis of the blue fox. Archives of Andrology 14: 35-43.

IV *Smith, A.J.; Clausen, O.P.F.; Kirkhus, B.; Jahnsen, T.; Møller, O.M. & Hansson, V.* (1984): Seasonal changes in spermatogenesis in the blue fox *(Alopex lagopus)*, quantified by DNA flow cytometry and measurement of soluble Mn2+- dependent adenylate cyclase activity. Journal of reproduction and Fertility 72: 453-461.

V. *Smith, A.J.; Bugge, H.P.; Andersen Berg, K.; Møller, O. & Hansson, V.* (1986): Seasonal changes in testicular structure and function in the blue fox *(Alopex lagopus)*, as quantified by morphometric analysis and measurement of adenylate cyclase activity. International Journal of Andrology 9: 53-66. (Scientifur, Vol. 11, No 3, 1987).

VI *Smith, A.J.; Mondain-Monval, M.; Møller, O.M.; Scholler, R. & Hansson, V.* (1985): Seasonal variations of LH, prolactin, androstenedione, testosterone and testicular FSH binding in the male blue fox *(Alopex lagopus)*. Journal of Reproduction and Fertlity 74: 449-458.

VII *Smith, A.J.; Mondain-Monval, M.; Andersen Berg, K.; Simon, P.; Forsberg, M.; Clausen, O.P.F.; Hansen, T.; Møller, O.M. & Scholler, R.* (1987): Effects of melatonin implantation on spermatogenesis, the moulting cycle and plasma concentrations of melatonin, LH, prolactin and testosterone in the male blue fox *(Alopex lagopus)*. Journal of Reproduction and Fertility 79: 379-390.

VIII *Smith, A.J., Mondain-Monval, M.; Simon, P.; Andersen Berg, K.; Clausen, O.P.F.; Hofmo, P.O. & Scholler, R.* (1987): Preliminary studies into the effects of bromocriptine on testicular regression and the spring moult in a seasonal breeder, the male blue fox *(Alopex lagopus)*. Journal of reproduction and Fertility 81: 517-524.

IX *Smith, A.J.; Mondain-Monval, M.; Andersen Berg, K.; Gordeladze, J.O.; Clausen, O.P.F.; Simon, P. & Scholler, R.* (1987): Sexual development in the immature male blue fox *(Alopex lagopus)*, investigated by testicular histology, DNA flow cytometry and measurement of plasma FSH, LH, testosterone and soluble testicular Mn2+ -dependent adenylate cyclase activity. Journal of Reproduction and Fertility 81: 505-515.

Heggedal 1987, ISBN - 82-991609-0-1.
2 fig. 118 references. Book, 29 pp + all original reports.

Mink breeding problems: Constitutional delayed puberty, pheromones, and other genetic problems of infertility

Legrande C. Ellis

Dark mink exhibit a constitutional delay of puberty similar to humans. In humans, this condition occurs with a deleyed maturational growth. Mink have a greater seperation of skeletal growth and gonadal growth than do humans and this may explain why in mink constitutional delayed puberty may not occur concomitant with reduced skeletal growth. Nevertheless, dark male mink are usually smaller than other mutant color phases of mink. These infertile mink may have large testes in late February and March, but because of their late development these animals do not leave sperm in females after breeding. It is generally assumed that it takes 50 to 70 days for sperm to develop from stem cell, and the testes of the animal must be 0.6 of their normal size before any mature sperm are formed. Treatment of infertile dark mink with delayed puberty with GnRH (gonadotropic release hormone) induced nonuniform testicular development with low fertility. The cause of the nonuniform response of dark mink testes to GnRH is unknown at this time.

Pheromones are known to be produced in experimental female animals with certain genetic defects that repell males with the same genetic defect. It is anticipated that mink with genetic defects could also produce pheromones that would repell males with the same genetic defect. For this reason, difficult matings with female mink might result from genetic defects common to both the male and female. One should reconsider the practice of wiring the mouths shut of females where there is difficulty in mating them. It would be wise to pelt the offspring of such matings.

A number of genetic causes of male infertility in animals are now well known. These conditions are discussed as they relate to mink breeding. The proper physical conditioning of female mink prior to breeding is discussed as a possible cause of female infertility, particularly of kit females.

Blue Book of Fur Farming 1988:21-23, 1987.
1 fig., 9 references.

Authors abstract

Fertility of minks and pigs

Maria Molin

This short review summarizes and describes the similarities and differences between the fertility of mink and pig. The differences are far more striking than the similarities: The sow is in heat every three weeks and the time during which she can be mated is short. During heat she ovulates even if she has not been mated. All normal pregnancies progress in the same way and the length of gestation is the same in all sows. A sow bears about 10 piglets twice a year. A good sow can have more than 10 litters before she is culled. Improving fertility

through breeding is made more difficult by the negative covariance between the size of the litter in which the gilt is born and her own first litter, i.e. gilts born in large litters tend to get small litters themselves. The heretability for the most important fertility traits are lower or much lower than 0,20 in most studies.

The mink has a seasonal breeding cycle with the mating season in March. The ovulation is induced by mating. Even if the female is mated and the eggs fertilized she can ovulate again if she is mated about a week later. The implantation is delayed and therefore the length of gestation varies greatly - most whelpings take place in the first week of May. The female mink bears about five kits once every year and as far as litter size is concerned there is rarely any reason to keep her for more than three litters. The heretability for the most important fertility traits are mostly estimated to be higher than 0.20 so the possibility to improve fertility through breeding is fairly good. There seems to be no disadvantage for the female to be born in a larger litter.

There are also some similarities: The problem with barren females are about the same in both species and the kit/piglet mortality is of the same size. The females ability to feed the kits/piglets and the number of normal teats are of great importance in both species.

Seminarieuppsats PhD-thesis NR 162, 1986- Minkens och Svinets Fruktsamhet.
2 tables, 2 fig., 49 references, 22 pp.
In SWED. Su. ENGL, SWED.

Authors summary

Freezing of fox semen. Relationship between freezing curve, dimension of freezing box, quantity of fluid nitrogen and distance between semen straws and nitrogen

Mette Schmidt, and Ib J. Christiansen

Styroplastic boxes of different dimensions and with varying quantity of fluid nitrogen and varying distance between the semen straws and the surface of the fluid nitrogen were investigated in order to demonstrate the influence upon the freezing curve (Tables 1 and 2). All boxes investigated were found usable for deep-freezing of semen, on the assumption that proper consideration was taken to the amount of fluid nitrogen as well as the above-mentioned distance; i.e. the distance from the surface of the nitrogen to the semen straws must be increased with increasing size of the box (Table 3).

Aarsberetning. Kongelig Veterinaer- og Landbohøjskole. Institut for Sterilitetsforskning. Denmark, 1986, No 29, p 59-64.
3 tables, 1 fig., 3 references.
In DANH. Su. ENGL.

Authors summary

Fertility in silver fox females by age and number of matings

Ladislav Stolc; Hana Vachatová; Milena Fantová, and Jan Smehyl

The investigations carried out in the three years 1975 to 1982 involved some 474 silver fox females out of a total population of 786 animals, and the data evaluated in this paper were taken from routine breeding records. The following indices of performance were considered: litter size at birth and at weaning, number of died-away offspring in relation to the number of matings and female age, female sterility percentage.

The highest number of live-born fox cubs was found in seven year-old females (5.00 $\pm$ 1.825), the lowest one in the five-year olds (4.03 $\pm$ 1.527). There was a great difference in the number of weaned cubs; the 7-year old females showed on the average 4.14 $\pm$ 2.794 weaned cubs, the 6-year old females 1.94 $\pm$ 2.205 ones only.

When studying the number of matings, we found the highest prolificacy in three times mated females (4.64 $\pm$ 1.361), (3.91 $\pm$ 1.814), the lowest one in those mated once. The results obtained are in line with the sterility percentage for the sample under study.

Sbornik Vysoke skoly zemedelske v Praze 6- Suchdole, Fakulta agronomická, rada B, 43, 1985, str. 145 - 155.
7 tables, 5 references.

In CZEC. Su. RUSS, ENGL. *Authors summary*

Oestrus and mating in the nutria

Anonymous

Work carried out mainly in eastern Europe on oestrus diagnosis and duration and on mating regimes is discussed.

Deutsche Pelztierzuchter: 61(5): 69, 1987.
In GERM.

CAB abstract

Breeding results in 1981-86

Eugenia Jørgensen

In Demark, in 1986, the performance was recorded of 1.811.829 mink at 3.312 farms. For Scan Black, Scan Brown, Pastel, Pearl and other types of mink, the percentage of infertile females was 12.0, 9.6, 10.2 11.4 and 12.3 resp., litter size at birth averaged 4.93, 5.64, 5.64, 5.32, 5.39 and 5.11, and the number of kits weaned per mated female 4.34, 5.10, 4.78, 4.77 and 4.48. Data are tabulated by size of farm and by district. For blue fox, silver fox, polecat and raccoon dog females, the percentage of infertile females was 19.9, 15.0, 14.2 and 24.6 resp., and litter size at birth averaged 5.30, 3.07, 7.14 and 4.04. Results are compared with those in previous years.

Dansk Pelsdyravl: 49(10): 696-698, 1986.
9 tables.
In DANH.

CAB abstract

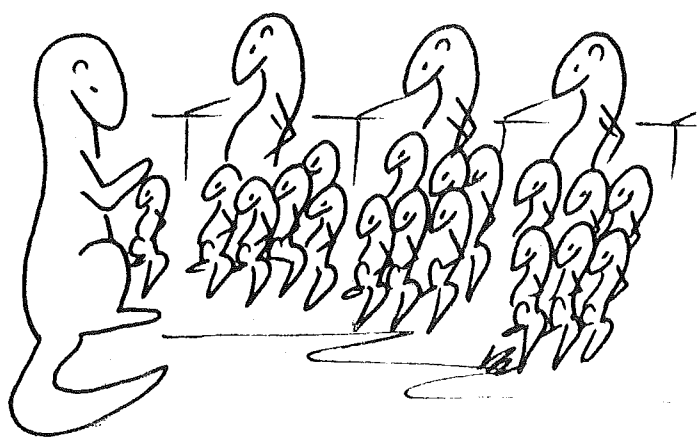
Breeding results in chinchillas. Performance at Danish chinchilla farms

Anonymous

For 3016 chinchilla females recorded in Denmark in 1986, mortality was 8.9%, the percantage of infertile females 15.91, and the percantage of females which returned to service 22.02. Litter size averaged 1.87, the number of young born per year per mated female 2.78, the number of young weaned 2.14, and the number surviving to 6 months of age 2.08. Of litters born, 39.35, 41.57, 19.94 and 4.46% resp. comprised 1, 2, 3 or 4 young; in these litters, mortality to 2 wk of age was 11.16, 16.79, 21.35 and 33.07%. Results are compared with those in 1984 and 1985.

Deutsche Pelztierzuchter: 61(5): 72, 1987.
3 tables.
In GERM.

Cab abstract



Feeding facts for the practical fur animal producers

Hans Berg

The booklet is prepared as a guide for farmers, feed producers and other interested as are connected to production of fur animal feed.

The booklet deals with basic physiological knowledge, norms for the different nourishments, the different feedstuffs, feedcomposition and hygienic acpects with special regard to finnish circumstances.

Feed control and feed quality is discussed in a special chapter and a comphrehensive table over the different feedstuffs chemical composition and nourishment content is given as well as aminoacid content and digestibility. Very usefull for many readers is a table given

the Scandinavian names for all feedstuffs.

The book which is covering the resent experiments in fur animal feeding has only one disadvantage - it is not available in English.

Pälsdjursstudier 23, Finlands Pälsdjursuppfödares Förbund R.F. Pälsdjurlaboratoriet, ISSN-0358-3759, ISBN-951-99746-2-8.
23 tables, 12 fig.
In SWED.

Abstract - Gunnar Jørgensen.

The effect of supplemented iron and vitamin-C on mink kits fed conventionally

Asbjørn Brandt

The effect of vitamin-c and iron on normal managed and fed (Danish standard) Pastel mink kits from weaning until pelting were subject to a factorial trial with the following treatments: vitamin-C (ascorbic acid) status before weaning, dietary vitamin-C in combination with chelated iron (Fe-EDTA) and iron sulphate ($FeSO_4$). supplemented vitamin-C had a positive effect on plasma-ascorbic acid content and to lesser extent on the growth rate, haemoglobin concentration and number of erythrocytes. Iron sulphate in the feed had a similar effect.

There were no effect of EDTA-iron or vitamin-C supplementation in the lactation period prior to the experiment start on the measured variables.

The results did not reveal any interactions between the main treatments, which for instance could demonstrate an enhanced intestinal uptake of vitamin-C reduced iron.

In conclusion vitamin-C supplementation had a beneficial effect on the growth and general performance in Pastel mink kits from weaning until pelting.

Meddelelse No. 692, 1987, National Institute of Animal Science 4 pp.
4 tables, 5 references.
In DANH

Authors abstract

Effect of diet and hormones on color and quality of prime mink pelage

O. Slayden; J. Adair, and F. Stormshak

Induction of early growth of winter pelage should be of substantial economic benefit to the mink industry, providing pelt value is not compromised. In order to evaluate the effects

of diet on fur color and quality of bromocriptine- and melatonin-induced winter pelage, 90 standard dark female kit mink were assigned randomly at weaning to one of two dietary regimens. Diet 1 (n=30) was a basal mink ranch diet consisting of fish scrap (55%), chicken offal (25%), tripe/lung mix (10%) and dry mix (10%, composed of 80% finely ground pop-cooked wheat and 20% wheat bran, with 110 IU vitamin E and 2.475 grams thiamine mononitrate/kg). Diet 2 (n=60) was a supplemented basal diet consisting of fish scrap (45%), chicken offal (15%) tripe/lung mix (10%), beef liver (10%), eggs (10%) and dry mix (10%). Mink fed each diet were assigned to treatment (n=15) and control groups (n=15). Animals receiving diet 1 were treated with 120 mg melatonin implants (silastic) while those fed diet 2 were treated with 120 mg melatonin implants, 60 mg bromocriptine mesylate pellets (Innovative Research of America, Toledo, OH), or 60 mg bromocriptine pellets plus 18.6 mg melatonin implants (silastic). Control groups on each diet received no implants. All mink were housed in open-sided sheds and exposed to natural photoperiod. Fur growth was measured at biweekly intervals on a 4 cm^2 area on the right hip that had previously been shaved. Beginning in October, mink were examined for primeness of pelts by visual inspection of external skin pigmentation and each treatment group was pelted when it was determined that animals had fully prime pelage. Pelts were processed and sent to the Seattle Fur Exchange, Seattle Washington, U.S.A., for evaluation of color and quality by experienced commercial fur graders who had no prior knowledge of treatments. Pelage was scared by the graders for color (1 = XX-Dark, 2 = X-Dark, 3 = Dark, 4 = Dark brown, 5 = Brown, 6 = Red.) and quality (1 to 6) with 1 being the most desirable color or highest quality. Mink treated with 120 mg melatonin, 60 mg bromocriptine and 60 mg bromocriptine plus 18.6 mg melatonin all molted 1 mo ealier than controls and exhibited significantly greater fur growth during the months of August and September ($p < 0.05$). Mink implanted with 120 mg melatonin, and bromocriptine plus melatonin were considered to be in fully prime pelage by mid-October and were pelted October 23. However, mink receiving bromocriptine alone were not concidered to be in prime pelage in October and were pelted in December with controls. It was therefore concluded that treatment of mink with bromocriptine may not completely mimic the effect of exogenous melatonin on winter fur growth. Neither the diet supplementation with liver and eggs, nor the treatment to induce early fur growth had an effect on fur color or quality. Fur color scores (mean $\pm$ SE for diet 1 were: control, 4.3 $\pm$ a3. Melatonin (120 mg), 4.1 $\pm$ a2; and did 2: control, 4.0 $\pm$ a2; melatonin (120 mg) 3.9 $\pm$ a3; bromocriptine (60 mg) 3.9 $\pm$ 0.2, bromocriptine, (60 mg) plus melatonin, 18.6 mg 4.5 $\pm$ 0.4; while fur quality scores (mean $\pm$ SE) were: 1.5 $\pm$ 0.2; 1.8 $\pm$ 0.4; 1.7 $\pm$ 0.3; 1.9 $\pm$ 0.2; 1.3 $\pm$ 0.3; 1.9 $\pm$ 0.2, respectively. On this basis the prime pelage of melatonin-treated animals is indistinguishable from that of naturally primed winter pelage.

Blue Book of Fur Farming, 1988, pp 64-68.
2 tables, 4 fig.
Supported by a grant from the Mink Farmers Research Foundation, U.S.A.

Authors summary

Investigations on nutrients digestibility and selected biochemical blood indexes of polar foxes fed with the provender with addition of components treated with sodium benzoate, sulpuric acid and formaldehyde

Henryk Bieguszewski, and Oskar Lorek

The investigations were carried out on 38 clinically healthy polar foxes, divided into two groups. The control group of animals was fed with the provender 60% of which made the elements of animal origin, and 15% of that-fresh after slaughter blood and 30% slaughtering wastes.

The experimental group of foxes was fed with the ratio in which fresh after-slughter blood and a half of fresh slaughtering wastes were replaced with blood treated with sodium benzoate and sulphuric acid and slughtering wastes with addition of formalehyde. Replacing a part of the provenders of animal origin with the provenders treated with the additives resulted in lowering of the digestibility coefficient of the ratio protein. The nitrogen retention was nearly the same in both groups.

The results of investigations of biochemical parameters of blood suggest that the provender

treated with the additives does not affect unfavourably the animals health, although causes some changes of certain blood indexes of foxes.

Bydgoskie Towarzystwo Naukowe Prace Wydzialu Nauk Przyrodniczych Seria B, 1984, Nr 31, pp. 51-59.
5 tables, 15 references.
In POLH, Su. RUSS, ENGL.

Authors summary

Leukocytes and blood plasma proteins of polar foxes fed on diet with the addition feed

Henryk Bieguszewski, and Manfred Oskar Lorek

Investigated the effect of replacement 50% animal feedstuffs in the diet of polar foxes for slaughterhouse blood conserved with sodium benzoate and sulphuric acid and for slaughterhouse waste materials concerved with formaldehyde on white picture and blood plasma proteins.

The addition of conserved feedstuffs to the diet had not any effect on number of leucocytes and leukograme of blood. No characteristic changes were found in contents total blood plasma proteins and electrophoretic fractions of blood plasma proteins in the experimental animals group.

Bydgoskie Towarzystwo Naukowe Prace Wydzialu Nauk Przyrodniczych Seria B, 1985, Nr 32, pp 11-19.
3 tables, 16 references.
In POLH,. Su. RUSS, ENGL.

Authors summary

Digestibility of nutrients, nitrogen retention and some blood indexes of polar foxes fed with concentration with high level of blood concervated

Henryk Bieguszewski

Two series of investigations were carried out on 128 polar foxes, divided into two groups.

Group I control - were fed with the standard ration, 50% of which were provenders of animal origin, group II experimental - were fed with the ratio in which 50 % of provenders of animal origin were replaced with blood treated with sulphuric acid and sodium benzoate. 8 clinically healthy foxes (4 of the control and 4 of the experimental groups) were subject to digestibility and haematological examinations in the first series of investigations. Replacing 50% of meat-fish provender of the ratio with the afterslughter blood treated with the additives has not affected unfavourably the digestion process of nutrients and nitrogen retention in the organisms of animals under examinations. No statiscally essential changes in haematological indexes of foxes fed with the provender treated with the additives were stated.

The investigations of the second series, carried out on 120 foxes, showed that replacing 50% of provenders of animal origin of the ratio with blood treated with the additives has not affected unfavourably weight gains and the quality of pelts.

Bydgoskie Towarzystwo Naukowe Prace Wydzialu Przyrodniczych Seria B, 1984, Nr 31, pp 33-39.
6 tables, 7 references.
In POLH. Su. RUSS, ENGL.

Authors summary

Body weight gains, digestibility of feeds, rations and chosen hematological indices of growing polar foxes given rations with addtion of feeds preserved with formaldehyde

Henryk Bieguszewski

The respective experiments were carried out on 48 clinically healthy polar foxes, divided into 3 groups. The Ist group (control) was given standard ration, in which 60% constituted feeds of animal origin, The IInd group fed the ration, in which 30% of fresh or frozen meat-fish feed was substituted by the meat-fish feed preserved with formaldehyde. The IIIrd group was fed the ration, in which 60% of meat-fish feed was substituted by the feed preserved with formaldehyde.

Polar foxes took willingly in the rations with addition of preserved feeds. The substitution in the ration for foxes 30 or 60% of feeds of animal origin by the meat-fish feed preserved with formaldehyde did not exert any negative influence on the body weight gains. No worsening of digestibility of constituents of the ration containing the preserved feed has been observed.

Results of the investigations of hematological indices suggest that the feed preserved with formaldehyde does not affect negatively the health of foxes. The commercial value of skins of the foxes of experimental groups approximated the value of skin obtained from control animals.

Rocziniki Nauk Rolniczych, 1984 Seria B, TOM 102 Zeszyt 3, pp 111-120.
4 tables, 17 references.
In POLH. Su RUSS, ENGL.

Authors summary

The employment of gelation of blood + whey in nutrition of polar foxes

Manfred Oskar Lorek, and Henryk Bieguszewski

Effects of substitution $^1/_3$ part of meat and fishy diet by gelation of blood + whey on some components of blood and some usable coefficients in polar foxes were studied. Foxes during their season of growth ate meal with gelation of blood + whey willingly, which showed no negative results of body weight. Gelation of blood + whey showed no changes in morphological and biochemical components of blood. Resilience of hair was a little worse in foxes which ate meal with gelation of blood + whey. Commercial value of foxes pelts from experimental group was nearing value of pelts from control group.

Zeszyty Problemowe postepow Nauk Rolniczych, 1987 z. 341, pp 201-210.
4 tables, 6 references.
In POLH. Su. RUSS, ENGL.

Authors abstract

Certain haematological indexes and liver function on polar foxes fed with the diet containing the addition gelation of blood + whey

Henryk Bieguszewski; Beata Kniola, and Jaroslaw Szmergalski

In 1984 year there were carried on the investigations of 38 polar foxes divided into two groups (16 foxes in control group + 22 in experimental group). Animals of experimental group were fed with the diet containing 75% standard diet and 25% gelation of blood + whey. There were indicated statistically significant increase in count of red blood cells and in contents certain indexes of protein metabolism in blood's plasma of polar foxes fed with the diet containing the addition gelation of blood + whey. There was no essential effect of differential diet on excresability of polar foxes liver.

Zeszyty Naukowe Nr 140 - Zootechnika (14)- 1986, pp. 17-23.
2 tables, 11 references.
In POLH. Su. RUSS, ENGL. *Authors summary*

Effect of addtition of feed preserved to the diet on certain utility indexes of polar foxes

Henryk Bieguszewski, and Manfred Oskar Lorek

Investigated the effect of replacement 50% animal feedstuffs in the diet of polar foxes for slaughterhouse blood conserved with sodium benzoate and sulphuric acid and for slaughterhouse waste materials conserved with formaldehyde on certain utility indexes.

The addition of conserved feedstuffs to the diet had not any effect on reproduction rates of females and on the quality of foxes fur coat.

The animals body weight in experimental group was a little lower than the animals body weight in control group in all time of experiment. Statistical significant were only in the females group.

Bydgoskie Towarzystwo Naukowe Prace Wydzialu Nauk Przyrodniczych, Seria B, 1985, Nr 32, 21-28.
3 tables, 11 references.
In POLH. Su. RUSS, ENGL. *Authors abstract*

Certain haematological indexes in polar foxes fed with diet containing addition of protein fat paste preserved with mineral and organic acids

Henryk Bieguszewski; Manfred Oskar Lorek, and Mariusz Fijalkowski

There was investigated the effect of replacement 50% provenance feedstuffs in the polar foxes diet by protein fat paste conserved with formic, muriatic and sulphuric acids on some morphological and biochemical indexes of blood. The addition of the conserved paste to the diet had not a negative effect on the investigated haematological indexes.

Zeszyty Naukowe Nr 133 - Zootechnika (12)- 1986.
4 tables, 9 references.
In POLH. Su. RUSS, ENGL.

Authors summary

The digestibility of nutrients and nitrogen retention of raccoon dogs (Nycterutes Procyonoides Gray)

Henryk Bieguszewski, and Manfred Oskar Lorek

There were investigated the nutrients digestibility of diet and nitrogen balance on 6 raccoon dog males in age of 3.5 months and 8 raccoon dog males in 6 months. There were as certain that the digestibility coefficient of nutrients in raccoon dogs was similary to the digestibility coefficient of nutrients in polar foxes and polecat-ferrets. Older raccoon dogs digested organic matter crude protein and crude fat better than 3.5 months old ones. Indicated influence of age on nitrogen retention in raccoon dogs.

Akademia Techniczno-Rolnica Ih. Jana I Jedrzeja Sniadeckich W Bydgoszczy Zeszty Naukowe Nr 140 - Zootechnika (14) - 1986.
2 tables, 5 references.
In POLH. Su. ENGL, RUSS.

Authors abstract

Riboskin in diets for adult mink

S.L. Balash

Adult female mink were fed on a traditional farm diet containing protein 10.1 to 11.5, fat 3.6 to 4.4 and nitrogen-free extract (NFE) 3.9 to 4.4 g/100 kcal metabolizable energy (ME). The daily allowance of ME varied from 207 to 273 kcal. In a second trial the ME allowance was increased from 226 kcal in January to 352 kcal in May, while the amounts of protein, fat and NFE in those months were 9.9 to 11.5, 3.0 to 4.1 and 3.7 to 5.5 g/100 kcal ME. Starting from February 20 to May 30 some of the mink were given the basal diet supplemented for alternate 2-day periods with Riboksin at 5 mg/kg body weight. In both trials the number, and percentage survival, of offspring from dams given Riboksin were greater than from those given the basal diet only. That result was confirmed in a third feeding trial.

Krolokovodstvo i Zverovodstvo: (No. 6): 10, 1986.
1 table.
In RUSS.

CAB abstract

A new feed for mink

V.G. Pasichnik

Maurolicus muelleri, a non-edible fish, average body length 4.5 cm and body weight 1.4 g, contained 14.5% protein and 16% fat, the fat content varying with season and being 20 to 24% in April and May. Digestibility of organic matter of the fish was 91.2%. The amino acid composition of the fish protein was similar to that of other sea fish used as feed for mink; concentrations of thiaminase and trimethyl aminoxidase did not exceed that of other fish. Feeding trials lasting for 3 years were made with young and adult breeding mink which were given a basal diet containing normal feed fish or that diet with 25 to 53% of the fish protein replaced with protein from M. muelleri. There was no significant difference between the control and test fish on growth or pelt quality. It is concluded that M. muelliri can

replace, on average, 48 and 30% of normal fish protein in diets for adult and growing mink, respectively.

Krolikovodstvo i Zverovodstvo: (No. 6): 9. 1986. In RUSS.

CAB abstract

The pathology of experimental methylmercury poisoning in river otter (Lutra canadensis)

Dennis J. O'Connor, and Svend W. Nielsen

The clinical, morphologic, and toxicologic aspects of methylmercurialism in the river otter were examined. Otters were exposed to diets containing 0 (Group 0 control; 2 otter), 2 (Group 1; 3 otter), 4 (Group 2; 3 otter), and 8 (Group 3; 3 otter) mg mercury as methylmercury per kg diet. Exposure was continous for 230 days. Feeding of the 2, 4, and 8 mg mercury/kg diets resulted in average exposure of 0.1, 0.17, and 0.38 mg mercury/kg body weight/day, respectively.

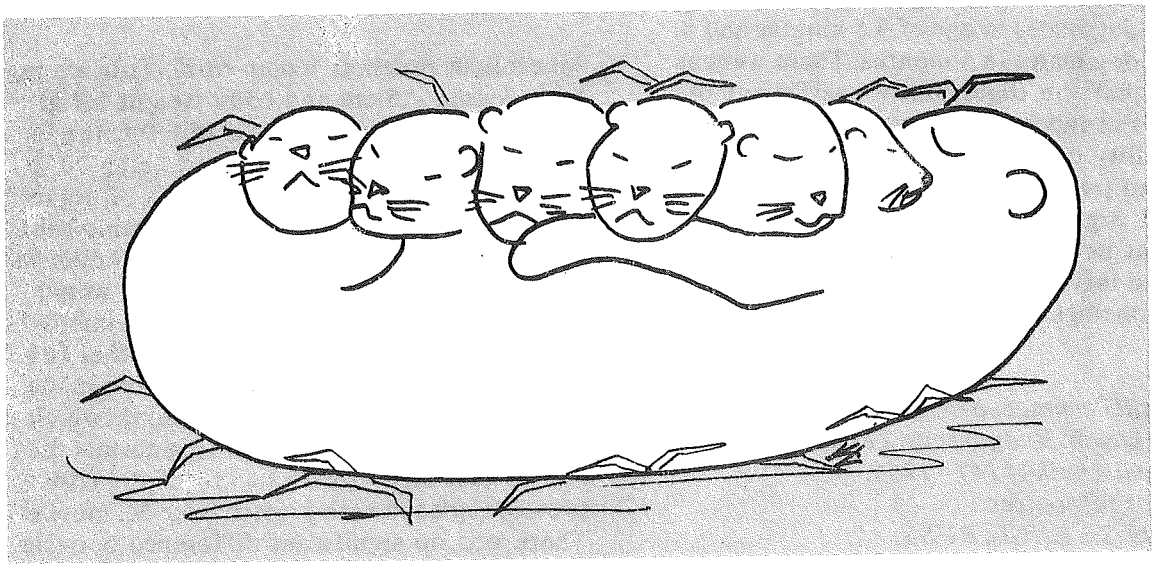
All methylmercury exposed animals developed clinical signs of intoxication with the time of onset inversely proportional to the level of methylmercury in the diets. Mean survival times for Groups 1, 2,, and 3 were 184, 117, and 54 days, respectively.

The clinical signs included anorexia, ataxia, paresis, marked depression, visual impairments, convulsions, recumbency, and terminal coma. The total mercury exposure and the terminal tissue levels of mercury wer similar among all treated groups.

Methylmercury did not cause any significant alterations in hematologic or serum biochemical profiles. Macroscopic abnormalities occurred in two animals and consisted of subarachnoid hemorrhage and dilatation of lateral ventricles. Histological lesions of the central nervous system were morphologically similar in all poisoned otter despite differences in dietary levels of exposure. Neuronal degeneration and necrosis and astrocytosis in the cerebral cortex were the most frequent findings. Additional common lesions were necrosis of cerebellar granular cells, perivascular cuffing, leptomenigitis, vacuolation, and demyelinating changes and no lesions occurred in perioheral nerves.

International Conference on Wildlife Diseases. Uppsala (Sweden). 18-24 August 1985.

Authors summary



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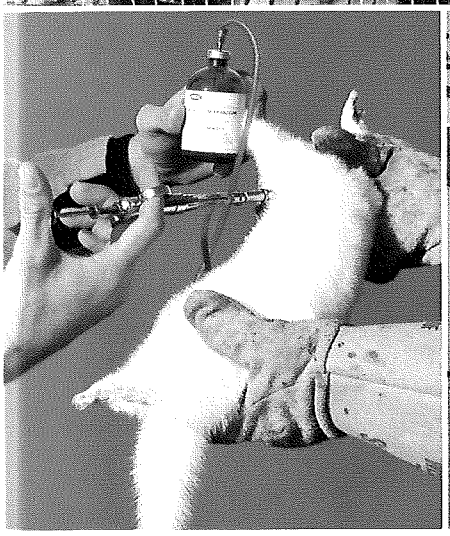

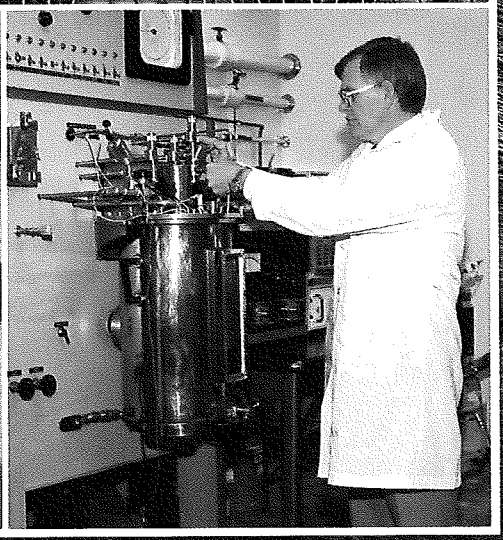

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Plasmacytosis in mink - disease symptoms and precoutions to avoid spreading

Jouni Kangas

Plasmacytosis is a disease which is very common in mink and cause serious ecconomical losses.

The booklet mentiones a lot of experiences regarding plasmacytosis, its nature, its occurence on farms, the symptoms and influence on the production. Further more the booklet describes some practical precoutions to avoid spreading and to erradicate the sickness.

Finlands Pälsdjuruppfödares Förbund, R.F.
ISSN-0358-3759, Nr. 10.
13 tables, 4 fig., 24 pictures, 12 references.
In SWED.

Abstract - Gunnar Jørgensen

Diseases in foxes and raccoon dogs

Jouni Kangas

The booklet describes all known diseases in fox, raccoon dog, and partly mink, caused by infections, parasites, intoxications and different feed deficiencies, as well as prevention and treatment.

Disturbances in digestion and reproduction as well as inherited diseases is described and discussed.

The booklet is rich illustrated, clinical symptoms and possible causes is tabeled.

The only question which came up after reading the booklet was: "Why isn't this available in English"?

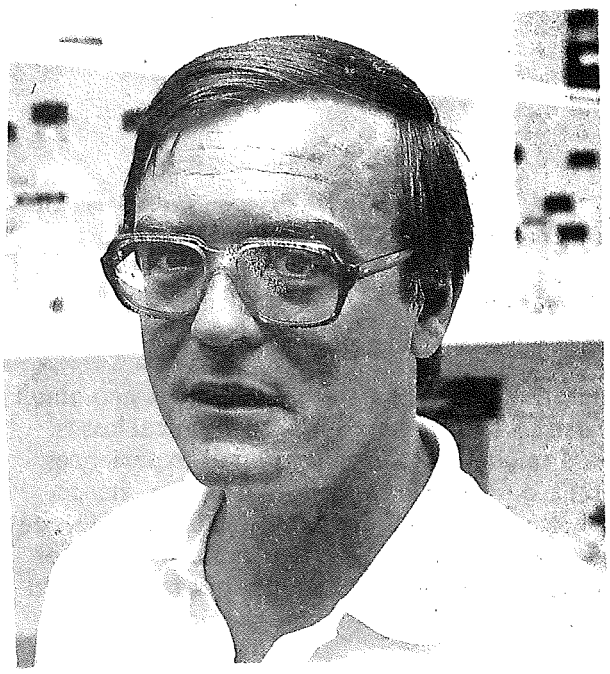
Finlands Pälsdjuruppfödares Förbund R.F.
ISSN-0385-3759, Nr 6, ISBN-951-99391-6-4.
6 tables, 6 fig., 27 pictures, 6 references.
In SWED.

Abstract - Gunnar Jørgensen

"You must realize, Erskine, that preventive medicine does NOT consist of giving patients medication for diseases they don't have."

Aleutian disease of mink (Thesis)

Bent Aasted



Bent Aasted

Aleutian disease (mink plamacytose) is caused by infection with a persistent parvovirus, Aleutian disease virus (ADV). Virus interferes with the immune system with resulting increased gammaglobulin production (hypergammaglobulinemia), which is followed up by immune complex formation and finally often fatal immune complex disease.

The studies have focused on the following aspects of Aleutian disease 1): Purification of virus and physio/chemical - and serological characterization of virus. 2): Introduction of new serological methods for analysis of antiviral antibodies, and finally 3): Analyses of quantity and quality of the antibodies produced during disease.

Ad 1): Virus is found in vivo in the form of immune complexes. For virus purification it is necessary to dissociate the antibodies from virus. This is called "virus activation". A systematic study on virus activation methods concluded, that acid activation was the method of choice. Later in the electrophoresis and hydroxylapatite chromatography. Purified virus showed parvovirus related polypeptides, a finding which supported the classification of ADV as a parvovirus. Virus showed a fast electrophoretic migration in crossed immunoelectrophoresis and in isoelectric focusing the isoelectric point of virus was measured to 4.0 - 4.4. Polypeptides from different ADV isolates were studied by immune blotting and immune precipitation. It was shown that in vivo produced virus expressed intact parvovirus proteins (with molecular weights of 85000, 75000 and 71000). In vivo produced virus almost always showed smaller polypeptides were broken down. This treatment does not change the icosahedral structure of virus, and virus is fully infectious. In the same study structural differences were shown between the polypeptides from in vivo produced and in vitro produced virus, It was shown, that polypeptides from in vivo produced virus are 2000 - 3000 dalton larger than those of in vitro produced ADV.

Virus DNA was isolated and 3 segments representing 80% of the genome was cloned in either bacteriophage M13mp9 or plasmid pUC8 (the cloning was performed by Dr. Mayer and Dr. Bloom, NIH, NIAID, U.S.A.). A recombinant plasmid (called pBM1) introduced expression of virus related polypeptides in E. coli (molecular weights 55000, 34000 and 27000).

Serological analyses with both conventional as well as hybridoma antibodies were done on 4 different virus isolates. Serological differences were found, but it was concluded, that the differences should not be taken as evidence for strain variation, but should be seen in the light of different in vivo proteolytic modulation. In the same study it was shown that in vitro produced virus (ADV-G) had a lower electrophoretic migration rate than several in vivo produced virus isolates.

Ad. 2: Two new methods for measuring antibody against ADV were introduced. One called the indirect counter current electrophoresis was shown to have a sensitivity 32 times higher than the traditional counter current electrophoresis. The other method, a radio immune assay (RIA) was very sensitive and could measure as littele as 5 ng of antibody to virus. This RIA was also used to measure virus antigen with a sensitivity of 3.2 ng. when 4 different diagnostic methods for measuring antibody to ADV were compared, RIA was shown to be approximately 10 times more sensitive than any of the other methods. Antisera from mink with strong hypergammaglobulinemia could be diluted more than 1 million times and still be positive in RIA.

Virus antigen was measured in organ extracts from experimentally infected animals.

Intestine and kidneys were the first two organs to contain virus antigen. This was possible virus antigen taken up from the inoculum. Spleen, liver, lymph nodes, peritoneal exudate- and bone marrow cells (i.e. lymphoid cells and organs) were next to be positive for virus antigen. This antigen was produced in higher amounts and corresponded probably to actively produced virus.

Ad. 3: The humoral immune system in virus infected mink is out of control during infection with ADV, with resulting often extreme production of gammaglobulin. The quantity and quality of produced antibodies to ADV were investigated. It was found that from 4 - 5% of the hypergammaglobulinemia consisted of antibodies to virus depending on which virus strain the mink were infected with (low or high virulent). The quality of the antibodies (binding energy towards viral antigens) were also analysed and found between 2×10^9 - 2×10^{10} 1/mol. These values indicates good binding capacity of the antibodies. During the development of the disease a slight decrease in antibody affinity was observed in standard mink, which was not observed in Aleutian genotype mink. In certain instances restricted heterogeneous antobodies were observed in mink sera.

The summary is based on the following previous publications:

1. Aasted, B.:Purification and characterization of Aleutian disease virus. Acta path. microbiol. scand. Sect. B. 88, 323-328, 1980a. (Scientifur Vol. 4, No. 1).*

2. Aasted, B., and Cohn, A.: Inhibition of precipitation in counter current electrophoresis. A sensitive method for detection of mink antibodies to Aleutian disease virus. Acta path. microbiol. immunol. Scand. Sect. C. 90, 15-19, 1982. (Scientifur Vol. 7, No. 1).*

3. Aasted, B., and Avery, B.: An easy method for comparing antibody affinities to related antigens. Acta path. microbiol. immunol. scand Sect. C. 91, 65-67, 1983. (Scientifur vol. 11, No. 3).*

4. Aasted, B., and Bloom, M.E.: Sensitive radioimmune assay for measuring Aleutian disease virus antigen and antibody. J. Clin. Microbiol. 18, 637-644, 1983. (Scientifur Vol. 8, No. 3).*

5. Aasted, B.; Bloom, M.E.; Cohn, A.; Race, R.E., and Wolfinbarger, J.B.: Preparation and optimization of in vivo produced Aleutian disease virus (ADV) antigen. Scientifur 7, 72-77, 1983.

6. Mayer, L.W.; Aasted, B; Garon, C.F., and Bloom, M.E. Molecular cloning of the Aleutian Disease Virus strains genome: Expression of Aleutian Disease virus antigens by a recombient plasmid. J. Virol. 48, 573-579, 1983.

7. Aasted, B.; Avery, B., and Cohn, A.: Serological analyses of different mink Aleutian disease virus strains. Arch. Virol. 80, 11-22, 1984a. (Scientifur vol. 9, No. 3).*

8. Aasted, B.; Tierney, G.S., and Bloom, M.E.: Analysis of the quantity of antiviral antibodies from mink infected with different Aleutian disease virus strains. Scand. J. Immunol. 19, 395-402, 1984b. (Scientifur vol. 11, No. 3).*

9. Aasted, B.; Race, R.E., and Bloom, M.E.: Aleutian disease virus, a parvovirus, is proteolytically degraded during in vivo infection in mink. J. Virol. 51, 7-13, 1984c. (Scientifur Vol. 9, No. 2).*

10. Aasted, B., and Bloom, M.E.: Mink with Aleutian disease have high-affinity antiviral antibodies. Scand. J. Immunol. 19, 411-418, 1984. (Scientifur Vol. 11, No. 3).*

* Issues of SCIENTIFUR in which abstract of the actual report have been published.

Thesis: The Royal Veterinary- and Agricultural University, Copenhagen.
47 pages, in DANH with English summary + 10 original reports (total 150 pp), 193 references. Reprints can be obtained from the author.

Immunoenzyme-histochemical detection of Aleutian disease virus with monoclonal antibodies and the immunoperoxidase technique (Thesis)

Dirk Dahler

In the work presented here it was attempted to identify and localize the virus of Aleutian disease (ADV) in organs of infected mink using immunoenzymehistochemical methods. The study made use of monoclonal antibodies produced in mice and cultured in cell cultures which were directed against the structural proteins p 75 and p 85 of ADV. The afficacy and specificity of the monoclonal antibodies was tested in extensive experiments with ADV-infected Clone 81 - cell cultures. Immunoenzymehistochemical methods used were the indirect immunoperoxidase technique (IIP) and the peroxidase-anti-peroxidase (RAP)-method, their capacity concerning the immunodiagnosis of AD-virus was also demonstrated in the experiments mentioned above.

Both methods proved suitable for the detection of ADV in cell culture. Similar to the findings of other authors using the immunofluorescence method, viral antigen was localized in the nucleus and at the nuclear membrane, respectively, but also in the cytoplasm of infected cells. In the majority of the 31 ranch mink studied virus was detected in one or more organs (liver, kidney, spleen, gastrointestinal lymph node). The occurrence of positive reactions in the nucleus and nucleus plus cytoplasm was considered as a specific demonstration of viral antigen. The identification of ADV in tissues was rendered difficult by several factors. Among the latter most important were the minute amount of viral antigen in the mink organs, the possible masking of the antigen due to immune complexes and the occurrence of pigments with a color proper similar to the peroxidase reaction product.

The immunohistochemical studies have shown, that monoclonal antibodies are quite useful for immunodiagnostic purposes giving clear results in contrary to conventional polyclonal antibodies.

Inaugural-Disertation, Institut für Pathologie und dem Institut für Virologie. Tierarztliche Hochschule, Hannover.
5 tables, 17 fig., 443 references, 246 pages.

In GERM. Su. ENGL. *Authors summary*

Counter current line absorption immunoelectrophoresis is an alternative diagnostic screening test to counter current immunoelectrophoresis in Aleutian disease (AD) eradication programs

Bent Aasted; Søren Alexandersen; Ander Cohn, and Mogens Hansen

Counter current immunoelectrophoresis (CCIE) is the diagnostic method used in the ongoing Aleutian disease virus eradication program on Danish mink farms. There has been an increasing demand for an alternative diagnostic test especially to evaluate suspected false positive CCIE reactions. We compared test results of a number of negative and positive mink sera in indirect counter current immunoelectrophoresis (ICCIE), counter current line absorption immunoelectrophoresis (CCLAIE) and radio immuno assay (RIA) with test results from counter current immunoelectrophoresis and found that counter current line absorption immunoelectrophoresis is the best alternative diagnostic screening test to counter current immunoelectrophoresis for Aleutian disease eradication programs. Not only proved the CCLAIE test to be useful for evaluation of doubtfully positive CCIE reactions, but it was found to have a higher sensitivety than the CCIE test.

Acta vet. scand. 1986, 27, 410-420.
2 tables, 3 fig., 8 references.
In ENGL. Su. ENGL, DANH.

Authors summary

Apparent lack of neutralizing antibodies in Aleutian disease is due to masking of antigenic sites by phospholipids

Birgit Stolze, and Oskar-Rüger Kaaden

It is genrerally accepted that Aleutian disease virus (ADV) cannot be neutralized by antibodies either *in vivo* or *in vitro*. We found several ways to demonstrate neutralization of ADV by specific antibodies from mink. It was essential to make ADV monodisperse by treatment with sodium lauroyl sarkosyl or -butanol or by filtration through 0.05-mym membranes before neutralization tests. In kinetic experiments, there was a 95% loss of virus infectivity

within the first 5 min of reaction, but a resistant fraction of about 1% remained after 1.5 hr of incubation. Neutralization titers between 1:160 and 1:640 were found in sera from naturally and experimentally infected mink. A positive relation was consistently found between neutralization and ELISA titers. Furthermore, separation of phospholipids from ADV was shown by thin-layer chromatography of butanol-extracted virions. By reconstitution of monodispersed ADV with various lipids, phospholipids were found to interfere with virus neutralization by attachment to the virus surface.

Virology 158, 174-180 (1987)
2 tables, 3 fig., 26 references

Authors abstract

Biological and physical comparison of mink enteritis virus with feline panleukopenia and canine parvovirus

Hitoshi Goto; Atsuyoshi Taneda; Morikazu Shinagawa, and Etsuko Hama

By biological and physical properties, mink enteritis virus (MEV) was compared with feline panleukopenia virus (FPLV) and canine parvovirus (CPV). MEV had about the same properties as FPLV in hemagglutination-inhibition tests, in the propagating ability of the viruses in MDCK cells and in the hemagglutinability, whereas the heat stability at 80^0C, and the restriction enzyme digestion patterns of the viral replicating form DNAs were similar to those of CPV.

Jpn. J. Vet. Sci. 48(5): 1025-1028, 1986
1 table, 1 fig., 2 references.
In ENGL. Su. ENGL, JAPN.

Authors abstract

Sufferings caused by protozoonosis in foxes

Inge Bjerkås

The report summary is based on the following reports:

Bjerkås, I.; Mohn, S.F., and Presthus, J.: Unidentified cyst-forming Sporozoon causing encephalomyelitis and myositis in dogs. Parasitenk. 1984, 70, 271-274.

Bjerkås, I., and Landsverk T.: Identification of Toxoplasma gondii and Encephalitozoon cuniculi by immunoperoxidase techniques and electron microscopy in stored, formalin-fixed, paraffin-embedded tissue. Acta vet. scand. (in press).

Reports in manus

Bjerkås, I., and Nesland, J.: Brain and spinal cord lesions in encephalitozoonosis in blue foxes.

Bjerkås, I.: Brain and spinal cord lesions in encephalitozoonosis in blue foxes. Transmission and scanning electron microscopic studies.

Bjerkås, I., and Presthus, J.: Toxoplasma-like sporozoan parasite associated with encephalomyelitis and myositis in dogs. immunohistochemical and ultrastructural characteristics.

Reports under preparation.

Bjerkås, I.: Brain and spinal lesions in encephalitozoonosis in mink.

Bjerkås, I.: Brain and spinal cord lesions in experimental toxoplasmosis in blue foxes.

Bjerkås, I., and Presthus, J.: Brain and spinal cord lesions in dogs and blue foxes infected with a Toxoplasma-like sporozoon.

Final report No. 613. ISBN 82-7290-387-3, ISSN 0800-9252.
NLVF. Oslo (Norway). 1986. 11 p. 3 references.
In NORG.

Experimental infection of red foxes with pseudorabies virus

Dimitrije Palic

The present study was undertaken to investigate the susceptibility of foxes to Aujeczky's disease (AD) virus, the ways of its introduction into the fox body, clinical picture and outcome of the disease. When AD virus was administered to foxes by various routes, pernasal route proved to be the most effective, when 100% of

test animals were affected after a very short incubation period. The infection was induced by peroral route as well, but 50% of test animals were affected after somewhat longer incubation period. The AD virus could not be transmitted by perucutaneous route of administration.

5. International Conference on wildlife Diseases, Uppsala (Sweden), 18-24 August, 1985.
Only summary recieved

uthors summaryAuthors summary

The epidemiology of sacroptes scabiei in wild red fox (Vulpes vulpes) in Sweden

Set Bornstein

During the last decade (1975-85) Sarcoptes scabiei has infected the red fox population througout Sweden except for the Island of Gotland. The spread southwards from the first affected areas in the north is said to have occurred in 3 wawes, associated with consecutive vole cycles.

The pattern of spread of the disease did not form a straight front-line. Infected areas were found adjacent to uninfected. Isolated cases were seen hundred of kilometers away from the the front of the epidemic areas. The average rate of the spread of the infection slowed down when the disease reached into southern Sweden.

Different rates of infestation and the spread of the disease could be related to different ecological zones, which is said to influenze the dynamics of the red fox populations. It is postulated that there are different limiting/regulating mechanisms between the nothern and southern red fox populations, which implies different behavioural patterns of the individual foxes. This could perhaps explain the different dispersal patterns in the fox populations and thus be of epidemiological significance.

During the current scabies epidemic other wild and domestic animals were found to be infested with Sarcoptes scabiei.

Alltogether 6 lynx (lynx lynx)have been found with heavy lesions of scabies. Two martens (Marten marten), one mountain hare (Lepus temedus) one polar fox (Alopex lagopus), one domestic cat and one horse were found with extensive scabies lesions.

Soon after the start of the scabies epidemic domestic dogs were found to be frequently infected.

Experimentally. Sacroptes scabiei, derived from scabies diseased Swedish red fox, have only given transient selflimiting infestations with typical skin lesions in dogs (beagles). Sacoptes scabiei from a marten heavy infected with Sacoptes scabiei could not infect dogs (beagles).

5. International Conference on Wildlife Diseases. Uppsala (Sweden), 18-24 August, 1985
Only summary recieved.

Authors summary

Campylobacter-like organisms isolated from gastric mucosa of ferrets

J.G. Fox; B.M. Edrise; E.B. Cabot; C. Beaucage; J.C. Murphy, and K.S. Prostak

Campylobacter-like organisms (CLO) were isolated from gastric lesions in 1 ferret and gastric mucosa of 2 healthy ferrets. The organism was not isolated from biopsies of gastric mucosa of 14 other healthy ferrets, 1 of which had a small gastric lesions located at the pylorus. Lesions from which CLO were isolated were located in the antrum of 1 ferret and were classified as inflammation with repair. Affected gastric tissue was highly vascularized with fibrous connective tissue surrounding irregularly shaped glands. Necrosis and ulceration of adjacent mucosa also were observed. Using Warthin-Starry stain, Campylobacter-like organisms were seen on and in the glandular epithelium of the ferret with gastric lesions from which CLO were isolated.

Am J Vet Res, Vol 47, No. 2, February 1986, 236-239.
1 table, 2 fig., 26 references.

Authors summary

Eurytrema procyonis in a New York fox

G.L. Foleby; W.I. Anderson, and M.E. Georgi

A fox infected with canine distemper virus had multiple *Eurytrema procyonis* trematodes within the major pancreatic duct. The ductal epithelium was slightly hyperplastic and there was mild periductal fibrosis present. There was dilatation of the pancreatic duct containing the parasites. Numerous eosinophilic intracytoplasmic inclusions were present in the epithelium of multiple organs, including the pancreatic ducts.

Cornwell veterinarian. Ithaca, N.Y. Cornell Veterinarian, Inc April 1987 v. 77 (2): p. 168-171.
1 fig., 10 references.

Authors abstract

4TH INTERNATIONAL SCIENTIFIC CONGRESS IN FUR ANIMAL PRODUCTION
AUGUST 21 - 28, 1988

INFORMATION FOR THOSE SUBMITTING TITLES

Please Note: Abstract forms will be mailed separately.

The form indicating your intention to participate in the 4th International Scientific Congress in Fur Animal Production has been received. The response was much greater than we had anticipated in that more than 120 title submissions were received. Therefore, concurrent sessions will be necessary.

Oral presentations will be allotted ten minutes with a further five minutes reserved for discussion. These time limits will be strictly enforced. The audio-visual equipment available will consist of a projector for 35 mm slides and an overhead projector for transparencies. The meeting rooms to be used are large, so please ensure that your slides are prepared so that they will be easily readable on the screen. Avoid complicated tables containing several lines of data.

Posters will be displayed throughout the meeting and there will be specific times during which the posters will be manned to facilitate communication. A space of approximately 1.2 x 2.5 meters will be available for the presentation of each poster.

Two copies of manuscripts for both oral and poster presentations are due on APRIL 1, 1988 and should be prepared according to the instructions previously circulated. Authors are encouraged to submit the manuscripts on computer disk in any well-known word processing format. Manuscripts will be sent to reviewers and edited for inclusion in the proceedings.

On behalf of the members of the organizing committee, thank you for your interest in the Congress. We look forward to an exciting and productive interchange of information.

Bruce D. Murphy
Scientific Chairman

POLSKIE TOWARZYSTWO ZOOTECHNICZNE
Polish Society of Animal Production
Польское Зоотехническое Общество
02-316 Warszawa, ul. Kaliska 9
tel. 22-17-23

Warsaw, 27th April 1988

Dr Gunnar Jørgensen
Scandinavian Association of
Agriculture Scientist
Hilleroed

Dear Dr Jørgensen,

As it is impossible for me to take part in the fourth Congress of Furbreeders in Canada this year, I would like to ask you, as one of the organizers of those congresses, to introduce to its participants the proposal of our Society that the next congress should take place in Poland.

Our country produces a considerable amount of furs, and consequently, there is a great number of specialists who are interested in the progress made in furbreeding. Moreover the organization of the fifth Congress in Poland would also enable furbreeders from other East European countries to participate.

On the other hand, getting acquainted with our country and furbreeding could prove to be interesting, I hope, for the specialists from Western Europe, America and other parts of the world.

I would like to express my hope that our proposal will be acceded to by the participants of the fourth Congress, and I wish them, on behalf of our Society, a profitable debate.

Faithfully yours

Prof. Janusz Maciejowski
President of Polish Society of Animal Production

W.S.R-P. Siedlce, zam. 9/86 - 1000

Akademia Rolnicza im. Hugona Kołłątaja
w Krakowie
Zakład Hodowli Zwierząt Futerkowych
30-059 Kraków, Al. Mickiewicza 24/28
Tel. 33-23-55 wew. 279.

Kraków, 1988-03-22.

Dr Gunnar Jørgensen
National Institute of Animal Science
Research in Fur Animals
Roskildevej 48 II
3400 Hillerød, Denmark

Dear Dr Jørgensen,

For a long time I have not heard from you. I wonder how things are going with you and also with the English edition of our book.

As I mentioned you before we are going to organize Scientific Conference of Polish Zootechnical Society on September 13 to 16,1988 in Olsztyn. In the frame of this Conference the papers on fur animal production will be presented. It would be enjoyable for us if you take part in that Conference and I would like to send you an invitation to participate in it. I would appreciate your decision and a written statement as soon as possible.

At the of 1987 and second time on February 26 to 28, 1988 I participated at the International Conference on Fur Animal Production in Kosice, Czechoslovakia. Thes? Conferences were organized by Dr Jan Buleca at Veterinary College in Kosice. Dr Jan Buleca /head of Committee/is going to organize the International Congress on Fur Animal Production in the next year /April 1989/. This Congress will take place in a beautiful area - Tatra Mountains. Dr J. Buleca asked me to inform you about this Congress and he would be very happy to be in contact with you and invite you to it.
Dr Buleca, also is interested in the cooperation with Scientifur. I think he would be happy if you send him some information about your Department activities, establishing in this way scientific cooperation, /Dr Buleca is an excellent man/. The address of Dr Jan Buleca is: Vysoka Skola Veterinarska, Kosice, Komenskeho 73, Czechoslovakia.

As concerns the International Congress on Fur Animal Production to be held in Toronto I am going to be there. Two months ago I received an invitation from Prof. Rene Belzile, Laval University in Quebec to visit him and then to participate in the Congress. So I hope we will meet during the Congress in Toronto.

Best regards to you and your Wife.

Stanisław Charoś

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INTERNATIONAL FUR ANIMAL SCIENTIFIC ASSOCIATION

(IFASA)

SCIENTIFUR is established in 1976 by The Fur Animal Division of The Scandinavian Association of Agricultural Scientists.

SCIENTIFUR is an international organization for information- and communication within the fur animal production.

SCIENTIFUR publishes quarterly the scientific journal SCIENTIFUR as well as books etc.